KNOWLEDGE AND ATTITUDE TOWARDS COVID–19 VACCINATION AMONG VACCINE–ELIGIBLE SELECTED RESIDENTS OF DHAKA CITY

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ABSTRACT

Introduction: An outbreak of a COVID-19 pandemic disease, caused by a novel coronavirus SARS-CoV-2, had posed a serious threat to global human health. Bangladesh has also come under the attack of this viral disease. This study aimed to discover knowledge and attitudes towards several approved vaccines to tackle COVID-19 among vaccine-eligible residents of Dhaka city. **Methods:** A descriptive cross-sectional study was conducted over three months from December 2021 to February 2022 among adults aged 18 years and above eligible for vaccination against COVID-19 who resided in Dhaka City. A sample size of 270 participants was selected using non-probability purposive sampling. **Results:** Results show that the majority of the participants were Muslims (88.15%) and between the ages of 18 and 27 (60.4%), had completed their Higher Secondary Certificate or graduation (88.15%). Among 270 participants, the COVID-19 vaccine had been administered to 236 respondents of which Sino pharm (41.5%) was mostly administered. 99.62% reported knowing COVID-19 vaccines. **Conclusion:** This study depicted a constructive approach among the vaccine-eligible residents of Dhaka City towards the COVID-19 vaccination. It is concluded that the understanding of people's perceptions about the COVID-19 vaccine would provide a tool to improve strategies to limit its transmission.

Keywords: Knowledge, Attitude, COVID-19, Vaccination, Dhaka

Introduction:

COVID-19 is a respiratory disease caused by a novel coronavirus named severe acute respiratory syndrome coronavirus 2. The virus shows various transmission routes and strong interpersonal infectivity, spreading rapidly through respiratory droplets and direct contact (Guan and Zhong,2020). On January 30, 2020, the WHO declared the COVID-19 outbreak a public health emergency of international concern, calling on all countries to take urgent action to prevent the pandemic (Tabari et al., 2020). By November 28, 2021, the disease had resulted in over 260 million confirmed cases and nearly 5.2 million deaths had been reported globally (Weekly epidemiological update on COVID-19 - 30 November 2021).

Bangladesh confirmed the first coronavirus case on 8 March 2020. In response to the COVID-19 pandemic, the Government of Bangladesh (GoB) declared special "general leave" from 26 March in the name of "lockdown" and extended it up to 30 May 2020 in seven different time slots (Shammi et al., 2021). COVID-19 patients were found in all 64 districts of the country; however, Dhaka, Narayanganj, Gazipur, and Chattogram have been mostly affected. Dhaka is the capital city of Bangladesh, and one of the fastest growing cities in the world where the majority of the textiles, tanneries, fertilizer plants, pharmaceuticals companies, cement factories, pulp and paper industries, and most of the government and non-government offices are located in this major city and leading to the ultimate possible reasons for higher prevalence of this disease in its areas (Islam et al., 2020). Since the beginning of the pandemic, as of 21 November 2021, 59.0% of reported cases were from the Dhaka division (48.1% at Dhaka city), Chattogram – 15.3%, Khulna – 7.2%, Rajshahi – 6.3%, Rangpur – 3.5%, Sylhet – 3.5%, Barishal – 2.9% and the lowest 2.3% from Mymensingh division. While 43.6% of the reported deaths were from Dhaka division (28.2% at Dhaka city), Chattogram – 20.3%, Khulna – 12.9%, Rajshahi – 7.3%, Rangpur – 4.9%, Sylhet – 4.6%, Barishal – 3.4%, and the lowest 3.0% from Mymensingh division (World Health Organization, 2021).

The challenges created by COVID-19 have affected the well-being of all individuals in all communities irrespective of rich-poor, literate-illiterate, or rural-urban directly or indirectly (Sharma et al., 2021). Preventive measures such as physical distancing, avoiding social gatherings, enforcing masks as mandatory, hand sanitizing, and many others have become a daily routine from the beginning of the national-wide lockdown (Sharma et al., 2021). Bangladesh's government began providing Covidshield, an Oxford AstraZeneca vaccine, to the general population, and additional vaccines including Moderna, Pfizer, and SinoPharma had also been launched to prevent the infection (Kalam et al., 2021). As of December 8, 2021, 7 vaccines were approved for use in Bangladesh (Islam, 2021). However, as is the case in many other countries, the government initially focused vaccination efforts on relatively limited categories of people (frontline medical personnel, government employees, private sector officials working on pandemic issues, and people aged 40 years and over), with the anticipation that the entire population would be eligible for vaccinations later (Kalam et al., 2021). On February 7, 2021, the authority launched a mass COVID-19 vaccination campaign (Bangladesh launches mass vaccinations amid challenges, 2022). 106,575,146 vaccines have already been administered, with 24.32% (39,653,764) of the entire population completely vaccinated as of December 8, 2021(Rahman et al.,

2022). Hence, it should be noteworthy that the growing concerns over the vaccine's safety and efficacy may delay this vaccination process (Rahman et al., 2022). The main objective of this study was to evaluate the Knowledge and attitude level towards the COVID-19 vaccine among Vaccine Eligible Residents in Dhaka city.

Methods:

This study design employed a descriptive cross-sectional approach which was conducted over three months from December 2021 to February 2022 within Dhaka City. The target population consisted of adults aged 18 years and above eligible for vaccination against COVID-19 who resided in Dhaka City. People aged below 18 years, non-residents of Dhaka city, and diagnosed with chronic medical conditions like Chronic Obstructive Pulmonary Disease (COPD), Heart Disease, Cancer etc were not considered in this study. A sample size of 270 participants was selected using non-probability purposive sampling. Data collection utilized a semi-structured questionnaire that was pretested and finalized before administration through face-to-face interviews.

The questionnaire included socio-demographic inquiries and assessed participants' knowledge and attitudes towards the COVID-19 vaccine using a Likert scale. Data analysis involved manual review for consistency and utilization of the Likert scale to gauge attitudes, with specific score ranges indicating degrees of agreement. Scores ranging from 1 to 1.8 indicated a "strongly disagree" response, while scores from 1.81 to 2.60 were categorized as "disagree." Responses falling within the range of 2.61 to 3.40 were considered "neutral." Scores between 3.41 and 4.20 were interpreted as "agree," and scores from 4.21 to 5 represented a "strongly agree" response. Ethical considerations were upheld, ensuring participant anonymity and voluntary involvement throughout the study. The research authority of Green Life Medical College, Dhaka, Bangladesh had given ethical approval (Reference No-GLM/1221/02-22) and advised to protect the rights of the institution and the respondents to ensure scientific integrity.

Results:

The cross-sectional study was conducted to evaluate knowledge and attitudes towards COVID-19 vaccination among vaccine-eligible residents of Dhaka City. 270 respondents voluntarily participated in this study and provided their informed consent.

Of the 270 responders, the majority (60.4%) were between the ages of 18 and 27. 19.9% of the population was in the 28–37 age group, 7.0% in the 38–47 age group, 9.30% in the 48–57 age group, and 4.4% in the 58+ age group. Of these, 49.63% and 50.37% were men and women, respectively. The vast majority of responders (88.15%) identified as Muslims. Of these, 11.11% practiced Hinduism, and the remaining 0.74 percent were Christians. Just 1.9% of the 270 respondents were widowed, 58.1% of respondents were single, and 40.0% of respondents were married. The majority of respondents (88.15%) had completed their Higher Secondary Certificate or higher in school, with secondary school coming in second (8.89%), and no formal education up to the primary level (1.48%) rounding out the group. Of the 270 respondents, students made up 54.8 percent of the sample. The

remaining respondents were made up of service providers (14.4%), businesswomen (11.5%), housewives (14.0%), health professionals (1.9%), and others (4.4%).

Table 1: Demographic information of study respondents.

Variable	N	%
Age of the respondents (in years)		
18-27	163	60.4
28-37	51	18.9
38-47	19	7.0
48-57	25	9.30
≥58	12	4.4
Gender of the respondents		
Male	134	49.63
Female	136	50.37
Religion of the respondents		
Islam	238	88.15
Hinduism	30	11.11
Christianity	02	0.74
Marital status of the respondents		
Married	108	40.0
Unmarried	157	58.1
Widowed	05	1.9
Educational status of the respondents		
No formal schooling	04	1.48
Up to primary level	04	1.48
Secondary school	24	8.89
Higher Secondary Certificate & above	238	88.15
Occupation of the respondents		
Health professional	5	1.9
Service holder	39	14.4
Businessman / woman	31	11.5
Housewife	35	13.0
Student	148	54.8
Others	12	4.4

The COVID-19 vaccine had been administered to 236 respondents (87.4%), whereas only 34 respondents (12.6%) had not received the vaccination. Of the 236 interviewed, 41.5% had used Sinopharm, which was followed by Moderna (25.9%), AstraZeneca/Oxford (19.1%), Pfizer-BioNTech (11.9%), Covaxin (0.8%), and others (0.8%). 236 responders were given the COVID-19 vaccine; of these, 214 (90.7%) had taken both doses, while 22 (9.3%) had only taken the first.

Table 2: Distribution of the respondents according the Covid-19 to vaccine status

Variable	N	%
Received Covid-19 Vaccine		
Yes	236	87.4
No	34	12.6
Type of vaccine		
Sinopharm	98	41.5
Moderna	61	25.9

AstraZeneca/Oxford	45	19.1
Pfizer-BioNTech	28	11.9
Covaxin	02	0.8
Others	02	0.8
Number of receiving dose		
First dose	22	9.3
Both dose	214	90.7

Among 270 respondents, the majority of the respondents (99.62%) knew about the COVID-19 vaccine while only a few respondents (0.38%) did not know about COVID-19 vaccination.

Among 270 respondents, the majority of the respondents (94.44%) knew how to register for vaccines while only 5.56% of the respondents did not know about COVID-19 vaccine registration. Among 270 respondents, the majority of the respondents (83.33%) thought that vaccines can protect them from COVID-19 infection while others **(**16.67%) did not think that vaccination can protect them from infection. Of the 270 respondents, over half (51.11%) were unaware that the COVID-19 vaccine is safe for pregnant women, whereas the remaining respondents (48.89%) were aware of this. Of the 270 respondents, 77.78% believed that individuals with co-morbidities and advanced age should receive vaccinations before others, and just 22.22% were unsure. Out of 270 responders, 57.30% believed that the COVID-19 vaccine could result in allergic reactions, whereas only 42.60% were unaware of this possibility. Out of 270 respondents, the majority (85.18%) believed that immunization may reduce COVID-19-related mortality, whereas the remaining respondents (14.82%) were unsure if vaccination could reduce mortality. Merely 14.08% of the 270 respondents were unaware of the possibility of reinfection following vaccination, while the majority of respondents (85.92%) believed it was feasible. Among 270 respondents, the majority of the respondents (43.70%) thought that vaccination can give protection for about 10 months to 1 year and 28.89% thought it 4 to 6 months while 20.38% thought it will be effective lifelong, and only 7.03% thought the vaccine was effective up to 3 months.

Table 3: Knowledge of the respondents regarding the COVID-19 vaccine

Knowledge regarding COVID-19 vaccine			
Statement	**Variable**	**N**	**%**
Opinion regarding knowledge about COVID-19 vaccine	Yes	269	99.62
	No	1	0.38
COVID-19 vaccine registration	Yes	255	94.44
	No	15	5.56
Vaccination can give protection from COVID-19 infection	Yes	225	83.33
	No	45	16.67
Safety of COVID-19 vaccine for pregnant women	Yes	132	48.89
	No	138	51.11
Priority of vaccination for people with advanced age and co-morbidities	Yes	210	77.78
	No	60	22.22
	Yes	155	57.40

Allergic reaction due to COVID-19 vaccine	No	115	42.60
Side effects of COVID-19 vaccine	Yes	191	70.74
	No	79	29.26
Vaccination and reduction of mortality	Yes	230	85.18
	No	40	14.82
Possibility of reinfection after vaccination	Yes	232	85.92
	No	38	14.08
Duration of effectiveness of COVID-19 vaccine	Up to 3 months	19	7.03
	4 to 6 months	78	28.89
	10 months to 1 year	118	43.70
	Lifelong	55	20.38

Among 270 respondents, the majority of the respondents (53.08%) got the information regarding the COVID-19 vaccine from social media. Considerable sources of information were family members and friends (17.78%). The newspaper was the source of information for 15.19% of respondents. Health professionals in the case of 8.14% of the respondents. Other sources in the case of 4.07% of the respondents and only 0.74% got the knowledge through the campaign.

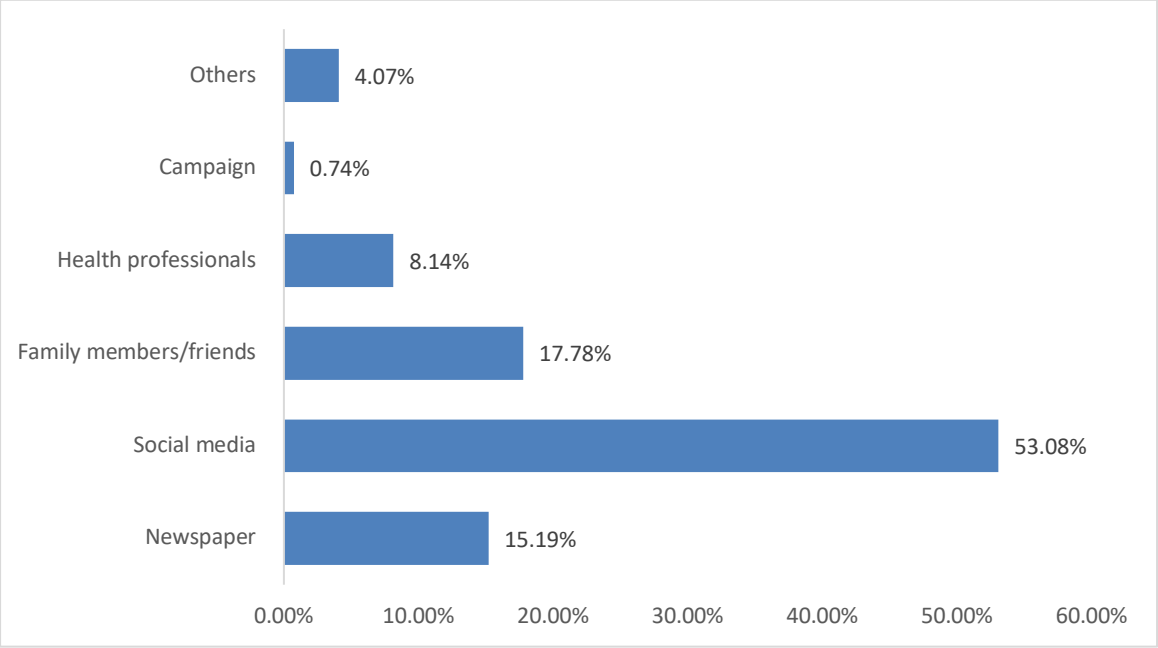

Figure 1: Source of information about COVID-19 vaccine

Among the 270 respondents, the majority (64.81%) agreed and 15.95% strongly agreed that the COVID-19 vaccines were safe. Almost half of the participants (50.37%) agreed to take the COVID-19 vaccine without any hesitation if it was offered to them and 30.74% also strongly agreed to do the same. 6.30 percent of respondents said they did not agree or disagree with the statement, while 11.85 percent disagreed and 0.74% strongly disagreed that people should get the vaccine without hesitation. The majority of responders (46.30%) strongly agreed, and 45.18 percent agreed, that getting the COVID-19 vaccine is necessary for them. The majority of participants—51.85% and 34.82% of respondents, respectively—strongly agreed and agreed that if a person remains infected even after receiving a vaccination, the isolation period should be kept in place. Of those who responded, 34.07% disagreed

and 18.88% strongly disagreed that the reports about COVID-19 vaccines were real, while 34.07% said they were neither sure nor sure, while 10.00% agreed and 2.96% even strongly agreed. Of the respondents, 41.48% disagreed and 15.93% strongly disagreed that mask use and good hand hygiene were sufficient measures to avoid COVID-19. From the remaining respondents, 21.11% were neutral, 12.59% agreed and 8.89% strongly agreed with the statement. The majority of responders (51.11%) strongly agreed with the statement that they should encourage their friends and family to receive COVID-19 vaccinations, while 37.78% agreed to follow likewise. Only a small percentage, 5.93% neither agreed nor disagreed, 3.70% disagreed and 1.48% strongly disagreed to do this. Among the 270 responses, 37.78% disagreed 22.96% strongly disagreed that the vaccination is not reliable because it is free, 18.52% neither agreed nor disagreed, 17.41% agreed and 3.33% strongly agreed with the statement. The majority of the respondents, 57.41% agreed and 25.93% strongly agreed that the severity of the infection is less after vaccination. Among the 270 respondents, 49.63% agreed, 26.30% strongly agreed, 14.81% neither agreed nor disagreed, 7.41% disagreed and only 1.85% strongly disagreed with the statement that 'Vaccination can provide a sense of protection from COVID-19'.

Table 4: Attitude regarding COVID-19 Vaccination among Vaccine Eligible Residents of Dhaka City

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean±SD
Safety of COVID-19 vaccination	43	175	44	8	0	3.94±0.65
Taking COVID-19 vaccine without hesitation	83	136	17	32	2	3.99±0.93
Essentiality of COVID-19 vaccines	125	122	15	8	0	4.35±0.71
Maintenance of isolation for vaccinated people who get infected	140	94	26	7	3	4.34±0.82
Accuracy of rumour(s) about COVID-19 vaccines	8	27	92	92	51	2.44±1.00
Proper hand hygiene & mask wearing being sufficient to prevent COVID-19	43	112	57	34	24	2.57±1.16
Encouraging family and friends to get COVID-19 vaccine	138	102	16	10	4	4.33±0.88
Reliability of vaccine because it is free	9	47	50	102	62	2.40±1.13

Severity of infection is less after vaccination	70	155	31	12	2	4.03±0.81
Perception of protection after vaccination	71	134	40	20	5	3.91±0.88

Discussion:

This investigation was to assess the perspectives and understanding of COVID-19 immunization among eligible individuals in Dhaka City.

Socio-demographic profile

According to the findings, the majority of respondents (60.4%) fell within the age range of 18-27 years, with a smaller proportion (4.4%) aged 58 years or older. This demographic composition contrasts with another study conducted across the general population of Bangladesh, where a greater percentage of respondents fell within the 30-50 age (Mahmud et al., 2021). In our study, the gender distribution was nearly balanced, with 49.63% male and 50.37% female participants. This contrasts with similar studies conducted in India and Bangladesh, which have reported a higher proportion of male respondents (Islam et al., 2021; Kumari et al., 2021). Regarding educational attainment, a large majority (88.15%) of our respondents had achieved at least a Higher Secondary Certificate (HSC) level of education or higher, and a notable percentage (54.8%) were still pursuing studies. These findings align with observations from prior studies conducted in similar settings (Mahmud et al., 2021).

In terms of vaccination status among eligible participants, a substantial majority (87.4%) reported receiving the COVID-19 vaccine, with 90.7% of these individuals having received both doses. The Sinopharm vaccine was the most commonly administered (41.5%), followed by Moderna (25.9%), AstraZeneca/Oxford (19.1%), Pfizer (11.9%), Covaxin (0.8%), and others (0.8%). The prevalence of Sinopharm usage could be attributed to the government's policy of administering this vaccine to younger individuals, particularly students aged 18-27 years, who formed a significant portion of our study cohort. This observation underscores the impact of policy decisions on vaccine distribution and uptake among different demographic groups.

Knowledge

The findings from this study indicate a high level of awareness about COVID-19 vaccines among respondents, with 99.62% reporting knowledge about the vaccines. This is notably higher than a previous study conducted in Bangladesh earlier in the same year, where 90% of respondents were aware of the vaccines (Islam et al., 2021). The increase in awareness observed in our study could be attributed to heightened health campaigns and increased media coverage aimed at educating the public about COVID-19 vaccination.

Regarding the process of vaccine registration, a substantial proportion (94.44%) of participants in our study knew how to register for vaccination. This contrasts sharply with a study conducted in Iraq, where only 40% of respondents were aware of the registration process. The disparity in knowledge levels may be linked to challenges such as limited internet access, inadequate information dissemination, and the impact of ongoing conflicts in the region (CARE, 2021).

The study also revealed a strong belief among respondents (83.33%) that COVID-19 vaccination can protect individuals from infection, indicating a high level of trust in the efficacy of the vaccines. This sentiment differs from a study conducted in Iraq, where 50% of respondents expressed concerns about vaccine safety (CARE, 2021). The variation in opinion may stem from differences in information availability and previous experiences with vaccination.

In a study conducted in Singapore, only 17.09% of respondents believed that COVID-19 vaccination was safe for pregnant women (Jayagobi et al., 2021). This finding contrasts with our study, where 48.89% of respondents expressed confidence in the safety of COVID-19 vaccines for pregnant women. The difference in perceptions could be attributed to limited information available about the safety of COVID-19 vaccines during pregnancy and concerns about potential harm to the fetus (Hong et al., 2022).

Similarly, a significant portion (57.40%) of respondents in our study believed that COVID-19 vaccination could lead to allergic reactions. This perception is comparable to a study conducted in China, where 47.2% of respondents shared similar concerns about allergic reactions to the COVID-19 vaccine (Hong et al., 2022). However, an earlier study in Bangladesh reported a much higher percentage (89%) of respondents believing that the COVID-19 vaccine could cause allergic reactions (Islam et al., 2021). This discrepancy may be due to variations in information accessibility and individuals' experiences, highlighting the impact of information gaps and differing cultural contexts on perceptions of vaccine safety and risk.

In terms of prioritization for vaccination, a majority of respondents (77.78%) believed that older adults and those with underlying health conditions should be vaccinated first. This finding aligns with a study conducted in the USA, where a similar proportion (78.6%) advocated for prioritizing medically vulnerable populations (Persad et al., 2021). Similarly, a significant number of respondents (70.74%) in our study believed that COVID-19 vaccines have side effects, consistent with findings from Malaysia, where 75.4% of respondents shared similar concerns (Mohamed et al., 2021).

Interestingly, social media emerged as the primary source of information about COVID-19 vaccines for a majority (54.08%) of respondents in our study. This finding aligns with results from studies conducted in Iraq and earlier in Bangladesh, where social media and mass media respectively played significant roles in disseminating information about vaccines (Islam et al., 2021). The variability in primary information sources across studies could be attributed to differences in sample selection criteria and regional information dissemination strategies.

Attitude

The study findings indicate that a majority of respondents perceive COVID-19 vaccines as safe, aligning with similar conclusions drawn from studies conducted among the general population in Bangladesh, residents of Saudi Arabia (Huynh et al., 2020), healthcare workers in Israel (Zaitoon et al., 2022), and cancer patients in Eastern China (Hong et al., 2022). However, a different study conducted in Bangladesh before widespread vaccine distribution revealed a higher level of uncertainty regarding vaccine safety, possibly due to limited knowledge at that time (Islam et al., 2021).

In terms of willingness to receive the COVID-19 vaccine, a significant proportion of respondents (50.37% agreed and 30.74% strongly agreed) expressed readiness to get vaccinated without hesitation, mirroring findings from studies in Bangladesh, healthcare workers in Dubai, and Vietnam (Islam et al., 2021; Albahri et al., 2020; 28. Huynh et al., 2020). Additionally, over 90% of participants in our study considered the COVID-19 vaccine essential, consistent with prior research conducted in Bangladesh (Islam et al., 2021).

The study also highlighted strong agreement among respondents regarding the importance of maintaining isolation measures even after vaccination, which echoes sentiments expressed in a Vietnam-based study regarding COVID-19 patient isolation (Huynh et al., 2020). Furthermore, a notable percentage of respondents (57.41%) in our study strongly disagreed with rumors about COVID-19 vaccines, indicating a high level of awareness among Dhaka City residents. Similarly, there was disagreement regarding vaccine reliability solely due to its free distribution.

Moreover, a significant portion of respondents (57.41% disagreed and 15.93% strongly disagreed) in our study did not consider proper hand hygiene and mask-wearing alone to be sufficient for preventing COVID-19, consistent with findings suggesting that vaccination is crucial for reducing the incidence of COVID-19 (Islam et al., 2021). The majority also expressed a willingness to encourage family and friends to get vaccinated, reflecting a high level of motivation and support for vaccination efforts (Islam et al., 2021; Hong et al., 2022).

Lastly, a majority of participants believed that the severity of COVID-19 infection is reduced after vaccination, which is supported by statements from the Center for Disease Control (CDC) emphasizing that vaccinated individuals are less likely to develop severe illness compared to the unvaccinated (CDC, 2023). These findings collectively underscore the positive attitudes towards COVID-19 vaccination and the perceived effectiveness of vaccines in mitigating disease severity among respondents in Dhaka City.

Limitations

The sampling for this study was purposive due to limitations such as financial constraints, time constraints, and the small sample size. The study area was limited to a small region in Bangladesh, and therefore, the findings cannot be generalized to the entire population. Additionally, probability sampling, which would have been a more suitable technique, was not feasible due to these constraints. Consequently, the study lacked a sampling frame and had a small sample size, impacting the generalizability of the results beyond the specific area studied.

Conclusion:

This study assessed COVID-19 vaccine knowledge and attitudes among Dhaka City residents. Most respondents were aged 18-27, Muslim, and had at least a higher secondary education. The gender ratio was balanced, with many married individuals and students. Sinopharm was the predominant vaccine, with a high rate of complete dosing. Knowledge and attitude of COVID-19 vaccines were widespread, although many were unsure about vaccine safety for pregnant women. The majority believed in vaccine effectiveness and supported prioritizing older and high-risk individuals for

vaccination. Most thought vaccine protection lasted 10 months to 1 year and relied on social media for information. Many were willing to get vaccinated, considering it essential, and supported continued isolation measures. Respondents believed vaccination reduced infection severity and provided protection against COVID-19.

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Conflicts of Interest

The authors declare no conflicts of interest.

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