COMMENTARY

Sleeping at the Century Mark

Commentary on Gu et al. Sociodemographic and health correlates of sleep quality and duration among very old Chinese. SLEEP 2010;33:601-610.

Donald L. Bliwise, PhD\textsuperscript{1}; Phyllis C. Zee, MD, PhD\textsuperscript{2}

\textsuperscript{1}Department of Neurology, Emory University School of Medicine, Atlanta, GA; \textsuperscript{2}Department of Neurology, Northwestern University School of Medicine, Chicago, IL

THIS ISSUE OF SLEEP CONTAINS AN EPIDEMIOLOGIC STUDY OF SELF-REPORTED SLEEP IN MAINLAND CHINA, DERIVED FROM THE CHINESE LONGITUDINAL Health Longevity Survey (CLHLS).\textsuperscript{1} Although questionnaire studies of sleep in older Chinese people (Hong Kong, Taiwan, Shandong Province mainland China) have been published previously in this journal,\textsuperscript{2,4} there are features of this particular study that are noteworthy, not the least of which is that the study includes data from more than 2700 individuals whose chronologic age exceeds 100 years. This remarkable cohort invites several comments.

Very little is known about sleep in humans 100 years of age or older. As we learn more about founder effects\textsuperscript{5} and even specific gene loci\textsuperscript{6} that predict the most longevous members of our species, characteristics of their sleep are likely to come to the fore. To date, other than a handful of scattered reports, including an early Russian laboratory study\textsuperscript{7} of individuals aged 90 to 110, which showed the expected low amounts of stage 4 sleep, and a few surveys of small numbers of centenarians from Italy,\textsuperscript{8} next to nothing is known about the sleep of populations reaching such a vaunted chronologic age. In the study of Gu et al.,\textsuperscript{1} substantial proportions of individuals over the age of 100 are reporting sleep durations in excess of 10 hours per day, and this effect appears to be stronger than for individuals in their 80s and even 90s. Moreover, not only does typical sleep duration increase with very advanced age, but among those oldest-old, chronologic age is a very strong predictor of good sleep quality, an effect that appears to be enhanced in successive decades beginning with those 80 to 89 years of age. One could circularly speculate, of course, both that good health predicts longer and better sleep and that longer and better sleep predict good health, and although the data presented here are cross-sectional and cannot disentangle causation, they certainly support both possibilities. Future studies with the CLHLS may provide some clues for answers to these issues.

When studying the most aged populations, verification and adjudication of chronologic age become a critical scientific concern. For example, in the United States, studies that examined individuals of 100+ years of age typically incorporate extensive and extraordinary verification efforts,\textsuperscript{9,10} and, indeed, according to the references cited by Gu et al.,\textsuperscript{1} the CLHLS participants have undergone such rigorous validation of their stated age (see references 38-43 cited in Gu et al.). Chinese culture is somewhat unique in this regard, as birthdates are typically recalled by zodiac signs associated with different animals (e.g., horse, tiger), which cycle every 12 years. Particularly, among Han Chinese (the ethnic majority population of mainland China), great significance is attached to the animal year of birth because it is often used to determine the timing of life events such as marriage and childbirth. Another validation of chronologic age for a population is the comparison of relative age distributions among other countries’ centenarians, for which better documentation may exist, including not only other Asian populations like Japan, but also Canada, the United States, and Sweden, which show virtually identical distributions of chronologic ages for persons over 100 years old. Although many Chinese tend to “advance” their birthdates to the start of the next lunar cycle (e.g., individuals may consider themselves 1 year of age at the time of the Chinese New Year in February, even if they were born in October of the previous year), the paper by Gu et al.\textsuperscript{1} includes large numbers of Chinese between 100 and 109 years of age, which provides a fascinating glimpse at reported sleep in extreme longevity among humans.

Apart from the undeniably important issues of validation, perhaps what is most intriguing about these human data are the apparent parallels to phylogenetically conserved lower animals, including invertebrate classes such as insects. Among drosophila, it is known that some fly mutants with exceedingly short sleep durations (Shaker, Sleepless) have very short life spans,\textsuperscript{10,11} and, interestingly, a highly longevous drosophila variant (appropriately called Methuselah) has also been described,\textsuperscript{12} although sleep in that line has not yet been characterized. Perhaps less well appreciated is that among wild-type drosophila (particularly females), the final 10% of lifespan demonstrates longer hours of daily sleep (inactivity),\textsuperscript{13} a finding seen to a qualified degree among older female honeybees as well.\textsuperscript{14} Long sleep durations among humans over 100 years of age also were detectable in the classic, first American Cancer Society Survey published decades ago (see Tables 1 and 2 in that study).\textsuperscript{15} Despite such enticing hints that longer sleep durations may somehow promote longevity, however, we should resist the temptation to assume that longer sleep durations must be beneficial for the organism, as their associations with adverse outcomes, at least in humans,\textsuperscript{16} are certainly well appreciated. Whether sleeping such long durations is a good thing or bad thing in very, very old age remains uncertain. But for those members of our species who may be lucky enough to still be
waking and sleeping at the century mark, it sure would be nice to know.

DISCLOSURE STATEMENT
The authors have indicated no financial conflicts of interest.

REFERENCES