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Is Insomnia Associated with Mortality?

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The Penn State Cohort mortality data, accepted in April and appearing in September, 2010 reported that insomnia was associated with mortality in men with short sleep duration, but not in men with “normal” sleep duration or in women.¹ Short sleep duration itself was not significantly associated with mortality in the Penn State Cohort. Our similar paper, accepted and published in the same months and also utilizing up to 14 years of follow-up, demonstrated mortality associated with objective long sleep duration as well as short, and found mortality associated with long and short time in bed and with poor sleep efficiency.² In our data, insomnia as measured by the validated WHI insomnia rating scale³ was not a significant mortality predictor, when long and short sleep were controlled (unpublished). What could explain the discrepancies between the two reports?

As compared to our study, the Penn State paper had a number of strengths: more subjects, both men and women, and polysomnographic ascertainment of total sleep time. The weakness of our paper was reliance on actigraphy, which may be less accurate than polysomnography, but it had the strength of an average of 6.8 nights of home actigraphy, thus minimizing the problems of first night effect, sleep disturbance due to the laboratory, and night-to-night variability in sleep duration. However, the discrepancies may be more attributable to differences in statistical analysis.

The Penn State paper divided groups at the median of 6 hours total sleep time, and called the below-median duration “short sleep” and the above-median duration “normal sleep.” It escapes me why above-median was called “normal” when it would not appear to be the sample norm. Actually, the largest questionnaire studies and our objective study have shown that the lowest mortality is associated with sleep perhaps a half hour below the median,^{4,5} but these studies and many others show that the relationship of sleep duration to mortality is U-shaped. Our study confirmed that U-shaped distribution using objective recording, with increased mortality both at the short and long ends of the sleep duration range. Was that U-shaped distribution also found in the Penn State sample?

For a U-shaped distribution, a median split would not be an appropriate way of assessing the relationship of mortality to sleep duration, nor would it be an adequate way of controlling confounding between sleep duration and insomnia. What would happen if the Penn State sample were controlled for the

absolute-value deviation of total sleep time from the median less 30 min (e.g., 330 min), as was done in our study, or if the data were grouped for subjects with short, near-median, and longer sleep durations? Controlling for sleep duration in such a manner, would insomnia remain significant among men with short sleep?

There are additional statistical concerns about the Penn State report of increased mortality associated with insomnia. First, of the 6 odds ratios computed in subgroups of men and women, only one odds ratio was “significant” with 95% confidence, and then only barely significant. If we subdivide into groups with and without baseline hypertension or diabetes, there were 12 subgroups, only one of which had a “significant” odds ratio. Would those odds ratios be significant if corrected for multiple testing? Another concern was use of complex adjustments of risk factors and weighting to adjust the male data to the target population and to the national population. Would the odds ratios for insomnia be significant before adjustment, as well as after?

Numerous previous studies have shown an association of hypnotic use to mortality, which can become confounded with insomnia. Was mortality controlled for hypnotic usage in examining the association with insomnia?

It would greatly help understand the discrepancies between reports if this additional information about the outstanding Penn State sample could be made available.

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