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Sexual dysfunction among tobacco abuse patients

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Abstract
Background: Tobacco use is a leading preventable cause of global morbidity and mortality, responsible for over 8 million deaths annually. Despite public health efforts, smoking remains prevalent, particularly among men. It is linked to various health issues, including cardiovascular diseases, respiratory disorders, and cancers, and significantly impacts male sexual health, contributing to erectile dysfunction (ED), reduced libido, and premature ejaculation. ED, the inability to maintain an erection, is the most commonly reported issue. Smoking-induced sexual dysfunction is primarily due to vascular impairment, hormonal changes, and psychological effects, with smoking cessation improving erectile function.
Aim of the study: This study aims to investigate the prevalence of sexual dysfunction among male tobacco users.
Methods: This cross-sectional observational study was conducted at the Department of Psychiatry, Medical College for Womens and Hospital, Dhaka, Bangladesh from January 2024 to December 2024. A purposive sampling method was used to enrol 110 married male participants, aged 18 and above, who were current or former tobacco users. Exclusion criteria included individuals with unrelated psychiatric conditions or substance abuse. Data were collected through a structured questionnaire assessing demographic details, tobacco use history, and sexual dysfunction using the IIEF. Associated risk factors such as diabetes, hypertension, and obesity were analyzed using logistic regression. Statistical analysis was performed with SPSS, and results were considered significant at $p \leq 0.05$.
Result: A total of 110 participants were included, with the majority in the 26-35 age group (27.27%). The most common education level was secondary (45.45%), and most participants were employed (68.18%). Tobacco use was prevalent, with 72.73% smoking cigarettes and 63.64% using tobacco daily. Sexual dysfunction was reported by 63.64%, with erectile dysfunction being the most common (40.91%). Diabetes, obesity, depression, cardiovascular disease, and hypertension were identified as significant risk factors, with diabetes showing the highest odds ratio (OR = 2.5). The study highlights the significant prevalence of sexual dysfunction and its associated risk factors.
Conclusion: This study reveals a high prevalence of sexual dysfunction in tobacco users, with 63.64% reporting issues, primarily erectile dysfunction and decreased libido. Long-term daily tobacco use, along with comorbidities like diabetes, hypertension, and depression, significantly contribute to sexual health deterioration.

Keywords: Sexual dysfunction, tobacco abuse and infertility

Introduction

Tobacco abuse is widely recognized as the leading preventable cause of morbidity and premature mortality worldwide, contributing to a significant burden on global public health [1]. According to the World Health Organization (WHO), tobacco use accounts for over 8 million deaths annually, with the majority attributed to direct smoking and a smaller proportion from secondhand smoke exposure (WHO, 2021) [2]. Despite extensive efforts to reduce tobacco use through public health campaigns and regulations, the prevalence of smoking remains high, particularly among adult males [3]. Smoking is well-documented as a contributor to a variety of health issues, including cardiovascular diseases (CVDs), respiratory disorders, and various forms of cancer [4, 5]. Beyond its well-documented health hazards, tobacco use profoundly impacts men's sexual health, elevating the risks of erectile dysfunction, diminished libido, and premature ejaculation, all of which significantly impair overall quality of life [6, 7]. Among these, ED, or the inability to achieve or maintain a penile erection sufficient for sexual intercourse, is the most commonly reported issue [8].

Numerous studies have established a significant association between tobacco use and erectile dysfunction (ED), emphasizing smoking as an independent risk factor [9]. Cross-sectional and longitudinal research has consistently demonstrated that smoking contributes to the development and progression of sexual dysfunction in both men and women [10]. Furthermore, a dose-response relationship highlights those higher levels of cigarette exposure correlate with increased risk and severity of sexual dysfunction [11]. Moreover, smoking cessation has been shown to improve erectile function, highlighting the reversibility of some of the tobacco-related damage to sexual health [8]. The physiological mechanisms underlying tobacco-induced sexual dysfunction are multifactorial. Nicotine and other harmful chemicals in tobacco smoke impair vascular function by damaging the endothelium and reducing nitric oxide bioavailability, which is crucial for achieving and maintaining an erection [12]. Tobacco smoke increases the production of superoxide anions, which inactivate nitric oxide, thereby further exacerbating erectile difficulties [13]. Additionally, smoking alters the function of key enzymes involved in vasodilation, such as endothelial nitric oxide synthase (eNOS) and neuronal nitric oxide synthase (nNOS), leading to endothelial dysfunction and reduced blood flow to the genital area [14]. Beyond its vascular effects, smoking also influences hormonal levels, including a reduction in testosterone, which plays a crucial role in sexual arousal and performance [15]. This hormonal alteration, combined with the vascular impairments, creates a compounded risk for sexual dysfunction in male smokers. Additionally, the psychological consequences of smoking-induced sexual dysfunction such as stress, anxiety, and lowered self-esteem can perpetuate a vicious cycle that further diminishes sexual health [16]. Epidemiological studies consistently support the association between tobacco use and the onset of sexual dysfunction. For instance, a large-scale study by Wu *et al*. (2012) found that smokers had a significantly higher prevalence of ED compared to non-smokers, with the severity of dysfunction worsening as the quantity and duration of smoking increased [17]. These findings suggest that the negative effects of tobacco on sexual health are cumulative, with long-term smokers being at the highest risk for developing sexual dysfunction. Given the substantial impact of tobacco use on male sexual health, this study aims to investigate the prevalence of sexual dysfunction among male tobacco users.

Methodology & Materials

This comprehensive cross-sectional observational study was meticulously conducted at the Department of Psychiatry, Medical College for Womens and Hospital, Dhaka, Bangladesh from January 2024 to December 2024. Using a purposive sampling approach, the study enrolled a carefully selected cohort of 110 married male patients to investigate the prevalence, types, and associated risk factors of sexual dysfunction attributed to tobacco abuse. The recruitment process followed rigorously defined inclusion and exclusion criteria to ensure clinical relevance, maintain homogeneity within the study population, and enhance the reliability of the findings.

Inclusion Criteria

The study included adult males aged 18 years and above who were current or former users of any form of tobacco, whether smoked or smokeless.

Exclusion Criteria

Participants were excluded if they had no history of tobacco use, were diagnosed with pre-existing psychiatric conditions unrelated to tobacco use that could independently influence sexual dysfunction, and used other substances, such as alcohol or recreational drugs, that could affect sexual function.

Data Collection

Data collection was conducted using a structured questionnaire designed to comprehensively capture demographic details, tobacco use history, sexual dysfunction characteristics, and associated risk factors. Demographic information included age, educational level, and occupation, while tobacco use history encompassed duration, type (e.g., cigarettes, smokeless tobacco, or both), and frequency of use (e.g., daily, weekly, or occasional). Sexual dysfunction was assessed using the International Index of Erectile Function (IIEF) alongside supplementary questions targeting libido, ejaculatory function, and orgasmic ability, with dysfunction classified such as erectile dysfunction (ED), decreased libido, premature ejaculation, delayed ejaculation, and inability to achieve orgasm. Each participant's history of sexual dysfunction was evaluated in terms of its duration and frequency. Additionally, risk factors such as diabetes, hypertension, cardiovascular disease, depression, and obesity were recorded, and their associations with sexual dysfunction were analyzed using odds ratios (OR). Participants were thoroughly informed about the study's objectives and methodology, and written consent was obtained before participation, ensuring confidentiality and ethical compliance. Ethical approval was obtained from the institutional ethics review board before initiating the study.

Statistical Analysis

The collected data were systematically organized into tables and figures for enhanced clarity. Statistical analyses were performed using SPSS software (version 26) to identify trends and associations. Categorical variables were presented as frequencies and percentages, while logistic regression analysis determined associations between sexual dysfunction and risk factors. Results were reported as odds ratios (OR) with 95% confidence intervals (CI). A p-value of ≤ 0.05 was considered statistically significant, ensuring the robustness of the study's conclusions.

Results

A total of 110 participants were included in the study. The majority belonged to the 26-35 age group (27.27%), followed by the 36-45 age group (22.73%). Both the 46-60 and >60 age groups constituted 18.18%, while the 18-25 age group comprised 13.64%. Regarding educational levels, 45.45% had completed secondary education, 27.27% had tertiary education, 22.73% had primary education, and 4.55% had no formal education. Employment status revealed that 68.18% were employed, 13.64% were students, while unemployed and retired individuals each accounted for 9.09% (Table 1). Tobacco abuse history indicated that 40.91% of participants had used tobacco for 6-10 years, 36.36% for 1-5 years, 18.18% for more than 10 years, and 4.55% for less than one year. Most participants

(72.73%) smoked cigarettes, 22.73% used smokeless tobacco, and 4.55% used both. Daily use was reported by 63.64%, weekly by 22.73%, occasional use by 9.09%, and 4.55% were former users (Table 2). The prevalence of sexual dysfunction in the study population was 63.64%, as shown in Figure 1. Among the 70 participants assessed, erectile dysfunction was the most common type (40.91%), followed by decreased libido (22.73%). Premature ejaculation was reported by 9.09%, and both delayed ejaculation and inability to achieve orgasm by 4.55% each. Symptom duration of 1-6 months was noted in 27.27% of participants, while 18.18% experienced symptoms for less than one month. Durations of 6-12 months and over 12 months were each reported by 9.09%. Frequency data showed that 31.82% experienced sexual dysfunction consistently, 22.73% frequently, and 4.55% occasionally or rarely (Table 3). Table 4 presents the identified risk factors in the study, with diabetes exhibiting the highest odds ratio (OR) at 2.5 (95% CI: 1.5–4.0), followed by obesity with an OR of 2.4 (95% CI: 1.6-3.6). Depression showed an OR of 2.3 (95% CI: 1.6-3.5), cardiovascular disease had an OR of 2.1 (95% CI: 1.1-3.8), and hypertension had an OR of 2.0 (95% CI: 1.3-3.2).

Table 1: Demographical characteristics of the study population (N=110)

Variables	Frequency (N)	Percentage (%)
Age Group		
18-25	15	13.64
26-35	30	27.27
36-45	25	22.73
46-60	20	18.18
>60	20	18.18
Educational Level		
No formal education	5	4.55
Primary	25	22.73
Secondary	50	45.45
Tertiary	30	27.27
Occupation		
Unemployed	10	9.09
Employed	75	68.18
Student	15	13.64
Retired	10	9.09

Table 2: Tobacco abuse history of the study population (N=110)

Variables	Frequency (N)	Percentage (%)
Duration of Tobacco Use		
<1 year	5	4.55
1-5 years	40	36.36
6-10 years	45	40.91
>10 years	20	18.18
Type of Tobacco Used		
Cigarettes	80	72.73
Smokeless tobacco	25	22.73
Both	5	4.55
Frequency of Tobacco Use		
Daily	70	63.64
Weekly	25	22.73
Occasionally	10	9.09
Former user	5	4.55

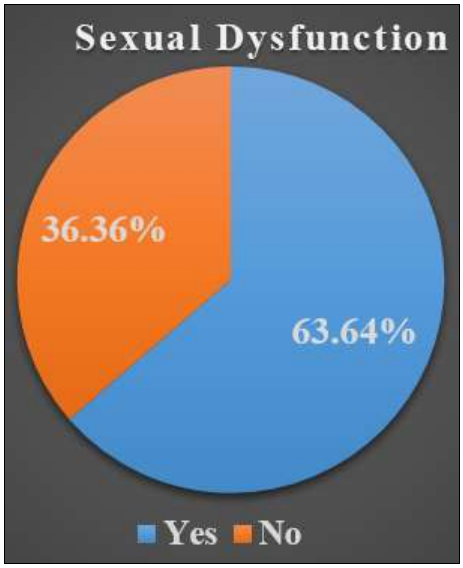

Fig 1: Prevalence of sexual dysfunction within the study population.

Table 3: Prevalence, Duration, and Frequency of Sexual Dysfunction in the Study Population (N=70)

Variables	Frequency (N)	Percentage (%)
Type of Sexual Dysfunction		
Erectile Dysfunction	45	40.91
Decreased Libido	25	22.73
Premature Ejaculation	10	9.09
Delayed Ejaculation	5	4.55
Inability to Achieve Orgasm	5	4.55
Duration of Sexual Dysfunction		
<1 month	20	18.18
1-6 months	30	27.27
6-12 months	10	9.09
>12 months	10	9.09
Frequency of Sexual Dysfunction		
Always	35	31.82
Frequently	25	22.73
Occasionally	5	4.55
Rarely	5	4.55

Table 4: Risk factor of the study

Risk Factor	Odds Ratio (OR)	95% (CI)
Diabetes	2.5	(1.5-4.0)
Hypertension	2	(1.3-3.2)
Cardiovascular Disease	2.1	(1.1-3.8)
Depression	2.3	(1.6-3.5)
Obesity	2.4	(1.6-3.6)

Discussion

This study provides critical insights into the demographic and clinical characteristics of tobacco abuse population. Addressing sexual dysfunction is a vital aspect of healthcare, as male sexual health is increasingly recognized as a significant determinant of overall well-being and quality of life [18-20]. Sexual dysfunction is not only prevalent but also a chronic condition affecting individuals globally, particularly those engaged in substance abuse, including tobacco use [21, 22]. This study, involving 110 participants, comprehensively explored the prevalence, types, and associated risk factors of sexual dysfunction. Consistent with previous research, sociodemographic factors such as age and education level demonstrated a significant influence on sexual health outcomes [23]. Most participants in our

study were between 26 and 35 years old (27.27%), which aligns with findings by Wen *et al*. (2017) and Diehl *et al*. (2016) suggesting that younger adults are more vulnerable to tobacco use and its health-related complications, including sexual dysfunction [10, 24]. Educational attainment further highlighted a concerning trend, with nearly half (45.45%) of participants having only a secondary education level. Lower education levels are well-documented risk factors for increased tobacco consumption and related health issues, as supported by other studies [24, 25]. Sexual dysfunction results from a combination of biological and psychosocial factors. Psychosocial factors often play dual roles as both causes and consequences of substance misuse [26]. Age, in particular, is a predictive factor, with erectile dysfunction (ED) being more prevalent in older individuals [20, 27]. In this study, 40.91% of participants reported ED, making it the most common type of sexual dysfunction. This finding is consistent with prior studies, including those by Karlıbel *et al*. (2019) and Sahin *et al*. (2020), which attribute high rates of ED among smokers to vascular and psychological factors exacerbated by nicotine dependence [28, 29]. The duration and frequency of tobacco use are critical factors influencing sexual health. Our study found that 40.91% of participants had used tobacco for 6-10 years, with cigarettes being the most common form (72.73%). Furthermore, 63.64% reported daily tobacco use, a behavior strongly associated with higher rates of sexual dysfunction [28, 30]. Research has demonstrated that heavy smokers experience significantly higher rates of ED compared to light or non-smokers [28, 30]. Sexual dysfunction was persistent among participants, with 27.27% reporting symptoms lasting 1-6 months, and 31.82% experiencing dysfunction consistently. These findings echo studies such as Foresta *et al*. (2004), which identified high rates of sexual dysfunction (27%) among male tobacco users [31]. Comorbidities further compound the issue of sexual dysfunction in tobacco users. This study revealed significant associations with conditions such as diabetes (OR = 2.5), hypertension (OR = 2.0), and depression (OR = 2.3), aligning with existing literature that highlights the interplay between these conditions and sexual health issues [30]. Nicotine's detrimental effects on the cardiovascular system and hormonal balance specifically testosterone and estrogen levels further exacerbate sexual dysfunction risk. Chronic smokers face up to a 2.3-fold increase in the likelihood of developing ED [32-34].

Limitations of the study: This study has several limitations. The reliance on self-reported data introduces the potential for recall bias and social desirability bias, especially regarding tobacco use and sexual dysfunction. Additionally, the study did not account for all possible confounding variables, such as genetic predispositions or other lifestyle factors, which may impact sexual health outcomes.

Conclusion

In conclusion, this study highlights the significant prevalence of sexual dysfunction among tobacco abuse patients, with 63.64% of participants reporting some form of dysfunction. Erectile dysfunction (ED) was the most commonly reported issue, followed by decreased libido. Tobacco use, especially long-term and daily consumption, was strongly associated with sexual health deterioration. Additionally, comorbid conditions such as diabetes, hypertension, and depression were identified as major risk factors.

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Conflict of interest: None declared.

Ethical approval: The study was approved by the Institutional Ethics Committee.

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