

The Impact of Sleep Health as a Healthy Lifestyle on Coping with Coronavirus Vulnerability: A Narrative Review

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Abstract

Background: Sleep health is a relatively new term in the sleep literature and an emerging concept in sleep medicine. Lack of attention to health sleep, leads to an increase in the incidence of various physical, mental, and immune disorders against infectious diseases.

Methods: This Narrative review study was conducted in September 2021. Studies and articles published in PubMed Databases, Web of Science, and Google search engine from 1983 to January 2021 were included in the study. All reviews and cross-sectional studies found through the keywords, including Sleep, sleep Health, Sleep Hygiene, Underlying diseases, COVID-19, and coronavirus, were reviewed regardless of the publication language.

Results: According to the collected evidence, sleep deprivation is one of the main causes of underlying diseases, and people with underlying diseases are most vulnerable to COVID-19. Also, East Asian countries such as China, Japan, and South Korea, with more scientific production in the field of healthy sleep, compared to EU member states, can protect themselves from diseases caused by unhealthy sleep and have lower mortality rate of COVID-19 infection.

Conclusion: given the vulnerability of underlying diseases to coronavirus, one of the most important functional areas and preventive factors in the occurrence of the underlying diseases that should be considered is sleep health. Encouraging and promoting sleep health is also important as a protective factor in preventing and managing COVID-19 infectious diseases. Sleep health might also be one of the important factors playing a role in the vulnerability of COVID-19 in different societies.

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Introduction

Sleep health is a relatively new term in the sleep literature as well as an emerging concept in sleep medicine, which is defined as a multidimensional structure consisting of regular, satisfactory, alert, timed, and adequate sleep,¹ which is directly related to mental health, a person's body

and health behaviors; moreover, sleep health is defined as a "multidimensional model of waking-sleep", tailored to the individual, social,² and environmental needs and the promotion of physical health and "Psychological".³

On the other hand, unhealthy sleep, which is estimated to vary between 20 and 41.7% in different countries, is associated with an increase in the

incidence of various physical and mental disorders that threaten a person's health, increasing vulnerability to chronic diseases, such as obesity, cardiovascular disease, diabetes, depression, other mood disorders, cognitive impairment, and chronic disorders such as arthritis, kidney disease, pain, immunodeficiency, epilepsy, and immunodeficiency against infectious diseases.⁴⁻¹³ Unhealthy sleep also causes poor mental health, drug use, increased morbidity and mortality, increased health care costs, negative economic impact, and other harmful effects.¹⁴⁻¹⁸ Evidence suggests that unhealthy sleep is associated with increased susceptibility to viral infections.¹⁹ Coronavirus 2019 was first reported in December 2019. Various reports indicate that the infection and mortality risks due to this virus in the mortality of people with underlying diseases, such as hypertension, diabetes, asthma, renal failure, cardiovascular disease, weak immune systems, and other high-risk diseases, are directly related and put people with physical and mental disorders at greater risk.²⁰

At present, national and global health organizations focus heavily on disinfection and hand washing, social distancing, masks, and the use of effective vitamins, herbs, chemicals, and vaccines to prevent and treat the virus, but the underlying issue, which is less considered is the role that proper sleep plays in health, because the literature shows that healthy sleep can help strengthen the immune system and body health, and vice versa, sleep disorders, such as insomnia and drowsiness, and sleep deprivation play an important role in reducing the body's immunity and is a major challenge to health and life quality associated with an increased risk of death^{18, 19, 21, 22}

The coronavirus is a phenomenon that has caused a crisis in the world due to its rapid spread and uncontrollable nature. Although this crisis is purely medical and related to the health system, it is a multidimensional phenomenon whose effects and consequences in various economic, social, cultural, and political fields can be observed and traced. Lifestyle is one of the areas affected by the social consequences of this crisis. This article attempts to assess the consequences of the corona crisis on lifestyle, emphasizing sleep health. Although decades of research have focused on sleep disorders, relatively little research has focused on sleep health. Since many studies have shown that excessive or short sleep and insomnia are associated with a higher risk of mortality and multiple diseases, we intend to address the impact of sleep health on COVID-19 and investigate the vulnerability of COVID-19 in patients due to unhealthy sleep based on scientific evidence.

Methods

The present article is a narrative review performed

by two researchers in September 2021 by searching scientific databases for articles published in Web of Science, Pubmed, Google Scholar, and Google Search. The terms combinations or related equivalents and synonyms were used as keywords such as Sleep, Sleep Health, Sleep Hygiene, Underlying diseases, COVID-19, and Coronavirus.

Search Strategy in PubMed/Medline

“Sleep” [Mesh] OR “Sleep Health” [Title] OR “Sleep Hygiene” [Title] AND (“covid-19” [Title] OR “coronavirus” [MeSH Terms] OR Underlying diseases [Title])

Search Strategy in Web of Science

TI=(Sleep OR Sleep Health OR Sleep Hygiene) AND TI=(COVID-19 OR Coronavirus).

TI=(Underlying diseases) AND TI=(Sleep OR Sleep Health OR Sleep Hygiene)

TI=(Underlying diseases) AND TI=(COVID-19 OR Coronavirus). Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years

All currently available full-text articles in English languages were examined. Abstracts of papers presented at the congresses and conferences were excluded. After searching, 523 articles were first retrieved; then inclusion and exclusion criteria were applied. Based on inclusion criteria, we entered all related descriptive and analytical studies (case-control, cohort, cross-sectional) that assessed sleep health, covid-19, and underlying diseases. There were no restrictions on study time, publication time, and document language. The exclusion criteria for this study are animal and laboratory studies, as well as duplicate results in the searched articles. Considering exclusion and inclusion criteria, the authors finally selected 17 articles to extract the content. Also, to evaluate the vulnerability of the COVID-19 virus to underlying diseases, 52 articles were extracted in the first stage, and after the screening, only the full text of 13 articles was included in the study.

Results

As shown in Figure 1, 17 articles were finally included in the study after reviewing, studying, and evaluating the titles, abstracts, and original text. All 17 articles address different aspects of healthy and unhealthy sleep effects on the incidence of the disease. Studies have shown that the effect of healthy and unhealthy sleep on the incidence of various diseases can be an alarm for a healthy lifestyle. Table 1 shows the characteristics of the studies included in the present study.

As shown in Figure 1, 13 articles were selected after reviewing, studying, and evaluating the titles, abstracts, and original text. 13 articles the vulnerability of most people with COVID-19 underlying disease.

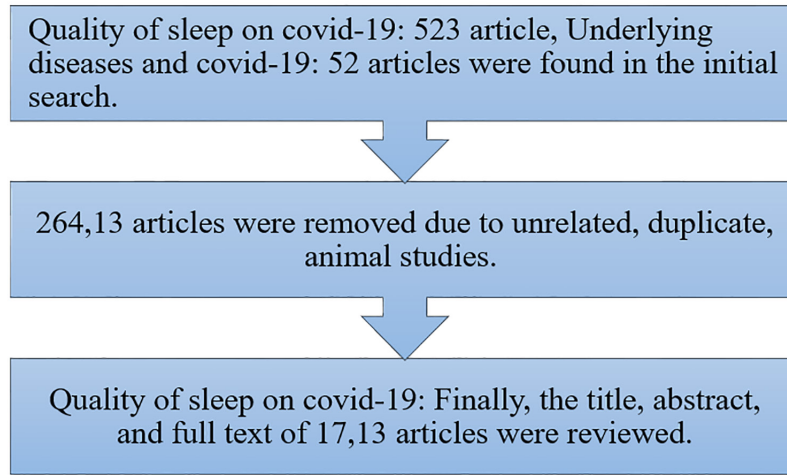


Figure 1: Flowchart of study steps

Table 1: The effect of healthy and unhealthy sleep on the incidence of diseases

Result	Place of study	Author	Study
Healthy sleep is effective in treating depression	USA	Aschbrenner KA, Naslund JA, Salwen-Deremer JK, Browne J, Bartels SJ, Wolfe RS, Xie H, Mueser KT	Sleep quality and its relationship to mental health, physical health, and health behaviors among young adults with serious mental illness enrolled in a lifestyle intervention trial
Improving sleep quality is effective in reducing depression and stress.	CHINA	Liu, Zhuang; Liu, Rongxun; Zhang, Yue; et al.	Association between perceived stress and depression among medical students during the outbreak of COVID-19: The mediating role of insomnia
Unhealthy sleep increases vulnerability to cardiovascular disease and overweight/obese people.	SOUTH KOREA AND USA	Cha E, Talman MS, Massey AH, Yan F, Rogers AE. Sleep,	Sleep, Lifestyle Behaviors, and Cardiometabolic Health Markers in Overweight/Obese Young Adults: A Pilot Study Using the SenseWear (R) Armband
Unhealthy sleep reduces activity and physical activity as well as increases smoking.	IRAN	Moudi A, Dashtgard A, Salehiniya H, Sadat Katebi M, Reza Razmara M, Reza Jani M.	The relationship between health-promoting lifestyle and sleep quality in postmenopausal women
Lack of sleep associated with physical activity, high blood pressure, and increased mortality.	CHINA	Liu F, Zhang H, Liu Y, Sun X, Yin Z, Li H, Deng K, Zhao Y, et al.	Sleep Duration Interacts With Lifestyle Risk Factors and Health Status to Alter Risk of All-Cause Mortality: The Rural Chinese Cohort Study
Heart disease, COPD, and gastric ulcers are associated with insomnia and hyperlipidemia, high blood pressure, cerebrovascular disease, and kidney stones with prolonged sleep.	AUSTRALIA CHINA USA	Wang S, Wu Y, Ungvari GS, Ng CH, Forester BP and et al.	Sleep duration and its association with demographics, lifestyle factors, poor mental health, and chronic diseases in older Chinese adults
Poor mental health and chronic illness are directly related to sleep deprivation and smoking and alcohol consumption with prolonged sleep.	AUSTRALIA CHINA	Wang S, Li B, Wu Y, Ungvari GS, Ng CH, Fu Y, Kou C, Yu Y, Sun HQ, Xiang YT.	Relationship of Sleep Duration with Sociodemographic Characteristics, Lifestyle, Mental Health, and Chronic Diseases in a Large Chinese Adult Population
sleep disorders are associated with cardiovascular risks.	USA	St-Onge MP, Grandner MA, Brown D, Conroy MB, Jean-Louis G, Coons M,	Sleep Duration and Quality: Impact on Lifestyle Behaviors and Cardiometabolic Health A Scientific Statement From the American Heart Association
Poor sleep quality affects health-related factors	USA	Baker FC, Wolfson AR, Lee KA.	Association of Sociodemographic, Lifestyle, and Health Factors with Sleep Quality and Daytime Sleepiness in Women: Findings from the 2007 National Sleep Foundation "Sleep in America Poll"
Unhealthy sleep causes complications such as fatigue, headaches, mood disorders, and....	SOUTH KOREA	Seo, Joon Sik; Lee, Jae Ho; Lee, Kang Kon	Lifestyle and Health State in Individuals with Frequent Nocturnal Sleep Interruption
Mental health and physical health improve with improved sleep quality.	JAPAN	Tanaka H, Shirakawa S.	Sleep health, lifestyle, and mental health in the old Japanese people - Ensuring sleep to promote a healthy brain and mind
Deteriorating sleep health is associated with worsening physical and mental health.	JAPAN	Taira K, Tanaka H, Arakawa M, Nagahama N, Uza M, Shirakawa S.	Sleep health and lifestyle of older people in Ogimi, a village of longevity

Sleep health is closely related to physical and mental health and is useful for maintaining and improving health.	JAPAN	Tanaka H, Taira K, Arakawa M, Masuda A, Yamamoto Y, Komoda Y, Kadegaru H, Shirakawa S	An examination of sleep health, lifestyle, and mental health in junior high school students
Unhealthy sleep is associated with poor health	JAPAN	Ohida T, Kamal AM, Uchiyama M, Kim K, Takemura S, Sone T, Ishii T.	The influence of lifestyle and health status factors on sleep loss among the general Japanese population
Healthy sleep eliminates toxins and wastes left over from the body's metabolism by cell metabolism. The cells then store the recovered energy and ability for the duration of the awakening.	IRAN	Mohammad Reza Rajabnezhad, Saeid Rajabnezhad, Fatemeh Rastegar, Shahriyar Nicknejad,	The Role of Sleep Functions in Human Health from the Perspective of the Holy Quran
Anxiety and depression are associated with poor sleep	INDIA	Rajkumar RP	COVID-19 and mental health: a review of the existing literature
Poor sleep hygiene, which aggravates and perpetuates sleep disorders, is associated with poor mental health.	ITALI	Zagaria, Andrea; Ballesio, Andrea; Musetti, Alessandro; et al.	Psychometric properties of the Sleep Hygiene Index in a Large Italian community sample

Table 2: Severe vulnerability to underlying diseases of covid-19

Result	Place of study	Author	Study
Patients with underlying cardiovascular disease are associated with increased COVID-19 mortality.	USA	Changal, Khalid; Mack, Sean; Verija, Spiro; et al.	In-hospital outcomes of COVID-19 infection in patients with underlying cardiovascular disease
People with heart failure, chronic lung disease, diabetes, etc., are at higher risk for COVID-19.	SOUTH KOREA	Choi, Yong Jun; Park, Ju-Young; Lee, Hye Sun; et al.	Variable effects of underlying diseases on the prognosis of patients with COVID-19
Chronic kidney disease, heart failure, and mental disorders increase the mortality of COVID-19.	SOUTH KOREA	Kim, Ejin; Kim, Yong Chul; Park, Jae Yoon; et al.	Evaluation of the Prognosis of COVID-19 Patients According to the Presence of Underlying Diseases and Drug Treatment
Patients with high blood pressure are more likely to be exposed to COVID-19.	TURKEY	Demirkol, Muhammed Emin; Kaya, Musa; Ozsari, Suleyman	Evaluating Laboratory Parameters of COVID-19 Cases With Underlying Chronic Diseases
Cardiovascular disease and chronic lung disease are at higher risk than COVID-19.	Canada	Willows, Steven; Alam, Syed Benazir; Sandhu, Jagdeep K.; et al.	A Canadian perspective on severe acute respiratory syndrome coronavirus two infections and treatment: how prevalent underlying inflammatory disease contributes to the pathogenesis
People with high blood pressure, dyslipidemia, diabetes, smokers, and the obese have a higher risk of COVID-19.	CUBA, ECUADOR, GERMANY, CHINA, ITALY	Nunez-Gil, Ivan J.; Fernandez-Ortiz, Antonio; Maroud Eid, Charbel; et al.	Underlying heart diseases and acute COVID-19 outcomes
Obesity is a major predisposing factor associated with coronavirus infection vulnerability.	IRAN	Abdollahi, Alireza; Sarvestani, Hasti Kamali; Rafat, Zahra; et al.	The association between the level of serum 25(OH) vitamin D, obesity, and underlying diseases with the risk of developing COVID-19
Factors such as aging, smoking, loss of consciousness, and underlying diseases such as heart disease and high blood pressure increase the risk of COVID-19.	IRAN	Zamaniah, Mohammadhossein; Foroozanfar, Zohre; Izadi, Zhila; et al.	Association of Underlying Diseases and Clinical Characteristics with Mortality in Patients with 2019 Novel Coronavirus in Iran
Underlying respiratory diseases, especially COPD and smoking, are associated with severe consequences of COVID-19	CANADA	Sanchez-Ramirez, Diana C.; Mackey, Denise	Underlying respiratory diseases, specifically COPD, and smoking are associated with severe COVID-19 outcomes: A systematic review and meta-analysis.
High blood pressure, cardiovascular disease, diabetes, smoking, chronic obstructive pulmonary disease (COPD), malignancy, and chronic kidney disease are the most common underlying diseases in the prevalence of COVID-19, respectively	IRAN	Emami, Amir; Javanmardi, Fatemeh; Pirbonyeh, Neda; et al.	Prevalence of Underlying Diseases in Hospitalized Patients with COVID-19: a Systematic Review and Meta-Analysis
There is a link between COVID-19 and people with depression, anxiety, and low immunity.	CHINA	Wu, Congchong; Zhou, Zhiying; Ni, Li; et al.	Correlation between anxiety-depression symptoms and immune characteristics in inpatients with 2019 novel coronavirus in Wuhan, China
People with substance use, depression, and social isolation have a worrying vulnerability during COVID-19.	USA	Fitzke, Reagan E.; Wang, Jennifer; Davis, Jordan P.; et al.	Substance use, depression, and loneliness among American veterans during the COVID-19 pandemic
People with unhealthy sleep quality and fatigue are more likely to be affected by a possible future epidemic.	SOUTH AFRICA, SPAIN, USA	Dilara Yuksel AND etal.	Sleeping when the world locks down: Correlates of sleep health during the COVID-19 pandemic across 59 countries

Discussion

This study is one of the first studies globally to bilaterally examine the impact of sleep health on underlying diseases and the vulnerability of underlying diseases from COVID-19. Based on the findings of Tables 1 and 2 both sleep health reactions and underlying diseases are directly related to the COVID-19 epidemic. On the other hand, Table 1 shows that unhealthy sleep alters the process of the body system and provides the basis for the occurrence of underlying diseases in the body, and makes the body susceptible to pathogens, including COVID-19, but healthy sleep prevents many underlying diseases by strengthening the immune system; On the other hand, the findings of Table 2 indicate that people with underlying diseases caused by unhealthy sleep and other factors are the more vulnerable to coronavirus. As a result, poor sleep conditions are one of the factors that cause underlying diseases in individuals and provide a predisposed ground for greater risk than COVID-19. Research has shown that unhealthy sleep makes the body system more susceptible to pathogens and is even associated with the individual's respiratory system.^{23, 24} It is severe and critical, according to research findings. People's vulnerability to this virus is directly related to the effectiveness of the body's immunity, lower infection rate, and higher body's immune response to disease.²⁵

On the other hand, Table 1 findings showed that unhealthy sleep is associated with adverse health consequences and chronic diseases such as cardiovascular disease, cancer, hypertension, obesity, and diabetes and psychological disorders such as depression, decreased activity, and weakening of the immune system, etc. On the other hand, the findings of Table 2 showed that underlying diseases, such as high blood pressure, diabetes, asthma, kidney failure, cardiovascular disease, weakened immune system, inactivity, and other high-risk diseases are some of the risk factors for COVID 19, increasing its morbidity and mortality. As a result, maintaining healthy sleep means maintaining overall physical and mental health, which can be critical to the vulnerability to COVID-19. Research in the same field confirms the findings of the two tables.^{12, 20, 26-33}

The findings also show that most scientific research on the effect of healthy and unhealthy sleep has been done in East Asian countries, especially China, Japan, and South Korea, and only one study has been done by EU member states. East Asian countries have a healthy lifestyle so one of the reasons for lower morbidity and mortality from COVID-19 in these countries might be healthy sleep. However, the EU member states, do not consider sleep health, leading to the underlying disease and higher morbidity and mortality than East Asia. Researchers have also shown that underlying diseases such as hyperlipidemia, hypertension, diabetes, heart failure, and chronic lung disease are

at greater risk for the trend of COVID-19 cure.³⁴⁻³⁶

Conclusion

Given the vulnerability of underlying diseases to coronavirus, one of the most important functional areas that should be considered, is sleep health; it can prevent the occurrence of underlying diseases. Also, earlier unhealthy lifestyle, such as unhealthy sleep during crises such as coronas, need to be reconsidered. Sleep health should be supported. Governments can benefit from the guidance of social agents, politicians, academics, health care professionals, and physicians, Providing people with the right methods to deal with unhealthy sleep to prevent the incidence and mortality of pandemics. Sleep health should be included in public health messages to help people maintain good mental and physical health and increase public awareness by using educational programs to present chronic problems caused by unhealthy sleep. Finally, the promotion and implementation of sleep health, as a protective factor in preventing and managing infectious diseases and other cases, is important in different communities. One of the reasons for lower morbidity and mortality of COVID-19 could be sleep health because Asian countries have paid more attention to sleep health. Hence, they are less vulnerable to COVID-19 than European countries that have paid less attention to this issue.

Conflicts of Interest: None declared.

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