

L. R. C. Gandolphi^{1,2}, K. M. Okazaki^{1,3}, K. T. Nozoe¹,
D. N. Polesel¹, M. L. Andersen¹ and S. Tufik¹
¹Departamento de Psicobiologia, Universidade Federal
de São Paulo, São Paulo, SP, Brazil, ²Faculdade de
Medicina de Marília, Marília, SP, Brazil and ³The Johns
Hopkins University, Baltimore, MD, USA

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Response: Influence of sleep disorders on television viewing time, diabetes and obesity

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We thank Gandolphi and colleagues [1] for raising important issues about diabetes-related comorbidities, such as sleep disorders as possible confounding factors in relation to our

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recently published work [2]. In addition they emphasize the importance of our study, which evaluated television (TV) viewing time as a risk factor for diabetes mellitus, a global health issue.

Gandolphi *et al.* [1] have stated that TV exerts great influence on individuals' behaviors, including biological and psychological mechanisms, and in particular suggested that sleep disorders are highly associated with TV viewing. The association between TV viewing and sleep remains relatively unexplored in older adults. In a small sample of 711 adults, TV viewing was associated with later bed time but was not associated with sleep duration (the interval between bedtime and rise time) or tiredness [3]. Previous data from a controlled trial designed to reduce TV viewing did not observe any effects on sleep duration or awakenings [4] although this was perhaps not unexpected given that all participants demonstrated normal sleeping patterns at study entry.

We agree that verifying the presence of sleep disorders in the present sample may provide additional insights. Thus we have explored the association between TV and sleep in the current cohort of older adults from the English Longitudinal Study of Ageing, previously described (2). Sleep duration was measured by an open-ended question asking participants how many hours they slept on an average week night. Responses were coded into “< 5 h”, “5–6 h”, “6–7 h”, “7–8 h” and “> 8 h”. Sleep disturbance was assessed with three questions enquiring about difficulties falling sleep, staying asleep, and feeling tired upon waking up. These items were rated on a 4-point scale (ranging from 1 = “not during the last month” to 4 = “three or more times a week”). Sleep disturbance (three or more times a week) was commonly reported; 15.1% reported difficulty falling asleep, 49.0% reported problems with waking up in the night, 19.5% reported being tired when waking up. TV viewing was associated with sleep disturbances in a dose-response manner, particularly with difficulties in falling asleep (Table 1). We observed a ‘U-shaped’ association between sleep duration and TV viewing, suggesting that both short (< 5 hrs) and long sleep duration (> 8 hrs) was associated with more TV time (Figure 1). In fully adjusted models, participants that reported 6–7 hrs sleep per night displayed the lowest TV time (–0.57, 95% CI, –0.89, –0.25 hrs/d) in relation to those reporting < 5 hrs sleep. In summary, our results do demonstrate an association between TV viewing and sleep disturbance in older adults.

As our data are cross-sectional it is difficult to interpret the direction of the association, that is, if TV viewing displaces and disrupts sleep or if people watch TV if they cannot sleep. Indeed, the association between TV/sitting and obesity may also be explained by reverse causation [5]. We agree that TV viewing is associated with numerous risk factors, including poor diet, lower socio economic status, obesity, smoking, depressive symptoms, and comorbidity. However, it remains unknown if excessive TV viewing is a causal factor in explaining disease risk or whether it simply reflects a cluster

Table 1 The association between TV viewing and sleep disturbance in men and women (N = 7,190; aged 65.1 ± 9.3 yrs) from the English Longitudinal study of Ageing.

Daily TV viewing time	N	Odds Ratio (95% CI)* <i>Difficulty falling asleep</i>	Odds Ratio (95% CI)* <i>Waking up in the night</i>	Odds Ratio (95% CI)* <i>Waking up feeling tired</i>
< 2 hrs/d	724	Reference	Reference	Reference
2 < 4 hrs/d	2450	1.29 (0.96, 1.73)	1.03 (0.87, 1.22)	0.96 (0.75, 1.23)
4 < 6 hrs/d	1974	1.59 (1.18, 2.14)	1.10 (0.92, 1.32)	1.04 (0.81, 1.33)
≥ 6 hrs/d	2042	1.77 (1.32, 2.38)	1.18 (1.00, 1.42)	1.12 (0.88, 1.44)
<i>p-trend</i>		< 0.001	0.12	0.32

*Model adjusted for age, sex, cigarette smoking, frequency of alcohol intake, physical activity, self-reported chronic illness, disability, depressive symptoms, body mass index category (< 25, 25-30, ≥ 30 kg/m²).

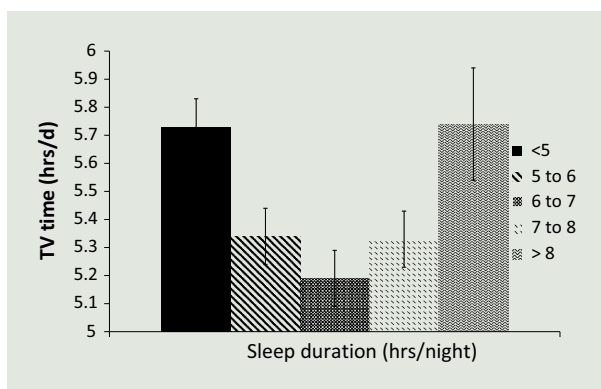


FIGURE 1 Association between sleep duration and TV viewing. Data are displayed as means \pm SEM, adjusted for age, sex, cigarette smoking, alcohol intake, physical activity, self-reported chronic illness, disability, depressive symptoms, and body mass index.

of unhealthy behaviors. Sleep disturbance might be important in explaining the association between TV viewing and adverse health, although the temporal sequence cannot be established using the present study design.

Numerous health behaviours, such as physical activity, sleep, and diet, are often imprecisely measured in large scale epidemiological studies, thus the inclusion of objective measures such as polysomnography examinations in the near future may greatly improve our understanding in this area.

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Competing interests

None declared.

M. Hamer¹ and L. Smith²

¹Physical Activity Research Group, Department of Epidemiology and Public Health, University College London and ²Health Behaviour Research Centre, Department of Epidemiology and Public Health, University College, London, UK

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