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Letter to the Editor

Is obesity prevention as simple as turning off the television and having a nap?

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Although obesity research has traditionally focused on the role of diet and exercise, the unique contribution of sedentary behaviour (e.g. sitting or lying down) has received increasing attention in recent years. In particular, television (TV) viewing has been frequently associated with weight gain in both children and adults independent of other risk factors including baseline BMI and physical activity levels[1,2].

Like TV watching, sleep is an activity characterised by prolonged periods of reduced energy expenditure. Yet accumulating evidence suggests that adequate sleep protects against obesity, while short sleep duration is prospectively associated with increases in both total and abdominal adiposity in adults and children[3,4]. These contrasting lines of evidence suggest that if an individual is planning to spend an afternoon on the couch, they are better off asleep than watching TV. While the above may seem like an odd public health message, it is nonetheless supported by a growing body of research suggesting that TV viewing and sleep have contrasting effects on energy balance and weight maintenance.

TV viewing burns energy at a slower rate than most other waking activities, which may initially seem like the most probable mechanism explaining its association with excess weight gain[1,2]. However, a meta-analysis has reported only minor associations between TV viewing and moderate or vigorous physical activity[5] in children and youth, suggesting that TV viewing does not displace high-intensity exercise in this age group. Further, it has been reported that the relationship between TV viewing and adiposity is not mediated by physical activity energy expenditure[2]. It is worth noting that it is also entirely possible for an individual to accumulate large amounts of TV time while still exceeding physical activity guidelines. Although the relationship between TV viewing and energy expenditure is not yet conclusively understood, most available evidence suggests that it may be energy intake, rather than expenditure, that largely accounts for the relationship between TV viewing and weight gain.

TV viewing has been linked to increased food intake in both prospective and intervention studies. This may be partially due to exposure to food advertisements, which often promote unhealthy dietary habits, and may prime individuals for future food intake. A recent intervention study by Harris *et al.*[6] has reported that exposure to food advertisements increased subsequent food intake by roughly 30 and 45 % in adults and children, respectively. TV viewing also provides opportunities for snacking, and is associated with an increased intake of high-energy foods and passive overconsumption[2]. Intervention studies that impose a reduction in TV viewing among children have consistently reported reductions in body weight[1], which may be moderated through reductions in food intake[7]. These findings suggest that TV viewing has a relatively strong positive association with food intake in both adults and children.

As with TV viewing, people burn energy slowly while asleep. Reducing time spent sleeping could therefore theoretically provide an individual with more opportunities for increased energy expenditure. Nevertheless, some evidence suggests that partial sleep deprivation may actually be associated with decreased energy expenditure through fatigue-related reductions in physical activity and lowered body temperature[3]. This remains controversial, however, as more recent studies have found little evidence linking partial sleep deprivation to changes in total energy expenditure, RMR or physical activity[4]. Thus, as with TV viewing, available evidence suggests that energy expenditure is not the primary mechanism linking insufficient sleep with increased adiposity.

Current evidence suggests that sleep duration is negatively associated with both acute and chronic food intake. Sleep restriction is known to increase food intake in both human subjects and animal models, and seems to predispose individuals towards increased intake of energy-dense foods that are high in fats and carbohydrates[4]. These effects on food intake are probably related to changes in homeostatic (e.g. hormonal) and/or hedonic (e.g. reward-seeking) feeding behaviour[3,4]. Insufficient sleep may increase the homeostatic drive to eat, as short-duration sleepers are known to have increased levels of ghrelin, reduced levels of leptin and altered glucose homeostasis[3,4]. Short sleep duration may also increase the rewarding value of food, which suggests that food intake could also be increased through non-homeostatic mechanisms[4]. Finally, reduced sleep may simply offer individuals increased opportunities for energy intake[3,4]. This impact may be especially strong when extra waking hours are spent watching TV, which may further stimulate food intake[4]. Collectively, this evidence suggests that inadequate

sleep may have a substantial impact on energy intake, and thereby energy balance and body weight.

The above evidence suggests that TV viewing and sleep exert opposing influences on energy balance and body weight. It is also worth noting that the relationships of both sleep and TV viewing with obesity appear to be stronger in the paediatric age group[2,3]. TV viewing tends to stimulate food intake, while an obesogenic environment exacerbates this problem with easy access to energy-dense and palatable foods. In contrast, the activity of sleeping is 'satiating' from biological and environmental perspectives since it reduces the drive to eat, opportunities for food intake, and exposure to external food-related cues. Although speculative, it is plausible that a few hours of napping on the couch could have a vastly different (and more positive) impact on weight maintenance than an equivalent amount of TV viewing. This raises an obvious question: if you are concerned about your body weight, is it better to sleep through your favourite TV show rather than watching it?

It is perhaps time that clinicians urge their patients to not only reduce their daily amount of TV viewing, but to also replace that TV time with a good night's sleep. Interventions that focus on increasing sleep time or reducing TV viewing may prove easier to implement than those focused specifically on diet or exercise. Available evidence already suggests that reducing TV time is an effective means of reducing body weight in children and youth[1,7], and initial reports have suggested that increasing sleep may improve mood and help reduce food cravings among obese adults[4]. Reducing TV viewing and/or getting adequate sleep require little in the way of resources or expertise, and may therefore be more sustainable than more traditional interventions focused on diet and exercise. If having a good night's sleep truly is better for your weight than watching TV, this would be a lifestyle modification which may be substantially easier to implement than adopting a new diet or exercise routine. This change of focus is certainly worth consideration, right after a short nap.

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