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Original research article

The impact of nicotine dependence on sleep quality in outpatient clinic patients

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Abstract

Nicotine dependence is widely recognized as a major public health concern with far-reaching consequences for overall health. One area of particular interest is the impact of nicotine use on sleep quality, as previous research has suggested that substance use, including nicotine, is closely linked to sleep disturbances. This study aims to explore the effects of nicotine dependence on sleep quality in patients attending an outpatient clinic.

A cross-sectional study was conducted at the outpatient department of a tertiary care hospital. The study included 200 participants aged 18 years and older who were actively using tobacco products. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), while nicotine dependence was measured using the Fagerström Test for Nicotine Dependence (FTND).

The mean age of participants was 43.5 years, with a higher proportion of males (76%) compared to females (24%). The study found significant gender differences in sleep quality, with females reporting poorer subjective sleep quality, longer sleep latency, and more frequent sleep disturbances than males ($p < 0.001$). A significant inverse correlation was observed between the degree of nicotine dependence and sleep quality ($p<0.05$). Overall, 26.5% of participants scored above 5 on the PSQI, indicating poor sleep quality.

The findings of this study underscore the negative impact of nicotine dependence on sleep quality, with gender differences in the severity of sleep disturbances. These results highlight the importance of addressing nicotine dependence in the management of sleep disorders. Healthcare providers should consider integrating smoking cessation strategies into treatment plans for patients with sleep complaints to improve overall health outcomes.

Keywords: Nicotine dependence, sleep quality, Pittsburgh sleep quality index, fagerström test for nicotine dependence, gender differences, outpatient clinic

Introduction

Nicotine dependence is a widespread issue that can have significant implications for an individual's overall health and well-being (López-Torrecillas *et al*., 2014) (Chase & Hogarth, 2011). One area of particular concern is the potential impact of nicotine dependence on sleep quality. Research has consistently demonstrated a convincing link between substance abuse, including nicotine, and sleep problems. (Hasler *et al*., 2011)

Active smoking, smokeless tobacco, and secondhand smoke exposure have all been associated with insufficient sleep. (Chattu *et al*., 2018) Furthermore, the problems linked to inadequate sleep, such as reduced impulse control, attention span, and memory impairments, may exacerbate pre-existing mood disorders, which are frequently associated with severe sleep problems. This study aims to investigate the effects of nicotine dependence on sleep quality in patients attending an outpatient department.

A cross-sectional study was conducted at the outpatient department of a tertiary care hospital. Patients aged 18 years and above who were actively using tobacco products were included in the study. Sleep quality was assessed using the Pittsburgh Sleep Quality Index, a widely used and validated measure of

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sleep disturbance. Nicotine dependence was evaluated using the Fagerström Test for Nicotine Dependence.

Literature Review

Numerous studies have explored the relationship between nicotine dependence and sleep quality. One study found that patients presenting to a medical clinic with sleep complaints were more likely to have problems with drug and/or alcohol use, including nicotine, compared to those without sleep complaints. Another study highlighted the reciprocal and mutually facilitating effects of insufficient sleep and behavioral or emotional problems, including those associated with nicotine dependence. (Chattu *et al*., 2018) The current body of evidence suggests that nicotine dependence can have a significant impact on an individual's sleep quality, potentially exacerbating existing sleep disturbances and contributing to overall poor health outcomes.

Methodology

Study Design and Participants

- A cross-sectional study was conducted at the outpatient department of a tertiary care hospital.
- Patients aged 18 years and above who were actively using tobacco products were included in the study.
- Patients were excluded if they had any pre-existing sleep disorders or were taking medications that could affect sleep in the past 3 months
- And presence of any physical and/or mental illnesses, including alcohol or illegal substance abuse/dependence are excluded.

Measures and Procedures

- Sleep quality was assessed using the Pittsburgh Sleep Quality Index (Buysse *et al*., 1989), a widely used and validated measure of sleep disturbance.
- Nicotine dependence was evaluated using the Fagerström Test (Fagerstrom Test for Nicotine Dependence (FTND), 2020) for Nicotine Dependence.
- Data were collected through face-to-face interviews. Demographic information, including age, gender and education status was also obtained.
- The study was approved by the Institutional Ethics Committee, and informed consent was obtained from all participants.
- Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Bivariate analyses were conducted to examine the association between nicotine dependence and sleep quality, using appropriate statistical tests based on the distribution of the data. Spearman’s rho correlation was used to assess the relationship between the degree of nicotine dependence and sleep quality.
- The statistical analysis was performed using SPSS version 26. A p-value of less than 0.05 was considered statistically significant.

Results

The study enrolled a total of 200 participants, with a mean age of 43.50 (SD = 15.79) years. The sample was predominantly male (76%).

Demographic Characteristics

- **Age:** The average age of participants is 43.5 years, with an age range from 18 to 78 years. The sample includes individuals from various age groups, with a higher proportion of males compared to females, especially in the younger and older age groups.
- **Education Level:** The education levels of the participants vary, with the largest proportions having middle school (24.5% males, 7.5% females) and high school (24.5%) education. There are significantly more males than females in the lower education categories, and no females in the "graduated" (university-educated) category.
- **Marital Status:** The majority of the sample is married, with more males married compared to females. The unmarried and divorced/widowed categories also show a higher proportion of males than female.

The demographic and clinical characteristics of the study participants are presented in Table 1.

Table 1: Demographic variables

Variables	Overall	Male	Female
	(*n* = 200)	(*n* = 152)	(*n* = 48)
Age (yrs), M ± SD	43.50 ± 15.79	43.28 ± 15.76	43.79± 15.75
Range (yrs)	12–99	12–99	12–93

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18-19	5.50%	4.00%	1.50%
20-29	21.00%	16.50%	4.50%
30–39	18.50%	14.50%	4.00%
40–49	17.50%	12.50%	5.00%
50–59	18.50%	14.50%	4.00%
60-69	12.00%	9.00%	3.00%
> 70	7.00%	5.00%	2.00%
	100.00%	**76.00%**	**24.00%**
Education (yrs)			
Illiteracy or Primary school%	21.00%	12.00%	9.00%
Middle school	32.00%	24.50%	7.50%
High school	24.50%	21.50%	3.00%
Intermediate	13.50%	9.00%	4.50%
Graduated	9.00%	9.00%	0.00%
Marital status			
Married	71.50%	56.50%	17.00%
Unmarried	18.50%	13.00%	3.50%
Divorced or widowed	10.00%	6.50%	3.50%

Overall, participants reported mild sleep quality issues, with an average subjective sleep quality score of 0.82 ± 0.65. Females reported poorer subjective sleep quality compared to males, with an average score of 0.91 ± 0.66 for females and 0.79 ± 0.64 for males. This difference was statistically significant.

The average score for sleep latency was 0.77 ± 0.73, indicating moderate delays in falling asleep. Females took slightly longer to fall asleep, with an average score of 0.82 ± 0.75 compared to 0.75 ± 0.72 for males. This gender difference was statistically significant. 35.5% of participants fell asleep within 15 minutes, while the majority took 16-30 minutes. A small percentage (6.25% of females and 1.31% of males) took more than 60 minutes to fall asleep.

The average score for sleep duration was 0.58 ± 0.78, suggesting moderate sleep duration issues. Females reported shorter sleep duration, with an average score of 0.67 ± 0.81 compared to 0.55 ± 0.76 for males. This gender difference was statistically significant. 46.5% of participants slept more than 7 hours, with more males than females in this category. 12.5% of females slept less than 5 hours, compared to 1.32% of males.

The average score for sleep disturbances was 0.78 ± 0.55, indicating moderate disturbances. Females experienced more frequent sleep disturbances, with an average score of 0.86 ± 0.52 compared to 0.75 ± 0.56 for males. This gender difference was statistically significant.

The study found that participants overall experienced moderate daytime impairment due to poor sleep, with an average score of 0.88 ± 0.84. Females reported more daytime dysfunction compared to males, with an average score of 1.00 ± 0.86 versus 0.84 ± 0.83 for males. This gender difference was statistically significant, indicating that females had more difficulty in daily functioning due to sleep problems.

Table 2: Score of the PSQI components and PSQI total score in overall participants

Variables	**Total**	**Male**	**Female**	***P****
	(*n* = 200)	**(*n* = 152)**	**(*n* = 48)**	
Subjective sleep quality, M ± SD	0.82 ± 0.65	0.79 ± 0.64	0.91 ± 0.66	< 0.001
Sleep latency, M ± SD	0.77 ± 0.73	0.75 ± 0.72	0.82 ± 0.75	< 0.001
≤15 min, %	35.50%	36.19%	33.33%	–
16-30 min, %	52.50%	53.95%	47.92%	–
31-60 min, %	9.50%	8.55%	12.50%	–
> 60 min, %	2.50%	1.31%	6.25%	–
Sleep duration, M ± SD	0.58 ± 0.78	0.55 ± 0.76	0.67 ± 0.81	< 0.001
> 7 h, %	46.50%	48.68%	39.58%	–
5–7 h, %	49.50%	50.00%	47.91%	–
< 5 h, %	4.00%	1.32%	12.50%	–
Sleep disturbance, M ± SD	0.78 ± 0.55	0.75 ± 0.56	0.86 ± 0.52	< 0.001
Need for sleep medications, M ± SD	0.11 ± 0.38	0.11 ± 0.37	0.12 ± 0.42	0.807
Not during the past month, %	91.50%	92.10%	89.58%	–
Less than once a week, %	6.50%	5.93%	8.34%	–
Once or twice a week, %	1.50%	1.32%	2.08%	–
≥3 times a week, %	0.50%	0.65%	0.00%	–
Daytime dysfunction, M ± SD	0.88 ± 0.84	0.84 ± 0.83	1.00 ± 0.86	< 0.001
PSQI total score, M ± SD	4.26 ± 2.67	4.11 ± 2.62	4.72 ± 2.75	< 0.001
sleep disturbances (PSQI > 5), %	26.50%	24.50%	32.70%	< 0.001

The overall average PSQI total score was 4.26 ± 2.67, suggesting that the sample as a whole experienced

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moderate sleep quality issues. Females reported worse overall sleep quality, with a slightly higher average total score of 4.72 ± 2.75 compared to 4.11 ± 2.62 for males. This gender difference was also statistically significant.
Furthermore, 26.5% of the total sample scored above 5 on the PSQI, which is considered an indicator of poor sleep quality. A higher percentage of females reported poor sleep quality compared to males, and this gender difference was statistically significant.

Discussion

The present study found a significant inverse correlation between the degree of nicotine dependence and sleep quality among patients attending an outpatient department. These findings are consistent with previous research that has demonstrated the detrimental effects of nicotine dependence on sleep quality. (Köksal & Sağlam, 2022) Chronic nicotine use can also lead to withdrawal symptoms, including sleep disturbances, which can further exacerbate the problem. (Chase & Hogarth, 2011) Furthermore, the problems linked to inadequate sleep, such as reduced impulse control, attention span, and memory impairments, may exacerbate pre-existing mood disorders, which are frequently associated with severe sleep problems.
The findings of this study underscore the importance of addressing nicotine dependence in the management of sleep disorders. Comprehensive interventions that target both nicotine dependence and sleep quality may be more effective in improving overall health outcomes in this patient population (Chattu *et al*., 2018) (Giannaki *et al*., 2024).
Many studies have found gender differences in sleep quality, with women generally experiencing poorer sleep outcomes than men, consistent with the results of this study.
Several studies have reported gender differences in sleep quality, with females generally experiencing poorer sleep outcomes than males, which aligns with the results of this study. Some studies found that women reported poorer sleep quality and higher rates of insomnia compared to men, especially as women age. The authors suggested that hormonal changes during perimenopause and menopause may contribute to the gender differences in sleep.(Pusalavidyasagar *et al*., 2018).
Kravitz *et al*., found similar gender differences in subjective sleep quality. Their study showed that women reported more sleep disturbances and poorer sleep quality than men (Kravitz *et al*., 2003), especially in middle-aged and older populations. These results are consistent with this study's finding that females reported worse subjective sleep quality.
In some studies women have significantly longer sleep latency compared to men (Guidozzi, 2015). They concluded that psychological and hormonal factors might contribute (Mallampalli & Carter, 2014) to delayed sleep onset in women.

Limitations

- **Cultural Context:** Differences in gender roles, social expectations, and lifestyle factors in various cultural settings can lead to varying sleep quality outcomes between men and women.
- **Age and Health:** Sleep quality is influenced by age, health conditions, and hormonal changes, which may not be consistently accounted for across studies.
- **Measurement Approach:** Variations in the tools used to assess sleep quality can result in differing conclusions, especially when relying on self-reports that may introduce biases in gender comparisons.
- **Sample Characteristics:** The specific demographics of the study populations, such as focusing on young adults versus older adults or those with specific health conditions, can affect the observed gender differences in sleep quality.

Conclusion

The present study demonstrates a significant inverse correlation between the degree of nicotine dependence and sleep quality among patients attending an outpatient department. These findings highlight the need for healthcare providers to routinely assess and address nicotine dependence in patients with sleep-related complaints. Comprehensive interventions that target both nicotine dependence and sleep quality may be crucial in improving overall health outcomes in this patient population.
The findings of this study underscore the importance of addressing nicotine dependence in the management of sleep disorders.

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