



INSIGHTS INTO COVID-19 VACCINE UPTAKE FREQUENCY, INSPIRATIONAL AND DENIAL FACTORS - CROSS SECTIONAL SURVEY IN THE REGIONS OF PUNJAB, INDIA

Akankshi Oberoi	M.B.B.S, Government Medical College, Patiala, Punjab, India.
Simardeep Kaur	M.B.B.S, Government Medical College, Patiala, Punjab, India.
Jayksh Chhabra	M.B.B.S, Government Medical College, Patiala, Punjab, India.
Aditya Jain*	Associate Professor, Department of Physiology, Government Medical College, Patiala, Punjab, India. *Corresponding Author

ABSTRACT

Introduction: COVID-19 pandemic is regarded as the most difficult circumstance in the history of intensive care. Despite the availability of safe and effective vaccines, vaccination reluctance hinders the widespread coverage. Our study aims to estimate the inspirational and denial factors of the COVID-19 vaccine in Punjab. **Methodology:** A community-based cross-sectional study was conducted in the month of May-June 2022, using a self-constructed questionnaire and random sampling. A total of 556 individuals responded to the survey. Chi-square tests were performed to assess the factors influencing the vaccine acceptance and refusal. **Results:** The study shows that 87.7% of the respondents accepted the COVID-19 vaccine. Vaccine acceptance was higher among the students (100%), healthcare officials (97%), higher income (96.6%), higher education (94.8%), and 18-33 years (91.4%). Vaccines being the most effective means for pandemic control (54.34%), free cost (28.95%), easy availability (26.85%) served as driving factors for acceptance. Illiterate/lower education (40%), non healthcare officials (21.8%), 34-49 years (19.8%), and lower income (17%) were significant predictors of vaccine hesitancy ($p < 0.05$). Doubt in efficacy (38.10%), fear of side effects and long term complications (33.33%), belief in their strong natural immunity and mistrust in modern medicine (31.74%) were the major barriers to vaccination. **Conclusion:** In order to increase the vaccination rates and effectively implement the health policies, health officials must assess complex and dynamic factors relating to socio-economy, health system mistrust and health literacy. Officials should act in accordance with their public's understanding to raise people's consciousness and dispel their myths about the vaccine to curtail the spread of vaccine preventable diseases.

KEYWORDS : COVID-19 epidemiology, COVID-19 mortality, COVID-19 prevention and control, Vaccination

INTRODUCTION

COVID-19 Pandemic is regarded as the greatest challenge in the history of critical care. As of now, in India, a total of 4.43 crore cases and 527,416 deaths have occurred so far [1]. Indeed, the pandemic has caused huge morbidity and mortality and has profoundly impacted our health, freedom, economy, education, transportation, food and basic supply chain [2].

Measures such as masks, social distancing, and hand hygiene have been implemented to minimize virus propagation during a pandemic [3] but long term control of infectious disease requires a global preventive immunization programme [4]. Vaccine hesitancy is defined as a "delay in acceptance or refusal of vaccines despite availability of vaccinations services" [5]. Even though a safe and effective COVID-19 vaccine is available to counteract this pandemic, vaccine hesitancy still acts as a roadblock to conquering this battle.

Till February 23, 2022, 96% of the people in Punjab had received their first doses. Another 72% had both doses administered at the same time. This shows that 28 percent of adults haven't yet vaccinated themselves [6]. Vaccinating the entire population helps build herd immunity effectively and prevent the spread of infectious illnesses [7]. The success of a vaccination programme will depend on the vaccine uptake frequency.

Vaccination has been an effective method of preventing the spread of deadly diseases on numerous occasions in the past as well like influenza, measles and smallpox [8], [9], [10], [11]. On the contrary, vaccine refusal has been a problem, hampering efforts to keep infectious diseases under control. Examples include, polio [12], Haemophilus influenzae [13], varicella [14], pneumococcal [15] and measles [16].

Vaccine hesitancy is considered among top 10 threats to

health, as per WHO [17]. In order to increase vaccination rates, we need to know what makes people want to get vaccinated and what discourages them from getting the vaccine.

Very few studies have been conducted in India, particularly in the Punjab region, to evaluate people's attitudes toward vaccination and their reasons for accepting or rejecting it. This study aimed at evaluating the vaccination status, attitude, beliefs and concerns of natives of Punjab region regarding vaccination. Previous studies investigated uptake rate and its associated factors before/during the vaccination push, but this is one of the first studies to evaluate the actual uptake rate and the reluctance and inspiration factors connected with it after the campaign.

MATERIALS AND METHODOLOGY

This is a cross-sectional electronic questionnaire-based study that was carried out in different regions of Punjab, India between May and June 2022. The questionnaire was designed using the Google forms in English as well as in Punjabi, which is the regional spoken language of Punjab to make it suitable to the general population. A web link of the questionnaire was created which was forwarded by the researchers to their personal and social contacts via Whatsapp messenger, social media and email.

The questionnaire was designed to evaluate the participant's motivation and hesitancy towards COVID-19 vaccination. Participants who did not take vaccination were also questioned about their willingness to get vaccinated in the future.

Questionnaire Content

17 different questions were asked. In the first few questions, sociodemographic details of participants were asked including age (18-33, 34-49, 50-65 and more than 65 years), gender (male, female) education (Illiterate/less than or equal

to matric, high school, bachelor/postgraduate degree), marital status(unmarried,married or divorcee/widow), employment (unemployed/homemaker, non-healthcare job,healthcare job or student), monthly income(<25000 INR, 25000-74999 INR, 75000-1 lakh INR, or more than 1 lakh INR) religion (Hindu, Sikh, Muslim, Christian or Other), residential status including the name of their city/village.

The next questions evaluated their history of any chronic disease, personal or family/friends history of COVID-19 infection and any death due to COVID infection in nearby contacts. Additionally, the type of vaccine (Covishield, Covaxin or Other) and the number of doses received (1 dose only or 2 doses) was recorded.

The questionnaire also assessed their possible motivation for receiving the vaccine. The participants were allowed to tick more than 1 choice. People who didn't get the shot were asked to mark the "Not applicable (Not vaccinated)" box so they wouldn't be listed in this section.

The possible reasons for hesitancy for COVID vaccine among unvaccinated individuals was also considered in the survey. Here also, participants were allowed to select more than 1 option. Those already vaccinated were asked to select the "Not applicable" box to be excluded from this section later on. Finally, the unvaccinated individuals were asked if they would be willing to receive vaccination in the future by asking them 'If not vaccinated yet, are you willing to get vaccinated in the future?' and the responses were recorded as 'Yes', 'No/Do not Know or "Not applicable" (if already vaccinated).

15 randomly chosen people (08 women and 07 men) were polled as part of a pilot study to verify the questionnaire and make sure it was reliable and appropriate. The pilot test findings showed some minor revisions, and the current study was carried out using the final, corrected version of the questionnaire based on the pilot test results.

Sampling Method

Participants were recruited by random sampling method through mass whatsapp, social media and email invitations, to the general public through personal and social contacts in different places of Punjab.

Participants were provided the link to the survey. All participants were made aware that this study is for research purposes only and their participation was voluntary. They were not asked for their names, e-mail address, or contact information, ensuring the privacy of survey respondents.

Study Population (inclusion/ exclusion)

Inclusion: Residents of Punjab, males and females, who were at least 18 years of age or older at the time of survey were included in the study.

Exclusion: Those who were under 18 years of age, or non-residents of Punjab were excluded from the study.

Statistical Analysis

The data was collected using google forms in English and Punjabi.

The data was summarized and numerically coded in Google Sheets to enhance the analysis and compile the results of the entire survey. The data was subjected to further statistical analysis using SPSS (Statistical Package for Social Sciences) version 23. Chi-square tests were used to analyze the correlation between qualitative factors based on how the data was distributed. All statistical tests with p-value was less than 0.05 were considered significant.

The participants' initial attributes were displayed statistically,

in terms of both frequency and percentages.

Ethical Approval

The research project was submitted and approved by the Ethical Committee of Government Medical College, Patiala, Punjab, India.

Ethical approval number: No. Trg 9(310)2022/38576

RESULTS

From a total of 556 respondents who were invited to participate, 512 participants had completed the self-administered questionnaires with a response rate of 92.09%.

Socio Demographic profile of participants

Table 1 summarizes the set of demographic data including age, gender, education, marital status, employment, monthly income and area of residence.

The majority of respondents were in the age group 18 to 33 years (54.7%, n = 280), females were 65.8%(n = 337), 70.7% (n= 362) of the population had a university degree/post-graduate, 55.1% (n=282) had monthly income of less than 25000 INR(Indian rupee), 52.15% (n=267) were employed, 61% (n=1874) were married and more than half of the respondents (62.5%, n = 320) were residing in urban areas.

Table 1 summarizes distribution of the sample by socio demographic variables and their vaccination status.

Table 1

Variable	Vaccinated [%]	Unvaccinated [%]	p-value
Age			< 0.05
18 to 33 years	256 [91.4]	24 [8.6]	
34 to 49 years	89 [80.2]	22 [19.8]	
50 to 65 years	82 [86.3]	13 [13.7]	
More than 65 years	22 [84.6]	04 [15.4]	
Gender			n.s.
Male	154 [88]	21 [12]	
Female	295 [87.5]	42 [12.5]	
Education			< 0.001 *
Illiterate/ < matric	45 [60]	30 [40]	
High school	61 [81.3]	14 [18.7]	
Bachelor's/ Postgraduate	343 [94.8]	19 [5.2]	
Marital status			n.s.
Unmarried	189 [90]	21 [10]	
Married	244 [86.8]	37 [13.2]	
Divorcee/widow	16 [76.2]	05 [23.8]	
Employment			<0.001 *
Unemployed / homemaker	164 [92.7]	13[7.3]	
Healthcare related job	34 [97.1]	1 [2.9]	
Non healthcare related job	183 [78.9]	49 [21.1]	
Students [medical/ non-medical]	68 [100]	0	
Monthly income			<0.05 *
< 25,000	234 [83]	48 [17]	
25,000 to 74,999	129 [91.5]	12 [8.5]	
75,000 to >1 lakh	86 [96.6]	03 [3.4]	
Area of residence			n.s.
Urban	282 [88.1]	38[11.9]	
Rural	167 [87]	25 [13]	

*p-value < 0.05 is significant

**p-value < 0.01 is highly significant

Overall, 87.7% (449 out of 512) of participants took the vaccination, whereas 12.3% (63 out of 512) did not.

We found statistically significant ($p < 0.05$) greater vaccine hesitancy among the age group 34-49 years (19.8%) and highly significant greater hesitancy in monthly income less than 25000 INR (17%) ($p < 0.05$), lower education status i.e illiterate or less than/equal to matric (40%) ($p < 0.001$) and non-healthcare job officials (21.1%) ($p < 0.001$), when compared to subgroups under a particular group.

Chronic Disease Association With Vaccination Uptake Frequency.

Table 2 summarizes the relationship between personal history of chronic disease or COVID infection, family/social history of COVID infection or death due to COVID with the vaccination status of the individual.

Out of 512 total respondents, highly significant ($p < 0.001$) vaccine hesitancy was found among responders with chronic disease (33.9%, $n = 20$) as compared to those without any chronic disease (9.5%, $n = 43$).

The relationship of COVID infection in oneself/family/friends or the death of a family member/friend and the decision to accept COVID vaccine was not significant ($p > 0.05$).

Table 2

	Vaccinated [%]	Unvaccinated [%]	p-value
History of chronic disease (hypertension, diabetes, TB, COPD, asthma, cancer, kidney and heart disease, etc.)			$< 0.001^*$
Yes	39 [66.1]	20 [33.9]	
No	410 [90.5]	43 [9.5]	
Have you ever suffered from chronic infection?			n.s.

Table 3

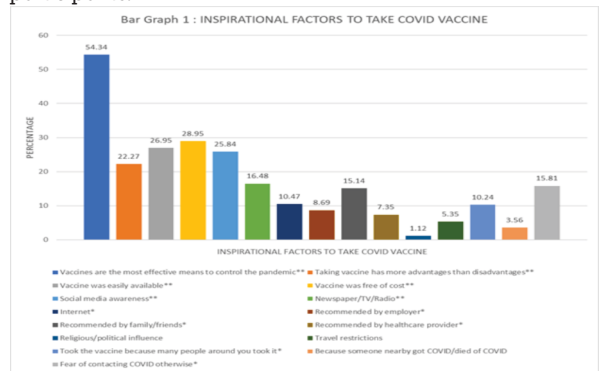
INSPIRATIONAL FACTORS	RESPONDED YES N = 449	ASSOCIATION WITH SOCIODEMOGRAPHIC VARIABLES						
		AGE	GENDER	MARITAL STATUS	EDUCATION	EMPLOYMENT	MONTHLY INCOME	AREA OF RESIDENCE
Vaccines are the most effective means to control the pandemic	244[54.34]	n.s.	n.s.	n.s.	P value < 0.001	P value < 0.001	P value < 0.001	n.s.
Taking vaccine has more advantages than disadvantages	100 [22.27]	P value < 0.001	P value < 0.05	P value < 0.05	P value < 0.05	P value < 0.001	P value < 0.001	P value < 0.001
Vaccine was easily available	121[26.95]	n.s.	P value < 0.01	n.s.	n.s.	n.s.	P value < 0.001	n.s.
Vaccine was free of cost	130 [28.95]	n.s.	P value < 0.001	n.s.	n.s.	n.s.	n.s.	n.s.
Social media awareness	116[25.84]	n.s.	n.s.	n.s.	P value < 0.01	n.s.	P value < 0.001	n.s.
Newspaper/TV/Radio	74 [16.48]	P value < 0.05	P value < 0.01	P value < 0.01	n.s.	n.s.	P value < 0.001	n.s.
Internet	47 [10.47]	n.s.	P value < 0.001	n.s.	n.s.	P value < 0.05	P value < 0.001	n.s.
Recommended by employer	39 [8.69]	n.s.	n.s.	n.s.	n.s.	P value < 0.01	P value < 0.001	n.s.
Recommended by family/friends	68 [15.14]	P value < 0.00	P value < 0.001	n.s.	n.s.	n.s.	P value < 0.01	n.s.
Recommended by healthcare provider	33 [7.35]	n.s.	n.s.	n.s.	n.s.	n.s.	P value < 0.001	n.s.

Yes	72 [91.1]	07 [8.9]	
No	377 [87.1]	56 [12.9]	
Has anyone in the family/friends/ anyone nearby suffered from covid infection at any time ?			n.s.
Yes	123 [92.5]	10 [7.5]	
No	326 [86]	53 [14]	
Someone died due to covid in family/ friends/ neighborhood ?			n.s.
Yes	44 [91.7]	04[8.3]	
No	405 [87.3]	59[12.7]	

**p-value < 0.01 is highly significant

Inspirational Factors For Uptake Of COVID-19 Vaccine

Bar graph 1 shows the frequency of different factors in our participants.



*p-value < 0.05 is significant

**p-value < 0.01 is highly significant

Table 3 Shows The Relationship Between Individual Inspirational Factors For COVID Vaccine And Sociodemographic Factors.

Religious/political influence	05 [1.12]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Travel restrictions	24 [5.35]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Took the vaccine because many people around you took it	46 [10.24]	n.s.	n.s.	P value < 0.05	P value < 0.001	n.s.	P value < 0.05	n.s.
Because someone nearby got COVID/died of COVID	16 [3.56]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Fear of contacting COVID otherwise	17 [15.81]	n.s.	n.s.	n.s.	n.s.	P value < 0.05	n.s.	n.s.

N= total no. of vaccinated individuals

*p-value < 0.05 is significant

**p-value < 0.01 is highly significant

Acceptance of the COVID-19 vaccine has been found to be linked to a number of sociodemographic factors. Higher education (high school, graduates and postgraduates), higher income (>75,000 INR) and the employed population showed trust in vaccine efficacy. Higher income was strongly influenced by easy availability. Higher education and higher income are influenced by social media. Taking the vaccine has more advantages than disadvantages was significantly reported in the age group 34-49 years, higher income, healthcare workers and higher education. Newspaper/ TV/ Radio was a significant influencing factor among the 34-65 years age group and higher income. Taking the vaccine because of the fear of contacting COVID otherwise was significantly found among the students and lower income (<25000 INR). Recommendation of family/friends was a significant factor in the age group >65 and higher income population. Students and the population with higher income, participants were more significantly motivated by the Internet. Lower education (illiterate/matric education) and lower income people took the vaccine because many people around them took it. Recommendation by the employer was reported by participants in the non-healthcare sector and higher income.

Motivation by the healthcare provider was found in higher

Table 4

Denial Factors	Responded Yes [%]	Association With Sociodemographic Variables						
	N= 63	AGE	GENDER	MARITAL STATUS	EDUCATION	EMPLOYMENT	MONTHLY INCOME	AREA OF RESIDENCE
Vaccine is not effective	24 [38.1]	N.S.	N.S.	p-value < 0.001	p-value < 0.001	p-value < 0.001	p-value < 0.001	n.s.
Someone in your family/friends had severe side effects due to COVID vaccine	06 [9.52]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Social media impact	01 [1.59]	N.S.	N.S.	P value < 0.001	N.S.	N.S.	N.S.	N.S.
Religious/ Political reasons	0	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Pregnancy/Planning to get pregnant in near future	05 [7.94]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Not available nearby	01 [1.59]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Not available free of cost	02 [4.76]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Negative motivation by family/friends	02 [3.17]	N.S.	N.S.	N.S.	p-value < 0.01	N.S.	N.S.	N.S.
Lack of awareness of importance of vaccine	05 [7.94]	N.S.	N.S.	N.S.	p-value < 0.001	N.S.	N.S.	N.S.
Fear of syringes	10 [15.87]	N.S.	p-value < 0.001	p-value < 0.001	p-value < 0.001	N.S.	N.S.	N.S.

income. Although vaccine's free of cost served as bait for receiving vaccines, it did not have significant association with any particular socio-demographic variable. Although gender, marital status, area of residency did not affect a person's decision to get vaccinated in our study, some individual inspirational factors did much more strongly correlate with males, married population and people living in urban residency. For instance, there is a significant association between the male group and factors like vaccinations, newspaper/TV/radio/internet, and recommendations from family/friends.

COVID-19 vaccination hesitancy-related factors

Bar graph 2 shows the frequency of hesitancy factors in our participants.

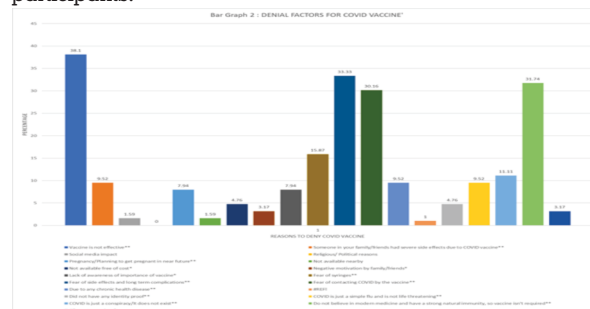


Table 4 shows the relationship between individual hesitancy factors for COVID vaccine and sociodemographic factors

Fear of side effects and long-term complications	21 [33.33]	N.S.	N.S.	N.S.	p-value < 0.001	p-value < 0.05	N.S.	N.S.
Fear of contacting COVID by the vaccine	19 [30.16]	N.S.	N.S.	N.S.	p-value < 0.001	p-value < 0.001	p-value < 0.001	N.S.
Due to any chronic health disease	06 [3.52]	N.S.	N.S.	N.S.	p-value < 0.05	N.S.	N.S.	N.S.
Do not believe in modern medicine	20 [31.74]	N.S.	N.S.	N.S.	p-value < 0.001	N.S.	N.S.	N.S.
and you have a strong natural immunity, so vaccine isn't required								
Did not have any identity proof	03 [4.76]	N.S.	N.S.	N.S.	p-value < 0.01	N.S.	N.S.	N.S.
COVID is just a simple flu and is not life threatening	06 [9.52]	N.S.	N.S.	N.S.	p-value < 0.01	N.S.	N.S.	N.S.
COVID is just a conspiracy/It does not exist	07 [11.11]	N.S.	N.S.	N.S.	p-value < 0.001	N.S.	p-value < 0.001	N.S.
Allergy to vaccines	02 [3.17]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

p-value < 0.05 is significant

p-value < 0.01 is highly significant

Denial factors such as ineffectiveness and fear of contacting COVID from the vaccine itself were found to be highly significantly associated with illiterate population, non healthcare workers and low income. Fear of side effects and long term complications was surprisingly observed with higher education groups and the unemployed.

Strong natural immunity and distrust in modern medicine, lack of identity proof to get registered, belief that COVID is a simple flu and isn't life threatening, lack of awareness of importance of vaccine, opposition from their families or friends were significantly associated with lower education(illiterate/< matric education).

Surprisingly, the higher education(bachelor's/postgraduate) population showed a significant association with denial factors such as fear of syringes and chronic health disease. Belief that COVID is just a conspiracy was observed in lower education (illiterate); and lower income(<25,000 INR).Someone in the family/friends had severe side effects due to Covid vaccine, pregnancy or planning to get pregnant in the future, not available free of cost, allergy to vaccines did not show significant association with any particular socio-demographic variable.

More than half of the unvaccinated population was still either not ready to get vaccinated or was not sure about it as summarized in Table 5.

Table 5 summarizes willingness to get vaccinated in the future

Table 5

If not vaccinated, are you willing to vaccinate yourself in the future?	Frequency [%]	P Value
YES	12 [29.04]	0.001*
NO	19[13.15]	0.001*
NOT SURE	32 [50.8]	0.001*

*p-value < 0.01 is highly significant

DISCUSSION

Vaccination is the most effective weapon in the pandemic arsenal to combat the spread of deadly coronavirus [SARS-Cov2]. But, discovering the COVID vaccine is only half the battle won, the other half remains with complete public acceptance to get vaccinated. Therefore, it is important to take into account the factors of motivation and hesitance that influence people's decisions to get vaccinated.

The purpose of this study was to determine the vaccination rate, factors affecting public's motivation and reluctance to vaccinate themselves in Punjab.

In our study, the majority of our participants (87.7%) were vaccinated and 12.3% remained unvaccinated. Similar studies showed a vaccine acceptance rate of 89.4% in China [18], 87.8% in Greece [19], 95.78% in UAE [20], 73.4% in Botswana [21], 83.6% in India [22]. Our findings were more than the average acceptance rate observed in a study conducted in lower and middle income countries (80.3%)[23].

Among the vaccinated, the highest uptake rate was seen in the 18-33 years age group, higher education[24], higher income, students and people working in the health care sector. [25],[26],[27],[28],[29],[30].

Lowest uptake rate was seen in 34-49 yrs age group, lower education, lower income and people working in non health care sector. This is in accordance with the findings of various studies Ireland [31], Saudi Arabia [32], Italy [33] USA[34].

Because they have more people depending on them, such as spouses, children, parents, and adults in the 34–49 age range may be more apprehensive about accepting the COVID vaccine. Opposite to the findings of our study, a study conducted in Australia[35] revealed that the middle aged population was least hesitant.

These findings may act as red flags for government, policymakers, health professionals and international organizations to focus on low socioeconomic groups more effectively and eliminate their potential concerns.

Due to factors like crowded living conditions and poor sanitation, weakened immune systems, a greater reliance on outside employment and public transportation, and an inability to practise social distancing at home or at work, people in low socioeconomic groups are more likely to contract COVID-19 than people in high socioeconomic groups, but they are less willing to get vaccinated. This trend is also seen in a study done in neighbouring country Pakistan [36].

Therefore, measures are required to maximize vaccine uptake in vulnerable and disadvantaged groups who have already been disproportionately affected by the pandemic.

In order to combat the pandemic's disproportionate impact on low-income and educationally deprived populations, initiatives must be taken by government officials, policymakers, health professionals and international

organizations to increase vaccination rates among the lower socioeconomic groups and eliminate their potential concerns.

Our study discovered that people with a chronic disease had lower rates of vaccine uptake and greater hesitancy than healthy respondents. One possible explanation for this finding is that the population of Punjab with chronic diseases are concerned that receiving the vaccine will worsen their condition, and the contradictory advice of their peers makes them even more hesitant. Furthermore, there is a lack of relevant data on the administration of COVID vaccination to those with chronic diseases. Therefore, the most effective way to deal with this issue is to raise awareness and facilitate open lines of discussion. Healthcare providers and policymakers should work together to get the word out about the benefits of the COVID vaccination for chronic disease patients. In contrast to our study, healthcare personnels in Ethiopia [37] had high acceptance among those with a history of chronic disease. The US study [38] also reported less hesitancy among individuals with a history of chronic illness. Reno and colleagues reported the positive correlation between prevalence of any chronic disease with the likelihood of getting the COVID-19 vaccination [39].

Healthcare professionals should leverage their knowledge to educate the reluctant population about the link between their chronic disease and a poor prognosis for COVID-19, and thus motivate the eligible chronic disease patients for the COVID vaccine.

Our study found that personal/social history of COVID infection or any death nearby due to COVID-19 infection had no bearing on the decision of the population of Punjab to accept or reject the COVID vaccine. Contrary to our findings, some studies reported lesser acceptance [40] and lesser hesitation [38] for those with a history of COVID-19 diagnosis. Marital status and area of residence (urban/rural) of the individual did not play any significant role in acceptance or rejection of COVID-19 vaccine in our study, similar to the study conducted in South Korea [41]. In contrast to our findings, a few studies revealed that marital status had impacted vaccine acceptance and married people were more likely to be hesitant [41], [42].

It is usually seen that there is higher medical care service utilization among women [43], although in our findings, gender did not have any significant role to play in receiving COVID vaccine. Similar findings were seen in a study conducted by Bosnia where significant distinction with respect to gender was not seen but a mildly higher acceptance rate was seen in males [26]. In contrast to our findings, vaccine uptake rates of the studies in Japan [44], Tamil Nadu [27] showed a significant association with gender.

The decision to get vaccinated is complicated and it is influenced by a variety of factors. Among the vaccinated, 2 factors related to the public's confidence in vaccinations, in particular, vaccine efficacy and its advantages were very significant [45]. These were mainly seen in population groups with higher education, higher income and the employed ones. On the flip side, among the unvaccinated, lower/no education, lower income and non healthcare personnels had major concerns related to the perceived effectiveness, and risks of getting COVID disease from the vaccine itself. [46], [47], [48]. Similar hesitancy reasons were seen in the influenza pandemic of 2009 as reported by a survey done in Hong Kong where fear of side effects stood out the most common reason for rejection of vaccines [49].

Also, these groups were more likely to believe in the conspiracy theories related to COVID-19 vaccine [33] and the lack of awareness of the importance of vaccination. It may be attributable to their lack of comprehension regarding the

operation of vaccines and a failure to distinguish between reliable and unreliable sources of information. There is an undeniable correlation between sociodemographic factors and knowledge of the vaccine's mechanism.

Understanding the importance of education in this setting is crucial as it increases a person's likelihood of receiving vaccinations. Because a major population of India has lower health literacy, increasing the literacy rates via communication can act as a social defense against COVID-19 pandemic [50], [51], [52]. There must be efforts made to provide the important information regarding vaccines in a way that is appropriate for those with poor levels of health literacy and avoiding the use of any medical jargon. To help deliver this information, local physicians can play a major role.

Some of the individuals who received the immunization admitted that they did so out of fear of contracting COVID [53], while others said they did so because their friends and family members had also received it. These nebulous reasons may have favored vaccination, but they are actually a sign of concern, if individuals are not using their rational thinking. This behavior was especially seen in low-income and undereducated populations, which highlights the necessity of health literacy even more.

Also, the employed population with higher income were significantly recommended by their employers. Since, employees are more likely to develop an infection owing to their travel for work and other work-related activities such as attending professional conferences and taking business trips, many employers have made it necessary to present a COVID immunization certificate in order to gain access to the workplace. Hence, employees are more likely to get a vaccine on recommendation by their employers for their financial stability and job security.

It was seen that social media and internet played a positive role for the higher income and higher education groups driving them towards getting vaccinated, similar to study conducted in Jordan [54], [55]. 15% of the vaccinated population with some or other chronic disease was positively influenced from social media towards taking the vaccine ($p < 0.001$). There are increased chances of getting misinformed while relying on the internet and social media as there is infomedic related to COVID-19 creating vaccine apprehension, the issue also discussed in earlier studies [56], [57], [41], [58]. But, a well-educated, well informed person with high standards of living has the ability to gather factual information as well as question any false information going around concerning the COVID-19 vaccine by independently checking their veracity [59], [30]. Sources of information like newspaper/TV/Radio also served as significant positive drivers for COVID vaccine acceptance among higher income and 34-65 years age groups. The affluent population is eager to stay at the forefront of medical news and their ready access to print and broadcast media. While the younger generation is more likely to turn to social media for news, those between the ages of 34 and 65 are more likely to rely on traditional media [42].

Taking the vaccination on recommendation by family/friends was a factor significantly associated with the age group > 65 years. This may owe to the fact that since they are a dependent population [60] and listened to the guidance of their families. It is encouraging to see that senior citizens in Punjab are being cared for by their family/friends. Encouragement from the closed ones was seen as a motivational factor in other studies too [61], [62], [63].

Recommendation by a healthcare professional was found to be more significant in a population with high standards of living, because they have easy access to healthcare and more

opportunities to network professionally. This suggests that medical professional's advice might serve as a source of inspiration.

One of the major factor responsible for COVID hesitancy was the safety and fear of side effects[64],[65],[66]. Surprisingly, a few participants who were highly educated did not take the vaccine due to safety concerns and fear of side effects and long term complications, fear of syringes and due to some chronic health disease. Perhaps, because they are more perceptive, skeptical , and scrutinize what they hear, and are more health concerned, hence, their wisdom led them to worry about the consequences of the vaccine. Safety of vaccines was also a concern seen among the unemployed population. Strong natural immunity, hence, no need for vaccination [67] and distrust in modern medicine. Many Indians rely on the widespread use of home medicines to boost their bodies' immune systems.

Though it's not incorrect to suggest that certain home cures have some degree of success, relying on them alone to fight the epidemic is not acceptable. Natural home treatments that enhance immunity should be used in addition to vaccination, not as a replacement for it, in the fight against COVID, it should be stressed to the public.

CONCLUSION

The best approach to fight a pandemic and reduce the detrimental effects of an infection is to ensure that a vaccine that is both effective and easily accessible. Even though our research demonstrates a high rate of COVID vaccine uptake, the presence of an unvaccinated population remains a barrier to attaining herd immunity for the prevention of this disease.

There is a significant gap in the adoption of the COVID-19 vaccine between those in higher and lower socioeconomic groups, and this disparity needs to be reduced. To reduce vaccine reluctance during COVID-19, health authorities must evaluate the dynamic and complicated aspects surrounding health care system mistrust and health literacy. Health fairs, media campaigns, and meetings with community health professionals, auxiliary nurse midwives, ASHA staff and Anganwadi staff can all do more to raise people's consciousness and dispel their myths about the vaccine. The major reluctance and motivating factors in the population of their respective regions should be analysed, and government and healthcare officials should act according to the understanding and beliefs of their public to implement any health strategy, whether it be in the present or in the future.

Strengths And Limitations

Our study has certain strengths and limitations.

After a vaccination drive was launched in Punjab about a year and a half ago, this is one of the first projects in our region to use a reliable and validated questionnaire to assess the factors influencing people's decision to get immunized.

Understanding people's attitudes and behaviors about vaccines is essential for increasing vaccine coverage. Health professionals can use the drivers and breakers for getting the COVID-19 vaccine that this study uncovered to better target their efforts.

However, our research does have certain caveats. Even though we have collected data from diverse regions of the state, we did not use a stratified random sampling technique to enroll the participants. There is little room for confidence in generalizing the results to the entire population of the state based on this sample.

Second, a self-reported questionnaire may have led to more desirable responses. Lastly, because it was an online survey, digitally illiterate people made up only a small fraction of total participants. So, they were interviewed personally and the

form was filled by the researchers on their behalf.

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