Adequateness in sleep duration among adults in India: Evidence from national time use survey

Introduction

Adequate daily sleep is considered to be essential for an overall healthful and productive lifestyle. Over recent years, there has been a noticeable shift in global sleep patterns, with both shorter and longer sleep durations becoming more common. A multi-country analysis on the prevalence of short and long sleep durations has shown a declining trend in the share of individuals getting the optimum amount of sleep required [1]. Further evidence indicates the effect of factors such as age, employment status, marital status, educational level, and race on sleep duration [2,3]. Sleep adequateness is not given due attention in public health programmes in most low- and middle-income countries, as there is little evidence on the burden of sleep problems in these settings [4].

A major question here is what is the ideal duration of sleep for adults? The American Academy of Sleep Medicine (AASM) and Sleep Research Society (SRS) have developed a consensus recommendation for the amount of sleep needed to promote optimal health in adults [5]. As per this recommendation an individual regularly requires 7 - 8 hours of sleep per night to promote their health. Any habitual sleep below or above this recommended norm is likely to be a public health concern. Studies show that habitual short and long sleep durations are associated with adverse health outcomes [6,7]. Existing evidence from a 10-country study shows short sleep duration is less prevalent than the prevalence of long sleep durations in respective countries [6]. Another analysis of 28 countries with comparable sleep data reported that Indians to be having third highest sleep duration and the earliest wake up time [8].

Studies have shown sleep deprivation is a risk factor for cardiovascular ailments, diabetes, cancerous tumour formation, impaired immune function, and accidents [7,9]. Long sleep duration too is associated with metabolic syndrome, cardiovascular disease, diabetes and cognitive impairment [7]. The existing evidence on sleep patterns from India has been limited to either younger or older age groups. Longitudinal Aging Study in India (LASI) showed 13 percent of population aged 45 years old and above in the country are currently grappling with

various issues related to their sleep patterns and quality [10]. A study examining the associations between perceptions of neighbourhood safety and social cohesion on sleep duration and sleep quality among older adults in India found that those in unsafe neighbourhoods had poor sleep quality than peers residing in safe neighbourhoods [11]. Sleep problems are strongly linked to poor health, decreased grip strength, and impaired cognitive functioning in older adults globally, particularly in low-income settings like India, where sleep issues are associated with poorer well-being, psychiatric comorbidities, diabetes, and social determinants [12,13].

Methods

Data Source

This study utilizes data available from India's first Time Use Survey (TUS) undertaken by the National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India [14]. Time use surveys are globally recognized as an ideal source to obtain an objective measure of sleep duration which can be compared within and across population [8,15,16]. India's TUS carried out between January and December 2019, gives information on how individuals aged 6 and above allocate their time across various activities throughout a typical day. TUS covered 518,744 members from 138,799 households surveyed, of which time use data was collected from 445,250 individuals aged 6 years and above. Household members aged below 18 years and cases where time use was recorded for an abnormal day were excluded from this analysis. Thus, the final sample analysed here comprised of 330,207 cases/individuals aged 18 years and above with information on time use on a normal day. TUS provides data on activities performed by these individual household members from 4:00 AM on the day before the date of the interview to 4:00 AM on the date of the interview. The reference period of 24 hours was split into 48 time slots, each slot of 30 minutes duration. The TUS data set has activities codified as per the International Classification of Activities for Time Use Statistics 2016 (ICATUS 2016) [17].

Outcome Variable

ICATUS (2016) activity code 911 (night sleep/essential sleep) refers to the longest sleep, either during the day or at night for each respondent in TUS. Activity code represents longest sleep,

either during the day or at night, time in bed before and after sleep when no other activity is specified. Incidental sleep/naps were excluded while creating the duration of sleep variable [17]. This duration of sleep variable was converted into a categorical outcome variable using the AASM/ SRS recommendation of adequacy of sleep [6]. This outcome variable for sleep duration was categorised as short sleep duration (≤6 hours), normal sleep (6-9 hours) and long sleep duration (≥ 9 hours).

Predictor Variables

An association between demographic and socio-economic characteristics (SES) of respondents and sleep duration was performed. The following demographic and SES variables were considered for analysis: age groups in years (18-29, 30-44, 45-59, 60-74, and 75+); sex (male, female); marital status (never married, currently married, widowed/divorced/separated); employment status (regular & self-employed, non-regular employed, unpaid work, students, rentiers/ pensioners/remittance recipients/etc., unemployed); education level (no education, primary, middle, secondary, higher); place of residence (rural, urban); religion (Hindu, Muslim, Christian, others); social group (scheduled tribe, scheduled caste, other backward caste, others); household size (living alone, two to four members, more than four members); household monthly per capita consumer expenditure (MPCE) quintile (poorest, poorer, middle, richer, richest). Here social group classification is common variable used in India to capture the continuing caste or past occupation of respondent's family based social hierarchy in India, while MPCE quintile is used as a proxy to represent economic background of respondent's household. Type of day variable was also created based on day for which sleep information was collected to examine the sleep differential between a weekday (Monday to Friday) and a weekend (Saturday and Sunday).

Statistical Analysis

Firstly, the age-sex differentials in the mean sleep duration (in hours) were undertaken to illustrate the differentials in age specific sleep curve for India. Secondly a bivariate analysis of the risk of short/long duration sleep and an adult individual's demographic, and socio-economic characteristics was performed.

Finally, a multinomial logistic regression analysis is applied for testing association between short/ long duration and demographic and socio-economic characteristics under study. Here normal duration of sleep (6-9 hours) is kept as the base or reference outcome in this analysis. Multinomial logistic regression provides the relative risk ratios (RRR), which is the risk of short duration sleep relative to normal duration sleep in a sub-group against their reference category within the same sub-group. Similarly, it provides the RRR for long duration sleep relative to normal duration sleep for each of the independent/exploratory variable of interest. An RRR > 1 indicates that the outcome is more likely to be in the comparison category than in the reference category and vice versa if RRR<1. Survey weights provided in the data sets were applied in all analysis to adjust for the design of the study. Analysis was conducted using Stata software, version 16 (StataCorp LLC., College Station, United States of America).

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