The Libyan International Medical University

Faculty of Basic Medical Science

The relation between sleep and heart disease

Mohamed Ibrahim Elbaaja

2082

Supervised by: Dr. Essam Eldanna

Assisted by: Dr. Lujien Shakmak

Report Submitted to fulfill the requirements for Scientific Research Activity

Date of Submission: 12 / 3 / 2020

Abstract:

This report explores the relationship between sleep and heart diseases showing it is a two-way street. Heart disease describes a range of conditions that affect your heart. Diseases under the heart disease umbrella include blood vessel diseases, such as coronary artery disease; heart rhythm problems (arrhythmias); and heart defects you're born with (congenital heart defects), among others, it is often used interchangeably with the term "cardiovascular disease." Cardiovascular disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke. Heart diseases have many causes, one being an irregular sleeping schedule, too much or too little sleep can take a drastic toll on ones heart health. The right amount of sleep is protective of heart health. Hence, sleeping less than the recommended amount has long been linked to poor health outcomes. This includes increased risks for cardiovascular risk factors like obesity, diabetes mellitus, and high blood pressure and an increased risk of cardiovascular events. Now, a flurry of recent studies is solidifying that evidence base and showing that poor sleep is linked both to preclinical atherosclerosis and to a higher rate of death among patients with heart disease. This report will conclude studies that support the hypothesis that there is a clear relation between poor sleep and heart diseases.

Introduction:

Heart disease, also known as cardiovascular disease, describes a group of health conditions affecting the heart. About 31% of deaths each year are attributed to heart disease. Common types of heart disease include coronary artery disease, high blood pressure, cardiac arrest, congestive heart failure, arrhythmia, peripheral artery disease and congenital heart disease. The list of risk factors for heart disease is a long one. It includes age, family history, sex, smoking, poor diet, diabetes, obesity, and more. One major risk factor for heart disease is poor sleep, whether that sleep is too short, too long, or simply unrest. the sleep requirements vary slightly from person to person, most healthy adults need between 7 to 9 hours of sleep per night to function at their best. Children and teens need even more. In the Western world, the average person gets only 6 hours of sleep per night. That's 1.5 hours less than the average sleeper from 100 years ago and below the recommended minimum of 7 hours per night.

Sleep is an important factor of cardiovascular function, therefore there is a temporal association between physiological sleep and occurrence of vascular events, cardiac arrhythmias, and sudden death. Epidemiological and pathophysiological studies also indicate that there may be a causal link between primary sleep abnormalities (sleep curtailment, shift work, and sleep-disordered breathing) and cardiovascular and metabolic disease, such as hypertension, atherosclerosis, stroke, heart failure, cardiac arrhythmias, sudden death, obesity, and the metabolic syndrome. Finally, sleep disturbances may occur as a result of several medical conditions (including obesity, chronic heart failure, and menopause) and may therefore contribute to cardiovascular morbidity associated with these conditions [(1) (3) (4) (6)]

Materials and methods:

In 2017 a study consisting of nearly 13,000 adults who experienced poor sleep, and their heart conditions were evaluated to determine if poor sleep conduct to heart problems and be one of the risk factors of these problems. [(3)]

Earlier in 2014 another study was done by a team of researchers who conducted a comprehensive review that summarized the findings from 15 prior studies focusing on relation between heart disease and sleep. In total, these studies covered nearly 475,000 individuals whose sleep hours and health statuses were determined. [(5)]

Another study was performed in 2018, where the data from nearly 117,00 adults, aging between 35 to 70, in about 21 countries and were followed for of nearly eight years, to see if their sleep hours affected their health and lead to heart problems. [(2)]

Results:

The overwhelming amount of research establishing the connection between poor sleep and heart disease has lead the Poor sleep can describe a variety of issues, including trouble falling asleep or trouble staying asleep, dependence on sleeping pills, daytime fatigue, and sleep-disordered breathing like snoring.

According to a 2017 study of nearly 13,000 adults, people who experience poor sleep due to any of the mentioned issues have a 71% higher risk of ischemic heart disease (abbreviated as IHD, covering heart attack or angina) and a 45% higher risk of stroke. [3] (figure 1)

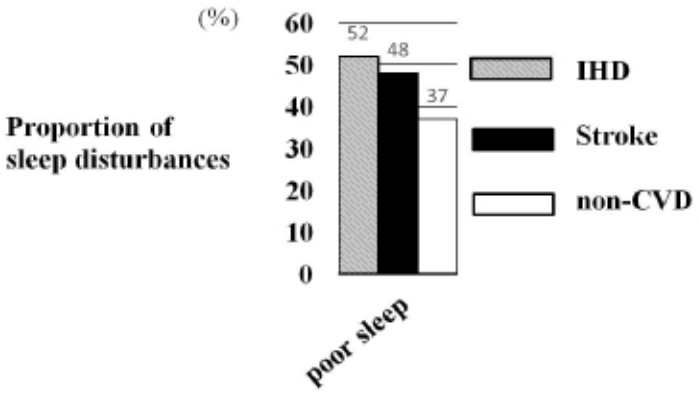

Figure 1- Proportion of poor sleep and health problems.

Earlier, in 2014, a team of researchers conducted a comprehensive review that summarized the findings from 15 prior studies focusing on heart disease and sleep. In total, these studies covered nearly 475,000 individuals and found that both short and long sleep were risk factors for heart disease:

- **Short sleepers:** (people who slept fewer than 6 hours) had nearly a 50% higher risk of dying from *coronary heart disease* (*CHD)* seven to 25 years later, and a 15% increased risk of stroke.
- **Long sleepers:** (people who slept longer than 9 hours) had an even higher risk of stroke at 65%, and a lesser (although still worsen when compared to healthy sleepers) risk of *(CHD)* at 38%.

Rates of heart disease (such as *stroke* or *heart failure*) and death were 7.8 per 1000 among those who slept the recommended six to eight hours per night, compared with 8.4 per 1000 among those who slept eight to nine hours, 10.4 per 1000 among those who slept nine to 10 hours, and 14.8 per 1000 among those who slept more than 10 hours a night. That translates into a 5 percent, 17 percent and 41 percent increased risk, respectively. [5]

Discussion:

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels which include coronary heart disease (disease of the blood vessels supplying the heart muscle), cerebrovascular disease (disease of the blood vessels supplying the brain), peripheral arterial disease (disease of blood vessels supplying the arms and legs), rheumatic heart disease (damage to the heart muscle and heart valves from rheumatic fever), congenital heart disease (malformations of heart structure existing at birth), deep vein thrombosis and pulmonary embolism (blood clots in the leg veins, which can dislodge and move to the heart and lungs). They are the number 1 cause of death globally, more people die annually from CVDs than from any other cause. In 2016, 31% of all global deaths were caused by cardiovascular diseases, an estimated 17.9 million people. Of these deaths, 85% are due to heart attack and stroke. Cardiovascular diseases have a number of causes and risk factors. The most important behavioral risk factors of heart disease and stroke are unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol. These effects may show up in individuals as raised blood pressure, raised blood glucose, raised blood lipids, and overweight and obesity.

Both sleep deprivation and heart disease are extremely common in today's modern world. They're also both connected with higher mortality rates. Heart disease and sleep have a bidirectional relationship. Chronically poor sleep increases your risk for heart disease, and worsens symptoms for those who already have it. Unfortunately, having a heart condition makes it more difficult to get good sleep, creating a no-win situation. Poor sleep is a risk factor for heart disease all on its own, independent from the aforementioned health issues. Even for otherwise healthy individuals, disturbed sleep can increase your risk of mortality from cardiovascular issues. Time and again, research indicates that quality sleep is just as critical for the long-term health as diet and exercise. [(2),(3),(5),(6)]

Conclusion:

In brief, this report has concluded that there is a clear connection between lack of sleep and heart diseases. This has been portrayed through three distinguished case studies. These have been carried out through 3 different years, 2018, 2017 and 2014, each of them reaching the same conclusion affirming the aim of this report - that the rate of heart disease among people who slept more or less than normal range (7-9h) is higher than those who got the recommended amount of sleep.

References:

1. Sasaki N, Ozono R, Teramen K, Yamashita H, Fujiwara S, Kihara Y. P6215Poor sleep and cardiovascular disease: different pattern of sleep disturbance in ischemic heart disease and stroke. Eur Heart J. 2017 Aug 29;38.

2. Flu & Cough Cold. Too Much Sleep May Bring Heart Disease, Death Risk. WebMD Dec. 5, 2018.

3. Tuck Sleep. (2020). *Sleep and Your Heart: The Link Between Heart Disease and Sleep*. Tuck Feb. 15, 2020.

4. Sleepfoundation.org. (2020). *National Sleep Foundation Recommends New Sleep Times | National I I sleep foundation.*

5. Gangwisch JE, Heymsfield SB, Boden-Albala B, Buijs RM, Kreier F ,Pickering TG, Rundle AG, Zammit GK, Malaspina, et al. Short sleep duration as a risk factor for hypertension: analyses of the first National Health and Nutrition Examination Survey. Hypertension. Am Heart Assoc; 2014;47(5):833-39.

6. Wolk, R., Gami, A. S., Garcia-Touchard, A., & Somers, V. K. (2005). Sleep and cardiovascular disease. *Current problems in cardiology*, *30*(12), 625-662.