

# Covid 19 Vaccination Status, Hesitancy and Barriers; A Multicenter Study of Medical Students from Pakistan

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## ABSTRACT

**Introduction:** The key factor to fight with COVID-19 is vaccination for the development of which global stakeholders allocated huge resources. But at the same time many conspiracies arose and a phenomenon of vaccine hesitancy also developed which is restricting a large no of population to be vaccinated. The current study was designed to find out vaccination status of medical students and their families, vaccine hesitancy and barriers they faced in convincing their families to be vaccinated.

**Methods:** Around 1400 students of 4th year and 5th year from 8 medical colleges of Punjab province were invited to participate in this online survey. This Validated Questionnaire consisted of three parts, demographic information, vaccination status and barriers for vaccination.

**Results:** Out of 522 participants, 41.1% were males and 58.6% were females. The mean age of the participants was 22.33 ±1.17 SD. An encouraging finding is that majority of medical students were vaccinated (91%, n=475). Same is the case with their nuclear family members. Majority of medical students have at least tried to convince their family members for vaccination (80%). A significant proportion of participants experienced barriers to convince their nuclear and extended family members. Among these, serious complications/death, clotting episodes, may inject something in body to be controlled by others in future were mention worthy. The phenomenon of vaccine hesitancy is impeding the people from COVID-19 vaccination. Steps must be taken at all levels to curb this cumbersome conspiracy. So, the fantasy of bringing this global calamity to an end could be fulfilled.

**Conclusion:** The study concludes that a significant number of medical students got vaccinated and also tried to convince their nuclear and extended families. However, the phenomenon of vaccine hesitancy is impeding the drive for mass vaccination. Apart from the interventions at multiple levels, medical students must be encouraged and directed to play their role for community awareness.

**Keywords:** Covid 19, vaccination status, hesitancy, barriers, medical students.

## INTRODUCTION

Covid-19 is no more a stranger around the globe but it is a renowned catastrophe of an unimaginable scale. Although many of its details are still ambiguous but much has been revealed regarding the organism, infectivity, clinical manifestations and prevention. It is a pathogen invisible through naked eye, but its damages are exponentially visible through its morbidity, mortality and adverse impacts on the human life. As of 6th October 2021, the global data of World Health organization (WHO) presents that there have been 235,673,032 confirmed Covid-19 cases including 4,814,651 deaths<sup>1</sup>. In Pakistan the confirmed cases reported till 6TH October, 2021 are 1,255,321 and 28,032 deaths, whereas the total number of administered vaccine doses is 87,741,079<sup>2</sup>. The remedial measures have been practiced to avoid its spread through lockdowns, restrictions on activities of human life and implementations of strict Standard Operating Procedures (SOPs). Massive efforts to inform motivate and guide people about the epidemiology, transmission and preventive measures are already in exercise. But, the waves of spread are still being observed in different countries at different times.

Immediately after the declaration of the COVID-19 pandemic by the World Health Organization (WHO), efforts started for the development of an effective vaccine. The global policy and decision makers allocated huge resources for development of vaccine. Similarly, relaxations were given and restrictions were weaved off to expedite its development which is rightly considered as the most effective way of preventing the disease and thus its dreadful and horrifying outcomes. To fight this pandemic and bringing it to the end, the key factor is vaccination. Unless a significantly large proportion of the world population is immune to this virus, the dream of ending this havoc will not become a reality. To get immunity against COVID-19 by contacting it and surviving is not that effective, but the safest way for this is through a vaccine<sup>3</sup>. A woman aged 91 years from UK was the first person in the world who received the first COVID-19 vaccine on December 08, 2020<sup>4</sup>.

Since then, huge number of vaccine shots are being given. In developed nations this vaccination drive is very fast but unfortunately in developing countries it is seriously very slow. The latest data represents that a total of 6.39 billion doses of COVID-19 vaccination have been administered worldwide where as in Pakistan this number is 87,741,079<sup>5,2</sup>.

Many vaccines are available and many more are in different phases of development. The vaccination campaigns were successfully run all over the world. Besides these promotional campaigns, lot of deceptions were also propagated during the development process of COVID-19 vaccine. The conspiracies started rising again when vaccines were made available in market. Most of these were initiated from the developed world and gained popularity in developing countries. This nasty and unauthenticated information prevented a large component of general public to get the protecting shots. Be it a computer chip insertion and 5 G theories or change in genetic make-up through messenger RNA story, they all are so misleading that they are destroying the efforts to contain the pandemic. The mislead people are further adding to the damage by sharing this false information through social media platforms and thus spreading to those who are easy preys to such hoax material. Many religious fears are also created through deception and they are so strong that people plainly refuse to get vaccinated. This phenomenon of not willing to get the available vaccination is termed as "vaccine hesitancy". It is not specific to COVID-19 vaccines, but also for many other vaccines available. The WHO has recognized it among the top health threats globally<sup>6-9</sup>.

The current study was designed to find out vaccination status of the medical students and their nuclear, extended families along with the vaccine hesitancy and barriers they faced in convincing their families to be vaccinated.

## MATERIAL AND METHODS

A multicenter survey based descriptive study was conducted from June 2021 to July 2021. A list of medical colleges accredited with

Pakistan Medical Commission (PMC) was retrieved from the official website. Eight medical colleges including four from public sector and four private medical colleges were selected for the study through non probability convenience sampling technique. All the students of 4th and final year MBBS were invited for participation in this research. An online questionnaire consisting of three different sections including personal information, vaccination status, vaccination hesitancy and barriers for vaccination was prepared. It comprised of 20 questions covering the different areas related with the study. The tool was validated through expert opinion and modifications were made accordingly. The instrument was also pilot tested for reliability. The link of the questionnaire was forwarded to the WhatsApp groups of 4th and final year MBBS class in each college. The students were requested to participate in the study on voluntary basis. These classes were followed three times to fill and submit the questionnaire. The data collected through the online forms was transferred to SPSS version 23 and analyzed. Relevant statistical tests have also been applied.

## RESULTS

A total of 1400 students in eight different medical colleges were invited for the study through an online questionnaire, but 522 participated with a response rate of 37.3%. Out of these 522 respondents, 216 (41.4%) were males and 306 (58.6%) were females. The age of the participants ranged between 20 to 26 years with a mean of 22.33  $\pm$ 1.17 SD. The basic profile of the study participants is presented in table 1. The findings regarding vaccination status, partial or full vaccination and responses about different questions are presented in Table 2. The results are quite encouraging except the vaccination of grandparents which is 216 (41.4%).

Table 1: Demographic characteristics of the participants

Category		Frequency(n)	Percentage (%)
Gender	Male	216	41.1
	Female	306	58.6
Class	4th Year	396	75.9
	Final Year	126	24.1
Marital status	Married	17	3.3
	Unmarried	505	96.7
Institution	Private	302	57.9
	Public	220	42.1
Nuclear family residence	Urban	381	74.1
	Rural	54	10.3
	Mixed	81	15.5
Extended family residence	Urban	305	58.4
	Rural	94	18.0
	Mixed	123	23.6

Table 2: Responses of the study participants regarding different questions

Questions	Yes (%)	No (%)
Are you vaccinated?	475 (91)	47 (9)
If you vaccinated, is it complete?	366 (70.1)	156 (29.9)
Is your father vaccinated?	403 (77.2)	119 (22.8)
Is your mother vaccinated?	370 (70.9)	152 (29.1)
Are your grandparents vaccinated?	216 (41.4)	306 (58.6)
Are your siblings vaccinated?	348 (66.7)	174 (33.3)
Are your uncles and aunts vaccinated?	432 (82.8)	90 (17.2)
Have you tried to convince your nuclear family members for vaccination?	439 (84.1)	83 (15.9)
Have you tried to convince your extended family members for vaccination?	400 (76.6)	122 (23.4)

A significant proportion of participants experienced barriers to convince their nuclear and extended family members. Among these, serious complications/death (33.3%), clotting episodes (11.1%), may inject something in body to be controlled by others in future (10.5%) were mention worthy. other barriers were fear of causing infertility, (5.7%), big thread to religion (2.3) and change of character, personality and family system. The results of

vaccination status were cross tabulated with the gender, class and public or private sector medical college of the study participants. The findings were found to be slightly higher in males (92.1%), in the class of MBBS 4th year (91.9%) and among the private sector medical colleges (90.9%). However, no statistically significant difference was calculated at p value of < .05.

The findings of present study regarding gender, class and sector of the study participants were also compared with the results of the questions "have you tried to convince the nuclear and extended family for vaccination"? But no statistically significant difference was found. However, it is worth mentioning that 439 (84.1%) of the participants have tried to convince their nuclear family and 400 (76.6%) of the subjects reported that they have tried to convince their extended family members. Moreover, the results show that the convincing of nuclear family was higher among the females (84.3%), in public colleges (87.2%) and in the final year class (84.9%). Similarly, the finding regarding convincing the extended family was found to be more in males (79.16%), public sector (79.13%) and final year (80.5%) participants.

Table 3: Gender, class and sector wise comparison with vaccination status of the participants

Category		Vaccination Status		p-value
		Yes (%)	No (%)	
Gender	Male	199 (92.1)	17 (7.9)	0.447
	Female	276 (90.8)	30 (9.2)	
Class	4th year	364 (91.9)	32 (8.1)	0.19
	Final year	111 (88.1)	15 (11.9)	
Sector	Private	275 (91.1)	27 (8.9)	0.95
	Public	200 (90.9)	20 (9.1)	

The results are not significant at p < .05.

## DISCUSSION

Vaccines play a pivotal role in disease prevention. According to WHO millions of lives are saved annually with the use of vaccines worldwide<sup>10</sup>. Therefore investments on immunizations are considered as the best use of resources for health of the communities<sup>11,12</sup>. Immunization through vaccination is not only important for individuals but a significant proportion of vaccinated population is considered as the protection of the entire community named as the herd immunity. Herd immunity is achieved by vaccinating majority of healthy individuals of a community and this indirectly gives protection to the ones who were not vaccinated. This however, is through immunization of a certain percentage of a community's population<sup>13</sup>. There are so many factors involved in this relatively complex phenomenon to understand. Different scientists have suggested for diverse percentages of population to be immune before touching the status of herd immunity for COVID-19 which ranges from 50% to 67% or even higher<sup>13-16</sup>.

Despite the highly beneficial roles of immunization, unfortunately in developing and underdeveloped world there are many issues related with the acceptance of vaccines. A well-known phenomenon of vaccine hesitancy is present in these countries. In this hesitancy, there is a reluctance to use an available vaccine. In Pakistan due to many conspiracy theories based upon the religious, social, economic and political problems has nurtured this vaccine hesitancy<sup>18</sup>. These falsified thoughts in form of conspires theories has led the polio still not eradicated and making Pakistan among only two countries in the whole world where it still exists. When talking of COVID-19, developed world is also full of doubts, insecurities, conspiracies and hesitancy. Not only general population but even the medical fraternity has dissenting voices against the vaccination. They have doubts about the efficacy of vaccines as well as presence of actual COVID-19 viruses in the vaccines<sup>19</sup>.

Although around 1400 students in eight medical colleges were invited to participate for the study through online Google form-based study, but only 37.3% responded. This shows a lack of willingness to participate even in online surveys. Repeated reminders were given for the completion but overall response was

not very encouraging. This may require finding out the ways to improve participant's response in online research surveys. In this study, 91% of the medical students were vaccinated, which is really a very encouraging number. Medical students in senior clinical years get exposure with patients as part of their studies & training. So, vaccination against COVID-19 is definitely of prime protective value for them. But at the same time when we compare it with the other countries, it is found that we are either much better or at par with the world. Vaccination status of the families is also encouraging except for the grandparents, which is 41.4%. Contrary to the fact that people over 60 years in age were prioritized along with healthcare personnel for the early vaccination, this rate shows that barriers may have worked maximum for this group.

The vast majority of the participants responded that they had tried to convince their nuclear (84.1%) and extended (76.6%) families. As a general perception it is thought that families and close friends of health personnel have better knowledge regarding health issues and medicines. So, the need to convince them to get vaccinated against COVID-19 would be less. If this amount of convincing was needed for the families of the medical students, it means that there were barriers for vaccination intentions. But at the same time, it is encouraging to know that at least they tried to convince their families for the vaccination, instead of staying indifferent. As regards to the nuclear families the results are quite encouraging. This shows that they succeeded in the counseling or convincing. Even way before the availability of the COVID-19 vaccines, there was a huge roar of negative voices against them. A lot of conspiracy theories regarding religious, social, criminal, tactical, and conspiratorial aspects of individuals as well as groups, sections, fractions and even nations started surfacing, and are still hampering the efforts to vaccinated according to the targets.

The participants of this study were asked about the barriers they faced while they tried to convince their nuclear and extended family. The most common barriers they faced were, fear of having serious complications or even death (33.3%), clotting episodes (11.1%), fear to get something injected in the body to be controlled by others in future (10.5%). Other answers were fear of causing infertility, (5.7%), vaccination is a big threat to religion (2.3%), and change of character, personality and family system (01%). A study by Farrukh & colleagues from Peshawar Pakistan found concerns that COVID-19 vaccines are not Halal, negative social media propaganda, disapproval from clerics & social circles, concerns about efficacy and fear of adverse reactions as the major barriers for this vaccination<sup>20</sup>. Another multicenter study from Pakistan by Khalid Rehman & colleagues, conducted on healthcare personnel found that 67% of participants were concerned about the efficacy and 67% about the safety of the COVID-19 vaccine, 54.5% were concerned that potentially faulty or fake vaccine may be available<sup>21</sup>. Religious permissibility (29.3%) and hidden motives (28.6%) were identified as other barriers. Prior COVID-19 exposure (42.19%), possible adverse effects (33.17%) and doubtful vaccine effectiveness (31.48%) were the factors of concern among healthcare workers participated in another study from Rawalpindi Pakistan<sup>22</sup>. A study from Sindh Pakistan found fear of infertility, doubts about efficacy, potential adverse effects, pregnancy, breastfeeding, co-morbidities as the major impeding factors<sup>23</sup>.

The cumulative vaccine hesitancy may be expressed as the percentage of family members of medical students still not received it. In present study it was found out as 32.2%. In another study from Pakistan, it was 40% which contrasts the findings of current study<sup>19</sup>. Another study from United States 22% participants responded that they will either definitely not or its less likely that they will get COVID-19 vaccine<sup>24</sup>. In other studies, from US 10.8% clearly had no intent to get vaccine while 31.6% were not sure that they will get it (24) Another study concludes that more than one third (31.1%) participants did not anticipate to get a COVID-19 vaccine<sup>25</sup>. By unveiling the reasons for this hesitancy or reluctance to get vaccinated against COVI-19, measures may be found out to overcome this menace. Unless these barriers, doubts, concerns

and fears are overcome no mass vaccination campaign will be successful. These should be logically and properly comprehended and addressed. All the persons, groups or sections that have a voice and general public follows their advice should first be contacted and convinced. They should be facilitated by governments to run a mass awareness campaign.

## CONCLUSION

The study concludes that a significant number of medical students got vaccinated and also tried to convince their nuclear and extended families. However, the phenomenon of vaccine hesitancy is impeding the drive for mass vaccination. Apart from the interventions at multiple levels, medical students must be encouraged and directed to play their role for community awareness.

**Limitations of the Study:** Although it is a multicenter study covering the institutes from major cities of Pakistan but the convenience-based sampling technique and low response rate should be considered as the limitation of the study.

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