Childhood Influences on Diabetes among Older Americans

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ABSTRACT

The health experiences of today's older population are strongly tied to conditions experienced decades earlier in life. Working within a life-course framework, we estimate nested multinomial logistic regression models with data from the 1998 wave of the Health and Retirement Study to evaluate the influence of a number of theoretically important aspects of childhood to identify the major facets of childhood associated with adult diabetes. We also investigate the core mediating mechanisms potentially linking childhood conditions with diabetes – adult achievement processes and adult lifestyle factors such as obesity. The results show that persons born in the South, with low levels of educational attainment, with low SES in the family of origin, and with poor childhood health all had significantly higher odds of reported diabetes. We also found that obesity, smoking, and socioeconomic achievement processes are powerful mechanisms linking childhood disadvantage with a greater odds of diabetes at older ages.

BACKGROUND

Diabetes prevalence rates have increased by approximately 30% since 1980 in the United States. The rate of growth exceeds that for all other major chronic conditions (McKinlay and Marceau, 2000). The consequences of diabetes are far-ranging and impact several biological systems. These include kidney-related conditions such as end-stage renal disease (Harris, 1998), diabetic retinopathy, which is the leading cause vision problems of American adults aged 20-74 years, and various ailments of the nervous system (NDIC, 2003) which may cause a delay in food digestion or nerve damage in the feet and hands.

A life-course framework offers insights into the factors influencing diabetes. Although symptoms usually manifest in mid- and later life, the physiological onset of diabetes can occur in adolescent and young adulthood. Social mechanisms have been posited that may influence susceptibility to diabetes at an earlier period in life. These mechanisms, or "social chains of risk" (Kuh et. al, 1997), are evident throughout childhood through the lack of essential nutrition, unhealthy eating habits, poor family socioeconomic status, and low educational attainment, among others. These crucial social factors in early life, in turn, may foster adult health lifestyle factors (e.g., obesity) or socioeconomic achievement processes, which may further increase individuals'

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chances of acquiring diabetes (Lawlor, Ebrahim, & Davey Smith, 2002; McKeigue, 1997). In this sense, the consequences of childhood circumstances are contingent on the pathways and experiences negotiated or constrained in adulthood.

This study builds on prior research in a number of ways. First, we assess whether associations detected in community- or hospital-based samples are evident in a nationally representative (and highly heterogeneous) sample of older Americans aged 50 years of age and older. Second, we evaluate the influence of a number of theoretically important aspects of childhood (place of birth, SES, significant health problems and education) to identify the major facets of childhood associated with adult diabetes. Third, we investigate the core mediating mechanisms potentially linking childhood conditions with diabetes – adult achievement processes and adult lifestyle factors such as obesity.

DATA AND MEASURES

We use the 1998 wave of the biannual Health and Retirement Study (HRS) to model the associations between childhood conditions and adult diabetes. The 1998 wave of the HRS includes persons aged 50 years of age and older (and their spouses) and is nationally representative of the American population for those ages. Most importantly for this analysis, the 1998 wave of the HRS included a battery of items asking respondents about their socioeconomic conditions and health experiences when they were 16 years of age. To our knowledge, no other nationally representative survey of population health contains such an array of information about childhood conditions. Because the HRS also collected information about adult socioeconomic achievement processes and health behaviors, we are able to investigate the ways in which childhood conditions are associated with diabetes in the older population.

Although the HRS offers advantages in examining these associations, we nonetheless are cognizant of methodological pitfalls in our analysis. Childhood information, for example, is necessarily retrospective and thus subject to recall error. Also, we rely on self-reported diabetes to measure the outcome of interest. The presence of diabetes is identified based on a respondent's report that a "doctor has ever told them" that they have diabetes or high blood sugar. Under-reporting is thus likely and we expect that those persons less likely to visit a doctor will be most likely to under-report. We argue in the full paper that these methodological problems are likely to lead to conservative estimates of childhood influences on diabetes. Because we rely on cross-sectional data to evaluate the associations, we also consider potential problems of endogeneity.

ANALYSIS

Diabetes prevalence is measured as a 3-category variable: no reported diabetes, diabetes without any major functional limitations, and diabetes with functional limitations. This measurement approach captures severity at a particular time point, but it also is an indirect indicator of "age at onset" since diabetics with functional problems are

likely to have had the condition longer compared to diabetes with no functional problems, all else being equal. In the context of our statistical models, we thus expect to see a gradient where childhood conditions are most strongly tied to odds of diabetes with functional limitations.

Nested multinomial logistic regression models are estimated, where we begin by estimating a reduced form model assessing the associations between the childhood conditions and the odds of diabetes, controlling for age, and race/ethnicity. We then introduce measures indicating possible mediating pathways. For example, we introduce obesity, smoking, and alcohol abuse into the baseline model and evaluate how the associations between the childhood measures and diabetes are altered across the two models. This model building exercise is also used to evaluate whether adult socioeconomic achievement processes mediate the effects of childhood conditions. A range of nested models is estimated to evaluate the sensitivity of the childhood associations to the order in which mediating measures are introduced.

RESULTS

The results of the modeling exercise showed that the odds of diabetes are strongly associated with a range of childhood conditions. Persons born in the South, with low levels of educational attainment, with low SES in the family of origin, and with poor childhood health all had significantly higher odds of reported diabetes. Further, a gradient was evident indicating that these childhood conditions were most strongly associated with having diabetes with a major functional limitation. The ties between childhood and adult diabetes appear to be multi-factorial in nature.

The results of the nested models provide insights into the types of mechanisms linking childhood with diabetes. Education's tie to diabetes, for example, operates primarily through obesity, smoking, and adult SES. Low education is associated with a greater probability of obesity, smoking, and lower adult SES, which, in turn, leads to higher odds of diabetes. Persons born in the South have higher rates of smoking which then increase the odds of diabetes. Low family SES is tied to diabetes primarily by increasing the probability of obesity and lower adult SES. The tie between poor childhood health and diabetes reflects a greater probability of obesity, smoking, and low adult SES. Only the effect of low family SES remains significant in the full model, although its effect is dramatically reduced when compared to the reduced form results.

CONCLUSIONS

The results provide substantial evidence that the ties between childhood and diabetes stem from a range of childhood conditions – place of birth, education, family SES, and childhood health. Moreover, these effects are evident for a nationally representative population. The health experiences of today's older population are strongly tied to conditions experienced decades earlier in life. At the same time, our results show that childhood conditions set in motion a range of adult health behaviors and

achievement processes, which in turn, increase the odds of diabetes. As shown here, obesity, smoking, and socioeconomic achievement processes are powerful mechanisms linking childhood disadvantage with a greater odds of diabetes at older ages. Childhood thus initiates multiple "chains of risk" showing that there is no one super-highway connecting childhood with adult diabetes. The long-term effects of childhood are many and complex.

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