

Original Article

# Impact of COVID-19 on Patterns of Cigarette Smoking among Adult Smokers in Bangladesh

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## Abstract

**Background:** Bangladesh is a country with high prevalence of smoking which is a contributing factor to cause respiratory diseases. The situation of COVID-19 has become threatening physically for smokers as it is also a respiratory disease and it can also help in altering smoking behaviour because of perception towards this pandemic.

**Objective:** The objectives of this study were to investigate changes in cigarette smoking behaviour during COVID-19 among the adult smokers of Bangladesh according to perception towards COVID-19, and assess association between changes in cigarette smoking behaviour and perception towards COVID-19. **Methodology:**

An online descriptive cross-sectional study was conducted during 16 April, 2021 to 30 April, 2021 using anonymous Google form. Only adult Bangladeshi cigarette smokers were included in this study. Descriptive and co-relational analyses were conducted using SPSS-28.0. **Results:** Among 373 valid respondents, 259(69.43%) reported change in smoking behaviour during COVID-19. Some 313(83.91%) cigarette smokers perceived risk of being infected by COVID-19 and 30(8.04%) smokers were infected by COVID-19. Many (187, 50.13%) participants perceived that smokers have higher risk of contributing infection. In addition, 292(78.28%) smokers believed that smoking can cause more complications if infected, 182(48.79%) felt worried about their smoking behaviour and 225(60.32%) participants thought of lessening smoking during COVID-19. Majority (229, 61.39%) of the respondents tried to quit smoking. Patterns of change in cigarette smoking during COVID-19 were significantly associated with both perceived risks of higher contractibility ( $p=.001$ ) and higher physical complications ( $p=.004$ ). **Conclusion:** Percentage of people with changed smoking behaviour during COVID-19 was very high. Perception towards adverse impact of COVID-19 on smoking behaviour may lead to this change.

**Key Words:** COVID-19, Risk perception, Cigarette smoking, Behaviour change, Health Belief Model

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## Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease of respiratory illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Smoking is also recognized as one of the main risk factors for causing respiratory diseases.<sup>1</sup> Smoking has remained

important public health concern for long time and COVID-19 has added another dimension to this concern. Researchers have investigated the association of smoking with contractibility, severity and mortality of COVID-19. But the evidence on the effect of smoking on COVID-19 is

still emerging, where some researchers have found association with adverse outcomes associated with COVID-19 and some indicates no association.<sup>2-4</sup> Apart from this ambiguity, other factors (subsequent measures of COVID-19, loss of income, impact on mental health, lockdown, isolation) also have an impact on patterns of smoking.<sup>5-7</sup> So, the evidence on smoking and COVID-19 is still emerging.

Alarming, the World Health Organization (WHO) reported that 80% of the total smokers of the world are from Low-Middle Income Countries (LMICs).<sup>8</sup> Countries from all over the world are suffering from COVID-19, but patterns of smoking behaviour during pandemic is largely overlooked in LMICs.<sup>9</sup> But this part of the world needs extra attention- not only because of their high consumption of tobacco-related products, but also because of the different contextual factors of COVID-19 in these countries.

Bangladesh, where 126,000 deaths have been caused due to tobacco-related disease in 2018, is a south Asian country which belongs among top ten countries to use high amount of tobacco.<sup>10</sup> The prevalence of smoking in Bangladesh are 43.3% in adults, 44.7% in men and 1.5% in women.<sup>11,12</sup>

The COVID-19 pandemic, where the healthy behaviours are promoted by public health sectors and unhealthy behaviours are identified as risky, can serve as cues to action to behaviour change, such as smoking modification as per Health Belief Model (HBM).<sup>13</sup> This model also explains how perception inspires to change the behaviour.<sup>14</sup> So, perception towards COVID-19, worry and thoughts related to smoking can be associated with patterns of change in cigarette smoking.

This study was aimed at finding out the patterns of smoking behaviour among adult cigarette smokers of Bangladesh during COVID-19. Additional objectives of the study were to assess perception of adult Bangladeshi smokers towards COVID-19, to identify changes in cigarette smoking behaviour according to perception towards COVID-19 and to assess associations between changes in cigarette smoking behaviour and perception towards COVID-19.

## **Methodology**

### **Design and data collection**

A descriptive cross-sectional study was conducted using an anonymous online survey. The Data were collected from 16th of April, 2021 to 30th of April, 2021, during the peak

incidences of COVID-19. Face-to-face interview for method of data collection was avoided to ensure the safety. A 'Google form' was created and link of the form was shared using Facebook (Mostly used social media in Bangladesh). Prospective participants were asked to submit and share the online 'Google form' to collect a snowball sample of representativeness of Bangladeshi adult population. A total of 394 responses were submitted. Incomplete and unusable responses were discarded, leaving 373 complete responses.

### **Tools and measurement**

The purpose and other detailed information regarding the survey was provided in the first part of the questionnaire. Consent to participate in the study was taken. Online the questionnaire involved questions related to socio-demographic characteristics, COVID-19 related questions and smoking related questions. A pilot study was conducted to finalize the questionnaire.

### **Participants**

Participating in this survey was voluntary and the respondents were anonymous. Participants had on opportunity to withdraw them from the survey. Bangladeshi nationals, currently residing in the country, smokers with 18 years of age and above included in the study. Participants of different age, sex, educational background, socioeconomic status, geographical location were expected.

### **Data analysis**

Patterns of smoking at the time of COVID-19 were calculated by analyzing number of cigarette(s) smoked in two different times (no. of cigarette smoked before COVID-19 and currently). Both descriptive and co-relational data analyses were conducted using SPSS version 28.0.

## **Results**

### *Demographic characteristics of the participants*

Among the total 373 participants, the most (366, 98.12%) were from the age range of 18-35 years, male (359, 96.25%) and graduated (304, 81.5%). People from all divisional areas of Bangladesh had participated in the study, but the highest percent (114, 30.56%) of respondent was from Dhaka division and the lowest from Sylhet (25, 6.70%). Monthly family income of most of the participants (308/373, 82.57%) were more than twenty thousand takas. (Table I)

**Table I: Socio-Demographic characteristics of the participants (n=373)**

Demographic Characteristics	Number of participants	Percentage
<b>Age in years</b>		
Early adults (18-25)	150	40.21
Adults (26-35)	216	57.91
Late adults (>35)	7	1.88
<b>Sex</b>		
Male	359	96.25
Female	14	3.75
<b>Educational Qualifications</b>		
Secondary or lower	12	3.20
Up to Higher Secondary	57	15.28
Up to Honors	170	45.58
Masters and higher	134	35.92
<b>Geographical location</b>		
Barisal	46	12.33
Chattogram	64	17.16
Dhaka	114	30.56
Mymensingh	33	8.85
Khulna	28	7.51
Rajshahi	37	9.92
Rangpur	26	6.97
Sylhet	25	6.70
<b>Monthly Family Income in taka</b>		
< 20,000	65	17.42
21,000-40,000	139	37.26
> 40,000	169	45.31

#### Relationship of demographic characteristics and patterns of smoking

Table II depicts demographic characteristics and patterns of change in cigarette smoking among adult smokers in Bangladesh during COVID-19. Among 150 participants from the age group of 18-25 years, 89(59.33%) decreased cigarette smoking. However, 17(11.33%) of them from this age group also increased their amount of smoking. The highest number of participants (216, 57.91%) of this study was from the age group of 26-35 years, and among them, the rates of decreased and increased smoking were respectively 125(57.87%) and 24(11.11%). In addition, the highest number of participants (170, 45.58%), according to academic qualifications, was from the 'up to honors degree' group. In this group, 100(59.41%) decreased their smoking, whereas, 22(12.94%) increased this behaviour. The rate of decrease (78/134, 58.21%) was somewhat similar for 'masters and above' group, but the rate of increase (12, 8.96%) was lower than the honors group. While considering geographical area, the highest number of decrease (36/46, 78.26%) and lowest number of increase

the rate of decrease of cigarette smoking was found. (Table II)

Interestingly, 236(63.3%) of the respondents reported that if they get another chance to go back to their life when they started smoking, they will not start smoking again. From Table II, whether someone would smoke again or not given the chance, was significantly associated with their change in smoking frequency after COVID-19 outbreak (= 8.290,  $p = 0.016$ ).

**Table II: Relationship of Socio-Demographic characteristics and patterns of change in cigarette smoking behaviour during COVID-19 (n=373)**

Demographic characteristics	Participants n (%)	Patterns of change in cigarette smoking			P value
		Decreased n (%)	Unchanged n (%)	Increased n (%)	
<b>Age in years</b>					
18-25	150 (40.21)	89 (59.33)	44 (29.33)	17 (11.33)	0.869
26-35	216 (57.91)	125 (57.87)	67 (31.02)	24 (11.11)	
>35	7 (1.88)	4 (57.14)	3 (42.86)	0 (0.0)	
Total:	373 (100.00)	218 (58.44)	114 (30.57)	41 (10.99)	
<b>Educational Qualification</b>					
Secondary or lower	12 (3.20)	6 (50.00)	3 (25.00)	3 (25.00)	0.489
Up to Higher Secondary	57 (15.28)	33 (57.89)	20 (35.09)	4 (7.02)	
Up to Honors	170 (45.58)	101 (59.41)	47 (27.65)	22 (12.94)	
Masters and higher	134 (35.92)	78 (58.21)	44 (32.83)	12 (8.96)	
<b>Location</b>					
Barisal	46 (12.33)	36 (78.26)	9 (19.57)	1 (2.17)	0.043
Chattogram	64 (17.16)	30 (46.87)	23 (35.94)	11 (17.19)	
Dhaka	114 (30.56)	64 (56.14)	35 (30.70)	15 (13.16)	
Khulna	28 (8.85)	18 (64.28)	9 (32.14)	1 (3.57)	
Mymensingh	33 (7.51)	21 (63.64)	11 (33.33)	1 (3.03)	
Rajshahi	37 (9.92)	18 (48.65)	15 (40.54)	4 (10.81)	
Rangpur	26 (6.97)	18 (69.23)	6 (23.08)	2 (7.69)	
Sylhet	25 (6.70)	13 (52.00)	6 (24.00)	6 (24.00)	
<b>Monthly Family Income</b>					
<20,000	65 (17.42)	35 (53.85)	25 (38.46)	5 (7.69)	0.578
21-40,000	139 (37.26)	81 (58.27)	42 (30.22)	16 (11.51)	
>40,000	169 (45.31)	102 (60.36)	47 (27.81)	20 (11.83)	
<b>Opinion of smoking change if going back to start-time</b>					
No	236 (63.27)	147 (62.29)	71 (30.08)	18 (7.63)	0.016
Yes	137 (36.73)	71 (51.82)	43 (31.39)	23 (16.79)	
<b>Total</b>	<b>373 (100.00)</b>	<b>218 (58.44)</b>	<b>114 (30.56)</b>	<b>41 (10.99)</b>	

#### COVID-19 infection and patterns of change in cigarette smoking:

Some (55, 14.74%) of the respondents were either infected by COVID-19 or had someone in their family who had been infected. Of them, cigarette smoking was decreased among (18, 72.00%) whose family members were infected. More than fifty percent (16, 53.33%) of COVID-19 infected smokers also decreased their number of smoking. (Table III)

**Table III: Perception of the respondents towards COVID-19 and patterns of change in cigarette smoking behaviour (n=373)**

Characteristics	Participants n (%)	Patterns of change in cigarette smoking			P value
		Decreased n (%)	Unchanged n (%)	Increased n (%)	
<b>History of infection</b>					
No	318 (85.25)	184 (57.86)	98 (30.82)	36 (11.32)	.390
Self-infection	30 (8.04)	16 (53.33)	12 (40.00)	2 (6.67)	
Infection in family	25 (6.70)	18 (72.00)	4 (16.00)	3 (12.00)	
<b>Perceived risk of being infected by COVID-19</b>					
No risk	60 (16.09)	31 (51.67)	19 (31.67)	10 (16.67)	.782
Low risk	94 (25.20)	57 (60.64)	29 (30.85)	8 (8.51)	
Moderate risk	161 (43.16)	97 (60.25)	47 (29.19)	17 (10.56)	
High risk	58 (15.55)	33 (56.90)	19 (32.76)	6 (10.34)	
<b>Perceived risk of higher contractibility of infection</b>					
No	186 (49.87)	94 (50.54)	62 (33.33)	30 (16.13)	.001
Yes	187 (50.13)	124 (66.31)	52 (27.81)	11 (5.88)	
<b>Perceive risk of more severity</b>					
No	81 (21.72)	40 (49.38)	24 (29.63)	17 (20.99)	.004
Yes	292 (78.28)	178 (60.96)	90 (30.82)	24 (8.22)	
<b>Felt worried about smoking</b>					
No	191 (51.21)	90 (47.12)	70 (36.65)	31 (16.23)	.000
Yes	182 (48.79)	128 (70.33)	44 (24.18)	10 (5.49)	
<b>Thought of lessening smoking during COVID-19</b>					
No	148 (39.69)	59 (39.86)	61 (41.22)	28 (18.92)	.000
Yes	225 (60.32)	159 (70.67)	53 (23.56)	13 (5.78)	
<b>Tried to quit smoking during COVID-19</b>					
No	144 (38.61)	54 (37.50)	62 (43.06)	28 (19.44)	
Yes	229 (61.39)	164 (71.61)	52 (22.71)	13 (5.68)	
<b>Total</b>	<b>373 (100.00)</b>	<b>218 (58.44)</b>	<b>114 (30.56)</b>	<b>41 (10.99)</b>	

*Perceived self-risk of being infected by COVID-19 and patterns of change in cigarette smoking:*

Among the participants, 313(83.91%) found to perceive risk of being infected by COVID-19. Perception towards level of risks were categorized in three- low (94, 25.20%), moderate (161, 43.16%) and high (58, 15.55%). On the other hand, 60(16.09%) smokers perceived no risk of being infected. Reduction rate was found lower in the people who perceived no risk (31, 51.67%) than who perceived risk (60.64%, 60.25%, and 56.90% respectively for low, moderate and high-risk categories). (Table III)

*Perceived higher risk of contractibility of COVID-19 and patterns of change in cigarette smoking:*

In the question of perception towards contractibility of COVID-19 among smokers, around half (187, 50.13%) of the participants perceived that smokers were in higher risk of being infected by COVID-19. Some 124(66.31%) of the participants who perceived higher risk of contracting among smokers reported decreased amount of cigarette smoking during COVID-19. Another 94(50.54%) participants, who did not perceive the higher risk, but decreased the amount of smoking. Increased rate of smoking was noticed among those who perceived less risk.

(Table III)

*Perceived more risk of severity and patterns of change in cigarette smoking:*

While assessing perception towards physical complications among the cigarette smokers if infected by COVID-19, 292(78.28%) of the participants reported that physical complications would be higher if smokers were infected by COVID-19. Moreover, participants with perception of higher physical complications reported higher (178, 60.96%) decreased pattern of smoking. (Table III)

*Worry about smoking during COVID-19 and patterns of change in cigarette smoking:*

Among the participants, 182(48.79%) smokers reported to be worried about smoking during COVID-19 and 128(70.33%) of them reported decreased amount of smoking. Whereas, 90 (47.12%) of them reported decreased cigarette smoking who were not worried. (Table III)

*Lessening frequency and patterns of change in cigarette smoking:*

Majority of the respondents had either thought of lessening their patterns of cigarette smoking (225, 60.32%) or tried to lessen smoking (229, 61.39%). (Table III)

*Association between patterns of change in smoking and perception towards COVID-19:*

There was a significant association between patterns of change in cigarette smoking during COVID-19 and perceived higher risk of contraction of cigarette smokers or not ( $\chi^2 = 13.808$ ,  $p=0.001$ ), perceived higher risk of physical complications due to COVID-19 among smoker ( $\chi^2= 10.888$ ,  $p = 0.004$ ), worry about smoking during Covid-19 ( $\chi^2=23.106$ ,  $p=0.000$ ), thought of lessening smoking during COVID-19 ( $\chi^2= 37.629$ ,  $p = 0.000$ ) and tried to lessen smoking during Covid-19 ( $\chi^2= 44.828$ ,  $p = 0.000$ ). (Table III)

**Discussion**

A total of 218(58.44%) smokers in the present study reported decrease in cigarette smoking, while the rate was increasing in 218(10.99%) during COVID-19 pandemic. These findings are not in alignment with the first research of tobacco uses during COVID-19 in Bangladesh as they found no decrease and 15.9% of increase in smoking.<sup>15</sup> However, these two researches are different in many ways (i.e., participants, research design, etc). Moreover, risk perception of the cases of this research was high- 313(83.91%) of the participants who were smokers



perceived risk of being infected, 187(50.13%) of the perceived higher risk of contracting among smokers and 292(78.28%) perceived that complications will be higher among smokers. These perceptions among the study population may cause the higher decrease rate of smoking. Results from this study also shows that 187(50.13%) of the adult smokers of Bangladesh agreed that smoking increases contractibility of COVID-19. In the time of COVID-19, most of the smokers from different parts of the world also perceived that smoking increases contractibility of infection.<sup>17-19</sup> A study conducted among patients in primary care practices in an Eastern Massachusetts healthcare system also indicated that participants did not think of having increased risk of being infected.<sup>20</sup> Smokers also perceived that smoking had the potentiality to increase severity among the smokers if infected by COVID-19.<sup>17-20</sup> In this study, 292(78.28%) of respondents also believed that smokers had the possibility to face more physical problems if they are infected by COVID-19. In addition, 225(60.32%) of the participants thought of lessening smoking and 229(61.39%) tried to quitting smoking supported that evidence.

In the current study, expected changed smoking behaviour during COVID-19, based on HBM,<sup>21</sup> was met, as association was found between patterns of changed smoking behaviour and perceived risk of being infected. Moreover, perceived higher risk of contractibility and perceived higher risk of physical complications were also associated with changed cigarette smoking behaviour. Apart from this association, descriptive analysis showed that the rate of decrease of cigarette smoking was higher for example, 128(70.33%) of the worried smokers decreased their amount of smoking during COVID-19. So, application of HBM can be useful for smoking cessation program in Bangladesh.

As an online study, this study has also few limitations. The first limitation was inability to calculate response rate. In online studies, who are usually interested in the topic, do participate. The same thing could happen for this study. To ensure wider socio demographic representation, data from all divisional areas were included. But there were limited females and participants from lower educational status. Moreover, this study was not able to conclude whether the pattern of smoking was changed only because of their perception towards COVID-19 or not. Further studies can address these methodological limitations.

## Conclusion

Bangladeshi smokers are perceiving their smoking behaviour risky in the time of pandemic. As a result, thought of lessening and attempt of quitting smoking are very frequent. In addition, changed smoking behaviour was found among the smokers. Policy makers can use this evidence of association of risk perception with health behaviour to design smoking cessation programs in Bangladesh.

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