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Original Research Paper

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COVID-19 LOCKDOWNS AND TOBACCO USE AMONG PRIVATE UNIVERSITY STUDENTS IN DHAKA, BANGLADESH

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ABSTRACT The current study was aimed to investigate the changes in tobacco usage and their correlations among students from a private university in Dhaka, Bangladesh, during the lockdown periods due to the COVID-19 pandemic. It is designed as a cross-sectional study in which 572 students participated, among which 207 were smokers, in a self-administered online survey on Google Classrooms through Google forms. The socioeconomic characteristics of the participants, COVID-19, and tobacco use-related information were collected using a close-ended questionnaire. Participating students were asked if their tobacco consumption had changed during the COVID-19 lockdowns compared to before the pandemic. Among the smokers, 31.9% stated an increase in tobacco use in the extended lockdown periods imposed by the authorities to contain coronavirus infection and the rest had no change in such behavior. Tobacco intake in the form of cigarette smoking was substantially increased among the participants who thought the lockdown period was more stressful than pre-COVID times (aOR = 5.767, 95% CI: 2.5-13.26, $p < 0.001$), participants whose caffeine intake increased (aOR = 3.524, 95% CI: 1.70-7.29, $p < 0.002$), participants who attended any social events during lockdowns (aOR = 2.720, 95% CI: 1.26-5.86, p $p<0.012$) and those who reported it was difficult to procure cigarettes during the lockdown periods (aOR = 2.932, 95% CI: 1.36-6.32, $p < 0.007$). This study explored that stressful condition due to extended lockdowns, higher caffeine intake, and difficulty in getting cigarettes were significant elements for increased tobacco use among the selected students.

KEYWORDS : Cigarette smoking, COVID-19, stress, caffeine intake, students.

INTRODUCTION

Tobacco use mainly through cigarette smoking is the primary cause of death, illness, and impoverishment globally. An estimated 1.3 billion people are tobacco users, and 80% of them are from low-income and lower-middle-income countries of the world [1]. In Bangladesh, 35.3 % of all adults aged 15 and above use tobacco products, of which 18% smoke tobacco and 20.6% use smokeless tobacco broadly categorized as "spit tobacco" or "chewing tobacco" [2]. Tobacco smoking is prevalent in 60.2 % of university students of the country, with males (68.81%) consisting of the majority compared to females (19.56 %) [3]. In 2018, 13.5 % of total deaths in Bangladesh resulted from tobacco use, amounting to almost 126,000 people [4]. Smoking is intensely associated with several life-threatening diseases, including but not limited to cancers of the lung, respiratory system, bladder, and pancreas, ischemic heart disease, respiratory difficulties, aortic aneurysm, and chronic obstructive lung disease [5]. In addition, in all stages, the risk of atherosclerosis increases through tobacco smoking both actively and passively, ranging from endothelial dysfunction to various forms of cardiovascular disease [6]. Long-term smokers have also been associated with an increased risk of depression and schizophrenia [7]. Smoking also has been associated with unsafe driving, overconsumption of alcohol, domestic abuse, a lack of exercise, and the use of mental health and emergency services [8]. The initiation of students into university ushers in a new phase of their lives with higher degrees of freedom and a more liberal environment in which students are exposed and more susceptible to unhealthy habits such as smoking [9]. Studies have shown that a third of all students who have reported smoking to some degree in the U.S desire to smoke when waking up, an indication of nicotine dependence [10]. Moreover, smoking is a coping mechanism for university students undergoing higher amounts of stress due to the increased pressure of acquiring better results [11]. Psychological distress among students can develop due to disease outbreaks while forcing them to adopt health-threatening behavior [12]. Therefore, it is essential to examine the smoking behavior pattern among private university students of Bangladesh due to COVID-19. Extended lockdown periods during the pandemic have severely impaired mental wellness and restricted the mobility and social interactions of university students all around the world [13].

COVID-19, one of the deadliest pandemics in history, has taken the world by storm. First emerged in December 2019 as "a cluster of pneumonia with unknown aetiology" in the province of Hubei, China [14], it has since spread all over the globe, amassing 227,856,410 total cases and 4,684,461 total deaths as of 17th September 2021 [15]. On 8th March 2020, the first coronavirus-infected case had been declared in Bangladesh, resulting in a lockdown known as "general leave" declared by the government from 26th March 2020 [16]. Since then, lockdown periods were extended and imposed at different times to control the infection and educational institutions were shut down [17]. Through online classes and assessments, several top-ranked private universities have quickly taken their operations to the web [18]. As a result, the daily lives of all students have come to a standstill with prolonged periods of not being able to leave home and interact with other people. Increased family financial challenges, uncertainties in decision making by educational regulatory authorities, and a new learning landscape while remaining in social isolation have overwhelmingly created a stressful condition for private university students [19]. A plethora of research indicates that an increase in tobacco smoking or adopting cigarette smoking is a direct consequence of increased mental stress [20]. However, there is a lack of evidence to demonstrate a clear relationship between the shift in smoking behavior among private university students of Bangladesh and the social impacts of

COVID-19 lockdowns [21]. Thus, this study was employed to explore the existing knowledge gap. The study d attempted to explore the factors associated with the changing tobacco use among selected private university students in Dhaka, Bangladesh.

METHOD

In this cross-sectional study, a quantitative approach was followed, and a survey questionnaire was created in Google forms. The questionnaire was circulated amongst the students in the Google Classrooms of Independent University, Bangladesh (IUB) between 27th June 2021 and 27th August 2021 by taking prior permission from the facilitators. IUB, founded in 1993, is one of the oldest and leading private universities of Bangladesh based in Dhaka and it has more than seven thousand undergraduate students [22]. The questionnaire consisted of close-ended questions, with most questions requiring polar answers for more straightforward statistical analysis. The survey was completely anonymous as no names or other identifying information were asked for, and it took approximately fifteen minutes to complete. Confirmation of smoking was made before respondents were able to complete the rest of the survey to ensure only existing smokers were included in the study. A total of 572 responses were received, of which 207 (36.2%) confirmed they were smokers and only smokers' responses were used in the analysis. Due to the COVID-19 lockdown, it was impractical to consider smokers who had smoked previously and therefore, only the increase in smoking of existing smokers were considered. Smokers who had recently quit were also not included as they did not fall into the study's scope of existing smokers. The outcome variable of the study was measured in terms of perceived changes, if any, in the tobacco use pattern since the COVID-19 lockdown was imposed. Students were asked to provide their socio-demographic information, smoking habits-related information, and other familial information. The outcome variable was coded as 'no change' (=0) and 'increased' (=1). The independent or the explanatory variables are taken under consideration in this study include family size, family income, unemployment in the family due to COVID-19, pre-existing medical conditions, frequency of social interactions, and mental health conditions. The collected data was analyzed in SPSS (Version 24.0). Descriptive analysis was conducted to assess the distribution of the variables. Chi-square tests, with a 5% level of significance, were done to relate and compare modifications in tobacco consumption by the descriptive and explanatory variables. Binary logistic regression analysis was also adopted to examine the factors linked with change in increase in tobacco among selected smokers. The adjusted odds ratio (aOR) and associated 95% confidence interval (95% CI) are stated. An adjusted odds ratio (aOR) is a metric for the relationship between an exposure and a result. The aOR compares the chances of an event occurring in the absence of a certain exposure against the odds of that outcome occurring in the presence of that exposure. The survey was completely anonymous as names and personal details were not required. Consent was taken from each respondent and respondents were also free to opt-out of the survey whenever they desired. Participants also did not receive any incentive for taking the survey. Since the study was self-funded, any approval from the institutional review board could not be taken.

RESULTS

Socioeconomic Characteristics

A total of 572 participants from graduate and undergraduate courses of IUB participated in the survey, of whom 207 participants (36.2%) were cigarette smokers. Although the percentage of smokers in our study are far below the national average mentioned by Hossain et al. (60.2%), it can be anticipated that if the sample size was bigger or the interview process was face-to-face, our value would be closer to the national average. Moreover, very few studies indicate a decrease in cigarette smoking whereas most studies indicate an increase in cigarette smoking during COVID-19. Non-smokers were not represented as only an increase in cigarette smoking was considered. Among the smoker respondents, 81.2% were primarily living in Dhaka Division, 84.1% were male, 86% were at the undergraduate level of education, and 84.5% were unmarried. Participants were asked to provide information about their weight and height. After that, the BMI was calculated, and it was found that 42.51% were overweight, 8.70% were underweight, and 48.79 % had a normal BMI. Table 1 below summarizes all characteristics mentioned.

Table – 1 General Details

Socioeconomic Characteristics	n	%
Have you been living primarily in Dhaka during the COVID19 period?		
No	39	18.8
Yes	168	81.2
Gender		
Female	33	15.9
Male	174	84.1
Age distribution		
Age group 1: 18-25 years	193	93.2
Age group 2: 26-30 years	14	6.8
Level of Education		
Undergraduate	178	86.0
Post-Graduate or Higher	29	14.0
Marital Status		
Single	175	84.5
Married	31	15.0
Divorced	1	0.5
BMI		
Underweight	18	8.70
Healthy	101	48.7
Overweight	88	42.5
No. of family members		
Category 1: Less 4 members	65	31.4
Category 2: 4-6 members	121	58.5
Category 3: More than 6 members	21	10.1
Family employment status during COVID19		
Loss of employment	27	13.0
No change	124	59.9
Reduced income from business	37	17.9
Reduced working hours	19	9.2

Source: Authors' survey

Health Behavior and Tobacco Use

Information regarding the frequency of tobacco use and factors that affect it were also acquired from the participants. 55.1% of the participants were involved in some form of physical activity, of whom 66 (31.88%) spent 1-2 hours per week in it. Participants consisted primarily of light smokers, as only 3.4% of them smoked over 20 cigarettes a day. Moreover, 37.2% of the participants reported smoking slightly less during the lockdown, whereas 31.9% reported having increased smoking to the extent. It is important to state that we have only considered factors that influence the increase in cigarette smoking. Several studies indicated that smokers were aware of the increased complications of COVID-19 infections linked to smoking which led them to reduce their smoking behavior [23]. An overwhelming majority of the participants (87.9%) reported having no chronic diseases, whereas 5.3% reported having some form of respiratory disease, 1.9% reported having cardiovascular disease, and 1.9% reported having diabetes. Smokers were asked if they lost anyone close during the pandemic, to which 39.6% confirmed. Furthermore, 63.3% had increased caffeine intake, 32.4% reported the use of non-pharmaceutical drugs, balcony access was available to 86.5%, and mobility was restricted by 71.5% during the

lockdown. Concern for Covid-19 was reasonably high, with 30% being concerned often and 36.2% having the highest level of anxiety. In addition, frequency of communication with friends and family was affected significantly as 53.1% of the respondents reported having less contact than pre-covid-19.

Table – 2 Aspects Related To Smoking Behavior And Physical Activity Of The Participants

Aspects	n	%
Involved in physical activity		
No	93	44.9
Yes	114	55.1
How much time do you spend on physical activity		
1-2 hours per week	66	31.88
3-4 hours per week	36	17.39
5-7 hours per week	17	8.21
How many cigarettes do you smoke daily		
1-2 pcs	61	29.5
2-5 pcs	72	34.8
5-10 pcs	47	22.7
10-20 pcs	20	9.7
Over 20	7	3.4
How did the lockdown affect the number of cigarettes you smoke		
Stopped smoking completely	11	5.3
Slightly less than before	77	37.2
Same	53	25.6
Slightly increased	41	19.8
Greatly increased	25	12.1
Do you have any chronic diseases		
None	182	87.9
Acidity	1	0.5
Allergies	1	0.5
Asthma	1	0.5
Back muscle spasm	1	0.5
Cancer	1	0.5
Cardiovascular diseases	4	1.9
Diabetes	4	1.9
Respiratory diseases	11	5.3
Irritable bowel syndrome (IBS)	1	0.5
Did you lose anyone close during COVID19		
No	125	60.4
Yes	82	39.6
Did your intake of caffeine		
No	76	36.7
Yes	131	63.3
Do you have the habit of taking any other non-pharmaceutical drugs		
No	140	67.6
Yes	67	32.4
Do you have access to a balcony or open space		
No	28	13.5
Yes	179	86.5
Did you restrict your mobility during the COVID lockdown		
No	59	28.5
Yes	148	71.5
Are you concerned about COVID19		
Not at all	9	4.4
Sometimes	61	29.5
Often	62	30.0
Very much	75	36.2
Interaction with friends and family during COVID19		
Less than before	110	53.1
Same as before	62	30.0
More than before	35	16.9

Source: Authors' survey

COVID-19 Lockdowns and Changes in Tobacco Intake

According to the analysis, 75.4% (156) of the participants reported that the lockdown period was more stressful than the pre-COVID times. Among them, 55.1% (114) reported an increase in cigarette smoking as they perceived such behavior as an effective stress management process. Loss of employment was associated ($p < 0.030$) with increased cigarette smoking. A significantly higher percentage ($p < 0.001$) of participants who reported that the lockdown period was stressful was associated with increased cigarette smoking compared to those who did not (64.74% vs 25.49%). Similarly, participants who reported increased caffeine intake were also strongly associated ($p < 0.001$) with increased cigarette smoking compared to those with lower caffeine intake (65.65% vs 36.84%). Furthermore, increased cigarette smoking was considerably higher ($p < 0.002$) among the students who had difficulty procuring cigarettes compared to those who did not (70.27% vs 46.62%). Details can be found in Table 3.

Table – 3 Changing Smoking Behavior

Characteristics	n (smoker)	% change	*P*
Family employment status during COVID19 restrictions?			
Loss of employment	21	77.78	0.03
No change	61	49.19	
Reduced income from business	19	51.35	
Reduced working hours	13	68.42	
Do you think the lockdown period was more stressful?			
Yes	101	64.74	0
No	13	25.49	
Did your intake of caffeine (coffee, tea, coke, etc.) increase during this period?			
Yes	86	65.65	0
No	28	36.84	
Has the lockdown made it difficult to get cigarettes?			
Yes	52	70.27	0.001
No	62	46.62	
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$			

Source: Authors' survey

Determining Factors for Changes in Tobacco Consumption

In the attuned statistical analysis, the students' stressfulness of lockdown, increased caffeine intake, attending social events, and difficulty getting cigarettes were all suggestively related to increased tobacco use (Table 4). We found that participants who thought the lockdown period was more stressful than pre-COVID times had 57.6% greater odds than those who did not (aOR = 5.767, 95% CI: 2.5-13.26, $p < 0.001$) in terms of increased tobacco intake. Participants whose caffeine intake did not increase were 3.5 times less likely to smoke more (aOR = 3.524, 95% CI: 1.70-7.29, $p < 0.002$). Moreover, participants who did not attend any social events during lockdowns had 2.7 times lower odds of increased cigarette smoking (aOR = 2.720, 95% CI: 1.26-5.86, p $p<0.012$). On the other hand, those who reported it was difficult to procure cigarettes during the lockdown were 293% more likely to increase cigarette consumption (aOR = 2.932, 95% CI: 1.36-6.32, $p < 0.007$).

Table – 4 Factors Related To Changing Smoking Behavior Among The Participants And Multi-variate Analysis

Characteristics	aOR	95% CI	*P*
Stressfulness of lockdown			
No	Ref		
Yes	5.767	2.51-13.26	0.000
Increase of caffeine intake during lockdown			

No	Ref		
Yes	3.524	1.70-7.29	0.001
Attended any social event during lockdown			
No	Ref		
Yes	2.720	1.26-5.86	0.011
Difficulty in getting cigarettes during lockdown			
No	Ref		
Yes	2.932	1.36-6.32	0.006
Exponentiated coefficients; 95% confidence intervals in brackets $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$			

Source: Authors' survey

DISCUSSION

To our knowledge, no other studies in Bangladesh have investigated the factors associated with tobacco intake or use patterns among private university students in Bangladesh during the global pandemic. This study observed an overall rise of 31.9% in cigarette smoking among selected students during lockdown periods imposed at different times since March 2020. The primary reason for an increase in cigarette smoking was stress stemming from the socioeconomic and psychological impacts of COVID-19. Several studies demonstrated that young people having limited communication with friends and family during lockdown periods led to social isolation and enhanced risky behavior including increased tobacco use (Philip, et al. 2020). Another study exploring the effects of cumulative stress and impulsivity on smoking status reported that smoking status is linked to aggregate adversity through direct and indirect impact (García, Bursac and Derefinko 2020). Furthermore, according to Bommele and his colleagues (2020), stress was associated with increased smoking. Loss of family members' employment was also tied to increased pressure, which results in increased cigarette consumption, found in this study. Previous studies have also documented the evidence of the stress of unemployment (Drake, et al. 2021). Catecholamine levels in the urine were higher in subjects who had been unemployed for more extended periods (Netter 2021). The sympathetic adrenal medullary system's arousal is a vital measure of a stress response (Whiting, et al. 2021).

This study also noted a robust relationship between increased caffeine intake and increased cigarette smoking. This result is supported by the findings of other studies indicating that even when linked contextual indicators of caffeine consumption and smoking were statistically controlled, the probabilities of smoking rose with caffeine consumption (Fagan, et al. 2021). Caffeine consumption was also linked to an increased desire to smoke and subjective reinforcement from cigarettes. According to epidemiological research, smokers are more likely than non-smokers to be moderate to heavy coffee users and reported coffee and cigarette consumption rates are often significantly associated (García-Pérez, et al. 2020). Furthermore, cigarette smoking is more likely during and soon after coffee consumption than at other times, according to temporal analysis of smoking behavior (Kanbay, et al. 2021).

We have found that attending social events is also a factor associated with increased cigarette smoking. According to a study, smoking is less prevalent at home or at the university by occasional smokers (Stafylis, et al. 2018). Their findings show that students who are not long-term smokers may be more likely to smoke in social circumstances under conscious or unconscious pressure. They hypothesized that while irregular and occasional smokers are less expected than regular daily smokers to buy cigarettes on their own, mingling with others having similar smoking behavior in social gatherings like parties, restaurants, and coffee shops offer access to cigarettes through friends and strangers alike. Furthermore, their research revealed that daily and occasional smokers had different individual and societal features concerning their smoking habits. Social influences have an impact on daily and social smokers. Regular smokers smoke in any setting, but they mostly select to do so in a shared setting. Occasional smokers smoke irregularly with friends in a friendly setting and are often influenced by social factors (Hoek, et al. 2019). One unanticipated finding was the strong association between having difficulty procuring cigarettes and increased cigarette smoking frequency. This can be explained by DiFranza, Ursprung, and Biller's (2012) study. They state that abstinence from tobacco causes common withdrawal symptoms such as wanting, desire, and needing, commonly acknowledged as feelings experienced by smokers. Smokers who find it challenging to obtain cigarettes refrain for extended periods, which leads to a rise in smoking later on due to these withdrawal symptoms.

CONCLUSIONS

The present study has brought to light the increase in cigarette smoking among Bangladeshi university students during COVID-19 due to stress. This study noted that feeling stressed due to the lockdown, increased caffeine intake, and difficulty in procuring cigarettes were noteworthy elements for increased tobacco use. It has set the ground for health practitioners and policymakers to give due importance to this issue. Initiatives are needed to disseminate information on the adverse effects of tobacco use. Stress management techniques such as meditation and exercise may also be promoted to combat increased cigarette smoking. Consumption of caffeine may be remediated with their decaf counterparts, and procurement of cigarettes may be more accessible but limited. It is also necessary to research to determine the efficacy and cost-effectiveness of such interventions.

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