Letters to the Editor

RE: “SELF-REPORTED SLEEP DURATION, SLEEP QUALITY, AND BREAST CANCER RISK IN A POPULATION-BASED CASE-CONTROL STUDY”

Within their carefully executed and interpreted study, Girschik et al. (1) investigated the relationship between incident breast cancer and the self-reported duration and/or quality of sleep in Western Australian women. The authors concluded that sleep duration and/or quality are not associated with breast cancer risks significantly above or below the null.

With this letter, I would like to reinforce the important closing sentence by Girschik et al.: “The ongoing issue of how best to measure sleep in epidemiologic studies needs to be addressed” (1, p. 10). Indeed, 1) beyond the case-control study’s assignment of one sleep duration category which is intended to summarize sleep duration for several decades, I would like to point to an alternative assessment of sleep duration that may capture relevant variations of, and cumulative exposures to, sleep before and during the many years of the development of cancer. Moreover, 2) beyond the focus on sleep duration and on sleep quality, understanding complex facets of “sleep” may require considering the timing of sleep as well.

Regarding point 1 above, can we really identify the “usual duration of sleep” (1, p. 2) for the extended time before and during the development of breast cancer? Clearly, individuals experience variable sleep duration over a lifetime. An alternative to limiting the study participants to a single sleep duration category for a large time window of interest could be to work with “sleep-years” (2, 3). This simple exposure parameter approximates cumulative time spent at sleep in several time windows, which could be relevant for the development of cancer. Table 1 shows a simplified example of how variable answers to the question (“How many hours did you sleep in different time windows of your life?”) are scaled (by setting 1 sleep-year to be equal to sleeping 6 hours per day for 1 year) and accumulated over decades of interest (by summing up the multiplied number of hours slept per day by the number of years the individual reconstructs this quantitative sleep duration). Recalling decisive life events such as graduation, marriage, pregnancy, caring for children, employment changes, personal losses, grief, illness, stress or anxiety, and so on may help to recall and mark points and periods in life that may be associated with changes of sleep duration over decades.

Ultimately, using the concept of accumulated sleep-years rather than “one category of sleep duration fits decades” may provide a methodological advance not only for retrospective studies but also for prospective studies into the biologically plausible effects of sleep on health and disease.

Regarding point 2 above, recent work by Gamble et al. (4) suggests that when we sleep may be very relevant regarding how we cope with or physiologically adjust to work or activities at biologically unusual times such as shift work. In 2007, shift work involving circadian disruption was classified by the International Agency for Research on Cancer (IARC) as a probable human carcinogen (5). Interestingly, Gamble et al. observed that the sleep duration was comparable between night-shift and day-shift nurses. For observed differences regarding how nurses adapted to night shifts, the authors suggested that when nurses sleep relative to their work activities could be crucial. This notion is important because adaptation to shift work may protect against the circadian disruption that experts from the International Agency for Research on Cancer expect to “probably” increase cancer risks.

Overall, Girschik et al. (1) set a high standard for studies in this field of possibly high public health relevance. Because there can be alternatives to assigning sleep duration, and also sleep quality, to one category for the decades of interest, thereby assuming stability over the entire period, I would modify within parentheses what the authors conclude elsewhere (6, p. 1): “the null findings reported in our article suggest that there is no association between sleep duration (as assessed in this study) or sleep quality (as assessed in this study) and breast cancer risk.” Following the authors’

Table 1. Accumulated Sleep-Years in Simplified, Identical Time Windows for 4 Individuals With Inter- and Intraindividual Variability of Sleep Duration

<table>
<thead>
<tr>
<th>Individual</th>
<th>Reported Hours of Sleep/Day/Year, by Age</th>
<th>Scaled Sleep-Years Over 4 Decades</th>
<th>Accumulated Sleep-Years During 4 Decades</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20–29 Years</td>
<td>30–39 Years</td>
<td>40–49 Years</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>8</td>
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<td>6</td>
<td>6</td>
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<tr>
<td>4</td>
<td>9</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

* Rounded values; adapted from the articles by Erren (2, 3).
advice to address “how best to measure sleep in epidemiologic studies” (1, p. 10) can yield improved assessments of the duration, quality, and timing of sleep for future research. Because all 3 facets of sleep could be linked in a causal web, epidemiologic studies should eventually consider all of them to understand whether or not the complex issue of "sleep" may impact on chronic processes such as cancer.

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REFERENCES

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Editor's note: In accordance with Journal policy, Girschik et al. were asked whether they wished to reply to this letter, but they chose not to do so.