

EDITORIAL

Research Priorities in the Area of Sleep/Circadian Rhythm and Aging Research: Commentary on “Report and Research Agenda of the American Geriatrics Society and National Institute on Aging Bedside-to-Bench Conference on Sleep, Circadian Rhythms, and Aging: New Avenues for Improving Brain Health, Physical Health, and Functioning”

Constance H. Fung, MD, MSHS¹; Sigrid C. Veasey, MD^{2,3}

¹Geriatric Research, Education and Clinical Center and Sleep Center, VA Greater Los Angeles Healthcare System, Los Angeles, CA; ²Department of Medicine, David Geffen School of Medicine at UCLA, Los Angeles, CA; ³Department of Medicine, University of Pennsylvania, Philadelphia, PA

Currently, over 50 million individuals in the United States are 65 years or older. Sleep and circadian disturbances (SCD) are prevalent in older individuals. Despite a tremendous amount of research characterizing sleep/circadian rhythms across aging research, key mechanisms underlying the disturbances are poorly understood.

One of the fundamental challenges in understanding mechanisms underlying SCD in aging is that so many aspects of health and disease influence these processes in older individuals. For this reason, the National Institute on Aging and the American Geriatrics Society, with generous support from other groups, orchestrated a multi-disciplinary conference (October 4 to 6, 2015) that brought together both established and early basic, clinical, and health services research investigators who study the many aspects of nocturnal disruptions in older adults. Organizers acquired information about “gaps in knowledge” from the conference faculty and other participants prior to the conference. At the end of the conference and after much discussion, several faculty members re-addressed the “gaps in knowledge” in the context of information gained from the diverse presentations, and drafted a white paper, which summarizes what is known regarding SCD in older adults and identifies important questions to address.¹ For our field, the conference was immensely successful in several notable directions.

During the conference, faculty provided an important “forest” overview of SCD in older adults, conceptualizing it as a geriatric syndrome (ie, a “multifactorial health condition that occurs when the accumulated effects of impairments in multiple systems renders a person vulnerable to situation challenges”²). Specific changes in SCD that occur with advanced age, diseases, environmental exposures, and medications may contribute to the development of SCD. Further phenotyping and better understanding of how the temporal progression of SCD may be altered are needed. Key research questions raised during the conference included questions such as “what is normal healthy aging of sleep” and “how does the need for sleep change with aging?”

Numerous researchers representing many perspectives detailed bi-directional influences between SCD and neurodegeneration. For example, it remains unclear whether sleep disturbances influence the temporal progression of Alzheimer’s disease and other neurodegenerative processes; yet newer research suggests that specific groups of neurons

that are essential for optimal cognition, including the locus coeruleus can be injured by disturbed sleep. Moreover, sleep loss can delay the clearance of amyloid and other toxins from the brains interstitial space, and sleep loss prompts a pro-inflammatory response in the brain that could advance the temporal progression of many neurodegenerative processes. In turn, age-related degeneration of suprachiasmatic nuclei neurons and sleep-active neurons may contribute to poor sleep in older individuals may not only drive a feed-forward process of sleep loss neural injury but may add to daytime cognitive disturbance. There is a need to further investigate the roles of each of these potential contributors to neurodegenerative processes.

Insomnia was examined from many perspectives as well. Insomnia in the older population is associated with substantial morbidity and mortality. Moreover, some pharmacologic therapies for insomnia are associated with increased morbidity and mortality. Thus, understanding major causes of insomnia and identifying safer therapies for insomnia are clearly of high importance.

Other key questions raised in light of the research presented included “how does aging affect treatment outcomes for SCD and outcomes for specific sleep disorders?” Related questions raised were “what disparities are present in SCD in older adults” and “how do disparities influence outcomes?”

In addition to systematically laying out key next steps for the field, this conference was designed to bring together early-stage investigators and established investigators who share common research interests to facilitate the development of lasting mentoring relationships. Mentees met with mentors during the meeting and were encouraged to continue building the relationships beyond the meeting. Mentors provided guidance on research design, approaches, career directions, and important steps for advancement, thereby facilitating a pipeline for future research in SCD and aging.

Overall, this conference emphasized the importance of multi-disciplinary perspectives and approaches to SCD and aging research, laid out priorities for research in the field, and began to foster the development of the next generation of researchers for our field. It is clear that for SCD research, bedside-to-bench multi-disciplinary team research has the potential to substantially improve the quality of life and health outcomes for the growing population of older adults.

REFERENCES

1. Fung CH, Vitiello MV, Alessi CA, Kuchel GA. Report and research agenda of the American Geriatrics Society and National Institute on Aging bedside-to-bench conference on sleep, circadian rhythms, and aging: new avenues for improving brain health, physical health, and functioning. *J Am Geriatr Soc.* 2016; 64: e238–e47.
2. Tinetti ME, Williams CS, Gill TM. Dizziness among older adults: a possible geriatric syndrome. *Ann Intern Med.* 2000; 132(5): 337–344.

FUNDING

This publication was supported by the National Institute on Aging (NIA) of the National Institutes of Health (NIH) under Award Number K23AG045937 and The Beeson Career Development in Aging Research Award Program (supported by NIA, AFAR, The John A. Hartford Foundation, and The Atlantic Philanthropies) to CHF and by NIH grants to SCV: HL123331, HL124576 and AG054104.

ACKNOWLEDGMENTS

The content of this paper is solely the responsibility of the authors and does not necessarily represent the official views of the Department of Veterans Affairs or National Institutes on Health.

SUBMISSION & CORRESPONDENCE INFORMATION

Submitted for publication March, 2017

Accepted for publication April, 2017

Corresponding Author: Constance H. Fung, MD, MSHS, Geriatric Research, Education and Clinical Center and Sleep Center, VA Greater Los Angeles Healthcare System, 16111 Plummer Street (11E, GRECC), North Hills, CA 91343, USA. Telephone: +818-891-7711-X39311; Fax: +818-895-9519;

Email: constance.fung@va.gov

DISCLOSURE STATEMENT

None declared.