

ORIGINAL ARTICLE

# KNOWLEDGE AND PSYCHOSOCIAL IMPACT OF COVID-19 VACCINE ON ITS ACCEPTANCE

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## ABSTRACT

*This study was conducted with aim to determine knowledge, attitude and psychosocial status of community regarding COVID-19 vaccinations in Pakistan. This cross-sectional study was based on paper copy and internet survey forms completed by 3008 participants. This survey comprised of questions related to knowledge, acceptance and the psychological stress about COVID-19 vaccine. Participants from high-education (graduation, post-graduation, PhD, Post doc) and low-income (less than 20,000 PKR) background were more hesitant about getting vaccine, expressing concern about vaccine and were anxious about its side effects. P-value (< 0.05%) was significant for these variables. Increasing the vaccine uptake by population would require propagation of accurate information to masses by medical health professionals, as they are most trusted by the study participants for information.*

**Keywords:** Covid-19, Vaccination, Hesitancy, Confidence, Acceptance

## INTRODUCTION

The latest threat to global health is the ongoing outbreak of acute respiratory syndrome, recognized as the Coronavirus disease 2019 (COVID -19). It originated first in Wuhan, China, in December 2019 and was declared as a global pandemic by World Health Organization (WHO) in March 2020 <sup>1</sup>. The COVID-19 outbreak has posed critical challenges for the general public as well as the health care professionals <sup>2</sup>. COVID-19 affects people in different ways, as per the data most of the infected people developed mild to moderate symptoms like fever, sore throat, dry cough, fatigue, loss of taste or smell, diarrhea, and/or skin rashes and subsequently recovered without hospitalization <sup>3</sup>. Many patients also presented with symptoms like difficulty in breathing and/or shortness of breath; chest pain and/or pressure and loss of speech. However, serious morbid conditions like respiratory distress syndrome, arrhythmias, cardiac damage, heart failure, stroke, chronic kidney impairment, and Guillain - Barre syndrome were also seen <sup>3,4</sup>.

Globally, COVID-19 incidence was very high, with an average of over 520,372,492 confirmed cases of COVID-19 and 6,270,232 deaths reported up till May 2022 <sup>5</sup>. On 31 December 2020, WHO issued the first emergency use listing (EUL) of a COVID-19 vaccine <sup>6</sup>. Since then, several vaccines have been approved against coronavirus and

distributed globally in different regions. Until May 2022, approximately a total of 11,660,300,000 vaccine doses were administered globally, out of which 5,169,900,000 were vaccinated with at least one dose and 4,668,300,000 number of people were fully vaccinated <sup>7</sup>. According to Centers for Disease Control & Prevention (CDC), people are considered “fully vaccinated” two weeks after they receive their second dose in a two-dose series (e.g. the Pfizer or Moderna vaccines), or two weeks after their first dose for single-dose vaccines (e.g. the Johnson & Johnson/Janssen vaccine) <sup>8</sup>.

In the United States of America, till May 2022 a total of 570,102,931 vaccine doses were administered, out of which 270,336,718 were vaccinated with at least one dose and 217,410,632 persons were fully vaccinated. Similarly in the United Kingdom, a total of 143,182,587 vaccine doses were administered, out of which 53,472,488 were vaccinated with at least one dose and 49,986,833 persons were fully vaccinated <sup>5</sup>. Up till May 2022, in Pakistan, there have been 1,529,405 confirmed cases with 30,379 reported deaths, while 254,189,036 vaccine doses have been administered <sup>5</sup>. In many countries, diseases that have been eradicated through vaccination, still persist in Pakistan due to varied reasons of economic, social, healthcare and environmental factors. The success and

failure of the expanded programmes of immunization are based on these factors. In general, rate of immunization show diversity between various provinces of Pakistan, each province having different trend regarding immunization coverage <sup>9</sup>.

Resistance to vaccination remains a substantial challenge globally due to various assumptions and theories like alleged poor quality of vaccines, questioning of dosing recommendations and fear of post-vaccine complications <sup>10</sup>. The success of immunization campaign ultimately relies on individuals' acceptance of these novel vaccines <sup>7,11,12</sup>. According to a meta-analysis, fear of contracting COVID-19, its perceived benefits, trust in health system, concomitant chronic diseases, high education, high level of knowledge had high odd ratio for COVID-19 vaccine acceptance <sup>13</sup>.

As far as, the impact of environmental factors is concerned, cost and geographic barriers effect the decision about getting vaccination. Social media environment and leaders are also considered influential in inspiring the public decision of vaccination <sup>14</sup>.

According to WHO, most common concerns of the people regarding immunization against this virus were regarding the safety or efficacy of these vaccines, their mode of action, a fear of getting false positive PCR or antigen laboratory test after COVID-19 vaccination. Many people were apprehensive about safety of vaccination during pregnancy or after COVID-19 exposure <sup>15</sup>. The complex reasons behind vaccine acceptance can be evaluated using the variables like environmental factors (social, public health policies, and social media information), agent factors (vaccine safety and efficacy), and the host factors (previous experience, knowledge, education and socio-economic levels of a person) <sup>16</sup>. All these factors synergistically act to create psychological stress among individuals worldwide, which directly impacts sense of well-being, behavior, and health. All stress related disorders can be treated by psychosocial counselling and interventions, which in turn has positive impact on chronic systemic diseases <sup>17</sup>.

The influence of above-mentioned factors upon acceptance of vaccination among Pakistani population has not been ascertained. Therefore, this study aimed to investigate community behavior towards vaccine acceptance and psychological stress based on age, educational background and monthly income experienced by study participants.

## METHODS

This cross-sectional study was conducted in Pakistan, based on paper copy and internet survey forms, completed by 3008 people from

June 2021 till Dec 2021 with ethical approval number RLDC/6125/21. A brief introduction was given on survey form about the research topic, and it was assured that the anonymity of the participants would be maintained. The submission of a filled survey form was considered as consent to participation in the study. The survey questionnaire was validated by conducting a pilot study, in which 150 participants filled the questionnaire form. The collected data was analyzed, and its internal consistency was evaluated by using Cronbach's alpha, which was 0.85.

The education status of these participants was divided into three categories: Low education level (no formal education or primary education), intermediate education (intermediate/ A-levels) and high education level (graduation, post-graduation, PhD, Post doc etc.) <sup>18</sup>. Monthly income was also divided into three categories: low-income (less than 20,000 PKR), middle-income (between 20,000 PKR and less than 300,000 PKR) and upper-income status (300,000 PKR or above) <sup>18</sup>.

In addition, the participants responded to questions about stress related to COVID-19 vaccination protocol, its mechanism and side effects based on age, educational background and monthly income according to the Likert Scale from 1 to 5 (1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Very, 5 = Extremely).

## Statistical Analysis

The data was entered and analyzed by using SPSS version 24.0. Frequencies and percentages were calculated for qualitative variables. The association of vaccination stress and acceptance with age, monthly income, and educational background were highlighted using chi-square based on scale variables. P-value less than 0.05% was considered as significant.

## RESULTS

The result of this study showed that out of 3008 participants, 42% were male, while 58% were female. About 53% were up to 30 years of age, whereas, 47% of participants were older than 30 years. It was observed that 1323 (44%) had high education, 963 (32%) intermediate, and 722 (24%) had low education level. About 30% of the participants had a monthly income less than 20K, 44% earned ranging between 20K-300K, whereas 26% made above 300K. Moreover, 47% were currently employed while 9% and 44% were retired and unemployed, respectively.

This study shows that around 73% agreed to get vaccinated once the vaccines were available and also acceded to recommend the COVID-19 vaccination to their family members and friends. However, 27% refused to get vaccinated, out of which 55% refused due to concern about side

effects, 17% thought they might get infected with COVID-19 vaccine and 28% did not specify about reason of refusal. Among those participants who were willing to get vaccinated, 71% said they were bound to get vaccinated due to policies laid down by employer organizations / teaching institutions etc., while 29% said they will get vaccination by their own choice, shown in table 1.

Data of the study depicts that 57.7% of participants claimed that they had enough information regarding COVID-19 vaccination. About 52.2% of the participants were convinced regarding the efficacy of vaccines and 51.2% of the participants felt that it was safe to get vaccinated. Moreover, the results from our study depicted that around 50.3% of the participants had enough information regarding side effects of the vaccine and 69% of the participants had enough information regarding vaccine recommendations (Table 1).

It was observed that all participants were moderate to extremely worried about the vaccines regardless of their educational background. However, the maximum percentage of participants who were extremely worried about the COVID-19 vaccine belonged to the higher education category, who strongly agreed that the vaccine and its side effects were continuously on their minds. The participants of this category were also eager to know more about the protocols of the vaccines and its side effects. This data is shown in figure 1 where p-values are significant for vaccine hesitancy in high-education group, demonstrates that

education level had a considerable impact on scale variables.

Most of the participants with monthly income ranging 20K - 300K PKR (middle-income) were neutral and below 20K PKR (low-income) were moderately worried about the COVID-19 vaccine compared to high-income individuals (with >300K PKR income), who were not at all worried about the vaccine. The effect of socioeconomic background on psychological aspect of COVID-19 vaccination is shown in figure 2. The p-values are significant for vaccine hesitancy in low-income group, demonstrating that income has a considerable impact on scale variables.

The highest percentage of participants ≤ 30 years of age strongly disagreed with being worried about the COVID-19 vaccine and having vaccine on their minds. The maximum number of ≤ 30-year-old participants agreed to know more about the vaccine protocols and strongly disagreed about getting the vaccine during co-morbidities. Table 2 shows significant p-values, demonstrating that age level has a substantial impact on scale variables.

The study shows significant number of participants trusted medical professionals (49%) followed by other health related sources like WHO (22%) and ministry of health 17%, for information and safety of COVID-19 vaccine as compared to non-medical opinion shapers like social media (8%) and religious leaders (4%) depicted in figure 3.

**Table 1: Characteristics of participants (n=30)**

If a COVID-19 vaccine is available to you, will you get it	Yes	2198	73.1
	No	810	26.9
		2110	70.1
Would you recommend COVID-19 vaccination to family and friends?	Yes	898	29.9
	No	1737	57.7
Do you feel you have enough information about how the vaccine works	Yes		
	No	67	2.2
	Not Sure	1204	40.0
Do you feel you have enough information about how effective the COVID-19 vaccines are	Yes	1569	52.2
	No	118	3.9
	Not Sure	1321	43.9
		1539	51.2
Do you feel you have enough information about how safe the COVID-19 vaccines are	Yes		
	No	128	4.3
	Not Sure	1341	44.6
		1513	50.3
Do you feel you have enough information about the vaccine side effects	Yes		
	No	112	3.7
	Not Sure	1383	46.0
		2080	69
Do you feel you have enough information about the COVID-19 vaccine recommendations	Yes		
	No	86	2.9
	Not Sure	842	28

**Table 2: Descriptive data of impact of age on vaccine hesitancy.**

			Age		P-Value
			Less or equal to 30 years	Greater than 30 years	
I am worried about the COVID-19 vaccine.	1	N / %	447 / 14.9	301 / 10	0.000
	2	N / %	316 / 10.5	223 / 7.4	
	3	N / %	490 / 16.3	376 / 12.5	
	4	N / %	214 / 7.1	335 / 11.1	
	5	N / %	124 / 4.1	182 / 6.1	
The Vaccine is on my mind continually	1	N / %	558 / 18.6	400 / 13.3	0.000
	2	N / %	440 / 14.6	216 / 7.2	
	3	N / %	398 / 13.2	433 / 14.4	
	4	N / %	122 / 4.1	195 / 6.5	
	5	N / %	73 / 2.4	173 / 5.8	
I would like to know as much as possible about the vaccine and its protocols.	1	N / %	198 / 6.6	132 / 4.4	0.000
	2	N / %	99 / 3.3	149 / 5	
	3	N / %	236 / 7.8	380 / 12.6	
	4	N / %	532 / 17.7	356 / 11.8	
	5	N / %	526 / 17.5	400 / 13.3	
I am worried that I will be refused the vaccine if I have any co-morbidities (flu, fever, cough, chronic lung diseases, heart diseases, etc.).	1	N / %	574 / 19.1	291 / 9.7	0.000*
	2	N / %	284 / 9.4	375 / 12.5	
	3	N / %	424 / 14.1	430 / 14.3	
	4	N / %	230 / 7.6	195 / 6.5	
	5	N / %	79 / 2.6	126 / 4.2	
The procedure is on my mind continually.	1	N / %	692 / 23	382 / 12.7	0.000
	2	N / %	311 / 10.3	409 / 13.6	
	3	N / %	407 / 13.5	361 / 12	
	4	N / %	147 / 4.9	202 / 6.7	
	5	N / %	34 / 1.1	63 / 2.1	
I would like to know as much as possible about the procedure.	1	N / %	196 / 6.5	168 / 5.6	0.000
	2	N / %	129 / 4.3	174 / 5.8	
	3	N / %	489 / 16.3	498 / 16.6	
	4	N / %	312 / 10.4	242 / 8	
	5	N / %	465 / 15.5	335 / 11.1	
I am worried about the side effects of the vaccine	1	N / %	130 / 4.3	48 / 1.6	0.000
	2	N / %	242 / 8	260 / 8.6	
	3	N / %	510 / 17	326 / 10.8	
	4	N / %	359 / 11.9	326 / 10.8	
	5	N / %	350 / 11.6	457 / 15.2	
The side effects are on my mind continually	1	N / %	394 / 13.1	131 / 4.4	0.000
	2	N / %	295 / 9.8	242 / 8	
	3	N / %	406 / 13.5	426 / 14.2	
	4	N / %	268 / 8.9	203 / 6.7	
	5	N / %	228 / 7.6	415 / 13.8	
I would like to know as much as possible about the side effects.	1	N / %	87 / 2.9	124 / 4.1	0.000
	2	N / %	134 / 4.5	141 / 4.7	
	3	N / %	311 / 10.3	343 / 11.4	
	4	N / %	430 / 14.3	309 / 10.3	
	5	N / %	629 / 20.9	500 / 16.6	

**DISCUSSION**

Opposition to vaccination dates back to the 1800s, when Edward Jenner invented the first vaccine. The Strategic Advisory Group of Experts

(SAGE) on immunization has defined vaccine hesitancy as “delay in acceptance or refusal of vaccines despite availability of vaccination services”<sup>19,20</sup>. Vaccine hesitancy has proliferated over the decades and was cited by WHO as one

of the top 10 global health threats in 2019. Vaccine hesitancy is complex, multifactorial, and influenced by a combination of emotional, cultural, social, spiritual, and political factors. It can vary across countries, vaccines, and time <sup>21</sup>.

Vaccine refusal, despite the public’s growing scientific sophistication, ultimately causes delay in vaccination, with significant consequences such as the resurgence of once eradicated vaccine-preventable diseases and/or failure to achieve herd immunity, thus threatening the general public health <sup>19</sup>

The current COVID-19 pandemic and the public reaction to the COVID-19 vaccine are examples of this substantial challenge, particularly in Pakistan <sup>10,22</sup>. Pakistani population also expressed reluctance during initial stages of vaccine launch, as observed in polio and other vaccination programs <sup>22</sup>. The effectiveness of the COVID-19 vaccine depends on its coverage because herd immunity will only develop if the vaccination rate is high in the population. Therefore, it is crucial to understand the public’s intention and concerns toward getting a vaccination to protect the most vulnerable people. It will allow the concerned authorities and health officials to design and implement specific and targeted interventions to raise awareness in the population and persuade them toward accepting the COVID-19 vaccination <sup>22</sup>.

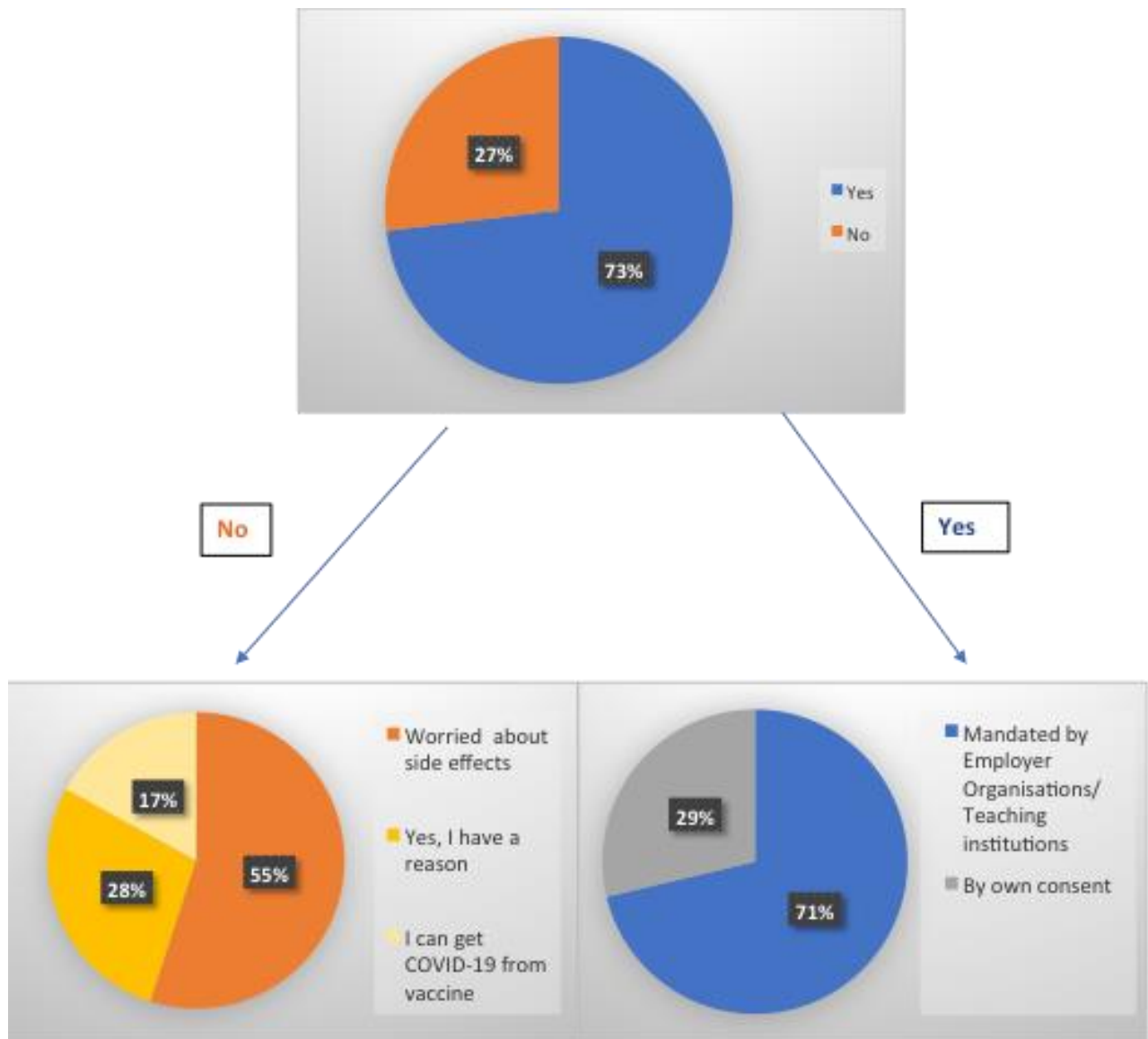


Figure 1: Frequency of participants’ willingness to get COVID-19 vaccine and reasons to accept or refuse vaccine.

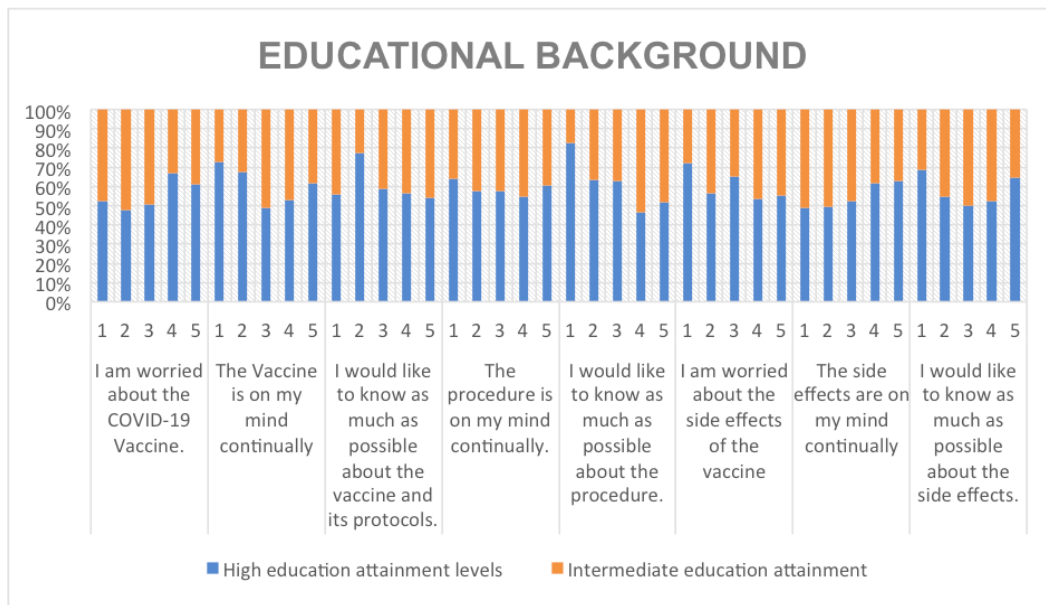


Figure 2: Impact of educational background on scale variables.

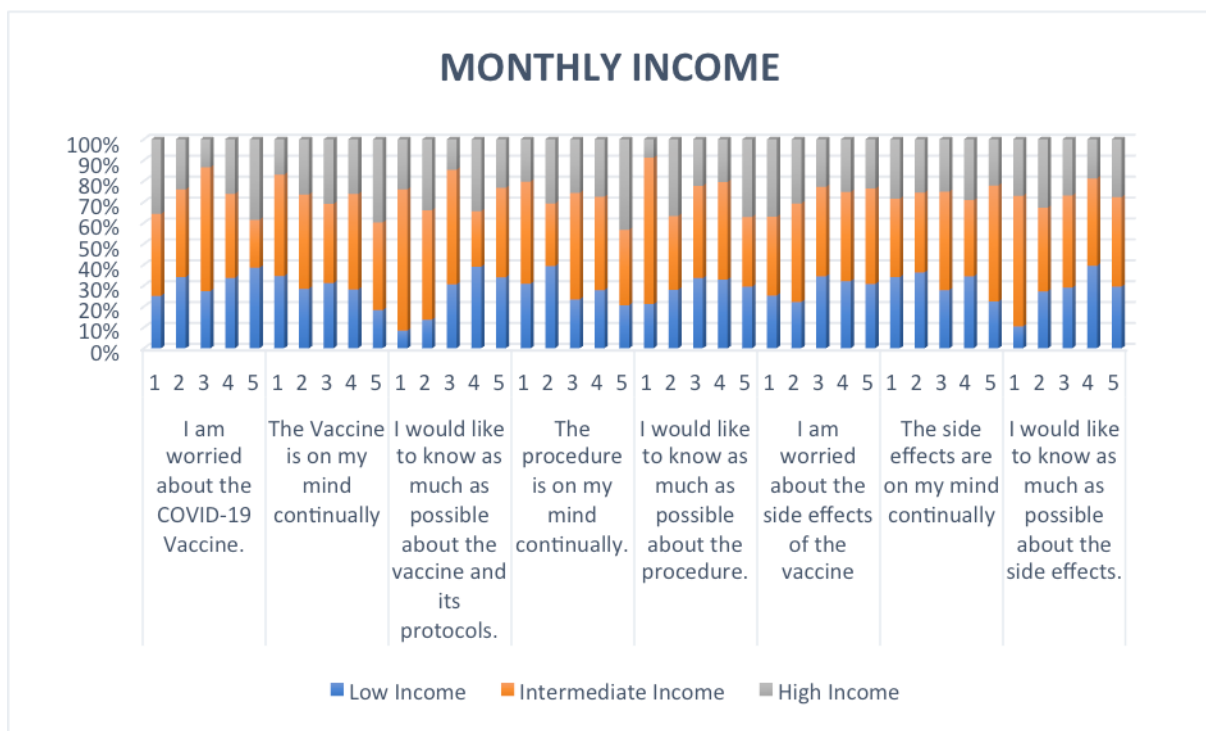
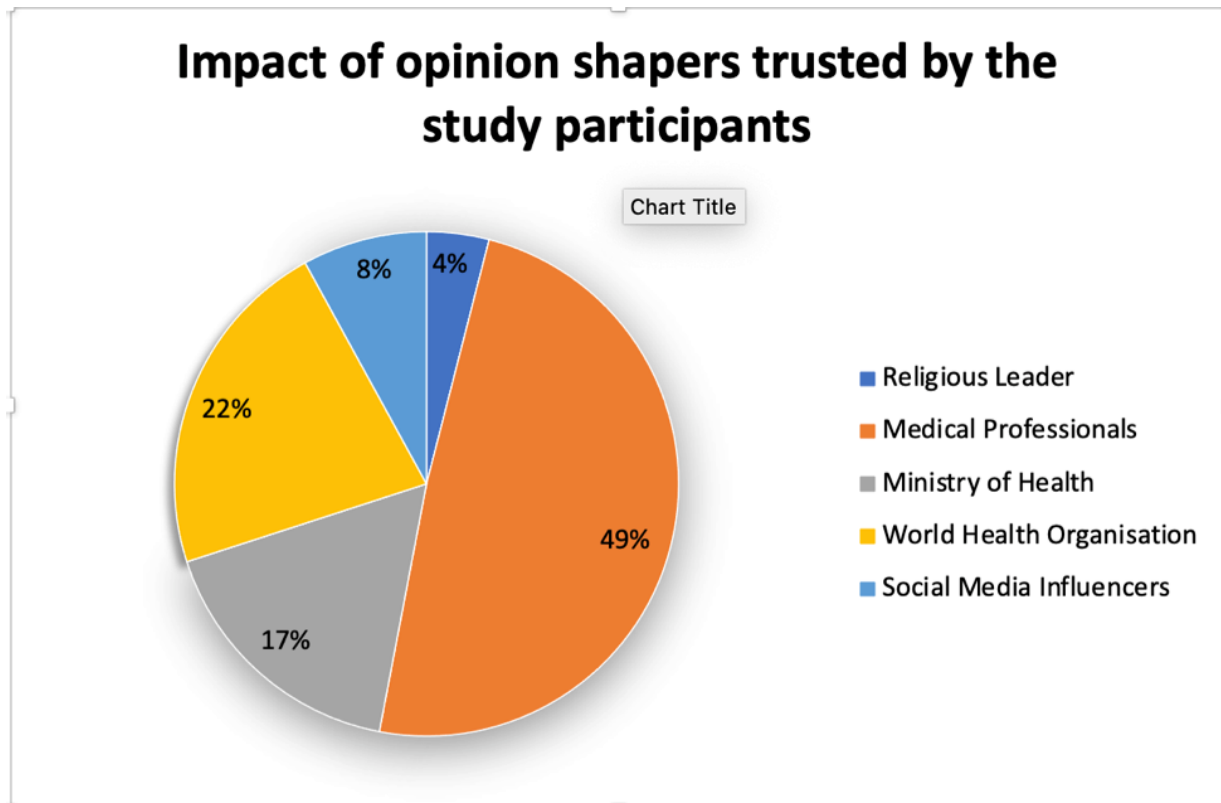


Figure 3: Impact of monthly income on scale variables.



**Figure 4:** Impact of opinion shapers trusted by the study participants.

In this study, when asked about willingness to get the COVID-19 vaccine, 73% of participants said 'yes' and 27% refused to get vaccine. The reasons of vaccine acceptance and refusal are depicted in figure 1. Main reason of refusal (55%) was the fear of side effects of vaccine while 17% had misconception and mistrust of getting COVID-19 after vaccination, which concurs with many surveys, that reported concerns related to vaccine safety and effectiveness as reason for delay or refusal<sup>23-27</sup>. In order to combat this delay, studies suggest honest and straightforward information about COVID-19 vaccine, as an approach to improve vaccine uptake among general population<sup>28,29</sup>.

Study participants were asked whether they felt they had enough information about mechanism of action of COVID-19 vaccine, its effectiveness, safety and side effects. Regarding mechanism of action, 57.7% reported to have sufficient knowledge while rest of participants either did not have adequate details or were unsure about it. Whereas 52.2% and 51.2% participants reported strong knowledge about vaccine effectiveness and vaccine safety respectively. Thus, it shows that up to half of study participants either did not have any knowledge about COVID-19 vaccination or were doubtful about it. These findings concur with opinion of many experts, who believe that there is growing trend of concern in the population regarding vaccine safety and efficacy, which affects the vaccine acceptance<sup>30</sup>. Even the vaccinated individuals may have considerable doubts and concerns related to vaccines<sup>30</sup>.

Such reservations and uncertainties create hesitancy, fear, and anxiety among individuals, and prevent them from receiving the vaccination. Studies have also documented that vaccine confidence is directly related to public awareness of infectious diseases<sup>10,31</sup>. Numerous cross-sectional surveys as well as a recent systematic review, have correlated COVID-19 vaccination intention with confidence in vaccine safety and effectiveness<sup>23,32-37</sup>.

Literature depicts that higher education attainment was associated with fewer concerns over vaccine safety or side effects,<sup>31,38</sup> and low educational background may deter individuals from getting vaccinated<sup>39</sup>. Studies in Pakistan have also confirmed that greater proportion of highly educated, healthy individuals with good monthly income were willing to get the vaccine and were not concerned about vaccine safety<sup>22</sup>. In contrast, the data of current study infers that highly educated people were more concerned about the COVID-19 vaccine, wanted more information about vaccine procedure, and its side effects were constantly on their minds, compared to uneducated or low-literacy individuals. These high educated participants were less willing to get the vaccine, coinciding with the findings, reported in study by Yang J et al<sup>40</sup>.

This study also revealed that the participants from high income group were not at all worried about the side effects of COVID-19 vaccine and were willing to accept the vaccine as compared to low-income participants, these findings

coincides with study conducted in UK (United Kingdom) <sup>32</sup>. Although COVID-19 vaccine was available in Pakistan as free of cost, however, still participants from low-income group were moderately worried about vaccine, its side effects and wanted more information before getting vaccinated.

As far as association of psychosocial effects are concerned with respect to age, the majority of participants having age  $\leq 30$  years, strongly disagreed with being worried about the COVID-19 vaccine and having vaccine on their minds. This data coincides with study of Paul et al in UK, <sup>32</sup> in which subjects of  $\leq 30$  years were less likely to have mistrust and worries about unforeseen effects. In addition to this, our study also showed that majority of individuals  $\leq 30$ -year-old were inquisitive about vaccine protocols and wanted more information regarding it.

## CONCLUSIONS

According to our study, the most susceptible group of participants with vaccine hesitancy and fear comprised of highly educated and low-income individuals with significant p-value. Current findings necessitate focus upon these individuals by health authorities in Pakistan. They must take serious measures to disseminate accurate and honest information by keeping medical health professionals on board, as they are most trusted for information by public. Moreover, prompt response to the public's queries and concerns should be prioritized in order to counteract misleading infodemics. Such timely efforts will help reduce anxiety among those individuals who are willing to get vaccinated but have limitations owing to scarce knowledge, multiple questions and concerns on their minds regarding COVID-19 vaccine. Besides, these measures will eliminate doubts which has psychosocial impact related to vaccine safety and will encourage increase in the vaccination rate in population especially among those who do not have serious intent to get the vaccination.

## Conflict of interest

The authors declared no potential conflicts of interest with respect to research, authorship, and/or publication of this article.

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