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Original Contribution

Childhood and Early Adult Predictors of Risk of Incident Back Pain: Ontario Child Health Study 2001 Follow-up

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Musculoskeletal disorders of the back and spine are a leading cause of disability in working-age populations. There is limited information on the potential consequences of childhood socioeconomic and health status on the risk of incident back pain in early adulthood. The authors describe factors associated with having had a first episode of back pain during the past year in the Ontario Child Health Study, a prospective cohort study of children who were aged 4–16 years at the time of enrollment in 1983 and were resurveyed in 2001. Respondents reporting a first episode of back pain ($n = 143$) were compared with respondents who had never experienced back pain ($n = 896$). The annual incidence of a first episode of back pain in this sample of young adults was 74.7/1,000. Following adjustment for age, sex, childhood conditions, childhood health status, and measures of early adult health, behavior, socioeconomic status, and work environment, the risk of incident back pain was associated with both low (odds ratio (OR) = 1.86, 95% confidence interval (CI): 1.14, 3.03) and moderate/high (OR = 1.85, 95% CI: 1.07, 3.02) levels of psychological distress, current heavy smoking (OR = 1.85, 95% CI: 1.10, 3.10), lower levels of parental education in childhood (OR = 1.72, 95% CI: 1.06, 2.80), and emotional or behavioral disorders in childhood (OR = 1.87, 95% CI: 1.02, 3.41). The associations of low childhood socioeconomic status and childhood emotional and behavioral disorders with risk of incident back pain in early adulthood are important findings with implications for better understanding the etiology of soft-tissue disorders.

back pain; cohort studies; occupations; prospective studies; smoking; social class; stress, psychological

Abbreviations: CI, confidence interval; NCDS, National Child Development Study; OCHS, Ontario Child Health Study; OR, odds ratio.

Musculoskeletal disorders are the leading cause of disability in developed countries, with disorders of the back and spine representing the dominant class of morbidity (1). Back pain is generally understood to have a multifactoral etiology, with established risk factors in a spectrum of domains, including the physical and psychosocial demands of work and the behavioral, psychological, and physical characteristics of the individual (2–11).

Few studies have examined childhood risk factors for low back pain (12–14). In a novel study, Power et al. (12)

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described the contribution of early life factors to the prospective risk of low back pain in early adulthood. This study of a subsample of more than 5,000 United Kingdom young adults who were participants in the National Child Development Study (NCDS), a longitudinal study of a cohort enrolled at birth, did not find evidence that early childhood or youth characteristics, such as parental socioeconomic status, body mass index, or poorer emotional functioning, presented important risks for back pain in early adulthood. The study did report significant associations between the early initiation of smoking and psychological distress (at age 23) and the risk of incident back pain at age 33.

The Ontario Child Health Study (OCHS) provides an important opportunity to replicate the observations obtained from the NCDS. Like the NCDS, the OCHS has data on measures of parental socioeconomic status, emotional and behavioral function, and physical health in childhood, as well as social and economic characteristics and measures of health and function obtained in early adulthood.

MATERIALS AND METHODS

Study population and study design

The OCHS is a prospective cohort study of a representative sample of 3,294 children who were aged 4–16 years at the time of enrollment in 1983 and resident in the Canadian province of Ontario. The primary objective of the original cross-sectional survey was to estimate the prevalence of emotional and behavioral disorders among Ontario children (15–21). In 1987, a follow-up study of the original sample was conducted to assess outcomes for selected disorders, to identify factors which predicted the persistence of disorder, and to identify factors associated with the risk of incident disorder in the follow-up period. In 2001, the original OCHS children, now aged 21–34 years, were traced and resurveyed with the objective of evaluating the impact of childhood experiences on early adult health and functioning. A total of 2,867 of the original OCHS respondents were successfully traced, and 1,928 consented and fully participated in the young adult follow-up survey (22).

In this report, we identify the factors associated with a first episode of back pain in the past year, comparing respondents reporting a first episode of back pain ($n = 143$) with respondents who had never experienced back pain ($n = 896$). A total of 875 respondents from the 2001 survey wave reported an episode of back pain prior to the most recent 12-month recall period and were excluded from these analyses, as were the 14 respondents who did not complete the back pain module.

First episode of back pain

The dependent variable in this analysis was incident back pain with a first episode occurring in the year preceding the 2001 survey. Reproducibility of low back pain status in surveys is high when the low back pain has occurred in the 12 months before the respondent is surveyed (23). Respondents were asked the following four questions on back pain in the 2001 survey, replicating the questionnaire items used in the NCDS (12):

1. Have you ever had back pain which lasted for more than 1 day? Do not count the kind of pain you can get with the flu or with menstrual periods or pregnancy.
2. How old were you when you first had back pain lasting more than 1 day?
3. Have you ever had back pain lasting for more than 1 day at any time in the past 12 months?
4. Did this episode of back pain cause you to cut down on your normal daily activities at home, at a job, or in school for a period of 7 days or longer?

Independent variables

Explanatory variables were drawn from the young adult survey wave in 2001 and from the childhood period represented by the 1983 and 1987 survey waves, similar to the study by Power et al. (12).

Physical and psychosocial work exposures (2001 wave)

Respondents who reported having worked less than 10 hours per week on average during the past year were defined as not in the labor force (16.1 percent of the sample; see table 1) and were not administered the scales pertaining to work-related physical and psychosocial exposures.

Physical job demands. The Borg scale was used in the OCHS to create a metric of the perceived level of physical exertion required in one's job (24). Respondents were asked to rate the physical demands of their jobs from 0 (very, very light) to 14 (very, very demanding). Responses to the Borg scale question were used to classify respondents into two groups: those with the least or less physically demanding occupations and those with more physically demanding occupations. The prevalences of exposure to lower and higher levels of physical exertion at work are reported in table 1.

Job strain. A measure of job strain was derived from the Job Demand-Control Model (25, 26). The job strain hypothesis states that adverse reactions to psychosocial job characteristics are expected in work environments with high job strain–high demands and low job control. Using questions from the Job Content Questionnaire (25), respondents scoring in the bottom half of decision latitude (11 items) at work were designated as having low job control. Similarly, respondents in the top half of job demands (five items) were designated as having high job demands. Respondents with low job control and high job demands were considered to be in high-strain work environments. The other three quadrants—high job control and high job demands, low job control and low job demands, and high job control and low job demands—were defined as the reference category, in combination with respondents who were not in the labor force at the time of the 2001 survey.

Job satisfaction. A measure of job dissatisfaction was created from three items in the Job Content Questionnaire

(25). Respondents with job satisfaction scores in the bottom quartile were designated as dissatisfied with their jobs.

Social support at work. A scale was created from eight questions pertaining to social support received from coworkers and supervisors. Respondents in the bottom quartile were designated as having low social support at work (25).

Psychological, behavioral, and physical characteristics (2001 wave)

Personal social support. Personal social support was represented by two ordinal variables: ''infrequency of contact'' and ''problematic relationships with family and friends.'' ''Infrequent contact'' was defined as being in the quartile with the least frequent contact for mothers, fathers, close relatives, and friends. These four measures were then summed to create an ordinal variable with scores ranging from 0 to 4; 0 indicated frequent contact with mothers, fathers, close relatives, and friends, while 4 represented infrequent contact with each of those same persons. ''Problematic relationships'' was also an ordinal variable derived in the same manner, with scores ranging from 0 to 4, 4 representing problematic relationships with mothers, fathers, close relatives, and friends. If respondents had a valid reason for skipping the contact and problem questions because they did not have a parent, close relative, or friend, they received the highest score for infrequent contact and the lowest score for problematic relationships.

Psychological status. A mental health measure was derived from five items in the SF-36 health questionnaire (27), which were summed to create the mental health component. The mental health component included at least one item from each of the four major mental health dimensions: anxiety, depression, behavioral/emotional control, and psychological well-being (27). Mental health component scores were classified into three groups: Respondents with the lowest 25 percent of mental health scores were defined as having moderate/high psychological distress; persons with scores between the 25th and 50th percentiles were defined as having low distress; and persons with the remaining 50 percent of scores were defined as having no distress.

Physical characteristics. Body mass index (calculated as weight in kilograms divided by height in meters squared) was used as an indicator of physical health in young adults. Body mass index was derived with both sexes pooled together from the 2001 survey. Participants were classified into three body mass index groups: $<$70th, 70–85th, and $>$85th percentiles.

Smoking status. Information on respondents' smoking history and current smoking status was obtained from questionnaire items administered in the 2001 survey. Heavy smoking was defined as smoking 10 or more cigarettes daily. Light smoking included respondents who smoked 1–9 cigarettes daily, and occasional smoking included respondents who smoked less frequently than daily.

Socioeconomic status. Socioeconomic status in young adulthood was measured using a range of constructs, including occupation, income, and attained education (28, 29). In this analysis, we tested for an association between respondent education and the risk of incident back pain, comparing respondents with a college or university degree to respondents with lower levels of educational attainment.

Early life factors (1983 and 1987 waves)

Socioeconomic status. Socioeconomic status in childhood was measured using information on parental educational attainment. Where both parents had valid measures of education, the higher educational level was used to classify household socioeconomic status in childhood.

Emotional and behavioral disorders. The childhood and adolescent mental health disorders measured in the OCHS include hyperactivity, conduct disorder, and emotional disorder. The reliability and validity of these measures has been previously reported (16). In the 1983 survey, parents and teachers provided information on the emotional and behavioral status of children aged 4–11 years; parents and youth respondents provided information for children aged 12–16 years. In this analysis, respondents with prevalent hyperactivity, conduct disorder, or emotional disorder at either the 1983 or the 1987 survey wave were defined as having had an emotional or behavioral disorder in childhood.

Physical health. Of the measures of physical health assessed in the 1983 survey, data on functional limitations and the presence of chronic medical conditions are included in this analysis. ''Functional limitations'' defined a child who had one or more limitations in activities of daily living for more than 6 months but excluded those who were limited in the kind or amount of school work performed because of physical, emotional, or learning problems. The prevalence of chronic conditions was based on the ascertainment of illnesses or conditions lasting 6 months or longer. (See the footnotes to table 1 for definitions of functional limitations and chronic conditions.)

Sample attrition

Sample losses in longitudinal research weaken the precision of statistical estimates and may lead to systematic bias if sample losses are not random. Evaluation of sample loss in this cohort identified a number of child and family variables measured in 1983 as being associated with nonresponse in 2001 (22). We conducted analyses to identify an optimal set of baseline variables predicting nonresponse and used this information to adjust sampling weights (30). We investigated the impact of these adjusted sampling weights by comparing completely unweighted and weighted estimates of effect in statistical models of the relation between six child and family influences assessed in 1983 and three developmental endpoints measured in 2001. For the majority of associations examined, differences between weighted and unweighted estimates were minimal (22). We conducted additional analyses comparing the prevalences of developmental outcomes among OCHS respondents (weighted) and age-matched peers who were born in Canada, resident in Ontario, and participating in a national population study in 2000. These comparisons identified no important differences in the health and functional status of the two samples (22).

TABLE 1. Prevalence of possible risk factors for low back pain in early adulthood and childhood and unadjusted and adjusted odds ratios for incident back pain, Ontario Child Health Study, 1983–2001

	Risk factor prevalence (%)		Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio				
	Pain-free ($n = 896$)	Incident pain ($n = 143$)			Model 1*	Model 2†	Model 3‡	Full model	95% confidence interval
Demographic factors									
Sex									
Male	46.5	44.9	1.00						
Female	53.5	55.1	1.07	0.75, 1.52	1.09	1.07	1.27	1.19	0.77, 1.83
Age (years)									
21–25	30.1	35.3	1.00						
26–35	69.9	64.7	0.79	0.54, 1.15	0.8	0.85	0.68	0.69	0.44, 1.06
Early adult factors (2000)									
Physical job demands									
Not working full-time	16.3	15.6	1.16	0.69, 1.94	1.30			1.00	0.53, 1.88
Least/less demanding	56.1	46.4	1.00						
More/most demanding	27.6	38.0	1.66	1.12, 2.46	1.63			1.53	0.97, 2.43
Psychosocial work conditions									
Not high strain/not working	85.5	81.9	1.00						
High strain	14.5	18.1	1.30	0.82, 2.08	1.05			0.83	0.46, 1.51
Work social support									
High support/not working	81.0	75.6	1.00						
Low work support	19.0	24.4	1.37	0.90, 2.10	1.23			1.13	0.67, 1.93
Job satisfaction									
Satisfied or not working	84.4	77.7	1.00						
Dissatisfied (bottom quartile)	15.6	22.3	1.55	1.00, 2.42	1.36			1.11	0.63, 1.94
Mental health									
No distress	46.5	30.3	1.00						
Low distress	31.1	38.2	1.88	1.22, 2.89		1.87		1.86	1.14, 3.03
Moderate/high distress	22.4	31.5	2.15	1.36, 3.38		1.94		1.85	1.07, 3.20
Smoking status									
Nonsmoker	72.4	56.4	1.00						
Current light smoker (1–9 cigarettes/day)	13.9	19.8	1.83	1.14, 2.94		1.60		1.63	0.92, 2.91
Current heavy smoker (≥10 cigarettes/day)	13.7	23.8	2.23	1.43, 3.49		1.91		1.85	1.10, 3.10
Education									
University degree	32.6	21.2	1.00						
No university degree	67.4	78.8	1.80	1.17, 2.76		1.50		1.08	0.65, 1.80

Table continues

Test-retest reliability

In the course of administration of the 2001 survey wave, a 2-week test-retest reliability study was conducted in a group of 64 respondents. Results obtained from the test-retest study of the back pain items in the OCHS were similar to results found in other studies (23, 31). The kappa value for the reliability of recalling any prior episode of back pain was 0.78; the kappa value for back pain in the past year was 0.86; and the kappa value for back pain in the past year without a prior occurrence was 1.00.

Analysis plan

Table 1 shows risk factor exposure prevalences and unadjusted and adjusted odds ratios comparing respondents

TABLE 1. Continued

	Risk factor prevalence (%)		Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio				
	Pain-free ($n = 896$)	Incident pain ($n = 143$)			Model 1*	Model 2†	Model 3‡	Full model	95% confidence interval
Early life factors (1983/1987)									
Parental education									
University/college	36.0	21.9	1.00						
High school or less	64.0	78.1	2.01	1.31, 3.07			1.93	1.72	1.06, 2.80
Emotional/behavioral disorder§									
Absent	91.3	82.2	1.00						
Present	8.7	17.8	2.28	1.39, 3.75			2.15	1.87	1.02, 3.41
Functional limitations¶									
Absent	95.1	97.3	1.00						
Present	4.9	2.7	0.54	0.18, 1.62			0.47	0.39	0.12, 1.30
Chronic medical conditions#									
Absent	84.3	86.0	1.00						
Present	15.7	14.0	0.87	0.52, 1.46			0.99	1.01	0.56, 1.82
Other factors (2000)									
Personal social support									
Infrequent contact**			1.11	0.92, 1.34				1.04	0.84, 1.30
Problematic relationships††			1.06	0.91, 1.23				1.00	0.83, 1.20
No. of children									
0–2	95.1	93.4	1.00						
≥3	4.9	6.6	1.38	0.66, 2.87				1.81	0.79, 4.13
Physical factors (2000)									
Body mass index‡‡‡ in 2000									
<70th percentile	73.0	71.9	1.00						
70–85th percentile	15.0	5.4	0.39	0.17, 0.80				0.45	0.20, 0.99
>85th percentile	12.0	22.7	1.74	1.22, 3.03				1.61	0.94, 2.76

* Model 1: adjustment for work exposure in young adulthood.

† Model 2: adjustment for smoking status, psychological distress, and socioeconomic status in young adulthood.

‡ Model 3: adjustment for early childhood exposures.

§ Respondents with prevalent hyperactivity, conduct disorder, or emotional disorder at either the 1983 or the 1987 survey wave.

¶ "Functional limitations" include problems using transportation such as a car or bus; needing help or supervision in getting around the neighborhood; inability to walk; trouble bending, lifting, or stooping; trouble walking several blocks or climbing stairs; limitation in the performance, kind, or amount of vigorous activity; needing help with eating, dressing, bathing, or using the toilet; limitation in the kind or amount of ordinary play or activity engaged in with other children; or being out of school by the choice of the parent or child or for health reasons.

"Chronic conditions" include asthma; heart problems; epilepsy or convulsions without fever; kidney disease; arthritis or rheumatism; cerebral palsy; diabetes; cancer; spina bifida; muscular dystrophy or another muscle disease; cystic fibrosis; missing fingers, hands, arms, toes, feet, or legs; deformity of the feet, legs, fingers, arms, or back; club foot or cleft palate; paralysis or weakness; blindness or chronic sight problems; deafness or chronic hearing problems; muteness or chronic speech problems; chronic pain or discomfort; or any other medical problem or condition.

** "Infrequent social contact" was modeled as a five-level ordinal variable with scores ranging from 0 to 4 (0 (most frequent contact): 43.6%; 1: 33.2%; 2: 16.0%; 3: 6.2%; 4 (least frequent): 1.1%).

†† "Problematic relationships with friends and family" was modeled as a five-level ordinal variable with scores ranging from 0 to 4 (0 (least problematic): 46.2%; 1: 24.3%; 2: 16.9%; 3: 9.2%; 4 (most problematic): 3.3%).

‡‡‡ Weight (kg)/height $(m)^2$.

with a first episode of back pain in the past year with respondents who had never experienced back pain. All analyses were weighted to account for sample attrition over the 13-year follow-up period (22). All univariate and multivariate analyses were performed using logistic regression and were initially conducted separately by gender. The magnitude and direction of back pain risks were similar in both sexes; therefore, the data were combined in the reported

results. In the multivariate analyses, initial models estimated effects adjusted for age and sex and three separate groups of variables: Model 1 estimated the effects of work exposures in young adulthood; model 2 estimated the effects of smoking status, psychological distress, and socioeconomic status in young adulthood; and model 3 estimated the effects of early childhood measures. The full model incorporated all measures from childhood and young adulthood.

Multicollinearity was tested in each multivariate model by first producing a correlation matrix and then examining the tolerance and variance inflation of the independent variables in a linear regression (32).

RESULTS

The OCHS had 1,928 respondents in the 2001 wave. Of the 1,914 respondents who completed the back pain module, 896 had never experienced any low back pain, 343 had had back pain episodes during the recall period but not in the past year, and 675 had experienced back pain in the past year. Of these 675 prevalent cases, the 143 respondents who had had their first episode in the past year were defined as incident cases. The lifetime prevalence of back pain was 532/1,000, the 1-year point prevalence was 352/1,000, and the annual incidence of a first episode of back pain in this sample of young adults was 74.7/1,000.

In univariate analysis, the risk of incident back pain was associated with the following measures for which data had been obtained in the 2001 follow-up survey: a physically demanding job (odds ratio (OR) = 1.66, 95 percent confidence interval (CI): 1.12, 2.46), a low level of job satisfaction (OR = 1.55, 95 percent CI: 1.00, 2.42), both low (OR = 1.88, 95 percent CI: 1.22, 2.89) and moderate/high (OR = 2.15, 95 percent CI: 1.36, 3.38) levels of psychological distress, current light (OR = 1.83, 95 percent CI: 1.14, 2.94) and heavy (OR = 2.23, 95 percent CI: 1.43, 3.49) smoking, a lower level of education (OR = 1.80, 95 percent CI: 1.17, 2.76), and a body mass index above the 85th percentile (OR = 1.74, 95 percent CI: 1.22, 3.03). Neither age nor sex predicted the risk of incident back pain. Of the measures for which data had been obtained during childhood, significant risks were found in univariate analyses for lower levels of parental education (OR = 2.01, 95 percent CI: 1.31, 3.07) and emotional or behavioral disorders in childhood (OR = 2.28, 95 percent CI: 1.39, 3.75). Functional limitations in childhood and chronic medical conditions in childhood were not associated with the risk of incident back pain in the early adult period.

In the analytic model simultaneously adjusting for age, sex, childhood conditions, childhood health status, and measures of early adult health, behavior, socioeconomic status, and work environment, the following factors continued to predict the risk of incident back pain: both low (OR = 1.86, 95 percent CI: 1.14, 3.03) and moderate/high (OR = 1.85, 95 percent CI: 1.07, 3.02) levels of psychological distress, current heavy smoking (OR = 1.85, 95 percent CI: 1.10, 3.10), lower levels of parental education in childhood (OR = 1.72, 95 percent CI: 1.06, 2.80), and emotional or behavioral disorders in childhood (OR = 1.87, 95 percent CI: 1.02, 3.41).

Analyses restricted to the most severe cases of back pain (pain lasting 7 days or longer; $n = 51$) did not alter the findings reported here.

DISCUSSION

In this prospective cohort study of a representative sample of young adults aged 21–34 years, the annual incidence of a first episode of back pain was 74.7/1,000. This estimate is lower than typical findings in population studies of the incidence of low back pain; cumulative incidence estimates for annual episodes of back pain have been found to lie in the range of 181/1,000 to 360/1,000 (33). These latter estimates, however, represent the composite estimate of the incidence of a first episode and the incidence of recurrent episodes. The estimated annual incidence of a first episode of back pain in the NCDS, which is comparable in design to this study, was 109/1,000.

There has been relatively little research on the role of childhood experiences and exposures in the risk of back pain in young adulthood. In this study, we intentionally replicated the design of the NCDS, which found that risk of incident back pain at age 33 years was elevated among respondents with prevalent psychological distress at age 23 years and among persistent moderate or heavy smokers. Significant risk associations for social class in childhood and young adulthood, childhood emotional status, body mass index, and job satisfaction found in univariate analysis in the NCDS were not replicated in multivariate analysis.

In this analysis of the OCHS sample, we found the risk of incident pain in young adults to be elevated among respondents with prevalent psychological distress and among persistent moderate or heavy smokers. In addition, however, the risk of incident pain in the OCHS sample was predicted by lower levels of parental education in childhood and emotional or behavioral disorders in childhood. In this sample, the proportion of back pain incidence attributable to these two childhood exposures, after adjustment for exposures in early adulthood, was substantial: 32.3 percent in the case of lower levels of parental education and 7.9 percent in the case of childhood emotional or behavioral disorders. Clearly, there are complex causal pathways linking childhood environment and behavioral status to early adult health status (34). Whether the effects of parental education and childhood behavioral disorder represent latent effects of childhood experiences or indicate that childhood conditions shape pathways that partially determine exposures in early adulthood cannot be fully resolved in a single prospective study.

In a finding replicating the results of the NCDS, potential risk factors associated with physical and psychosocial working conditions did not predict risk of incident back pain following adjustment for other exposures incurred in the childhood and early adult periods. Unlike the NCDS, which imputed measures of physical job demands from information on occupation that was provided by respondents, physical job demands were measured directly by respondent self-report in the OCHS. The association between the highest level of physical job demands and the risk of incident back

pain in the OCHS sample approached statistical significance (OR = 1.53, 95 percent CI: 0.97, 2.43).

It is unclear whether the relation between smoking and back pain onset is causal (35, 36). Recent reviews have concluded that the epidemiologic evidence is inconclusive regarding an etiologic role for smoking in the incidence of back pain, citing in particular the relative absence of long-term follow-up studies. Of relevance to the finding of a positive association between smoking history and the incidence of a first episode of back pain in the OCHS sample, three of the four studies with youth and young adult samples (two cross-sectional studies and two longitudinal cohort studies) in the Leboeuf-Yde review (36) did find significant risks. Potential mechanisms which might underlie a causal role for smoking in the risk of back pain include effects on the cardiovascular system, mechanical effects arising from coughing, and nicotine effects on receptors in the neuromuscular system (12, 35). Smoking is also an indicator of psychological distress and other social traits associated with low socioeconomic status, which may indicate a risk of confounding by psychosocial factors. In the OCHS sample, the risk of back pain onset associated with smoking persisted after adjustment for extensive contemporary and childhood control variables. More research is required to better understand the relation between back pain onset and smoking.

Psychological distress was an important risk factor for incident back pain in both the NCDS and the OCHS. It is important to note that while the NCDS measured psychological distress 10 years prior to the survey wave that measured incident back pain, the OCHS measured distress concurrent with back pain. Power et al. (12) noted that age 23 and age 33 NCDS malaise scores exhibit a high degree of stability, suggesting that this characteristic may be an enduring trait of a person. In contrast to the NCDS, which found that poor childhood and adolescent emotional status predicted early adulthood lower back pain in univariate analysis but not in multivariate analysis, in the OCHS sample having a mental health disorder in childhood predicted early adult back pain onset in both univariate and multivariate analyses.

As was found in the NCDS cohort, the unadjusted risk of incident back pain associated with lower socioeconomic status in early adulthood in the OCHS was eliminated following adjustment for other factors in the early adult and childhood periods (unadjusted odds ratio = 1.80, 95 percent confidence interval 1.17, 2.76; model 2 adjusted odds ratio = 1.50 (not significant)). This outcome can be interpreted as demonstrating the role of socioeconomic status in determining the distribution of proximal physical and psychosocial risk factors, such as psychological distress, smoking, and physically demanding occupations, that are most directly causal in the etiology of soft-tissue disorders. It is also noteworthy that the estimated effect of early adult socioeconomic status was further reduced following adjustment for early childhood socioeconomic status (full model adjusted odds ratio = 1.08 (not significant)), indicating strong pathway effects during the early life course.

The findings of this study should be interpreted in light of the study's exclusion criteria. In estimating childhood and early adult risk factors for a first incident episode of back pain, we excluded from the analysis sample those respondents with one or more self-reported back pain episodes that occurred prior to the recall year. Respondents with earlier-onset back pain or respondents with a history of recurrent episodes of back pain may well have a distinct and different risk factor profile than we have reported.

In conclusion, this study replicated findings from the NCDS that contemporaneous psychological distress and smoking are risk factors for the onset of back pain (12). In addition, the OCHS indicates that the early-life factors of parental education and the presence of a childhood mental health disorder are associated with increased risk of back pain onset. The persistence of lower socioeconomic status in childhood and childhood emotional and behavioral disorders as risk factors for incident back pain in early adulthood is an important finding, with implications for better understanding the etiology of soft-tissue disorders and for appreciating the potential of childhood interventions to reduce the preventable burden of adult morbidity and disability.

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