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Commentary: Difficulties in disentangling causes of social class inequities in musculoskeletal health

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Life course epidemiology was suggested as a framework for describing and understanding associations between risk factors identified at different life stages and markers of ill health.[1] While social scientists have used and promoted this approach for many years, it was adopted by epidemiologists only recently.[1,2] In this issue, Khatun *et al*.[3] report one of the remarkably scarce longitudinal studies that use such a life course approach to disentangle causes of social class inequities in musculoskeletal health. In a prospective population-based cohort study, they explored the contribution of factors identified between adolescence and early adulthood to social class inequities in musculoskeletal disorders at age 30.

The baseline examination was conducted in 1981, with 1083 pupils aged 16 yr completing a comprehensive self-administered questionnaire. Three additional rounds of data collection were performed using the same type of questionnaire at ages 18, 21, and 30 yr, with an extraordinarily high response rate of 96% throughout the 14 yr of follow-up. Khatun *et al*. found an unadjusted odds ratio of approximately 2.0 for self-reported musculoskeletal disorders in blue-collar vs white-collar workers.

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To determine the contribution of a battery of factors identified at different life stages to social class differences at age 30, Khatun *et al*. applied a previously described approach[4] and conducted a series of logistic regression analyses. They compared the unadjusted odds ratio for self-reported musculoskeletal disorders in blue-collar vs white-collar workers with the odds ratios resulting from stepwise adjustment for these factors in multivariable analyses. Factors that were adjusted for ranged from socioeconomic characteristics of parents and study subjects, to lifestyle and health-related behaviours such as smoking and physical activity, work-related psychosocial characteristics including job demand and job control, and biomechanical factors such as BMI and heavy physical working conditions. The odds ratio was reduced to about 1.2 when all factors where included in the logistic regression model in the order of their ascertainment during life course. The most pronounced impact was the adjustment for heavy physical workload at age 30.

This study is elegant in the prospective nature of the data and in the superbly high response rate achieved over 14 yr. However, the ascertainment and definition of the measure of musculoskeletal health deserves cautious interpretation. Unlike other chronic conditions such as cancer, diabetes, or hypertension, musculoskeletal disorders are notoriously difficult to assess and classify. In a population-based survey, Eachus *et al*. validated a self-reported questionnaire that included questions on general health by comparing self-reported information with the morbidity status ascertained from general-practitioner-held computerized records, case notes, and hospital information.[5] While the questionnaire proved to be between 92 and 100% specific for conditions such as asthma, diabetes, or hypertension, the specificity was only 79% for musculoskeletal disorders, suggesting that the views of epidemiologists and clinicians may conflict considerably with those of patients for this class of conditions. The severity of the pathology as detected on radiographs, has, in fact, little to do with clinical severity as experienced by patients. Population surveys show, for example, that there are numerous asymptomatic individuals with advanced radiographic osteoarthritis on the one hand, and many others with severe pain but minimal detectable pathology on the other.[6]

It is pain and associated disability rather than radiological outcomes that lead people to seek help from general practitioners and specialists. Therefore, Khatun *et al*.'s approach[3] to base their definition of musculoskeletal disorders on self-reported pain in the back/hip or neck/shoulder region appears reasonable. However, asking whether participants had had 'any aches and pains in the back/hip [or] neck/shoulder […] regions […] in the last 12 months', the authors combined mild to severe complaints into one category to derive a binary variable that defined the presence or absence of musculoskeletal complaints. Mild complaints lasting only several days were thus considered equivalent to severe pain lasting the entire year. Alterations in the classification of complaints according to duration or severity could have influenced this measure of musculoskeletal health, and ultimately Khatun *et al*.'s results, considerably. O'Reilly *et al*. found that measures of joint pain were strongly influenced by even minor changes in question content.[7] In a postal survey they used three different questions to detect knee pain: (i) 'Have you ever had pain in or around the knee on most days for at least a month? If so, have you experienced any pain during the last year?' (ii) 'Have you had pain within the last year in or around the knee that occurred on most days for at least a month?' and (iii) 'Have you had knee pain on most days of the last month?' Resulting prevalence estimates of knee pain were 28%, 25%, and 19% for questions (i), (ii), and (iii), respectively. Future studies will have to address this by employing multiple measures of musculoskeletal disorders, including different classifications according to disease duration and severity. This will allow the distinction between mild, self-limited complaints that do not require any specific intervention and severe complaints of longer duration that may result in chronic pain and disability and impose a considerable burden of disease on society.

While acute pain is likely to be directly associated with structural damage caused by biomechanical factors such as repetitive strains, heavy physical workloads, or a recent trauma, chronic pain may not simply be the consequence of structural damage but the result of a complex interaction between structural change, central pain processing mechanisms, and pain perception, in turn influenced by comorbidity, psychosocial, and socioeconomic factors. In addition, chronic courses of musculoskeletal pain and disability are typically characterized by repetitive episodes. With each recurrence, episodes may become increasingly severe, resulting in an 'insult accumulation' as described by Riley.[8] Disease episodes occurring earlier in life also have the potential to modify the likelihood for and the response to risk factors arising later in life. This may in turn affect the likelihood, severity, and course of subsequent episodes. Such iterative causal pathways will not be adequately reflected by simple logistic regression modelling.[9]

We conclude that future studies employing a life course approach to disentangle causes of social class inequities in musculoskeletal health will have to account for differences between acute and chronic disorders and for the potential of iterative causal pathways. This will increase our understanding of mechanisms leading to chronic musculoskeletal disorders.

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