

Investigating the Link between Smoking and Cognitive Function in Elderlies

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DOI: <https://doi.org/10.3329/jafmc.v20i2.80410>

Abstract

Background: As we age, our cognitive abilities can decline, making everyday tasks more challenging. This decline is often linked to health behaviors throughout life. By adopting healthy habits in youth and adulthood, we may be able to improve our cognitive function later in life and reduce the risk of cognitive impairment.

Objective: This study specifically investigates whether smoking, a common habit, has a negative impact on the cognitive function of older adults.

Methods: This cross-sectional study was conducted among 120 elderly adults aged 60 years or above residing in Savar Upazila, Dhaka from July to September' 2023. respondents were included by convenience sampling method. Data were collected by face-to-face interview with a semi-structured questionnaire where cognitive functional status was observed through MMSE (Mini-Mental State Examination) scale and their smoking status was also recorded.

Results: Over half of the participants (55.8%, n=67) reported using tobacco, with smoking (34.2%, n=41) being more prevalent than smokeless tobacco use (21.7%, n=26). Interestingly, the majority of tobacco users (31.7%, n=38) had a long history of consumption, exceeding 21 to 50 years. Smokers had a significantly higher prevalence of mild cognitive impairment (35.8%) compared to non-smokers (13.2%). The study revealed statistically significant relationship ($p<0.05$) between the length of time individuals smoked and their level of cognitive impairment.

Conclusion: The prevalence of smoking among older adults is alarmingly high and poses a significant risk to cognitive health. Urgent action is needed to implement effective tobacco control measures.

Keywords: Smoking, Tobacco use, Cognitive Function, Cognitive Impairment.

Introduction

The natural course of aging brings changes to both our bodies and minds. These changes can make it more difficult to manage daily activities and increase susceptibility to various

health conditions.¹ The World Health Organization (WHO) emphasizes "healthy aging" as the ability to maintain functional independence and pursue desired activities throughout our later years.²

One of the most significant challenges to healthy aging is cognitive decline, a gradual loss of thinking skills that can significantly impact a person's quality of life. This decline becomes particularly concerning as the global population ages, with a growing number of individuals experiencing cognitive impairment.³ Estimates suggest that around 50 million people worldwide live with this condition, with a higher prevalence observed in low- and middle-income countries. Dementia, a severe form of cognitive decline, affects 5-8% of individuals over 60 and this number is projected to increase to 152 million by 2050.⁴

The consequences of cognitive decline are far-reaching, impacting individuals, their families, and society as a whole. It can lead to a cascade of physical, mental, social and economic challenges. In the absence of a definitive cure for most cognitive disorders, researchers have shifted their focus towards identifying and modifying risk factors as a preventative strategy.^{5,6}

Smoking has been definitively linked to a wide range of age-related health problems. Growing evidence suggests that it can also contribute to cognitive decline in older adults. Smokers frequently report difficulties with memory, reasoning and sleep quality.^{7,8}

Given the unique demographic and cultural factors in our country, it is imperative to conduct local research on the impact of smoking on cognitive decline in our elderly population. This will enable us to develop tailored public health interventions to protect the cognitive health of our citizens.

Materials and Methods

This research, conducted in 2023, explored the potential link between smoking and cognitive function in elderly residents of Savar Upazila, Dhaka district, Bangladesh. Employing a cross-sectional design, the study recruited 120 participants aged 60 and above who fulfilled specific eligibility criteria.

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Convenience sampling, a non-probability sampling technique, was used for participant selection. To assess cognitive impairment, the primary outcome variable, the well-respected Mini-Mental State Examination (MMSE) was utilized.⁹ It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall and language. A score of 24 or higher typically indicates normal cognition while scores between 19 and 23 suggest mild cognitive impairment. Moderate cognitive impairment is often reflected in scores between 10 and 18 and severe impairment is indicated by a score of 9 or below. For this study, participants were categorized as: normal (MMSE ≥ 24), mild impairment (MMSE 19-23) and moderate/severe impairment (MMSE ≤ 18). Due to limited moderate and severe cases, these were combined together for analysis, enabling stronger comparisons between normal and impaired participants.

Prior to commencing interviews, researchers obtained informed written consent from each participant. They explained the study's purpose, objectives and the voluntary nature of participation, emphasizing the right to withdraw at any point. Additionally, assurances were provided regarding the confidentiality and anonymity of all information collected.

This study was done after taking due clearance from Institutional Review Board (IRB). Stringent protocols were implemented for data collection, processing, entry, and analysis to guarantee the accuracy and reliability of the findings. IBM SPSS v25, a leading software program in social sciences, was used for thorough data analysis. The results were then presented in a clear and concise format using tables and charts for optimal understanding.

Results

Table-I: Smoking profile of the respondents (n=120)

Attributes		Frequency (%)
Smoker	Yes	67 (55.8)
	No	53 (44.2)
Type of tobacco consumption	Smoking	41 (34.2)
	Smokeless	26 (21.7)
Duration of tobacco consumption	20 years or less	22 (18.3)
	21 to 50 years	38 (31.7)
	More than 50 years	7 (5.8)

The study revealed a significant presence of tobacco use among the participants. Over half (55.8%) reported consuming some form of tobacco. Direct smoking was the most common method, used by 34.2% of the participants. Smokeless tobacco use was less prevalent, accounting for 21.7%. Looking deeper at the smoking group, we can see a breakdown of their smoking duration. Nearly a fifth (18.3%) had a smoking history of less than 20 years. The largest group (31.7%) reported smoking for 21 to 50 years. A smaller group (5.8%) had smoked for over 50 years (Table-I).

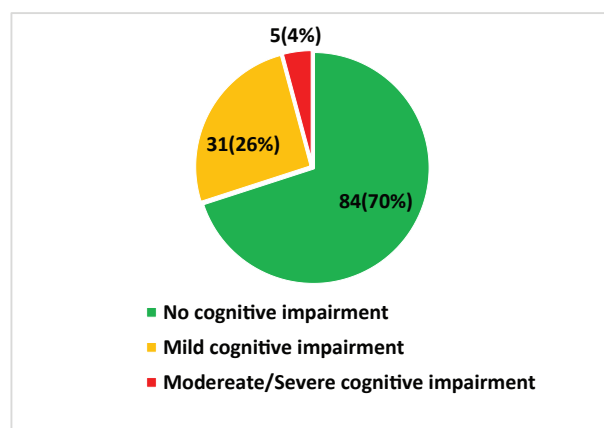


Figure-1: Cognitive Impairment Status of the Respondents.

The cognitive function assessment revealed a diverse distribution among the participants. The majority of participants (70%) showed no signs of cognitive impairment. However, a significant portion (26%) exhibited mild cognitive impairment. A smaller group (4%) displayed signs of moderate/severe cognitive impairment (Figure-1).

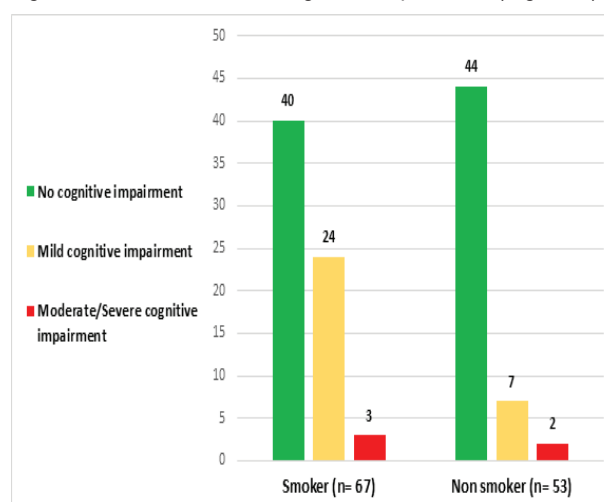


Figure-2: Distribution of Cognitive Impairment according to Smoking Status.

The study found a clear difference in cognitive function between smokers and non-smokers. Among smokers, 59.7% exhibited no cognitive impairment compared to non-smokers (83.0%). The prevalence of mild cognitive impairment was found to be higher among smokers (35.8%) compared to non-smokers (13.2%). This trend continued with severe cognitive impairment, where 4.5% of smokers were affected compared to only 3.8% of non-smokers (Figure-2).

The study identified a significant association ($p < 0.05$) between duration of smoking and cognitive impairment (Table-II). This suggests that both smoking and the length of time someone smokes may be important factors contributing to cognitive decline in this population.

Table-II: Relationship between smoking profile and cognitive status among the smokers of the study population (n=67)

Smoking profile		Cognitive status			P-value*
		No Cognitive Impairment (n=40)	Mild Cognitive Impairment (n=24)	Severe Cognitive Impairment (n=3)	
Type of tobacco consumption	Smoking	28 (70.0)	11 (45.8)	2 (66.7)	0.154
	Smokeless	12 (30.0)	13 (54.2)	1 (33.3)	
Duration of tobacco consumption	20 years or less	20 (50.0)	1 (4.2)	1 (33.3)	0.000
	21 to 50 years	15 (37.5)	22 (91.7)	1 (33.3)	
	More than 50 years	5 (12.5)	1 (4.2)	1 (33.3)	

* p-value reached from Chi-square test after adjusting with Fisher's exact (p-value <0.05 is considered to be significant)

Discussion

This study examined the relationship between tobacco use and cognitive function in a group of older adults living in a semi-urban area of Dhaka district, Bangladesh. The results of this study offer a deeper understanding of local patterns related to this pressing public health concern.

The research revealed a troubling prevalence of tobacco use among participants, with approximately 56% reporting tobacco consumption. This aligns with national data highlighting the high rates of tobacco use, particularly smoking, among adult males in Bangladesh. Compared to neighboring countries like Pakistan and Nepal, Bangladesh exhibits a higher prevalence, although it falls short of India's even more significant issue.¹⁰⁻¹²

Notably, the study revealed a disparity in the types of tobacco used by participants, with direct smoking being the most common followed by smokeless tobacco, where direct smoking was the more common method and reported by 38% respondents and smokeless tobacco use by 16% respondents. This contrasts with national data, which shows a higher prevalence of smokeless tobacco use among older adults.¹³ These discrepancies may be attributed to regional variations or methodological differences between the studies. Further research exploring the specific types of smokeless tobacco and their potential impact on cognitive function is warranted.

In addition to assessing tobacco use, the study focused on evaluating the cognitive function of participants. A significant number (26%) were found to have mild cognitive impairment, with a smaller group (4%) demonstrating severe impairment. These findings are in line with a previous national study in Bangladesh that examined the prevalence and predictors of cognitive decline among the elderly which also identified tobacco consumption as a contributing factor.¹⁴

The research team explored in more detail, analyzing the association between smoking habits (both current status and duration of smoking) and cognitive function. Their research that suggests a link between smoking and an

increased risk of dementia. Longitudinal studies have consistently shown that smokers face a higher likelihood of developing dementia compared to non-smokers.¹⁵

Conclusion

These findings from the present study in Dhaka's semi-urban area resonate with broader public health concerns. Given the high prevalence of tobacco use and its detrimental effects on cognitive health in older adults, urgent and comprehensive tobacco control measures are essential to protect the well-being of our aging population. Public awareness campaigns promoting smoking cessation alongside readily available support programs for those seeking to quit are crucial steps. Additionally, further research investigating the specific mechanisms by which smoking impact's cognitive function can inform the development of targeted interventions.

By delving deeper into local trends and contributing to the global understanding of the link between smoking and cognitive deterioration, this study offers valuable insights for policymakers and healthcare professionals in Bangladesh. Implementing effective tobacco control measures and promoting healthy aging initiatives can significantly improve the quality of life for older adults while reducing the burden on the healthcare system.

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