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## ORIGINAL ARTICLE

# Comparison between Attitudes for COVID 19 Vaccine acceptance in Vaccinated and Unvaccinated Medical Students in Karachi

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### ABSTRACT

**Objective:** The main aim was to assess the difference in attitudes towards COVID 19 vaccine acceptance among vaccinated and unvaccinated medical students. Secondary aim is to determine the factors affecting vaccine acceptance among medical students

**Study Design:** Descriptive cross-sectional study

**Place and Duration of Study:** Study was conducted online. Duration:6 weeks

**Material and Methods:** The study was conducted online with help of a predesigned online questionnaire. Undergraduate and postgraduate medical students of different medical universities in Karachi were included in the study. Statistical analysis was carried using SPSS version 22.

**Results:** Out of 419 participants, 309 (73.7%) were female and 110 (26.3%) were males. Mean age was  $22.54 \pm 2.14$  years. 74 (17.7%) participants were vaccinated for COVID-19 and 345 (82.3%) were unvaccinated. Among the unvaccinated, 212 (61.4%) were willing for vaccination whereas 82 were (23.7%) not sure and 52 (12.4%) said no. Results were compared in two groups: Group A- vaccinated for COVID-19 (n=74) and Group B unvaccinated for COVID-19 (n=345). Group A had fewer concerns about vaccine side effects, more faith in data providers and more willingness to get vaccinated.

**Conclusion:** Vaccinated medical students are more likely to convince colleagues and others to get vaccinated which shows positive attitudes and hopes for the future.

**Key Words:** COVID-19, Medical students, Vaccine hesitancy

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### INTRODUCTION

The world is in the midst of COVID 19 pandemic. The pandemic has affected the human life devastatingly and drastically. Large number of populations dying from COVID and complications has caused extreme distress. COVID has caused

most deaths amongst the frontline workers all over the world. That is why first preference was given to the health care providers as candidates for protection from COVID. Medical students and house officers are amongst the health care workers potentially exposed to the virus.<sup>1</sup>

A ray of hope is the newly produced COVID vaccine which is the only means of creating immunity and protecting this world from the crisis which has lasted more than a year already. Unfortunately, only the vaccine availability is not enough to stop the pandemic. Compliance and acceptance is also a factor. Depending on varying biological, environmental, and socio-behavioral factors, the threshold for COVID-19 herd immunity may be between 55% and 82% of the population<sup>2</sup> It usually takes 10 to 15 years and 4 to 5 clinical trials before a vaccine is introduced but due to the urgency of introducing the vaccine to the community, people face trust issues due to its rapid trials. Also side effects and long term effects of the vaccine are not confirmed as trials are still going on. Some before vaccine surveys, that included 493 and 2200 individuals, suggest only 3 in 4 people would get vaccinated if a COVID-19 vaccine were available, and only 30% would want to receive the vaccine soon after it becomes available.<sup>3</sup> Those who had concerns with childhood vaccines are amongst the population of people against COVID vaccine as well.<sup>4</sup> The only cure is acceptance to the COVID vaccine virus which is accepted to cause herd immunity and finally help in stopping spread of the virus and control this horrible pandemic.

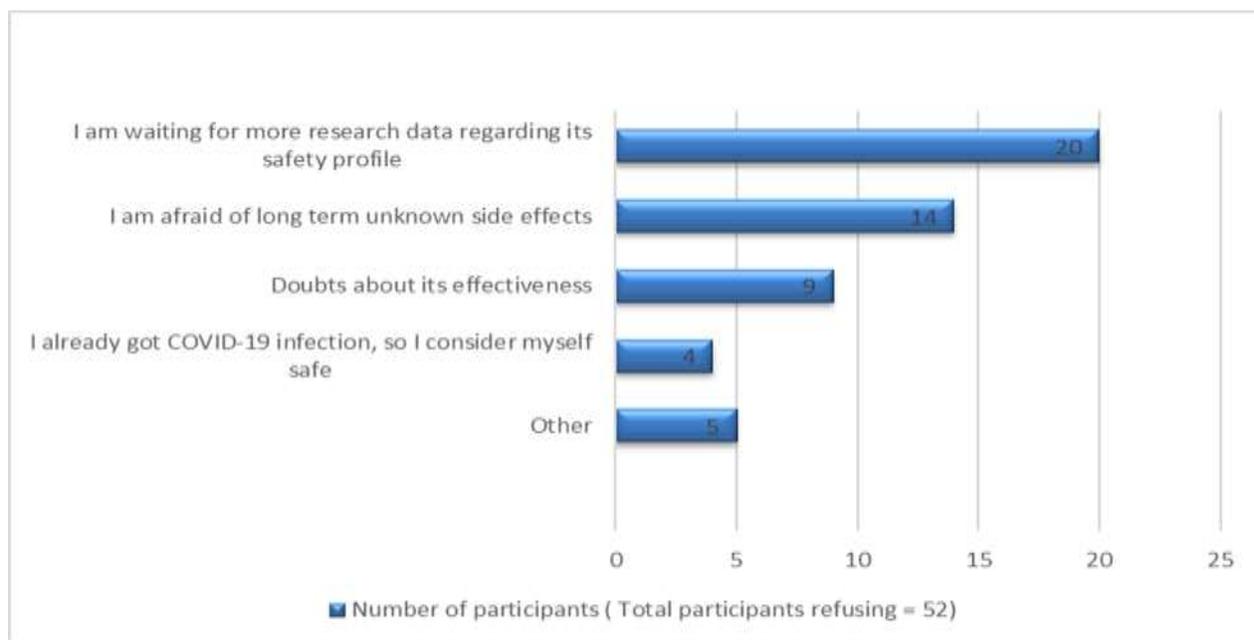
## MATERIAL AND METHODS

A descriptive, correlational, cross sectional study was conducted online with help of a predesigned questionnaire on google forms. Undergraduate and postgraduate medical students of different medical universities in Karachi were included in the study. The study was conducted for 6 weeks from 1<sup>st</sup> April 2021 to 14<sup>th</sup> May 2021. The sample size was calculated using the sample size calculator (<http://www.raosoft.com/samplesize.html>) with absolute precision of 5%, confidence interval of 95% and anticipated frequency of 50%. Sample size calculated to be was 384. Consecutive sampling technique was used. Undergraduate and

postgraduate medical students of different medical universities in Karachi who agreed to participate were included in the study. Undergraduate and postgraduate medical students of different medical universities in Karachi who disagreed to participate were included in the study. Nonmedical students were excluded as well. Online survey was designed based on the past researches involving attitudes and behaviours about vaccination. The questionnaire includes 5 sections including 1) Biodata, 2) COVID-19 experience 3) General attitude regarding vaccination 4) Attitude regarding COVID-19 vaccination 5) Personal views COVID-19 and vaccine. A question regarding the willingness to get vaccinated was included along with an open-ended question asking for reason if the participant was not willing to get vaccinated. Statistical analysis was carried using SPSS version 22.

## RESULTS

A total of 419 participants participated in study. 309 (73.7%) were female and 110 (26.3%) were males. Mean age of the participants was  $22.54 \pm 2.4$  years. 81.1% were from MBBS programme, 12.4% were from BDS programme. Only 5% of participants were postgraduates and rest were undergrads. 66.8% were from private sector and 33.2% were in public sector institutes. 74 (17.7%) were already vaccinated for COVID-19 at the time the survey was carried out and 345 (82.3%) were unvaccinated. Among the unvaccinated study population, 212 (61.4%) were willing to go for COVID-19 vaccination whereas 82 (23.7%) were not sure and only 52 (12.4%) said that they would not like to receive the vaccination for COVID-19. Fig 1 shows the reasons leading to their resistance for getting vaccinated. Most common reason being the wait for more research data regarding COVID-19 vaccination followed by the fear of long-term side effects of vaccination.



**Fig 1: Reasons for COVID-19 vaccination refusal**

The study participants were compared in 2 groups: Group A- vaccinated for COVID-19 (n=74) and Group B included the participants unvaccinated for COVID-19 (n=345). A comparison in the views of 2 groups was done which included the perception regarding three main areas including: 1) General attitude regarding vaccination 2) Attitude regarding COVID-19 vaccination and 3) Personal view regarding COVID-19 and vaccine. Participants who are already vaccinated for COVID-19 and those who are willing to get vaccinated had fewer concerns about the vaccine side effects, had more faith on the data provided by health experts regarding COVID-19 vaccination and agreed to the vaccination directives more as compared to the COVID-19 vaccine hesitant group.

Table 2 summarizes the comparison in the views of two groups.

Both groups agreed to the fact that it is crucial to get vaccinated to stay healthy, however 62% of group A participants did not agree to the idea that more vaccination is being done than actually required, whereas among group B participants only 38.4% disagreed. 27% group B participants

agreed to the idea as compared to 10.3% of group A participants who agreed.

Both the groups agreed that it is important to be vaccinated for COVID-19 to decrease the spread of disease. Only 1.2% participants in group B disagreed to the idea whereas none in group A disagreed.

As far as attitudes towards vaccination are concerned, 100% of group A participants agreed that getting vaccinated against COVID-19 is important for them, 72% group A participants agreed to register for COVID-19 vaccine trial whereas 6.8% disagreed. 87% of group B participants consider COVID-19 vaccination is important for them and 3.2% disagreed; moreover, 67% group B members agreed to take part in COVID-19 vaccine trial whereas 10% disagreed. 32% group A participants and 50% group B participants have concerns regarding the efficacy of vaccine and they believe it might not be effective. 43% group A participants as compared to 71% group B participants are concerned about the long term side effects of COVID-19 vaccine. Around half of the participants of both the groups are satisfied with the information provided

regarding COVID-19 vaccine by public health experts. Only 4.1% of group A participants preferred that they should not have got vaccination against COVID-19. 15.1% group B participants prefer not getting vaccinated, 48.7%

are willing to get vaccinated and 36.2% of the participants are still not sure.

Attitudes between vaccinated and unvaccinated medical students showed following results:

**TABLE 1: COVID 19 experience of the 2 groups**

	Overall (n=419) (%)	Vaccinated for COVID19 (n=74) (%)	Unvaccinated COVID19 (n=345) (%)
Have you suffered from COVID 19?	Yes- 70 (17.0)	13 (17.5)	57 (16.5)
	No- 349 (83.0)	61 (82.5)	288 (83.5)
Any of your immediate family members/close friends suffered from COVID 19?	Yes- 288 (83.5)	53 (71.6)	235 (68.2)
	No-131 (16.5)	21 (29.4)	110 (32.85)
Any of your immediate family members/close friends died from COVID 19?	Yes-105(25.05)	17(23.0)	88 (25.5)
	No-314(74.95)	57(77.0)	257(74.5)

**TABLE 2: Comparison between the two group's attitude towards general vaccination and COVID vaccination**

Attitude towards general vaccination		Overall n=419 (%)	Vaccinated for COVID19 n=74 (%)	Unvaccinated COVID19 n=345 (%)	
It is important to get vaccinated to stay healthy.	Strongly agree	232(55.3)	54 (73.0)	178 (51.6)	
	Agree	156(37.2)	18(24.3)	138(40.0)	
	Don't know	22(5.25)	2 (2.7)	20(5.7)	
	Disagree	8 (1.9)	0	8(2.3)	
	Strongly disagree	1 (0.2)	0	1(0.2)	
It is my role as a future physician to learn about vaccines for myself and my patients.	Strongly agree	312 (74.4)	67 (90.1)	245 (71)	
	Agree	102(24.3)	7 (9.5)	95 (27.5)	
	Don't know	4(0.95)	0	4 (1.2)	
	Disagree	1 (0.2)	0	1(0.3)	
More vaccination is being done then actually required	Strongly disagree	0	0	0	
	Strongly agree	41 (9.7)	7(9.5)	34 (9.8)	
	Agree	60 (14.3)	1(1.3)	59(17.1)	
	Don't know	139 (33.17)	20(27)	119(34.5)	
	Disagree	148 (35.3)	28(37.8)	120(34.7)	
<b>Attitude towards COVID19 vaccination</b>	Strongly disagree	31(7.39)	18(24.3)	13(3.7)	
			<b>Vaccinated for COVID19 n=74 (%)</b>	<b>Unvaccinated COVID19 n=345 (%)</b>	
	COVID-19 vaccination is important to decrease spread of the disease.	Strongly agree	243 (57.99)	55(74.3)	188(54.5)
		Agree	144 (34.36)	18(24.3)	126(36.5)
		Don't know	28(26.6)	1(1.3)	27(7.8)
Disagree		4 (0.09)	0	4(1.2)	
It should be mandatory for general population to get COVID-19 vaccination.	Strongly disagree	0	0	0	
	Strongly agree	189 (45.9)	45(60.8)	144 (41.7)	
	Agree	160 (38.1)	19(25.7)	141 (40.9)	
	Don't know	52 (12.4)	10(13.51)	42 (12.2)	
	Disagree	16 (3.8)	0	16 (4.6)	
It should be mandatory for health care professionals to get COVID-19 vaccination	Strongly disagree	02 (0.04)	0	2 (0.6)	
	Strongly agree	284 (67.7)	60(81.1)	224 (64.9)	
	Agree	102(24.3)	12(16.2)	90 (26.1)	
	Don't know	24 (5.7)	0	24 (6.9)	
	Disagree	8 (1.9)	2(2.7)	6 (1.7)	
	Strongly disagree	1 (0.02)	0	1 (0.3)	

<b>Personal views regarding covid-19 and its vaccine</b>				
Being related to medical field renders me to a greater chance to get exposed to COVID-19.	Strongly agree	273 (65.15)	62 (83.8)	211 (61.2)
	Agree	131 (31.2)	11 (14.9)	120 (34.8)
	Don't know	10 (2.3)	0	10 (2.9)
	Disagree	5 (1.1)	1 (1.4)	4 (1.2)
	Strongly disagree	0	0	0
It is important for me to get vaccinated for COVID-19.	Strongly agree	241 (57.5)	62 (83.8)	179 (51.9)
	Agree	136 (32.45)	12 (16.2)	124 (35.9)
	Don't know	31 (7.3)	0	31 (9.00)
	Disagree	11 (2.6)	0	11 (3.2)
	Strongly disagree	0	0	0
I would like to register in COVID-19 vaccine trial.	Strongly agree	155 (36.99)	38 (51.4)	117 (33.9)
	Agree	128 (30.5)	15 (20.3)	113 (32.8)
	Don't know	96 (22.91)	16 (21.6)	80 (23.2)
	Disagree	33 (7.8)	3 (4.1)	30 (8.7)
	Strongly disagree	7 (1.6)	2 (2.7)	5 (1.4)
I am concerned that COVID-19 vaccine might not be effective.	Strongly agree	57 (13.6)	9 (12.2)	48 (13.9)
	Agree	146 (34.8)	22 (29.7)	124 (35.9)
	Don't know	134 (31.98)	22 (29.7)	112 (32.5)
	Disagree	75 (17.89)	20 (27.00)	55 (15.9)
	Strongly disagree	7 (1.6)	1 (1.4)	6 (1.7)
I am worried about the unknown long term side effects of COVID-19 vaccination, if I get vaccinated.	Strongly agree	115 (27.44)	12 (16.2)	103 (29.9)
	Agree	160 (38.18)	20 (27)	140 (40.6)
	Don't know	77 (18.37)	14 (18.9)	63 (18.3)
	Disagree	55 (13.12)	19 (25.7)	36 (10.4)
	Strongly disagree	12 (2.86)	9 (12.2)	3 (0.9)
I believe I will be safe and protected from COVID-19 infection, if I get vaccinated.	Strongly agree	95 (22.67)	16 (21.6)	79 (22.9)
	Agree	179 (42.72)	37 (50)	142 (41.2)
	Don't know	118 (28.16)	19 (25.7)	99 (28.7)
	Disagree	21 (5.01)	2 (2.7)	19 (5.5)
	Strongly disagree	6 (1.4)	0	6 (1.7)
I am satisfied with the information provided by public health experts regarding COVID-19 vaccination	Strongly agree	87 (20.76)	13 (17.6)	74 (21.4)
	Agree	158 (37.7)	28 (37.8)	130 (37.7)
	Don't know	104 (24.82)	22 (29.7)	82 (23.8)
	Disagree	54 (12.88)	8 (10.8)	46 (13.3)
	Strongly disagree	16 (3.81)	3 (4.1)	13 (3.8)
I would not like to get vaccination/ I would not prefer that I had got COVID-19 vaccination.	Agree	94 (22.4)	3 (4.1)	91 (26.3)
	Don't know	89 (21.24)	3 (4.1)	86 (24.9)
	Disagree	236 (56.32)	68 (91.8)	168 (48.69)
I will only get COVID-19 vaccination if it is made mandatory to get vaccination by Health systems/ Medical schools./ I got vaccination as it was made mandatory by Medical school.	Strongly agree	67 (15.99)	2 (2.7)	65 (18.8)
	Agree	106 (25.29)	7 (9.5)	99 (28.7)
	Don't know	60 (14.31)	3 (4.1)	57 (16.5)
	Disagree	119 (28.4)	37 (50.00)	82 (23.8)
	Strongly disagree	67 (15.99)	25 (33.8)	42 (12.2)

## DISCUSSION

This study shows the attitudes of medical students towards vaccination in general and specifically COVID vaccine. The number of students believing in vaccination is a good indication that medical schools are doing a good job in making students aware of health hazards and how to control infections and their spread.

A study done previously for general vaccination trend in health professional showed the significance of concentrating on the key drivers in early medical education which included own risk of contracting influenza, vaccine safety, vaccination recommendation, promised to be a successful combination to increase vaccination uptake in health care professional.<sup>5</sup> A study done amongst nurses showed the reluctance to get vaccinated .It was not enough to get herd

immunity amongst health care workers.<sup>6</sup> Students are youth of a nation and a study showed the importance of acceptance in university students in china<sup>7</sup> Another study done in suggests although public shows reluctance in accepting COVID vaccine, a more 'localized' public education and role-modelling from public officials and health authorities can help a lot in building public trust.<sup>8</sup> In the 20<sup>th</sup> century, a large number of patients have chosen to delay or refuse vaccines. These individuals are described as "vaccine hesitant."<sup>9</sup> Understanding and addressing vaccine hesitancy is crucial to their successful implementation of any vaccination program.<sup>9</sup> same is true for the much awaited COVID vaccination. Vaccine hesitant individuals are a heterogeneous group who hold varying degrees of indecision about specific vaccines or vaccination in general.<sup>10</sup>

China has been one of the first in global efforts to develop COVID-19 vaccines. However, Chinese government faced issues in the judicious choice of the vaccine promotion program. A study done recently in China related to the COVID vaccine acceptance revealed significant benchmarks regarding causes of acceptance of the new COVID-19 vaccine provide helpful feedback for vaccine-promoting policies.<sup>11</sup> It is important for policymakers and public health practitioners to look for strategies to address anti-vaccination attitudes and to increase immunization rates. A study done in Europe discusses ways to discover how the problem of vaccination hesitancy is overcome to make the vaccination successful.<sup>12</sup> Healthcare workers can prevent the spread of the virus by getting themselves vaccinated and also be able to council their patients and that would help us achieve herd immunity.<sup>13,14,</sup>

The hesitancy for general vaccination and specifically COVID vaccines is comparable. Those who were already anti are more likely to be against COVID vaccine as well.<sup>15</sup> Those people who have suffered during this pandemic, health wise, economically and even socially do not want to trust the same system of the same government again.<sup>16</sup> It will be more difficult to convince such people to get vaccinated. However it is the duty of health professional to ensure safety and provide knowledge about vaccine benefits to the community in general. Medical students need to have adequate scientific knowledge with regards

to general vaccination as well as specific disease related vaccination and its benefits in order to protect their own health as well as their patients and parents health. Medical students are expected to counsel and convince people to get themselves and their families vaccinated.<sup>17</sup>

Psychological impact of being in close contact with a COVID positive patient were severe. Fear and anxiety was a major part of health care workers specially students. Those students who got relatives or someone in family affected by the virus were more likely to get vaccinated.<sup>18</sup>

Students were generally in favour of vaccination as they knew benefits outweigh the disease burden.<sup>19</sup> Knowledge and awareness is important and helps in acceptance of the vaccine. They include strategies to improve vaccine acceptance in medical education curriculum so that students may be made aware and could act as bridge between awareness and people acceptance of the vaccine.<sup>20</sup> The participants of vaccine trial can be used to give their live experiences about COVID vaccination and this will significantly reduce the hesitancy amongst people and it can be done by medical students who have been vaccinated.<sup>21</sup> Public and private sectors medical colleges have equal opportunities for being vaccinated and are aware of the vaccine benefits. Vaccine is one of the most effective way to combat and fight against this highly crippling pandemic in 100 years.<sup>22</sup>

The major threat to Pakistan vaccination program is due to the controversy theories and social media spreading false news about vaccine side effects. It is the urgent requirement and need to combat these myths and enhance trust in the vaccine.<sup>23</sup>

Such controversies are not only misleading the Pakistani public but also in other countries such as USA.<sup>24</sup> A cross sectional study done in December showed high acceptance amongst health care professionals.<sup>25</sup> The history of vaccine started long time back and it proved to protect the world from disease and death. We should learn from scientific history. Vaccine hesitancy is a global threat and we need a proper legislature to make sure after the surge is over, community is protected from the deadly disease for good.

**New knowledge added by this study:** Vaccine hesitancy is a major problem faced in different

areas of the world. The results highlight the reasons for hesitancy among medical students and points to the roots to develop strategies to tackle them. This can be helpful in decreasing the vaccine hesitancy among general public.

**Implications for clinical practice:** These results suggest that the vaccinated population of medical students who are going to be future doctors have overall more positive attitude in convincing the general population. These results can help in designing the strategies to support vaccination drive and increase the vaccine acceptance which might be the only hope for a COVID-19 free world.

**Limitations:** The study was conducted online.

### CONCLUSION

Vaccinated medical students are more likely to convince colleagues and others to get vaccinated which shows positive attitudes and hopes for the future.

**Further research:** Long term side effects and do they outweigh the benefits of vaccination.

**Ethical approval:** The study was conducted after the approval from IRB department of university. The ERC carrying the ERC no: ERC 57/2021 was issued.

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**Conflict of interest:** All authors have disclosed no conflicts of interest.

**Availability of data:** All the data is available and can be provided.

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