



A Cross Sectional Study on Adherence to COVID Appropriate Behaviour and Contributing Factors among Vaccinated Individuals Attending ENT OPD of a Teaching Hospital in India

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Maumita De,¹ Diptanshu Mukherjee,² Nabanita Chakraborty,¹ Saumendra Nath Bandyopadhyay²

ABSTRACT

Introduction

With the commencement of mass vaccination drive globally against COVID-19 infection, the daily COVID appropriate behaviour may be neglected among the population. However the long term efficacy and safety of vaccines is not confirmatory yet. Hence the study was carried out to assess the post-vaccination COVID appropriate behaviour and contributing factors.

Materials and Methods

A cross-sectional study was conducted in the out-patient department of ENT of a teaching hospital in India from November 2021 to January 2022 among 448 vaccinated individuals. Face to face interview of the participants with a schedule was carried out for data collection. The data were analyzed by means of proportion and Chi-square test.

Results

More than 90% of the participants practiced greeting without physical contact, covering nose, mouth during coughing or sneezing, social distancing. But thorough hand washing technique was maintained by less than 75% of the respondents and post-vaccination mask use was reduced to around 68%. Participants of female gender, younger age group, with no history of prior COVID-19 infection were found to be more compliant with precautionary measures and significantly ($p < 0.05$) varied in relation to wearing facemasks and hand washing.

Conclusion

Thus regardless of the vaccination status, adherence to personal preventive behaviours is necessary to prevent the further spread of COVID-19 infection. It can be emphasized by the competent authority by maintaining some regulations and the same message can be disseminated by health education materials to the general population with special emphasis on high risk groups.

Keywords

COVID Appropriate Behaviour; Post-vaccination; Adherence

1 - Department of Community Medicine, Nil Ratan Sircar Medical College and Hospital, Kolkata

2 - Department of ENT, Medical college, Kolkata

Corresponding author:

Dr Diptanshu Mukherjee

email: dipe_medico@rediffmail.com

Coronavirus disease 2019 (COVID-19) continues to spread globally and the emergence of severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) variants further brings new challenges in the prevention and control of the pandemic.¹ Mass vaccination against the COVID-19 infection is continuing

worldwide to attain herd immunity among the general population. COVID vaccination drive has started in India on 16th January, 2021 with prioritizing the health care professionals and elderly at the beginning. Next any citizen above 15 years of age is eligible for vaccination.² In India, the Central Drugs Standard Control Organization (CDSCO) approved Covishield (ChAdOx1_nCoV19) developed by Serum Institute of India; Bharat Biotech Limited's Covaxin and SPUTNIK-V by Gamaleya National Research Centre of Epidemiology and Microbiology, Russia for emergency use.³ But the long term surveillance of vaccine safety is yet to be proved specially among the high risk groups. Furthermore the effectiveness of current COVID vaccines may not be 100%^{4,5} and it will be again jeopardized as the new SARS-CoV-2 variants facilitate the immune escape.⁶ Thus, we should not ignore the post-vaccination breakthrough infections in recent real-world evidence.⁷⁻¹⁰

Ministry of Health & Family Welfare, Government of India released an illustrated guide of COVID appropriate behaviours followed by public even after COVID immunization. Personal protective measures like use of face masks, rigorous hand hygiene, maintaining social distancing and cough etiquette can have a definite role to minimize the spread of COVID-19.¹¹ A meta-analysis performed by Talic S et al during 2021 indicated a reduction in incidence of COVID-19 associated with hand washing (53%), mask wearing (53%) and physical distancing (25%).¹² But an alarming issue is that the general population may ignore the daily preventive measures following vaccination.¹³ There are evidences from previous vaccine rollouts regarding reduce in adherence to preventive behaviours.¹⁴ The keen expectation for the onset of COVID vaccination programs, supplemented with people's desire to return to "normal life," has driven concerns regarding reduced preventive behaviours among vaccinated individuals even earlier than recommended.^{15,16}

As of March 6, 2022 nearly 79.08% of Indian population received two doses of vaccine and precautionary dose administered only in 19,418,701 populations across the country.¹⁷ Hence the adherence to COVID appropriate behaviour is necessary to prevent

reemergence of COVID-19 pandemic, until sufficient vaccination coverage is reached for herd immunity.¹⁸

Again maintenance of protective behaviour depends on one's knowledge, attitude and other socio-demographic factors. A community based study in Ethiopia showed that the respondents with sufficient knowledge about COVID-19, from urban area and those who use social media as a source of information were more likely to follow COVID appropriate behaviour.¹⁹

There are plenty of patients attending ENT out-patient department (OPD) everyday from various socio-demographic backgrounds and maintenance of personal hygiene in terms of COVID appropriate behaviour could help them for further prevention of many allergic and infective diseases. Knowledge about vaccination induced complacency and negligence of preventive measures at population level is very important in formulating guidelines for the vaccinated people that are empirically informed. However, little is known about how this vaccination would affect the protective behaviours toward the COVID-19 pandemic. Hence this study was directed to assess the COVID appropriate behaviour and contributing factors among the vaccinated individuals attending ENT out-patient department (OPD) of a teaching hospital in India.

Materials and Methods

An observational, cross-sectional study was conducted in ENT OPD of a tertiary care hospital of West Bengal, India from November 2021 to January 2022 among adult patients above the age of 18 years and vaccinated with at least one dose of any COVID vaccine. Vaccinated individuals, refusing to give informed consent & those who were severely ill were excluded from the study. With a prevalence assumed to be 50%, the calculated sample size was 400. Considering non-response rate to be 10%, the sample size required was 440. Simple random sampling technique was used for selecting any two days of the week, on which patients attended the ENT OPD. Considering the inclusion and exclusion criteria, the vaccinated patients on that particular day were then selected by systematic random sampling. The average turnover being 100 patients per day in ENT OPD, every

5th beneficiary was chosen. The final sample size was 448. After receiving approval from Institutional Ethics Committee, permission was sought to obtain informed verbal consent from the participants. Respondents were assured of anonymity and confidentiality of the information collected.

A pre-designed and pre-tested schedule was used for interviewing the participants. The schedule consisted of four parts. The first part included socio-demographic details like age, gender, religion, occupation, education and residence. The second part included clinical profile of the patient viz. main presenting symptom in ENT OPD, comorbidity status and past history of COVID-19 infection. The third part contained COVID vaccination history viz. type of COVID vaccine and number of doses taken. Adherence to COVID appropriate behaviour (viz. wearing of masks, hand washing, disinfecting touched surfaces regularly, maintaining social distancing etc.) was included in the fourth part.

All collected data were analysed using Microsoft Excel 16.0 and Epi info 7.2.4. Proportions and Chi square test of significance was used for analysis. The significance level was fixed as $p < 0.05$.

Results

It has been found that majority of the study participants were in 18-44 years of age group (58.5%), female (55.4%), Hindu by religion (85.7%), engaged in business (29.5%), studied upto class 10 (64.7%) and residents of urban area (68.3%).

Among 448 patients in ENT OPD 182 patients (40.6%) presented primarily with ear discharge followed by 95 (21.2%) with deafness, 65 (14.5%) with nasal obstruction, 41 (9.2%) with headache, 26 (5.8%) with voice changes, 22 (4.9%) with throat discomfort followed by 17 (3.8%) with other symptoms like vertigo, nasal bleeding etc as main presenting symptom. A total of 138 study participants (30.8%) were suffering from associated comorbidities, and another 10 people (2.2%) did not know about their comorbidity status. Around 72 (16.1%) people among the study population have suffered from COVID infection in the past. Among 448 participants, 334 (74.6%) has taken Covishield vaccine, whereas 114 (25.4%) has taken the Covaxin and 382 (85.3%) have completed second dose of vaccination.

Distribution of various COVID appropriate behaviour revealed that, greeting others without physical contact most commonly practiced (99.1%); followed by calling National Toll Free number (98.7%); avoid spitting in the open (97.3%) and covering nose and mouth while... (95.5%) and avoid unnecessary travel (94.6%) and maintaining physical distance of more... (94.2%) and cleaning & disinfecting touched surface (89.7%) and avoid touching eyes, nose or mouth (86.6%) and hand washing frequently & thoroughly (73.7%) and wearing mask all the time outside... (68.3%).

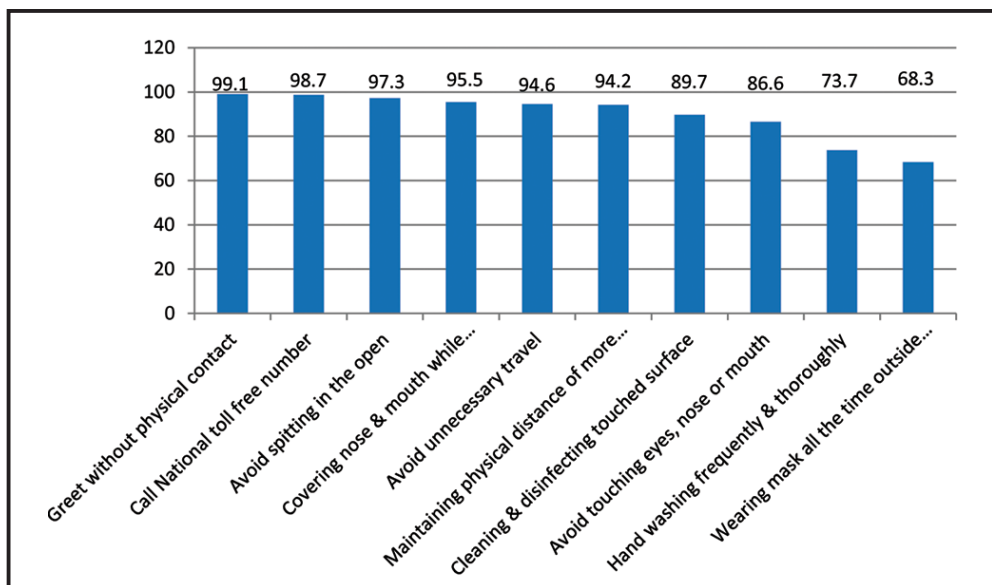


Fig. 1. Distribution of COVID appropriate behavior (n = 448)

coughing or sneezing (95.5%). The least commonly practiced preventive behaviour was wearing of masks all the time outside residence (68.3%) [Fig. 1]

The association of COVID appropriate behaviours with socio-demographic characteristics was statistically tested, as depicted in Table I, only yes responses on adherence to protective behaviour are mentioned. Wearing of facemasks all the time outside residence, frequent and thorough hand washing were maximally found among 18 to 44 years age group, female individuals, individuals belonging to Hindu religion, non formal literate (person who can read and write without any formal school education) and those residing in urban area. The association of wearing masks was found to be statistically significant with age, sex, residence; whereas association

of hand washing was significant with age, sex, religion, education level and residence ($p < 0.05$). Significant association was found between avoidance of touching nose, mouth with religion and residence. Regular cleaning and disinfection of surfaces was maximum among 18 to 44 years age group ($p < 0.05$), females, Christians and of other religion, Illiterate, non-formal literate people as well as those who studied upto Class 4 and in urban family. Greeting without physical contact significantly varied according to sex, religion & education; whereas maintaining physical distance of more than 6 feet was significant according to age group & education. Statistical significant association was found between gender with covering mouth, nose during coughing or sneezing and in case of avoidance of open spitting. Calling national toll

Table I: Socio demographic determinants of COVID appropriate behaviour (n=448)

SOCIO-DEMOGRAPHIC VARIABLES	COVID-APPROPRIATE BEHAVIOUR									
	WEARING MASK ALL THE TIME OUTSIDE RESIDENCE	HAND WASHING FREQUENTLY AND THOROUGHLY	AVOID TOUCHING EYES, NOSE OR MOUTH	CLEANING AND DISINFECTING TOUCHED SURFACES REGULARLY	GREET OTHER WITHOUT PHYSICAL CONTACT	MAINTAINING PHYSICAL DISTANCE OF MORE THAN 6 FEET	COVERING NOSE AND MOUTH WHILE COUGHING OR SNEEZING	AVOID SPITTING IN THE OPEN	CALL NATIONAL TOLL FREE NUMBER	AVOID UNNECESSARY TRAVEL
Age (years)										
18-44	196 (74.8)	206 (78.6)	230 (87.8)	246 (93.9)	260 (99.2)	258 (98.5)	246 (93.9)	254 (96.9)	262 (100)	252 (96.2)
45-59	52 (53.1)	66 (67.3)	86 (87.8)	76 (77.6)	98 (100)	86 (87.8)	96 (98.0)	96 (98.0)	98 (100)	92 (93.9)
≤60	58 (65.9)	58 (65.9)	72 (81.8)	80 (90.9)	86 (97.7)	78 (88.6)	86 (97.7)	86 (97.7)	82 (93.2)	80 (90.9)
	p=.000	p=.018	p=.339	p=.000	p=.243	p=.000	p=.135	p=.840	p=.000	p=.153

Table I: Contd.

Table I (Contd.): Socio demographic determinants of COVID appropriate behaviour (n=448)

SOCIO-DEMOGRAPHIC VARIABLES	COVID-APPROPRIATE BEHAVIOUR									
	WEARING MASK ALL THE TIME OUTSIDE RESIDENCE	HAND WASHING FREQUENTLY AND THOROUGHLY	AVOID TOUCHING EYES, NOSE OR MOUTH	CLEANING AND DISINFECTING TOUCHED SURFACES REGULARLY	GREET OTHER WITHOUT PHYSICAL CONTACT	MAINTAINING PHYSICAL DISTANCE OF MORE THAN 6 FEET	COVERING NOSE AND MOUTH WHILE COUGHING OR SNEEZING	AVOID SPITTING IN THE OPEN	CALL NATIONAL TOLL FREE NUMBER	AVOID UNNECESSARY TRAVEL
Sex										
Male	118 (59.0)	134 (67.0)	172 (86.0)	174 (87.0)	196 (98.0)	184 (92.0)	184 (92.0)	190 (95.0)	196 (98.0)	184 (92.0)
Female	188 (75.8) p=.000	196 (79.0) p=.004	216 (87.1) p=.869	228 (91.9) p=.087	248 (100) p=.025	238 (96.0) p=.074	244 (98.4) p=.001	246 (99.2) p=.006	246 (99.2) p=.275	240 (96.8) p=.026
Religion										
Hindu	268 (69.8)	292 (76.0)	338 (88.0)	340 (88.5)	384 (100)	360 (93.8)	370 (96.4)	378 (98.4)	384 (100)	368 (95.8)
Muslim	34 (60.7)	34 (60.7)	46 (82.1)	54 (96.4)	54 (96.4)	54 (96.4)	50 (89.3)	54 (96.4)	50 (89.3)	50 (89.3)
Christian	4 (66.7)	4 (66.7)	2 (33.3)	6 (100.0)	6 (100)	6 (100)	6 (100)	2 (33.3)	6 (100)	4 (66.7)
Others (Jain, Buddhist etc.)	0 (0.0) p=.102	0 (0.0) p=.008	2 (100) p=.001	2 (100.0) p=.238	0 (0.0) p=.000	2 (100) p=.767	2 (100) p=.107	2 (100) p=.000	2 (100) p=.000	2 (100) p=.003
Education										
Illiterate	2 (33.3)	0 (0.0)	4 (66.7)	6 (100)	6 (100)	4 (66.7)	6 (100)	6 (100)	6 (100)	6 (100)
Non formal literate	20 (76.9)	20 (76.9)	24 (92.3)	26 (100)	24 (92.3)	26 (100)	22 (84.6)	26 (100)	26 (100)	20 (76.9)
Studied upto Class 4	10 (62.5)	10 (62.5)	12 (75.0)	16 (100)	16 (100)	16 (100)	16 (100)	16 (100)	14 (87.5)	16 (100)

Table I: Contd.

Table I (Contd.): Socio demographic determinants of COVID appropriate behaviour (n=448)

SOCIO-DEMOGRAPHIC VARIABLES	COVID-APPROPRIATE BEHAVIOUR									
	WEARING MASK ALL THE TIME OUTSIDE RESIDENCE	HAND WASHING FREQUENTLY AND THOROUGHLY	AVOID TOUCHING EYES, NOSE OR MOUTH	CLEANING AND DISINFECTING TOUCHED SURFACES REGULARLY	GREET OTHER WITHOUT PHYSICAL CONTACT	MAINTAINING PHYSICAL DISTANCE OF MORE THAN 6 FEET	COVERING NOSE AND MOUTH WHILE COUGHING OR SNEEZING	AVOID SPITTING IN THE OPEN	CALL NATIONAL TOLL FREE NUMBER	AVOID UNNECESSARY TRAVEL
Studied upto Class 10	206 (71.0)	220 (75.9)	258 (89.0)	256 (88.3)	288 (99.3)	274 (94.5)	278 (95.9)	280 (96.6)	288 (99.3)	274 (94.5)
Studied upto class 12 and above	68 (61.8)	80 (72.7)	90 (81.8)	98 (89.1)	110 (100)	102 (92.7)	106 (96.4)	108 (98.2)	108 (98.2)	108 (98.2)
	p=.105	p=.001	p=.084	p=.184	p=.005	p=.023	p=.073	p=.682	p=.002	p=.000
Place of residence										
Rural	80 (56.3)	84 (59.2)	108 (76.1)	124 (87.3)	140 (98.6)	130 (91.5)	132 (93.0)	138 (97.2)	136 (95.8)	134 (94.4)
Urban	226 (73.9)	246 (80.4)	280 (91.5)	278 (90.8)	304 (99.3)	292 (95.4)	296 (96.7)	298 (97.4)	306 (100.0)	290 (94.8)
	p=.000	p=.000	p=.000	p=.253	p=.429	p=.103	p=.072	p=.902	p=.000	p=.859

free number and avoidance of unnecessary travel both were found to be significantly varied according to religion and education level of the participants.

Factors related to COVID-appropriate behaviour was depicted in Table II and only yes responses on adherence to preventive behaviour are mentioned in the table. Wearing masks all the time outside home was maximum with those who did not have any comorbidity, whereas all other COVID appropriate behaviour was maximum in those who did not know their comorbidity status. Calling national toll free number was maximum in those without any comorbidity or those who were not aware of their comorbidity and the association was statistically significant ($p < 0.05$). All the COVID appropriate behaviour was more

followed by people who did not suffer from COVID infection in the past except avoidance of touching mouth, nose and eyes and covering mouth, nose during coughing, sneezing. Significant association was found between past history of COVID infection with wearing mask, hand washing, greeting without physical contact, maintaining physical distance and avoid spitting in the open ($p < 0.05$). Adherence to COVID appropriate behaviour was more in individuals who have received only 1st dose of vaccine than those who received both the doses except in case of avoidance of open spitting. Wearing mask was found to be significantly vary ($p = .047$) according to vaccination dosage.

Table II: Factors related to COVID appropriate behaviour (n=448)

CLINICAL HISTORY	COVID-APPROPRIATE BEHAVIOUR									
	WEARING MASK ALL THE TIME OUTSIDE RESIDENCE	HAND WASHING FREQUENTLY AND THOROUGHLY	AVOID TOUCHING EYES, NOSE OR MOUTH	CLEANING AND DISINFECTING TOUCHED SURFACES REGULARLY	GREET OTHER WITHOUT PHYSICAL CONTACT	MAINTAINING PHYSICAL DISTANCE OF MORE THAN 6 FEET	COVERING NOSE AND MOUTH WHILE COUGHING OR SNEEZING	AVOID SPITTING IN THE OPEN	CALL NATIONAL TOLL FREE NUMBER	AVOID UNNECESSARY TRAVEL
Comorbidity present										
Yes	92 (66.7)	100 (72.5)	118 (85.5)	122 (88.4)	136 (98.6)	128 (92.8)	136 (98.6)	134 (97.1)	132 (95.7)	128 (92.8)
No	208 (69.3)	222 (74.0)	260 (86.7)	270 (90.0)	298 (99.3)	284 (94.7)	282 (94.0)	292 (97.3)	300 (100)	286 (95.3)
Don't know	6 (60.0)	8 (80.0)	10 (100)	10 (100)	10 (100)	10 (100)	10 (100)	10 (100)	10 (100)	10 (100)
	p=.728	p=.849	p=.429	p=.489	p=.689	p=.532	p=.079	p=.860	p=.001	p=.403
Suffered from COVID Infection in the past										
Yes	38 (57.6)	40 (60.6)	58 (87.9)	58 (87.9)	64 (97.0)	56 (84.8)	64 (97.0)	60 (90.9)	64 (97.0)	62 (93.9)
No	268 (70.2)	290 (75.9)	330 (86.4)	344 (90.1)	380 (99.5)	366 (95.8)	364 (95.3)	376 (98.4)	378 (99.0)	362 (94.8)
	p=.043	p=.009	p=.743	p=.591	p=.046	p=.000	p=.541	p=.000	p=.196	p=.783
Completed 2nd dose of vaccine										
Yes	254 (66.5)	276 (72.3)	330 (86.4)	342 (89.5)	378 (99.0)	358 (93.7)	364 (95.3)	372 (97.4)	376 (98.4)	360 (94.2)
No	52 (78.8)	54 (81.8)	58 (87.9)	60 (90.9)	66 (100)	64 (97.0)	64 (97.0)	64 (97.0)	66 (100)	64 (97)
	p=.047	p=.103	p=.743	p=.733	p=.404	p=.297	p=.541	p=.848	p=.305	p=.363

Discussion

The present study demonstrates the adherence to COVID-19 appropriate behaviours among vaccinated patients attending ENT OPD. We found that, greeting without physical contact, covering nose and mouth during coughing or sneezing, social distancing were maintained by more than 90% of the participants; whereas thorough hand washing practiced by less than 75% of the respondents. Likewise only 61.9% of the Iranian participants declared that they always wash their hands for at least 20 seconds, as reported by Firouzbakht M et al.²⁰ But according to a community-based study in Ethiopia, proper hand washing was practiced by 95% of the respondents followed by avoiding handshake (85.2%), covering mouth while coughing or sneezing (61.8%) and avoiding close contact with patients of cough or fever (59.8%).¹⁹

To our surprise post-vaccination mask use of the respondents was drastically reduced to around 68% reflecting that, the participants intended to believe that COVID-19 vaccination could reduce the morbidity and mortality of SARS-CoV-2 infection to some extent, which was consistent with previous findings.²¹ Here relaxation of preventive behaviours may be recognized as self-satisfaction after vaccination. Although maintaining facemask use considered as a cost-effective intervention until target vaccination coverages were achieved, as stated in a simulation-model study among the US population from March-July, 2020.²²

While ascertaining the effect of socio-demographic variables on post-vaccination COVID appropriate behaviour, wearing masks was found to be statistically different according to age, sex, residence, whereas hand washing significantly varied according to age, sex, religion, education level and residence. Similarly a study on COVID-19 preventive behaviours and influencing factors in Iran revealed that hand-washing and wearing mask had significant relation with gender, education and economic status.²⁰ In this study females were more likely to be willing to adhere to all protective measures. This finding was supported by several studies,²³⁻²⁵ which all

agreed that females were more compliant to health-related guidelines than males.

We found that the preventive behaviours were maximally practiced by 18- 44 years of age group in the contrary to the findings of Firouzbakht M et al.²⁰ This may be attributed to more engagement in outdoor activities by younger age group compelling them to maintain COVID appropriate behaviour.

Most of the safety behaviour was followed by people, who did not suffer from COVID infection in the past and significant difference was found between past histories of COVID infections with wearing mask, hand washing, greeting without physical contact, maintaining physical distance and avoid spitting in the open. While there were no significant differences reported in the complacency scores among oral health care professionals from India and the United States based on previous exposure to COVID-19.²⁶ Significant differences in our study may be as an effect of trust on protective antibody after getting infected with COVID-19 infection.

In this study adherence to all precautionary measures except avoidance of open spitting was more in single dose vaccinated individuals. That is probably due to assurance on double vaccine doses only instead of single dose.

Henceforth with the process of mass vaccination, major concern was that the daily preventive behaviours against COVID-19 may be reduced among the population, which was well represented in our study. Also the socio-demographic determinants and other related factors revealed in this study may contribute to identify the specific groups to promote preventive measures. However given the uncertain nature of the disease and the equivocal nature of results on vaccine effectiveness,²⁷ it is imperative that all the WHO suggested precautionary measures to be followed in the future to conquer this pandemic.

There are certain limitations in our study. The pre-test and post-test design was not counted, which would compare a better outcome of COVID appropriate behaviour among before and after vaccinated people. We cannot determine whether behavioral risk factors such as smoking, excessive alcohol consumption, physical

inactivity, obesity and unhealthy food intake play a significant role in the adherence to preventive COVID-19 measures. Also the shorter duration of this study does not allow us to account for trends in daily incidence of COVID-19 cases while studying vaccination-induced complacency.

Conclusion

To the best of our knowledge, this is one of the fewer studies to report how the preventive behaviours toward COVID-19 would be affected after vaccination. It also explored the various behavioural determinants. So regardless of the vaccination status, adherence to safety measures is quintessential in containing the COVID-19 infection, which emerges the need to circulate health education materials addressing this issue and the strategic dissemination of the same. It is time that policy makers and professional bodies emphasize the impending danger of COVID-19 susceptibility, which may get discounted by the virtue of the gigantic exuberance surrounding COVID-19 vaccines.

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