$\mathscr{R}$esearch Article

Mass media utilization to promote public behavior change during COVID-19 situation: A population survey of Dhaka city

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ABSTRACT

A huge amount of information associated with the novel coronavirus disease 2019 (COVID-19) outbreak was circulated by mass media in Bangladesh. There has been a rare example so far of how media intervention during the epidemic can affect the public behaviour of Bangladesh. We aimed to assess mass media's influence on changing public behaviour during the second wave of COVID-19. An online cross-sectional survey among 416 Bangladeshi respondents was conducted between August and September 2021. Besides descriptive statistics, datasets were analyzed through a set of statistical methods such as Pearson's correlation coefficient, and stepwise multiple regression model. The results showed that knowledge level change towards COVID-19 (10 items) had the highest association with behaviour change towards COVID-19 (16 items), indicating a high adoption of public behavior change. There was a positive significant relationship between the behaviour change towards COVID-19 (16 items) with the media's role in making awareness regarding COVID-19 (r= 0.342, p <.001), while there was a negative relationship between the behaviour change towards COVID-19 (16 items) of the respondents with age of participants (r= -.234, p <.001). The results also disclosed that knowledge level, media credibility, and media check-in had the largest contribution to influence the public behavior change. We also found that social media was highly used media as expected during the COVID-19 outbreak. The outcomes of the survey have vital implications for public behavior change and may support infectious disease suppression and control. Our outcomes also stress the significance of the reliability of information shared via mass media outlets and practical strategies to counter misinformation during the COVID-19 outbreak.

KEYWORDS: Mass media, COVID-19, changing behavior, knowledge level, Bangladesh

INTRODUCTION

Nowadays, the globe is facing a novel Coronavirus (COVID-19) that is causing an infectious pandemic worldwide. It has its roots in Wuhan, the capital of central China's Hubei province. The first positive coronavirus patient was identified in the Dhaka division, Bangladesh on 08 March 2020 (IEDCR, 2020). World Health Organization (WHO) said COVID-19 is an infectious disease caused by a recently identified coronavirus (WHO, 2020a). The common symptoms that WHO recognize are fever, dry cough, fatigue. Many other symptoms are sore throat, diarrhea, and shortness of breath pains, nausea, or runny nose (WHO, 2020b).

As is on 07 September 2020, COVID-19 was transmitted to almost all the countries around the globe (Anderson *et al.*, 2020).

5,356,281 people lose their lives and this number is increasing every moment, while total infected cases are 273,387,648 (Worldometer, 2021). 1,580,302 cases are detected in Bangladesh and deaths are 28,038 (WHO, 2021). Dhaka division is the country's topmost affected region. More than 50% of the affected patients are in the Dhaka division (IEDCR, 2020).

Before the pandemic of COVID-19, gossiping, handshaking, hand-holding, kissing, hugging, etc. are considered as people's most practiced lifestyle behaviors. But the coronavirus pandemic has forced us to change those behaviors and adopt social distancing, isolation, and many more. World Health Organization (WHO) also recognizes the value of human behavior in managing pandemics. Its Outbreak Communications Planning Guide suggests behavior changes can reduce the spread by as

much as 80% (WHO, 2008). Behavior changes are a process that takes time and requires support, therefore, mass media needs to initiate more quickly the type of support needed to address the challenges of changing behavior as satisfactory vaccines have still not been developed against COVID- 19. According to a study (Yan *et al.*, 2016), media reports should concentrate on changing people's behavior on the pandemic to help reduce disease spread. During an outbreak of disease, such as the A/H1N1 influenza pandemic of 2009, scientists also showed that mass media coverage -- including radio, television, newspapers, billboards, and booklets -- can affect people's behavior (Elsevier, 2016). Though from the very beginning, COVID-19 grabbed the attention of the media, TV, journalists, newspapers, and social media. However, there are too many sources and sites through which anyone can obtain information, and many of them are not credible which resulted in misinformation and difficulties to distinguish between rumors and reality. Thus, the public must refer to credible sources and information regarding COVID-19 such as WHO which provided social media teams and technical risk communication to respond and track rumors and myths (WHO, 2020c). Additionally, government and health care facilities should provide transparent and clear communication with health care workers, staff, and the public regarding the COVID-19 outbreak. The study aimed to assess mass media role in changing behavior of the people of the Dhaka Division of Bangladesh during the pandemic of COVID-19.

METHODS

Participant and Procedure

A cross-sectional study based on self-reported questionnaire was conducted between August and September 2021. We purposively select the Dhaka division as it is the country's topmost affected region. The questionnaire was developed on a web-based platform to facilitate the completion and collection of data during the study period. Invitations were sent to respondents to participate in the study using emails, and social media applications e.g., Facebook, Twitter, Messenger, WhatsApp, Email, and other online methods with selective people based on the snowball-sampling technique. The link to the survey questionnaire was included in the sent invitations. Total 416 respondents responded correctly through Google Forms. Participants were informed prior to their participation that their participation is anonymized, voluntary, and that their data will be treated as confidential. Also, a brief description of the study purpose was provided. To ensure participants from all the occupations, we formed a research team consisting of 8 members and it was told to share the online survey link from their online platforms, where all age groups are exposed. The team created a database of target participants through social media screening based on their occupation, educational qualification, the measures of preference, and response styles related to COVID-19. We collected 26 responses based on the purposive sampling method from each member. Approximately 520 participants were approached and of these, 416 of them partook in the survey (55.75% male and age range = >20-to->60 years).

Measures

A survey instrument was designed based on guidelines, reports, and course material regarding emerging respiratory diseases including COVID-19 by WHO (WHO, 2020d). The initial questionnaire was designed and subsequently validated in two steps. In the first place, the study instrument was sent to researchers, medical practitioners (pharmacists and doctors) and media expert to give their opinion with respect to its simplicity, relativity, and importance. Secondly, a pilot study was performed asking a small group of participants (N=35) for their thoughts on making the questionnaire easier and shorter. Participants from all disciplines have been chosen for the pilot survey. Reliability was measured using SPSS v. 20.0 and Cronbach's alpha value was 0.77. The data from the pilot survey were not added to the final analysis.

The questionnaire consisted of inquiries assessing:

i) Demographic characteristics included were gender, age, profession, and educational qualification.

ii) The knowledge level section had 10 items (Table 1) and responses were recorded on a five-point Likert scale (1, absolutely agree; 2, agree; 3, partially agree; 4, don't agree; 5, absolutely do not agree). Responses are presented as mean, standard deviation, and range. The final pool of these items was categorised into one domain: knowledge level change towards COVID-19.

iii) The behavior change section had 16 items (Table 1) and responses were recorded on a five-point Likert scale (1, absolutely comply; 2, comply; 3, partially comply; 4, don't comply; 5, absolutely do not comply). Responses are presented as mean, standard deviation, and range. The final pool of these items was categorised into one domain: behaviour change towards COVID-19.

iv) Media exploitation in terms of duration in a day section had 01 item and responses were recorded on a five-point Likert scale (1, less than 1 hour; 2, 1 hour-2 hours; 3, 2-4 hours; 4, 4-6 hours; 5, 6-8 hours or more). Responses are presented as mean, standard deviation, and range.

v) Media exploitation in terms of frequency in a day section had 01 item and responses were recorded on a five-point Likert scale (1, at intervals of less than 1 hour-2 hours; 2, at intervals of 2-4 hours; 3, at intervals of 4-6 hours; 4, at intervals of 6-8 hours or more; 5, once a day). Responses are presented as mean, standard deviation, and range.

vi) One item assessed the peoples' perception regarding mental health ramifications after media consumption. Responses were recorded on a five-point Likert scale (1, absolutely agree; 2, agree; 3, partially agree; 4, don't agree; 5, absolutely do not agree). Responses are presented as mean, standard deviation, and range.

vii) The credibility of the media content section had 01 item and responses were recorded on a five-point Likert scale (1, totally believe; 2, believe; 3, partly believe; 4, don't believe; 5, absolutely do not believe). Responses are presented as mean, standard deviation, and range.

viii) Media's role in making awareness regarding COVID-19 section had 01 item and responses were recorded on a five-point

Table 1: Questionnaire items for measuring knowledge level and behaviour change towards COVID-19

Knowledge level change towards COVID-19

No.	Items
1	COVID-19 is an infectious disease caused by the most recently discovered novel coronavirus in Wuhan, China.
2	The time between catching the novel coronavirus and beginning to have symptoms will be 14 days.
3	Fever, dry cough, tiredness, and body pains are the most common symptoms in COVID 19.
4	The person infected with novel coronavirus definitely develops symptoms.
5	The majority of people (about 80%) who get COVID-19 becomes seriously ill and develops breathing problem.
6	Old age people, and those with underlying medical problems like high BP, heart problems or diabetes, are more likely to develop serious illness.
7	People can also catch COVID-19 if they breathe in droplets from a person with COVID-19 who coughs out or exhales droplets.
8	Social distance means stay more than 1 m (3 feet) away from a person who is sick.
9	COVID-19 can be transmitted through the air.
10	Regular hand wash, social distancing, avoiding crowd, wearing a mask, and stay at home can protect the person from getting COVID-19.

Behaviour change towards COVID-19

No.	Items
1	Do you stay at home during this COVID-19 pandemic?
2	Do you cover your mouth and nose with a tissue or elbow when sneezing?
3	Do you put the tissue used during the sneezing safely in a dustbin?
4	Do you follow social distancing (>1 m) when you go and meet other people?
5	Do you perform regular hand wash in your daily routine activities?
6	Do you wear a mask/shields when you visit a hospital or infected person?
7	Do you wear gloves when you visit a hospital or infected person?
8	Have you traveled to any area affected by COVID-19?
9	Have you avoided using public transportation during rush hours?
10	Do you sanitize the surfaces which are suspected of infection exposure?
11	Do you use disinfectants to clean your house?
12	Do you eat healthy food focusing on outbreaks?
13	Do you try to stock up food and essential household items during the outbreak?
14	Do you give shake hands upon meeting of friends/family members/others?
15	Do you touch routinely your mouth, nose, and eyes?
16	Do you obey all government rules related to the COVID?

Likert scale (1, absolutely agree; 2, agree; 3, partially agree; 4, don't agree; 5, absolutely do not agree). Responses are presented as mean, standard deviation, and range.

Ethical Statement

The respondents' consent was received prior to the survey and remained confidential. All the participants were informed about the specific objective of this study before proceeding to fill-up the questionnaire. Participants were only able to participate in the survey once and could terminate the survey at any time they wished. Anonymity and confidentiality of the given information have been assured. Formal ethical permission of this study was taken from the respective authority (i.e., Noakhali Science & Technology University, Sonapur, Noakhali, Bangladesh).

Statistical Analysis

Statistical analysis was performed with IBM SPSS software version 20. Descriptive statistics such as mean, standard deviation, and range used to analyze the data. Pearson correlation coefficient formula equation was used to identify the correlation between the dependent and independent variables. Besides, stepwise multiple regression techniques were used to identify the variable which is significantly contributing to the prediction and means a plot of the one-way ANOVA test to observe the significant differences between the mean values of the variables.

RESULTS

A total of 416 participants attended the online survey, among which the percentage of male and female was 55.75% and 44.25% respectively, and the composition of age groups were >20 years (4.1%), 21-30 years (70.4%), 31-40 years (13.7%), 41-50 years (6.8%), 51-60 years (4.7%), and >60 years (0.3%) old. It was seen that the prevalence of young people in Bangladesh is higher than in mid-age and older groups because of habitual access and use the propensity of internet (Mamun and Griffiths, 2019). Among the participants, 12.9% have passed eighth grade, 9.4% have passed tenth grade, 11.3% have passed twelfth grade, 41.9% have completed an undergraduate degree and 24.5% have completed a graduate degree. However, in terms of occupation status, more than half of the respondents were students (52.7%) although, other groups such as housewives (8.2%), farmer (5.6%), service (17.1%), businessman (4.9%), unemployed (7.1%), and others (4.4%) participated in the study. Describing the frequency distribution of the respondents is presented in Table 2.

Using Mass Media to Get Information about COVID 19

National and international media most often depend upon the information supplied by WHO. Experts' views from the field of research while tackling COVID-19 are also got focused on media. Due to the unimaginable infectious power of COVID-19, people have been forced to change the scope of media use because they are interested to know the latest updates in this regard. The use of printed newspapers is greatly reduced when news spread that touching paper can cause coronavirus infections.

Respondents' were asked to answer on from which source they first get information on coronavirus disease. Findings expose that 61.65 percent of the total respondents got the information from social media. Next to social media, 14.61% of respondents got the information from network news that appeared on TV sets. The rest of the 13.23% were from family members and friends, 7.34% from online media, and only 3.17% of respondents got it from the newspaper. No respondents got the information from the radio. It is clearly be seen that for gathering news

Table 2: Frequency distribution of the respondents according to variables

Variable	Mean (SD)	Minimum	Maximum
Age	2.42 (0.90)	1	6
Education level	3.61 (1.30)	1	5
Occupation	5.43 (3.03)	1	9
Which source they first get information on COVID-19	3.92 (1.43)	1	7
Mental health ramifications after media consumption	2.81 (1.07)	1	5
Knowledge level change towards COVID-19 (10 items)	44.02 (5.60)	26	49
Media exploitation in terms of duration in a day	5.53 (3.06)	0	16
Media exploitation in terms of frequency in a day	16.09 (9.59)	0	35
Credibility of media content	15.11 (5.81)	3	25
Media's role in making awareness regarding COVID-19	4.43 (0.69)	1	5
Behaviour change towards COVID-19 (16 items)	70.09 (8.53)	5	80

related to coronavirus disease the respondents' have a higher dependency on social media.

Correlation of Behaviour Change towards COVID-19 (16 Items) with Other Variables

Pearson correlations between the variables of interest and demographic variables are presented in Table 3. Table 3 exposes that behaviour change towards COVID-19 (16 items) has positive significant associations with education level (r=.311, p <.001), occupation (r=.225, p <.001), which source they first get information on COVID-19 (r= 0.004, p <.001), knowledge level change towards COVID-19 (10 items) (r=.521, p <.001), media exploitation in terms of duration in a day (r= 0.313, p <.001), media exploitation in terms of frequency in a day (r= 0.445, p <.001), credibility of media content (r= 0.330, p <.001) and media's role in making awareness regarding COVID-19 (r= 0.342, p <.001). Although, behaviour change towards COVID-19 (16 items) has negative and significant associations with age (r= -.234, p <.001).

Figure 1 states that participants of the age group of 21-30 and 31-40 had the highest behaviour change towards COVID-19 (16 items), on the other hand, respondents who are more than 41 years old, had lower behaviour change towards COVID-19 (16 items). Thus, as they ages, their changing behaviour towards COVID-19 decreases.

The One-Way ANOVA means plot was used to find out the differences among the different categories of the education level of respondents in changing their behaviour towards COVID-19. Figure 2 illustrates that less-educated respondents made fewer behavioural changes towards COVID-19, but observed that behavioural changes were greater when respondents were more educated.

Table 3: Pearson correlation coefficients (r) and significance levels between outcome and explanatory variables observed in the survey

Outcome variable	Explanatory variable	Coefficient
Behaviour change towards COVID-19 (16 items)	Age	-0.234**
	Education level	0.311**
	Occupation	0.225**
	Which source they first get information on COVID-19	0.004[NS]
	Mental health ramifications after media consumption	-0.027[NS]
	Knowledge level change towards COVID-19	0.521**
	Media exploitation in terms of duration in a day	0.313**
	Media exploitation in terms of frequency in a day	0.445**
	Credibility of media content	0.330**
	Media's role in making awareness regarding COVID-19	0.342**

**Correlation is significant at 0.01 level of probability (2- tailed)
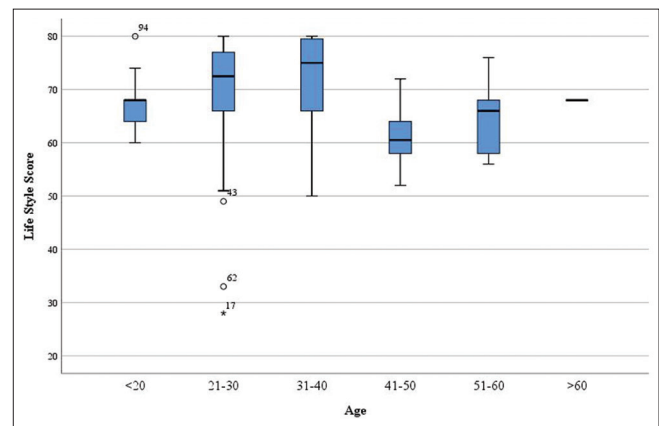*Correlation is significant at 0.05 level of probability (2- tailed)
[NS]Non-significant.

Figure 1: Box plots of different age groups and their changing behaviour towards COVID-19.

Predicting Contribution of Selected Explanatory Variables to Behaviour Change towards COVID-19 (16 Items)

Findings shown in Table 4 indicate that out of 7 correlated variables (which source they first get information on COVID-19, mental health ramifications after media consumption, knowledge level change towards COVID-19 (10 items), media exploitation in terms of duration in a day, media exploitation in terms of frequency in a day, credibility of media content, media's role in making awareness regarding COVID-19), only 3 explanatory variables finally remained in the stepwise multiple regression analysis which collectively accounted for 38.08 percent of the total variance. The other 4 variables were omitted as their F values or tolerance was too small to continue. The first variable that remained in the stepwise multiple regression equation was the knowledge level change towards COVID-19 (10 items). This variable

Table 4: Summary of the stepwise multiple regression analysis showing contribution of the selected explanatory variables to the behaviour change towards COVID-19 (16 items) of respondents

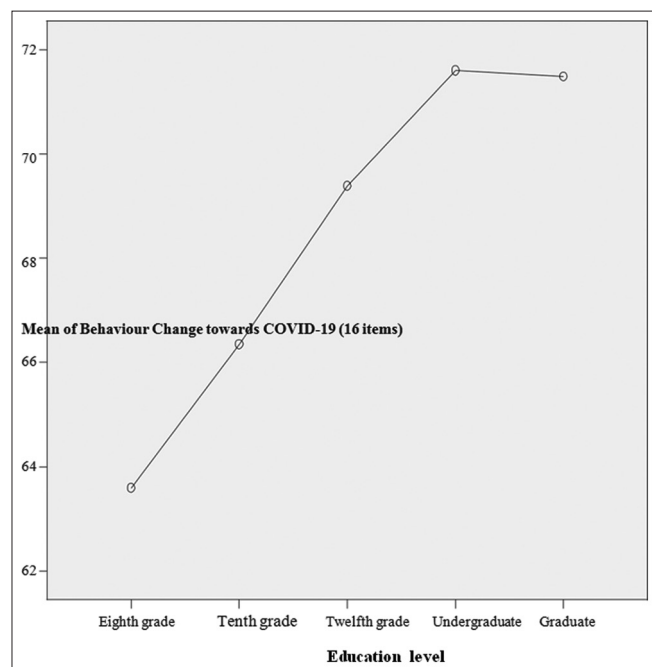| Step No.	Variables remained	R	R^2	Adjusted R^2	Increase in R^2	Variance explained in %
1.	Knowledge level change towards COVID-19 (10 items)	0.569	0.324	0.319	0.321	31.9
2.	Media exploitation in terms of frequency in a day	0.623	0.388	0.358	0.045	4.88
3.	Making awareness regarding COVID-19	0.631	0.398	0.381	0.013	1.3
						Total 38.08

Figure 2: One-Way ANOVA means plot between education level and behaviour change towards COVID-19 (16 items).

had the highest contribution of 31.9 percent in predicting the behaviour change towards COVID-19 (16 items) of the respondents. The second variable that remained in the stepwise multiple regression equation was media exploitation in terms of frequency in a day which contributed 4.88 percent in the behaviour change towards COVID-19 (16 items) of the respondents. The remaining one variable that remained in the stepwise multiple regression equation was media's role in making awareness regarding COVID-19 contributed 1.3 percent in predicting the behaviour change towards COVID-19 (16 items) of the respondents & may be considered less important in predicting the outcome variable.

DISCUSSION

COVID-19 created a complex situation all over the globe. To hinder the infectious capabilities of COVID-19 various suggestions are made like as to change our behavior by wearing a face cover/mask, washing hands frequently, avoiding crowded, etc. The strategies to decrease its transmission are mostly behavioral, such as hand washing, social distancing, coughing and sneezing, avoiding touching of the eyes, nose, and mouth (Haushofer & Metcalf, 2020). Chiu *et al.* (2020) write that the fear of the coronavirus has forced a good number of people to at least try to keep their hands clean when going out in

the street, wearing masks. The present study investigates the utilization of mass media in the changing behavior of the people for coronavirus (COVID-19) pandemic in the Dhaka Division, Bangladesh. In our study, we also examine the knowledge level of the study participants.

Proper knowledge of COVID-19's high infectivity makes people take a high level of preventive measures to avoid contamination (Zhong *et al.*, 2020). Hosen *et al.* (2020) also found that participant knowledge concerning COVID-19 was positively related to their adoption of preventive behavior. The mean of the knowledge level change regarding COVID-19 (10 items) was 44.02 (SD: 5.60, range: 26-49). The finding depicts that the mean of the behavior change of the participants towards COVID-19 (16 items) was 70.09 (SD: 8.53, range: 5-80). To impede infectious capabilities, various epidemiologists suggest staying at home and making social distance. Media personnel and social media users disseminate an ample amount of such information concerning this pandemic. Reducing individual exposure predisposition is currently one of the ways to prevent COVID-19 (Pogrebna & Kharmalov, 2020). During this tremendous environment, information is necessary for people concerning COVID-19. Coronavirus creates much firsthand information. People search for this information in various media. In our study, we found that more than half of the participants got information on COVID-19 from social media, and they also search for information on social media. Following social media, 14.61% of respondents got the information from network news that appeared on TV sets. Participants frequently knock these sources daily. There was no radio listener among the respondents. Since paper is a very physical medium, they have come under the spotlight, with concerns expressed about whether people can catch coronavirus simply by touching, newspaper reading was decreased exponentially. Respondents mainly depended upon the mass media, which need not the touch of its supply chain. For that reason, they chose social media, network news that appeared on TV sets, and online news media to collect the information concerned to COVID-19. Muflih *et al.* (2021) found that 58.2% of their respondents used social media, and 25.3% used local and international channels for COVID-19 information. Their participants used these sources daily to weekly.

In a pandemic moment, fake news and rumors play a tremendous role to misinform the citizens. Social media is the highest possible expedient rumor media in such a tough time. In Bangladesh, there was a huge rumor or fake information disseminated by social media too. However, in the case of changing behavior, all of the media played a positive role. If rumor outbreaks in any social media site, the other mass media

are played a vital role to curb it. And as it is seen in the present study respondents (M=15.11, SD=5.81) use mass media as a credible source, and participants (M=4.43, SD=0.69) believe media has a high role in making awareness regarding COVID-19. Besides, almost all of the people were frightened. Continuous publicity concerning COVID-19 through mass media is escalating fear, anxiety among the common people. However, the publicity of mass media makes its users adapt to new behavior. In this novel atmosphere, it was not possible to manage to change the mentality of the citizens without mass media. Instead of making awareness, if we just use the government-initiated tools such as legislation, regulation to compel the people to oblige healthy behavior, it might not work properly. Media exploitation in terms of both frequency in a day for COVID-19 information and the credibility of media content were positive and significant with the behavior change of the participants towards COVID-19 (16 items), while age was negative and significant. On the other hand, from which media they first get information on COVID-19, and mental health ramifications after media consumption were not significant. Among the different variables, knowledge level change towards COVID-19 (10 items) has the positive highest significance followed by the duration in a day of check-in media for COVID-19 information and media's role in making awareness regarding COVID-19. The stepwise linear regression found out that the audiences who have a high knowledge level towards COVID-19 were more prone to change their mentality to accept new behavior because of its highest contribution (31.9%). Besides, knocking the mass media exploitation in terms of frequency in a day causes the second-highest contribution (4.88%) to predict the behavior of the respondents. Media has a high role for making awareness regarding COVID-19 contributed 1.3 percent to predict the behavior change of the participants towards COVID-19 (16 items). To predict the behavior change towards COVID-19 (16 items), the total variance mentioned by these three variables is 38.08 percent. In the box plot, data presented that respondents who were in the age group of 21-30 and 31-40 years old adopted the highest behavior change score. However, those who were more than 41 years old are less prone to adopt the new behavior. The means plot of education and behavior change towards COVID-19 (16 items), presented that those who were a twelfth grade or more educated were more prone to adopt the behavior. However, those who were in eighth grade or tenth grade level were fewer enthusiasts to change behavior.

CONCLUSION

No one knows for sure how the coronavirus will behave in the long term, but experts say it could stay with us for decades or longer. As of now, there is no cure for COVID-19 and only a few evidence-based treatments are available. So changing behaviour is the only way to defeat it so far. For that, mass media now plays a huge role by circulating information and influencing public behavior to curtail the spread of disease. In this article, we discussed the positive impacts of mass media on changing public behaviour in Dhaka City during this COVID-19

pandemic. This evaluation can serve as feedback for the media to help devise better and more effective strategies to control and prevent subsequent outbreaks.

Limitations of the Study

There are certain limitations that need to be considered before interpreting the findings of this study. Firstly, as this is an online survey, it might not capture the responses from the areas with the restricted access to mass media platforms and internet facilities. Even, economically weaker sections of society who don't have android mobile phones, laptops, PCs, or tablets with mass media platforms applications are not captured in the sample, this results in coverage bias. Secondly, respondents may give false information in the self-administered questionnaire used in this online survey. Finally, illiterates, and respondents unable to understand English are not covered in this online survey.

CONFLICT OF INTEREST

There is no conflict of interest with any party or parties regarding the authorship or any other matter.

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