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Impact of poverty on dental pain among US adults

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Background

It should be considered a social injustice if people suffer from dental pain merely because they are poor. The association between economic disadvantage and adverse oral health outcomes is well known. However, evidence for this association based on causal inference is scarce. Thus, we aimed to obtain an approximate causal estimate of the impact of poverty on prevalence of frequent dental pain among United States(US) adults.

Methods

Data was from 2013-2014, 2015-2016, and 2017-2018 cycles of the National Health and Nutrition Examination Survey(NHANES) in the US. A total of 15,165 adults aged >19 years (mean±sd[weighted]= 47.76±17.1) were included. Self-reported frequency of dental pain was used as a binary outcome variable(0={hardly ever/never}; 1={very often/fairly often/occasionally}). Quartiles of the ratio of family income to poverty (income-index) was used as the exposure. To specify the impact of income-index on counterfactual outcome, we shifted the observed income-index level of each individual as a deterministic function of their observed income-index level. Then, doubly-robust targeted minimum loss-based estimation(TMLE) was used to estimate mean outcomes under corresponding counterfactual scenarios, adjusted for age, sex, educational attainment, and ethnicity.

Results

Prevalence of frequent dental pain in <25th, 25th-50th, 50th-75th, and >75th income-index quartile groups were 37.1%,30.4%, 24.9%, and 16.0%, respectively. Causal odds ratio (OR) and 95% confidence intervals (95%CI) calculated with TMLE showed that after adjusting for confounders, being in the lowest income-index quartile increase the likelihood of frequent dental pain by 74.2%[OR=1.74, 95%CI=1.53-1.94] compared to the highest income-index quartile. Similarly, compared to the highest income-index group, shifting to 25th-50th and 50th-75th groups increased the likelihood of dental pain by 31.4%[OR=1.31, 95%CI=1.16-1.46] and 21.3%[OR=1.21, 95%CI=1.06-1.35], respectively.

Conclusions

Low income-index levels significantly impacted the prevalence of frequent dental pain among US adults. When an individual's income-index gradually shifts towards poverty, there is a clear dose response and a gradient for frequent dental pain.

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