Rounding May Bias Self-Reported Headache Frequency: Results from the American Migraine Prevalence and Prevention (AMPP) Study

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Abstract

Objective

To determine if rounding influences retrospective reports of headache frequency.

Background

Information on headache frequency is usually gathered through retrospective patient self-report. Individuals tend to round these reports to convenient rates (e.g., 5 or 10 days per month). This creates clusters of reports around certain common numbers, a phenomenon known as heaping. In practice, heaping can distort the distribution of the observed reports and may bias estimates of the mean. In this study, we evaluate the extent of rounding in a large population of headache sufferers.

Methods

This secondary analysis of the AMPP study characterized the population distribution of headache frequency among community headache sufferers and determined the extent of numerical rounding (heaping) in such self-reported data. Several count distributions were evaluated, and a simplified version of Wang and Heitjan’s approach to heaping was used to estimate the probability that headache frequency was rounded to a multiple of 5. Finally, a multiple imputation procedure was used to estimate a theoretical “true” headache frequency.

Results

Surveys were mailed to 24,000 severe headache sufferers identified from a community survey. Headache frequency data were available for 15,976 respondents, of which 68.6% had migraine, 8.3% had probable migraine, and 10.0% had episodic tension-type headache. The mean number of headaches/month was 3.7 (SD = 5.6), and a disproportionate number of responses centered on multiples of 5 days. The Zero Inflated Negative Binomial distributions fit the data best. The odds that headache frequency was rounded to nearest 5 (e.g., 13 to 15) increased by 24% with each day increase in headache frequency (OR: 1.24, 95% CI: 1.23 to 1.25). Women were more likely to round than men. Rounding decreased with increasing age and increased with symptoms of depression (PHQ-9). The imputation procedure meaningfully altered the estimates of headache frequency when compared to the self-report, especially at high headache frequencies.

Conclusions

Headache sufferers exhibit heaping in their retrospective reports of headache days. Imputation procedures may be a valuable method of addressing this issue in research. Clinicians should be aware of the risk of false positive diagnosis of chronic migraine due to heaping in patients with 11 to 14 headache days per month. Shorter recall intervals and daily diaries may improve accuracy.

References


Research reported in this poster was supported by the National Institute of Neurological Disorders and Stroke of the National Institutes of Health under award number 1R01NS06525701.