Review of: "Association between indigenous status and Body Mass Index (BMI) in Australian adults: Does sleep duration affect the relationship?"

Sarah Blunden[1]

1 Central Queensland University

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Review /commentary of

“Association between Indigenous status and Body Mass Index (BMI) in Australian adults: Does sleep duration affect the relationship?”

Author:

Professor Sarah Blunden PhD,

Appleton Institute of Behavioural Science, Central Queensland University,

44 Greenhill Rd Wayville Adelaide,

South Australia, Australia. s.blunden@cqu.edu.au

This study is one of the first studies that has systematically evaluated the effect of sleep on obesity in Indigenous Australians and compared it to non-Indigenous Australians using large scale community based data from across the continent, through the Australian Health Survey. It adds to the small but increasingly impactful body of knowledge about the state of Indigenous sleep health.

This study is of seminal importance. Similar to other nations with First Nations populations New Zealand[1], Canada and the United States[2], the health and wellbeing of Indigenous Australians has long been an issue of concern and as noted in this paper, is complex and multifactorial. Consideration of Indigenous health cannot be separated from the on-going impact of colonization and subsequent transgenerational trauma, discrimination and racism and how these factors affect the contemporary state of health care, health delivery and health care uptake by Indigenous Australians.

There are consequential and overwhelming impacts on social and health disadvantage with Indigenous Australians reporting, significantly disproportionately higher prevalence rates of chronic diseases such as obesity/overweight[3].

While significant gaps in general health for Indigenous Australians have been noted, there has a realization that there has also been a distinct lack of attention to sleep health in Indigenous Australians[4]. It is indeed a pleasure to see this subject matter becoming more prominent in the literature. Several important points should be highlighted about the new

knowledge that this paper brings.

Firstly, and interestingly, here are new data to show that Indigenous status is a significant predictor of obesity and overweight. The authors suggest a partial explanation might be that Australian Indigenous people have different fat distributions than non-Indigenous people with a greater propensity for abdominal adiposity and leaner limbs[5]. Age was the only significantly predictive variable of BMI, and notably neither socioeconomic indicators, nor lifestyle Factors (e.g smoking) mediated this relationship. Why would this be so? It is likely that the relationship is complex. A direct mediation by social economic indicators would be more evident perhaps if the sample in this study were representative of all Indigenous groups, (rather than being seen as one homogeneous group), and findings were therefore inclusive of and sensitive to differences across different cultural groups in Indigenous populations in Australia. This is not the case and has been noted by the authors.

That social determinants and BMI were only related in non-Indigenous participants and these factors do not account for the higher prevalence of obesity in Indigenous populations is, at face value surprising, given the known link between lower socio economic status and obesity[6] and especially as the data represented here indicates the Indigenous participants to be the more disadvantaged subsample as defined by the SIEFA indices. However, the authors suggest an alternative and indirect avenue in which socioeconomic status can impact obesity through the fact of being Indigenous. A common form of modern-day trauma is acculturative stress which could be defined as a reduction in health status (including psychological, somatic and social aspects) of individuals who are undergoing acculturation). Acculturative stress in First Nation Australians include the daily stress faced due to “social insecurity.... feeling disrespected and subordinated” ([7]p.13) and having limited exposure to their culture, making it difficult to establish and maintain a strong cultural identity[8]. Furthermore, stress has being related to abdominal obesity[9]. Stress impacts glucocorticoid action[9] and inflammation which increases the likelihood of obesity[10]. These may partly explain these interindividual differences, with their aetiology in chronic and ongoing inequality and interpersonal institutional and systemic racism[9]. The message here is that the role of stress in the prevalence of obesity in Indigenous Australians should not be ignored.

Secondly, there is a small but significant interplay between sleep and BMI, as the relationship was weak and only partly mediated by sleep duration. Body Mass Index (BMI) has been associated with sleep in Non Indigenous[11], and Indigenous children[12], but in adults previous work has shown discrepant findings with some studies finding a predictive relationship[13] and others finding none[11].

Given this existing and noted relationship between sleep duration and obesity in non-Indigenous samples[10][12], the current findings may be surprising, particularly with the high prevalence of overweight/ obesity[3] and the disproportionally high incidence of chronic illnesses experienced in Indigenous Australians. Perhaps a lack of specificity resulting from this nationwide survey (which included relatively small Indigenous representation), and/or analyzing data with a broad generalised brush, may have some impact on these outcomes, but it is nonetheless interesting. Perhaps also the use of sleep duration as the variable of analysis, which was subjectively reported and further, recorded as only one typical night’s sleep, may not be a sensitive measure. I do indeed agree with the authors when they report that sleep duration is only part of the picture, and sleep duration reporting disallows explorations of sleep quality and sleep behaviour.

Sleep quality and sleep behaviours maybe more informative in exploring relationships between sleep and BMI (as suggested). The authors rightly suggest that future studies
could focus on the sleep behaviours of Indigenous Australians as seen in their daily lives acknowledging the ecology of the *'lived experience'*, rather than in an arbitrary subgroup such as that presented in this survey. A broader spectrum understanding of sleep behaviours, which has been explored in a recent review[13] could potentially capture additional sleep related variables that are indicative and predictive.

Indeed, this brings the conversation forward to the need to view sleep in a more holistic sense, related, in a bi-directional sense, to many other variables in the daily lives of Indigenous Australians that impact their health. First Nations Australians have a holistic view of health termed social emotional wellbeing (SEWB)[14]. The SEWB framework has been likened to the ecological systems theory within a more holistic western approach to health, which views an individual part of and impacted by individual, community, societal and systems factors[15]. For example, as detailed in this study, understanding sleep within the context of activity and eating habits is an important addition to viewing sleep through a multi-disciplinary lens. In addition, sleep duration was significantly associated with low household income and having 4 or more children in the household, highlighting potential confounding factors of overcrowding in households, which has been previously reported to impact social emotional wellbeing[13]. The "*lived experience*" of Indigenous Australians is likely to be more informative in understanding the relationships between sleep and BMI and indeed other health issues in these populations.

Together these observations seemed to confirm that the state of Indigenous health, be it sleep or metabolic health, needs to be considered from a more holistic perspective. The authors wanted to determine whether social determinants of health such as sleep, physical activity, diet and smoking status, predicted obesity and whether sleep remained predictive after accounting for the others. The results suggest that the answers might be more complex than previously thought and suggest some alternative avenues. In essence this paper tackles sleep and obesity from a more holistic approach than most previous work, the type of approach to health that is embedded in the social emotional wellbeing models of Indigenous health and necessary to understand sleep health and its impact on health in this target population.

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