



COMMENTARY

Morning caregiver activity and depression

Commentary on “Activity patterns related to depression symptoms in stressed dementia caregivers” by Smagula *et al.*

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As the proportion of older people in the population is increasing in nearly every country, the rate of dementia is expected to rise to 78 million in 2030 and 139 million in 2050 (WHO Dementia Fact Sheet, 2022). A dementia diagnosis has significant costs and consequences for the family, healthcare system, and society (Jeste *et al.*, 2021). There are currently over 11 million family members providing ongoing support for the 6.5 million people in the United States living with dementia, with an estimated 16 billion hours spent providing care coordination, transportation and accompaniment to healthcare visits, daily assistance with bathing and feeding, and end of life care (Alzheimer’s Association, 2022). Dementia caregivers (dCG) are especially impacted by the diagnosis and experience challenges in balancing professional, personal, and caring responsibilities (Jeste *et al.*, 2021). Although some caregivers report positive benefits associated with caregiving, there is extensive evidence showing the negative consequences on a caregiver’s physical, emotional, social, and financial health (White *et al.*, 2018). Approximately one-third of dCGs report symptoms of depression and anxiety (Kaddour and Kishita, 2020).

Depression is among the most burdensome disorders worldwide and gives rise to considerable adverse effects on activities of daily living for extended periods of time (Bruffaerts *et al.*, 2012). It is also well established that depression reduces the quality of life but is also associated with lower quality caregiving (Smith *et al.*, 2011). Neuropsychiatric symptoms of dementia are the most predictive of caregiver burden and depression, regardless of dementia diagnosis (Givens *et al.*, 2014). These effects are driven by disruptive behaviors, including agitation, aggression, disinhibition, delusions, and mood disturbances. These behaviors are particularly disturbing for caregivers because of the adverse effect on the emotional connection between the caregiver and the care recipient given that a majority of community-based care for people with dementia

is provided informally by friends and family members, with family caregivers providing over 80% of the assistance needed (Friedman *et al.*, 2015). Additionally, when compared with other types of caregiving, dementia caregiving is associated with higher depression incidence rates (Joling *et al.*, 2015). In their paper, Smagula *et al.* (2019) extend the limited and existing literature examining the specific effects and timing of activity restriction and depression in dementia caregivers to help stratify depression risk and find potential preventative interventions to alter activity at specific times.

The development of depression can be represented by genetic vulnerability to stress and depression as well as environmental factors, which can lead to changes in neurotransmission and circadian rhythms (Salgado-Delgado *et al.*, 2011). The significant and novel finding from Smagula *et al.* (2019) demonstrated that morning activity may protect dementia caregivers from depression symptoms since the group of dCGs with depression symptoms were found to be less active from 8 to 10 AM and predicted the degree of symptom change on the PHQ-9 6 months later. Although other key factors showed large associations with depression, including worsening insomnia symptoms, worsening intrusive thoughts, decreased mindfulness scores, increased medical comorbidity, and increased activity restriction, morning activity independently predicted the degree of change in depression symptoms over time. This corroborates the prior research examining the behavioral expressions of circadian rhythms as “typologies” or “chronotypes,” which refer to the expression of a person’s personal preference for a certain time of daily and sleep activities in a continuum between morning and night. A tendency toward “eveningness” is significantly associated with increased depression (Togo *et al.*, 2017). Although prior studies have indicated the relationship between chronotype and depression, mediated by sleep quality, alcohol consumption, emotional regulation strategies, and

positive re-evaluation (Van Den Berg *et al.*, 2018), none have examined morning-evening activity patterns in dementia caregivers in relation to depression or brain function. In the follow-up paper by the same authors (Smagula *et al.*, 2021) examining brain biomarkers of morningness, they identified lesser amygdala-posterior cingulate connectivity on the resting-state fMRI, which statistically mediated about 32% of the association between the degree of "morningness" and lower depression severity with significant correlations with both amygdala-posterior cingulate connectivity and depression severity. This observation solidified the concept of morningness as a useful target for interventions with existing brain biomarkers. Although prior research shows that amygdala-posterior cingulate connectivity increases when allocating attention to negative emotional stimuli, the research by Smagula and colleagues linked difficulty with morning activation to the ongoing direction of focus around distressing content. Introducing morning activity participation may distract from distress and lead to improvement in depressive symptoms (Smagula *et al.*, 2021).

While the findings from Smagula *et al.* (2019, 2021) represent novel findings and evidence for a new target for behavioral intervention in dCGs, one of the major limitations of Smagula *et al.* (2019) is the lack of a diverse sample, which may limit its generalizability to caregivers in different ethnic and racial groups. There is a growing understanding of the ethnic and cultural differences that influence the caregiving process in different cultural groups (Knight *et al.*, 2002). The findings reflected a small, older, racially homogenous sample of White individuals. Statistics from the Administration for Community Living (ACL) indicate that between 1999 and 2030, the older minority population (age 65+) is projected to increase by 217% compared to an increase of 81% for the older white population. Therefore, it is imperative that cultural influences be taken into consideration to reduce health disparities and improve access to health care, particularly for older adults living with dementia and their family caregivers. This is particularly important for families providing care since the construct of "familism" has been examined as a driving mechanism for cross-cultural differences in caregiving outcomes (Falzarano *et al.*, 2022). Familism is a cultural value that centers around a sense of collectivism and family attachment, consisting of three factors: familial obligations (obligation to provide care), perceived support (perception of support received from family), and family as referents (using relatives' views as behavioral/attitudinal references) (Knight and Sayegh, 2010). Research suggests that familism can protect against the negative effects of care-related stress, and that African Americans and Hispanics are guided by cultural values in their caregiving role compared to

Whites, therefore predicting lower burden and depressive symptoms compared to Whites (Falzarano *et al.*, 2022). However, when examining familism in Korean caregivers compared to Korean American and White caregivers, although familism was highest in Korean caregivers and lowest in Whites, Koreans showed the highest level of depression and anxiety, followed by Korean Americans than Whites (Lee and Farran, 2004). These results suggest a need for greater specificity in theories about familism values and culture and the generalizability of such findings to dCGs from differing cultural groups. Smagula *et al.* (2019) do not address any cultural influences on dCGs, but another future consideration can be examining if there is heterogeneity in the effects of morning activity on depression among different racial and ethnic groups or if this effect is sustained among all groups. This would provide more compelling evidence as a novel target for developing intervention with existing biomarkers to examine intervention effects on the brain and mental and physical health.

The US policies and healthcare system rely on families to assume many of the caregiver responsibilities, with a lot of research spent on studying interventions that may yield statistically significant benefits for families and caregivers (Gitlin *et al.*, 2015). Many interventions have been developed and evaluated to support dCGs, including psychoeducational interventions, cognitive behavioral therapy (CBT), counseling and case management, general support, respite care, and training the care recipient to improve function and cognition, as well as a combination of these interventions. In a recent updated meta-analysis by Walter and Pinquart (2020), the effects of these various caregiver interventions had, on average, a significant, small to moderate, effect on improving ability and knowledge, subjective well-being, caregiver burden, caregiver depression, and caregiver's anxiety as well as symptoms of the care recipient. Unfortunately, there was no effect on these interventions in reducing the risk of institutionalization for the care recipient (Walter and Pinquart, 2020). Although there was an overall significant, positive effect of these interventions for dCGs, the effect size remained small, including the effects of these interventions on depression in particular. There remains a significant need to improve the effects of these interventions for dCGs given the disproportionate investment in researching interventions for dCGs compared to the impact of effect when translating the evidence into practice. Although Smagula *et al.* (2019) contribute another potential target for behavioral interventions specifically aimed at depression symptoms at the intersection with sleep and chronobiology, and more importantly, the potential for sustained improvement in depression over time, it will be important to evaluate the effect size and impact over time for diverse groups of dCGs.

In summary the Smagula *et al.* study (2019) provide additional valuable findings in terms finding a novel target of diurnal rhythm- driven intervention in the treatment of depression for dCGs. More importantly, this effect is sustained over time, although the follow-up should be extended in future studies to see if this intervention can be a target protecting dCGs from depressive symptoms. This adds to the growing evidence of interventions for dCGs in improving their emotional and overall well-being.

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Conflict of Interest

Both Drs. Nguyen and Lavretsky have no conflicts of interest to disclose.

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