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Review Article

The impact of smoking on sleep and quality of life: a comprehensive review

Pavan Kumar C. Muddanna, M. Kumaraswamy*

Department of Pharmacy Practice, Sri Adichunchanagiri College of Pharmacy, B. G. Nagara, Karnataka, India

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***Correspondence:**
Dr. M. Kumaraswamy,
E-mail: mkumaraswamy@accp.co.in

ABSTRACT

Smoking is so widespread and can have such detrimental effects on health that research on the effects of smoking on sleep quality and general quality of life in smokers and non-smokers has already attracted a lot of attention. Numerous research articles have examined the relationship between smoking and sleep, contrasting smokers and non-smokers in various demographic settings and examining the possible impacts of smoking on sleep habits and general quality of life. Data from the corpus of research on the topic is gathered for this review, including differences in the quality of sleep between smokers and non-smokers. Studies comparing smokers' and non-smokers' sleep quality frequently find differences in a variety of areas pertaining to sleep patterns and overall sleep health. An overview of this field's research may be seen below: Smokers often experience poorer sleep compared to non-smokers, with difficulties falling and staying asleep, shorter sleep durations, altered sleep architecture, an increased risk of sleep disorders, and impaired day-to-day functioning. These findings demonstrate how important it is to support smokers in quitting in order to improve their overall health and sleep quality. The summary of the review concluded that smoking can affect the overall quality of life and sleep of both smokers and non-smokers.

Keywords: Smoking, Non-smokers and smokers, Sleep quality

INTRODUCTION

Research consistently indicates that, compared to non-smokers, smokers often have lower-quality sleep. Smokers frequently complain about having trouble going to sleep, waking up a lot during the night, and getting less sleep overall. The stimulant-like properties of nicotine, the addictive ingredient in cigarettes, are known to disrupt the body's normal circadian rhythm. Nicotine's energizing effects might make it difficult for smokers to get deep, restorative sleep.[1] Smokers' sleep difficulties are further exacerbated by their increased risk of developing sleep disorders such as insomnia, restless legs syndrome, and sleep apnea. Research comparing the quality of sleep experienced by smokers and non-smokers consistently reveals variations in a number of areas related to sleep patterns and general sleep health. Below is a summary of the research in this area: compared to non-smokers, smokers frequently report higher sleep onset latency, which indicates that they take longer to fall asleep. Smokers are more likely to wake up during the night and have interrupted sleep continuity after they are asleep. It is important to get enough sleep since insufficient sleep can alter the production of many hormones, such as prolactin, growth hormone, and thyroid-stimulating hormone (TSH).[2]

Among the conditions for which obtaining too little sleep increases the risk are acute myocardial infarction, type 2 diabetes, hypertension, obesity, cancer, and depression.[4] It also affects knowledge states worldwide by lowering psychomotor vigilance, which encompasses perception, memory, emotion, and attention.[3]

For assessing sleep quality and disruptions across a month, the Pittsburgh sleep quality index (PSQI) is a popular tool.

It is used in both clinical and research settings and was created by University of Pittsburgh academics. Nineteen self-rated questions plus five roommate-rated questions (if available) make up the PSQI; however, the roommate ratings are not factored into the scoring process.[5]

The stimulant and addictive part of nicotine, nicotine, can tamper with the body's normal circadian rhythm. When trying to stop smoking, smokers may encounter withdrawal symptoms at night, such as cravings for nicotine and disruptions in their sleep patterns. The quality of sleep and general well-being might be further compromised by nicotine withdrawal, which can intensify sleep disruptions. Smoking increases the chance of developing respiratory conditions, including obstructive sleep apnea (OSA), which can disturb the architecture of sleep by generating sporadic breathing pauses. Smokers who have OSA may suffer from more severe sleep architecture abnormalities, such as decreased REM sleep and higher fragmentation of sleep.[6]

On the other hand, giving up smoking can significantly enhance sleep quality and ought to be supported as a component of all-encompassing efforts to reduce nicotine. In order to design focused therapies to address this important public health concern, more research is required to clarify the underlying mechanisms between smoking and sleep disorders, which is why this review aims to gather more data.[7]

METHODS

The information found in published articles, the features and guidelines specified in the advanced report data for reviews were followed by this review.

Search strategy

A methodical methodology produced a list of possible investigations. Articles were retrieved from Web of Science, Cochrane, Embase, Scielo, Medline via PubMed, Virtual Health Library (Biblioteca Virtual em Saude, BVS), and Scopus were the databases used to conduct the review. Language was not a barrier.

RESULTS

Selection and evaluation of studies

In the initial search, 2561 studies were located; after 1063 duplicates were removed, 1498 studies remained. 1488 studies were filtered based on their title and abstract. After the other research was submitted and satisfied the inclusion requirements, ten publications were included in the review.

Characteristics of included studies

There were ten papers in all, two from the US and one from each of China, Korea, Saudi Arabia, France, Spain, Japan, Brazil, and Canada. 3112 smokers, 97 ex-smokers, 559 passive smokers, and 2456 non-smokers made up the total of 6625 people. Each participant was more than twenty years old. The characteristics of the included studies are shown in Table 1.

The Pittsburgh sleep quality index (PSQI) was used in the selected studies to assess the sample's sleep quality: In order to evaluate the quality of sleep and related issues, the PSQI consists of 10 questions that are grouped around seven factors: subjective sleep quality, length, habitual sleep efficiency, sleep delay, use of sleep aids, and dysfunction during the day.

Higher ratings indicate bigger alterations in sleep quality, and scores above 5 already suggest dysfunction in sleep components.[8] There is a range of zero to twenty-one points in the total score derived from the seven criteria.

Table 1: Characterization of included studies (n=10).

Author	Year	Country	Instrument	Sample (n)	Age (mean)	Sleep quality
Hwang et al	2018	Korea	PSQI	224	65	>5
Dugas et al	2013	Canada	PSQI	405	24	>5
Arbinaga et al	2017	Spain	PSQI	116	20	>5
Al-Mishari et al	2017	Saudi	PSQI	73	26	>5
Toyama et al	2018	Japan	PSQI	1781	19	>5
Baugh et al	2022	USA	PSQI	1647	39	>5
Gunge et al	2020	USA	PSQI	217	35	>5
Allavena et al	2012	France	PSQI	1354	47	>5
Shan et al	2016	China	PSQI	146	40	>5
de Araújo et al	2014	Brazil	PSQI	662	20	>5

DISCUSSION

The major objective of the study is to show that nicotine use does have an impact on sleep, namely on its duration, quality, and maintenance. By changing the neurotransmitters involved in sleep, it also frequently results in sleep issues.[9] Our aim is to demonstrate how difficult it is to stop smoking in addition to these sleep-related problems. According to research, smokers' sleep is significantly impacted by their habit, as seen by their

higher PSQI score when compared to non-smokers.[10-13] Since younger people smoke less and are exposed to less nicotine than older people, it is thought that the larger sample sizes of young people in both studies corroborate these findings because they show fewer systemic signs of smoking that could interfere with sleep. In all three investigations by Dugas et al, Li et al, and Han et al, smokers had lower-quality sleep, although it was still within the normal range for both smokers and non-smokers.[14-16] This implies that a decrease in the quality of sleep could be associated with smoking.

It is believed that the amount of cigarettes smoked during the day and the degree of nicotine addiction are connected to the quality of sleep. Studies conducted by Hwang et al and Chehri et al show that smoking reduces the quality of sleep.[17,18] Low-quality sleep is reported by Öztürk et al, Asghari et al, and Fattahzadeh-Ardalani et al, in relation to increased nicotine dependence.[19-21] Nicotine, a component of cigarettes, is most likely responsible for these negative effects on the quality of sleep.[22] The organism's lowered nicotine content when it sleeps is what causes nighttime withdrawal from nicotine.[23] As a result, it manifests as nighttime awakenings and a decline in sleep quality.

Smoking was found to have the greatest impact on sleep latency among the factors impacting sleep quality.[24-31] Sleep latency is the time between being awake and falling asleep completely. It is hypothesized that smokers experience prolonged sleep latency periods due to nicotine's stimulant effects, which can increase sympathetic tone, excitement, and alertness.[32-34] Accordingly, nicotine postpones the onset of sleep and increases sleep latency. Farris et al stated that anxiety sensitivity in addition to heavy smoking (greater than or equivalent to 33 cigarettes per day) may cause sleep delay since withdrawal from nicotine may cause restlessness and anxiety.[35]

Moreover, Allavena et al, Allavena, Chen et al, Kluge et al, and Sun et al, have all shown a connection between smoking and sleep problems.[36-40] Nicotine, which is found in cigarette smoke, irritates the upper respiratory tract and results in symptoms including sleep apnea and snoring. Sleep quality is lowered by the discomfort these symptoms cause.[41,42] Smokers' subjective quality of sleep has been described as altered, their sleep efficiency has been altered in some studies, and their duration of sleep has been reported by seven authors to be decreased among smokers.[13-15,17,18,21,23,24,27] As a result, other aspects of sleep quality are also impacted.

Smoking promotes dysfunction during the day, according to studies by Wittekind et al, Kluge, Broussard et al, and Broussard et al.[43-46] It is believed that malfunction during the day is linked to dissatisfaction with nocturnal sleep brought on by other changes brought on by nicotine smoking, such as shorter sleep cycles and less effective sleep.[47] Smoking would therefore be an attempt to mitigate dysfunction during the day because of the excitatory effects of nicotine, which can make smokers' sleep worse.

Out of all the domains of sleep quality measured by the PSQI, the use of sleep aids resulted in the least significant changes, and those changes were only seen in two trials. Xu et al found that only female smokers used medication more frequently, while Li et al, only observed this effect in light and moderate smokers.[48,49] It is believed that smoking nicotine does not significantly enhance the use of sleeping medications because of this.[50]

Changes in the quality of sleep were more likely to be reported by women, stated increasing drug use and experiencing worse, more subjective sleep.[22,23] Reduced amount of time spent sleeping, especially in female smokers. Women may have poorer sleep quality than men because of social, cultural, and pharmacological stressors that are thought to influence them more than men. These gender differences in sleep quality may be the result of these stresses.

Research also raises the possibility that smoking is exacerbated by inadequate sleep, as noted by Fattahzadeh-Ardalani et al, and Chehri et al.[18,21] On the other hand, Danilov et al show how nicotine and cigarettes affect dopamine release, which inhibits sleep and suggests that dopamine is related to alertness.[25] When they are taken into account, the probability that smoking cigarettes is the cause of the previously indicated effects on sleep quality rises.

CONCLUSION

The lowest PSQI scores of smokers, which affect different portions of the scale, showed how smoking negatively affects sleep quality, as this review illustrated. Given this, the study highlights how crucial it is to inquire about patients' quality of life and associated aspects, such as sleep, during professional visits in order to perform relevant evaluations.

More study is advised, keeping in mind that actigraphy and polysomnography are innovative target techniques that allow for the assessment of sleep quality and the detection of other possible smoking-related changes in sleep quality.

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