HHS Public Access

Author manuscript

Neurology. Author manuscript; available in PMC 2016 January 06.

Published in final edited form as:

Neurology. 2013 September 10; 81(11): 942–943. doi:10.1212/WNL.0b013e3182a43ea7.

Migraine and the social selection vs causation hypotheses:

A question larger than either/or?

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For decades, the question of social selection vs social causation has been raised by public health researchers and social scientists to explain the association between socioeconomic factors and mood disorders.[1,2] The social selection or "downward drift" theory postulates that the disease itself limits an individual's educational and occupational achievements, leading to a lower socioeconomic status (SES). In contrast, the social causation hypothesis suggests that factors associated with low SES (e.g., stressful life events, poor health care access) increase the likelihood of disease onset or prolonged disease duration.[3,4] Simply stated, the end result of each hypothesis is as follows:

Social selection: Disease → Low SES.

Social causation: Low SES → Disease.

While the social selection and causation hypotheses are not necessarily mutually exclusive, the question has been broadly viewed by some as a choice between genetics (social selection) and environmental mediation (social causation).[3,4]

More recently, these paradigms have been applied as explanatory mechanisms for the often observed inverse association between migraine and measures of SES including income, education, employment, and occupation.[3–5] Specifically, for migraine, the question has become the following: Does a statistical association between migraine and a low SES reflect the tendency for an individual with migraine to drift into or remain in a lower SES category or does the experience of a lower SES status predispose an individual to migraine?

Although not all,[6–8] the majority of studies evaluating the migraine–SES association have reported higher migraine prevalence estimates among lower income or lower education groups.[4,5,9] Demographic factors linked with migraine prevalence estimates include sex (women > men), age (20–50 years of age), and race (Caucasian > African American > Asian). In those studies demonstrating higher migraine prevalence estimates among lower income groups, income falls between age and race in the order of magnitude of effect on migraine prevalence estimates.[10]

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STUDY FUNDING

No targeted funding reported.

In this issue of *Neurology*®, Stewart et al.[10] present further evidence of an association between low income and episodic migraine, utilizing data from the American Migraine Prevalence and Prevention study. The authors also attempt to determine whether the data are more consistent with the social selection or the social causation hypothesis by consideration of income-stratified incidence and remission rates.

More than 162,700 individuals were interviewed about migraine symptoms, recalled age at onset, and the date of their most recent attack. The authors calculated incidence and remission rates from this cross-sectional data using a statistical model that accounted for recall error, in essence constructing a quasi-longitudinal study.[10] They hypothesized that if social selection was the explanatory paradigm, then incidence and remission rates would not vary by income categories. In contrast, if the social causation paradigm was explanatory, then individuals in the lower income category would have higher incidence or lower remission rates compared to higher income categories.

Results demonstrated that age-specific prevalence and incidence rates were higher among lower income groups.[10] The authors interpreted these findings as being consistent with the social causation hypothesis. Remission rates, however, did not vary by income strata. The authors speculated, in their thoughtful discussion, that while this finding is not supportive of social selection, it does not exclude it from having a role in the migraine–SES association. They suggested that there may be different determinants to migraine onset, distinct from prognosis.[10] While at first this may appear to be only of theoretical interest, there are concrete implications for the design of clinical trials and genetic studies. In fact, the authors speculate that pooling migraineurs with shorter and longer duration or including remitted migraineurs in control groups may have contributed to the negative findings in migraine genetic studies.

Some caution in interpreting these findings may be warranted. The use of only one SES component, income, may not be fully representative of this multidimensional construct.[3,4] Previous research has shown that the use of a socioeconomic index that utilizes more than one measure to address SES has several advantages. First, it addresses SES as a multidimensional concept; and second, it reduces dominance of a single measure and allows for variation across categories.[4] This may be particularly important given that education accounts for approximately two-thirds of the low SES score and approximately half of the high SES score in the SES index. However, consistent with the current study by Stewart et al., in at least one previous study migraine prevalence estimates were increased in those with low SES using the SES index based on both education and income.[4]

A second consideration is the exclusion of those with chronic migraine, given that prior research suggested that low SES may be associated with migraine chronification.[4,11] The authors acknowledge this limitation, suggesting that the small size of the chronic migraine group would have limited its effect. Finally, it remains possible that other factors associated with SES (e.g., race, marital status) may have contributed to the migraine–SES association, as this was not fully modeled.

Many questions remain about the ways in which socioeconomic factors affect migraine. While the findings of Stewart et al. are supportive of a causal influence of low income on migraine incidence, this does not preclude a role for genetics and other endogenous factors. It is plausible that several processes of both social selection and causation contribute.[12] It is likely that the association of migraine with SES is larger than an either/or question. The question may just be: "Do migraine environmental and genetic factors affect one another reciprocally or even dynamically across the lifespan (i.e., indirect selection)?"[2] Despite the questions remaining, the current findings go a long way in providing evidence that social causation plays an important role in the association between episodic migraine and income, and provide important insights and direction for future research.[10]

Acknowledgments

DISCLOSURE

B.L. Peterlin has received investigator-initiated research support from GSK and Luitpold Pharmaceuticals, receives royalties from Oxford University Press, and receives funding from NIH/NINDS #K23-NS078345 and Landenberger Foundation. A.I. Scher has received funding from the Center for Neuroscience and Regenerative Medicine, DMRDP (Defense Medical Research and Development Program), and CDMRP. Go to Neurology.org for full disclosures.

Funding information and disclosures deemed relevant by the authors, if any, are provided at the end of the editorial.

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