Sleep Health xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Sleep Health

Journal of the National Sleep Foundation

journal homepage: sleephealthjournal.org

Relationship of sleep pattern and snoring with chronic disease: findings from a nationwide population-based survey

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ARTICLE INFO

Article history:
Received 4 May 2017
Received in revised form 9 October 2017
Accepted 10 October 2017
Available online xxxx

Keywords:
Sleep
Epidemiology of chronic noncommunicable diseases
Global health

ABSTRACT

Objectives: To investigate the association of total sleep time and presence or absence of snoring with chronic disease among the Bangladeshi adult population.
Design: Cross-sectional survey.
Setting: Urban and rural Bangladesh.
Participants: A total of 12,338 men and women aged ≥35 years.
Measurements: Total sleep time was considered as the total hours of sleep in 24 hours. Furthermore, sleep time was categorized into <7, 7-9, and >9 hours according to National Sleep Foundation (2015) guidelines. Self-reported snoring history was captured and corroborated with their respective sleep partner/spouse in more than 80% cases. Registered physician-diagnosed current and/or previous cases of hypertension, diabetes, coronary heart disease, cancer, stroke, chronic obstructive pulmonary disease, and any other chronic conditions were counted.
Results: Overall prevalence of at least 1 chronic disease in our study population was around 18%: men (15.4%) and women (20.0%). Hypertension has the highest prevalence (overall: 12.7%, men: 12.2%, women: 15%) followed by diabetes (4.9%), coronary heart diseases (3.2%), stroke (1.8%), chronic obstructive pulmonary disease (0.9%), and cancer (any type: 0.1%). Sleep pattern and snoring are significantly associated with all individual chronic disease except cancer. Sociodemographic, behavioral, and lifestyle variables were adjusted, and inadequate total sleep time (<7 hours) and snoring (yes/no) showed significant association with chronic disease status (risk ratio = 1.11, 95% confidence interval 1.00-1.22 and risk ratio = 1.20, 95% confidence interval 1.11-1.29, respectively).
Conclusion: Inadequate sleep and snoring are independently associated with chronic disease in Bangladeshi adult population and perhaps elsewhere.

Introduction

There is growing evidence that optimum sleep is important for maintaining good health throughout life.[1] Adequate sleep duration is required for our body to perform its normal somatic, cognitive, and psychological processes; however, any deprivation in its course poses a threat to our health.[2,3] One of the common sleep disorders, snoring, represents an important part of the spectrum of sleep-disordered breathing in human.[4] Earlier studies suggested that those who regularly fail to have adequate sleep duration are at increased risk of a variety of chronic diseases, but the exact mechanism underlying this association is unclear.[5–7] As many as 150 million people worldwide suffer from sleep problems that might affect their quality of life and leave them vulnerable to other adverse outcomes.[8] A multi-country study showed that nearly 17% of the population in developing nations suffers from sleep problems, similar to the prevalence of sleep disturbances in the developed world (reported to be about 20%).[9] This study was conducted in mostly rural areas of developing nations across 2 continents; the prevalence of sleep disorders varied widely between regions. It stated that Bangladesh had the highest reported rates of overall sleep problems, largely driven by its exceptionally high rate of sleep difficulties in women. Furthermore, more than 40% of Bangladeshi women reported having sleep problems compared to 23.6% of Bangladeshi men.[9] Over the last few years, much attention has been paid to addressing obesity as an emerging global health crisis

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https://doi.org/10.1016/j.sleh.2017.10.003
2352-7218/

along with HIV, malnutrition, and other chronic diseases. However, sleep disorder has not received much public attention and, given its deleterious effects, needs consideration as a "next-generation" global health threat in low- and middle-income countries. Common sleep disorders like snoring and inadequate sleep duration are mostly ignored even though both inadequate sleep and snoring are known to contribute to poor health and diminished well-being.

Many studies have shown that a shorter sleep duration affects human memory and the immune system, and in particular, inadequate sleep duration (<6 hours) is significantly associated with a higher risk of chronic conditions such as obesity, diabetes, hypertension, coronary heart disease (CHD), ischemic heart disease, and mental health disorders.[12–18] Furthermore, a long sleep duration (>8 hours in 24 hours) is associated with obesity, hypertension, CHD, and impaired physical and psychological well-being. Some studies have reported that longer sleep durations could contribute a 20%-30% greater risk of mortality; however, shorter sleep duration might have stronger effect than longer sleep duration.[11–14,16,17,19–23] Thinking from a different point of view, the usual average daily sleep duration in a given population is variable and depends on individual population characteristics including genetics, environment, social factors, and comorbid medical conditions.[10,11] It is, however, possible that these factors may misperceive relationship or increase the probability of reverse temporal relationship or bidirectional relations.[24,25] This reverse causality could mean that all the adverse health consequences due to inadequate sleep may be because of the existing chronic diseases/conditions that impede the normal sleep duration which may result in either shorter and/or longer phase.[25,26] This complex interaction, that is, the lack of specific unidirectional causality, inadequate sleep duration may consider as an indicator for poor health outcomes rather than casual risk factor for medical conditions.[11]

A recent country-representative study on sleep duration in Bangladesh found that more than half of school-going children and one-fifth of teenagers slept less than their recommended duration. Conversely, one-third of the older population slept more than their recommended hours.[27] A significant proportion of the Bangladeshi population in different age groups suffers from a sleep disorder, but the reasons behind this remain unclear. Bangladesh has experienced an epidemiological transition, with large increases in chronic diseases.[28] Over a 20-year period (1986 to 2006), cardiovascular diseases increased by 30-fold in males and by 46-fold in females,[29] further emphasizing sex discrepancies in health. Ischemic or hemorrhagic stroke is the third leading cause of death and accounts for a high number of disability-adjusted life-years in Bangladesh.[30] There is growing concern about the drastic and consistent rise in the incidence of chronic disease in Bangladesh, with many public health interventions now being undertaken by the Government of Bangladesh, non-governmental organizations, and other international partners. There are very insufficient data on the relationship between sleep duration, snoring, and chronic diseases in poor socioeconomic contexts. Most sleep relation studies were conducted in high-income countries, which may not be generalizable to low- to middle-income countries (LMICs). Therefore, we aimed to measure the relationship of sleep duration and sleep disorders with the presence chronic disease in the Bangladeshi population.

Methods

BRAC Health, Nutrition, and Population Program cohort overview

In 2015, BRAC Research and Evaluation Division initiated a large cohort of BRAC Health, Nutrition and Population Program (HNPP) beneficiaries to capture epidemiological disease transition over time. The rationale was to address HNPP performance and to assess disaggregated information to obtain a better understanding of maternal, neonatal, child, and adult health in Bangladesh and potentially produce a baseline health status of Bangladesh. The cohort assembled 60,503 men, women, and children of all ages residing across

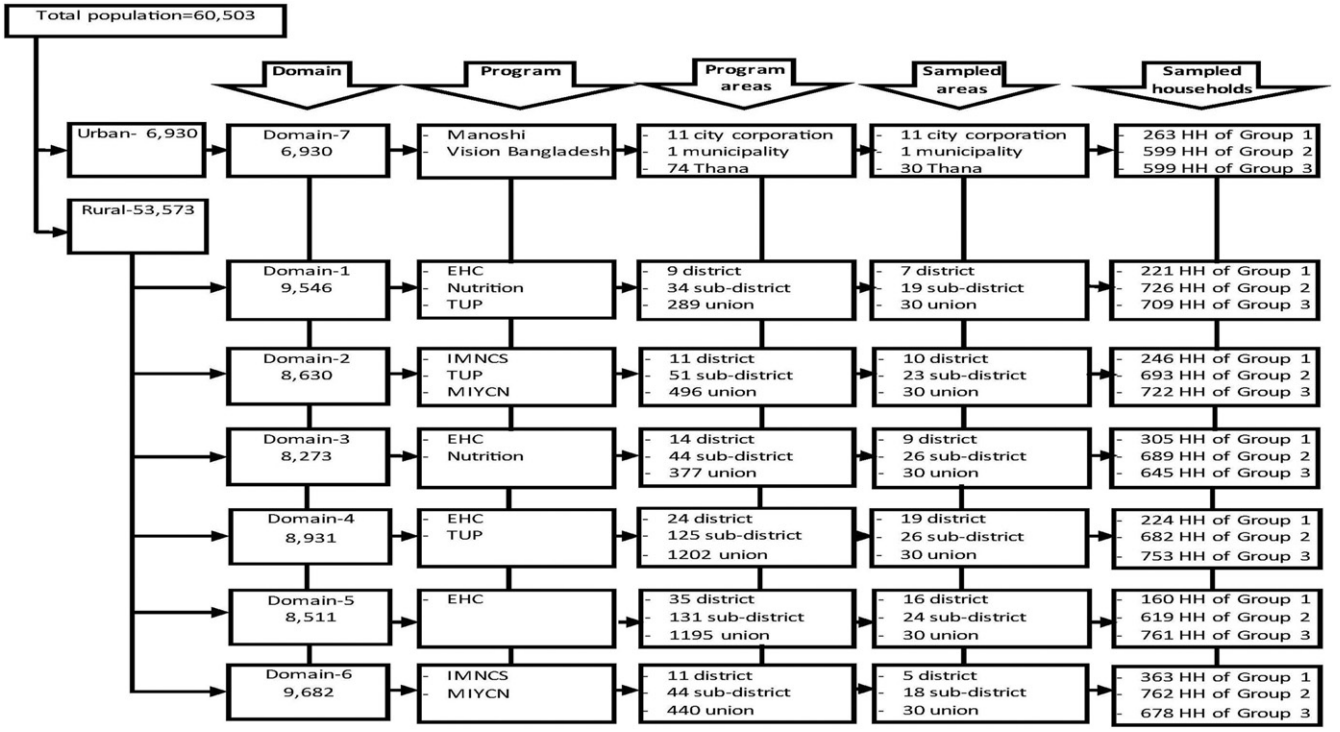

Fig. 1. Multi-stage sampling data collection from BRAC HNPP. HH, household; EHC, essential health care; TUP, targeting the ultrapoor; IMNCS, improved maternal neonatal child survival; MIYCN, maternal, infant, and young child nutrition.

Please cite this article as: Yunus FM, et al, Relationship of sleep pattern and snoring with chronic disease: findings from a nationwide population-based survey, Sleep Health (2017), https://doi.org/10.1016/j.sleh.2017.10.003