Research Article

# Assessing Vaccine Attitudes: A Cross-Sectional Study in Hyderabad, India

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## ARTICLE INFO

## ABSTRACT

This study assessed vaccine acceptance, hesitancy, and skepticism among adults aged 18 years and above in Hyderabad, India, amid the COVID-19 pandemic. Conducted from November 2020 to June 2021, the web-based observational survey gathered responses from 255 participants using a comprehensive questionnaire. The survey examined socio-demographic aspects, understanding of COVID-19 and vaccinations, perceptions of vaccine safety and effectiveness, and readiness to financially contribute to receiving the vaccine. The findings revealed that 84.71% of the individuals were open to getting the COVID-19 vaccination, while 26.67% identified as anti-vaxxers. The majority of respondents (88.63%) concurred that vaccines are crucial in preventing severe illnesses. However, 58.43% expressed worries about potential long-term health issues arising from the vaccine. Trust in vaccine producers was mixed, with 61.96% expressing trust. Education level significantly influenced vaccine acceptance, with higher-educated individuals showing greater willingness to get vaccinated. These insights into vaccine acceptance and perceptions offer valuable guidance for policymakers and authorities responsible for public health in dealing with vaccine reluctance and improving vaccination campaigns. The findings of the study are crucial in the current context of increasing reports of adverse vaccine effects, providing valuable guidance for public health strategies to enhance vaccine uptake.

## INTRODUCTION

The worldwide healthcare infrastructure, financial systems, and everyday routines have been significantly affected by the appearance of the new coronavirus, SARS-CoV-2, in late 2019, resulting in the COVID-19 outbreak. The rapid development and dissemination of vaccines have been crucial in managing the spread of the virus and reducing the associated rates of illness and death.[1] Vaccine hesitancy and skepticism pose significant challenges to achieving widespread vaccine acceptance. Vaccine hesitancy is characterized by a reluctance to accept or refuse to get vaccinated, even with access to immunization services. Factors such as apathy, ease of access, and trust influence vaccine hesitancy.[2] Understanding these components is crucial for achieving successful public health plans to enhance vaccine acceptance. This study, conducted in Hyderabad, India, from November 2020 to June 2021, intended to evaluate acceptance, hesitancy, and skepticism regarding vaccines among adults aged 18 years and above. India is essential for studying vaccine acceptance due to its diverse population and varying access to healthcare and education. It has been previously demonstrated that various elements such as educational level, socioeconomic background, and trust in health authorities have significantly impacted vaccine acceptance.[3] Misinformation and a lack of awareness are major factors that lead to vaccine hesitancy.[4] The vaccination campaign in India encountered difficulties with public perception and logistical issues during its early stages.[5] Global trends in vaccine acceptance and hesitancy provide essential context for this study. Research from different parts of the world has

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emphasized different levels of acceptance of vaccines. For example, a worldwide survey showed a broad spectrum of vaccine acceptance rates, with higher levels of acceptance in countries such as China and lower levels in Russia and France.[6] Political beliefs, race, ethnicity, and healthcare access have affected vaccine acceptance in the United States.[4] The ongoing changes in the pandemic, as well as the regular appearance of new mutations, highlight the significance of sustaining high vaccination rates.[7] The rise of the Delta and Omicron variants has highlighted the crucial need for booster doses and ongoing public health awareness.[8] It is vital to consistently evaluate public opinions on vaccination and respond to new concerns with specific interventions within this changing environment. Research showed that 84.71% of individuals were open to getting the COVID-19 vaccination, offering an essential glimpse into public opinion during a crucial phase of the pandemic. Even with this intense level of acceptance, a significant minority expressing doubt or resistance emphasizes the continuous requirement for successful communication tactics and public health measures. [9] To overcome vaccine hesitancy, it is essential to use various methods, such as making accurate information more accessible, building trust in health authorities, and dealing with particular worries about vaccine safety and effectiveness.[10] The study hypothesized that many people would doubt vaccines due to false information, lack of trust in health authorities, and worries about vaccine safety. It is crucial to comprehend and deal with these concerns, considering the vital role of vaccination in ending the pandemic. The conclusions of this study could aid public health officials in creating specific strategies to boost vaccine acceptance, thereby improving the overall effectiveness of vaccination efforts in India and similar settings globally. The importance of this study goes beyond its original period, as the knowledge gained can help shape current and future vaccination drives. By placing our discoveries in the broader context of ongoing research and current obstacles in vaccine distribution and acceptance, we aim to provide valuable perspectives for improving vaccination efforts in India and similar settings globally. The persistent challenge of vaccine hesitancy highlights the need to comprehend and tackle the underlying factors to achieve higher vaccination rates and improved public health outcomes. [11]

## Materials And Methods

### Study Design and Setting

A web-based observational survey was conducted in Hyderabad, India, from November 2020 to June 2021. The study's objective was to evaluate the acceptance, hesitancy, and perceptions regarding vaccination for COVID-19 for individuals 18 years and older."

## Study Participants

### *Inclusion & exclusion criteria*

The criteria for inclusion in the study were meticulously designed to encompass individuals aged 18 years and above from all socioeconomic backgrounds, educational levels, and genders. This comprehensive approach aimed to ensure a diverse representation of the adult population in Hyderabad, India. Participants under 18 and those with incomplete survey responses were excluded from the analysis. Additionally, to ensure effective survey distribution, participants were required to have access to the internet and social media platforms such as WhatsApp, Instagram, and Facebook.

## Data Collection and Statistical Analysis

A self-designed questionnaire was created after reviewing the existing literature and previous studies assessing the intentions of the Indian population regarding COVID-19 vaccination. The questionnaire consisted of five sections with 55 questions covering socio-demographic information, general knowledge regarding COVID-19 and vaccines, understanding of the safety of vaccines and efficacy, readiness to spend money for the vaccine, and causes for vaccine hesitancy. The survey was distributed in English using Google Forms and shared on social media platforms like WhatsApp, Instagram, and Facebook. Before participating, individuals were notified that it was voluntary and asked to give informed consent, respecting their autonomy and decision. The Institutional Ethics Committee approved the research. Before participating in the survey, all individuals gave informed consent. Participants were guaranteed that their answers would be kept private, and the information was anonymized for evaluation. The study followed ethical standards and guidelines for research involving human participants. The materials and methods are visually represented in a consort flow diagram, as depicted in Fig. 1.

The information gathered from the filled-out surveys was inputted into a Microsoft Excel file and assessed employing the Statistical Package for the Social Sciences (SPSS) for data analysis and statistical computation. Demographic characteristics and questionnaire item responses were summarized using descriptive statistics. The Pearson chi-square test was employed to evaluate the association between socio-demographic variables and respondents' willingness characteristics regarding vaccine acceptance. If the p-value was under 0.05, the results were considered to have statistical significance.

## Results

### Participant Characteristics

The survey included 255 participants, with the majority being in the 18 to 25 age group (80.39%), followed by 26 to 35 years (9.80%), 36 to 45 years (5.49%), and above
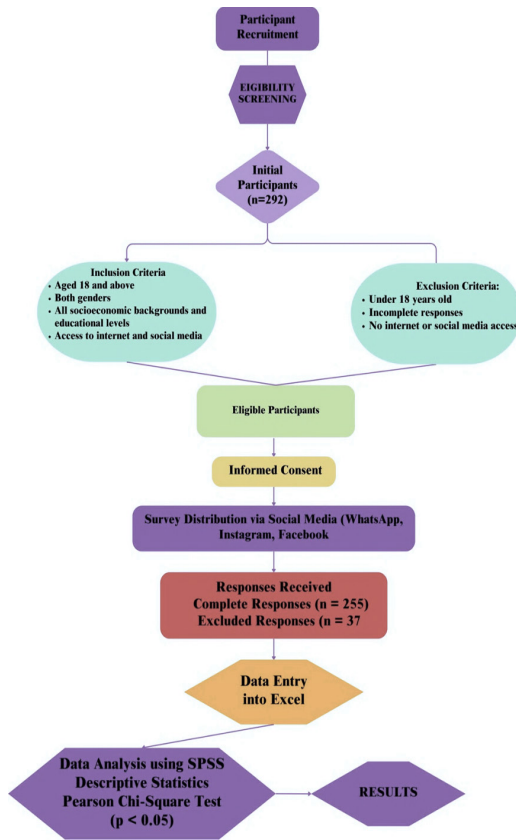
**Fig. 1:** Consort flow chart representing materials and method

**Table 1:** Participant characteristics

| Age group | Frequency (n = 255) | % |
|---|---|---|
| 18–25 | 205 | 80.39 |
| 26–35 | 25 | 9.80 |
| 36–45 | 14 | 5.49 |
| Above 45 | 12 | 4.71 |
| *Gender* | | |
| Male | 113 | 44.31 |
| Female | 142 | 55.69 |
| *Literacy* | | |
| High school | 1 | 0.39 |
| Intermediate | 14 | 5.49 |
| Graduate/Professional | 175 | 68.63 |
| Post graduate | 65 | 25.49 |
| *Annual Income* | | |
| ₹ < 1,00,000 | 95 | 37.25 |
| ₹ 1,00,001–1,50,000 | 34 | 13.33 |
| ₹ 1,50,001–2,00,000 | 27 | 10.59 |
| ₹ > 2,00,000 | 99 | 38.82 |

This table presents the demographic characteristics of the survey participants. The participants (n = 255) are categorized by age group, gender, literacy level, and annual income. The age group distribution shows that most participants (80.39%) were between 18 and 25 years old. The gender distribution indicates a higher proportion of females (55.69%) than males (44.31%). Regarding literacy, most participants were graduates or professionals (68.63%), followed by post-graduates (25.49%), individuals with intermediate education (5.49%), and a small number with only high school education (0.39%). Annual income data reveal that 38.82% of participants earned more than ₹2,00,000 annually, while the rest had varying income levels below this amount.

45 years (4.71%). Gender distribution showed a higher proportion of females (55.69%) than males (44.31%). In terms of educational attainment, most participants were graduates or professionals (68.63%), followed by post-graduates (25.49%), those with an intermediate education level (5.49%), and a small number with only high school education (0.39%). Regarding annual income, 38.82% of the participants reported earning more than ₹2,00,000, 37.25% earned less than ₹1,00,000, 13.33% earned between ₹1,00,001 and ₹1,50,000, and 10.59% earned between ₹1,50,001 and ₹2,00,000 (Table 1).

## Knowledge and Information on Vaccines

Most participants agreed on the importance of vaccines in preventing serious diseases, with 43.92% strongly agreeing and 44.71% agreeing. Only 9.80% were uncertain, while a small fraction disagreed (0.78%) or strongly disagreed (0.78%). Most participants (61.57%) believed that vaccines strengthen the immune system. However, 30.20% were uncertain, and 8.24% did not think vaccines boost the immune system. When asked whether the side effects of most vaccines outweigh the benefits, responses were more varied. 9.41% strongly agreed, and 34.51% agreed with the statement. A considerable proportion of participants (42.75%) were uncertain, indicating a significant level of ambivalence. On the contrary, 11.37% disagreed, and 1.96% strongly disagreed, suggesting they believed the benefits outweighed the side effects (Table 2).

**Table 2:** Knowledge and information on vaccines

| | Response | Frequency | % |
|---|---|---|---|
| Are Vaccines important for prevention of serious disease? | Strongly agree | 112 | 43.92 |
| | Agree | 114 | 44.71 |
| | Uncertain | 25 | 9.80 |
| | Disagree | 2 | 0.78 |
| | Strongly disagree | 2 | 0.78 |
| Do you think vaccine strengthen the immune system? | Yes | 157 | 61.57 |
| | No | 21 | 8.24 |
| | Maybe | 77 | 30.20 |
| The side effects of most vaccine overcome the benefits. | Strongly agree | 24 | 9.41 |
| | Agree | 88 | 34.51 |
| | Uncertain | 109 | 42.75 |
| | Disagree | 29 | 11.37 |
| | Strongly disagree | 5 | 1.96 |

This table summarizes responses from 255 participants on vaccine perceptions, including their views on vaccine importance, immune system strengthening, and side effects versus benefits. Most agreed (44.71%) or strongly agreed (43.92%) that vaccines are essential. A majority (61.57%) believed vaccines strengthen the immune system, while 30.20% were uncertain. Regarding side effects, 42.75% were unsure if they outweigh the benefits, 34.51% agreed, 9.41% strongly agreed, and 13.33% disagreed or strongly disagreed.

## Vaccination History and Anti-Vaccine Identification

The reported vaccination rate was below 50%, with only 40.78% of participants stating that they had been vaccinated against the flu, while a majority (59.22%) had not received a flu vaccine. When asked if they identified as anti-vaxxers, 26.67% of participants affirmed this identification, whereas a substantial majority (73.33%) did not [Table 3].

## General Perceptions Regarding the COVID-19 Immunization

Only 18.82% of respondents believed the pandemic could be brought to an end by the COVID-19 vaccine. A

**Table 3:** Vaccination history and anti-vaccine identification

|  | Response | Frequency | % |
|---|---|---|---|
| Have you been vaccinated against flu? | Yes | 104 | 40.78 |
|  | No | 151 | 59.22 |
| *Anti-vaccine movement* |  |  |  |
| Do you identify yourself as an anti-vaxxer (A person who is against vaccination)? | Yes | 68 | 26.67 |
|  | No | 187 | 73.33 |

This table shows the participant's vaccination history and identification with the anti-vaccine movement. Of the 255 participants, 40.78% had been vaccinated against the flu, while 59.22% had not. Regarding the anti-vaccine movement, 26.67% identified as anti-vaxxers, and 73.33% did not.

**Table 4:** General perceptions of Covid-19 vaccine

|  | Response | Frequency | % |
|---|---|---|---|
| Will this Covid-19 vaccine end the pandemic? | Yes | 48 | 18.82 |
|  | No | 57 | 22.35 |
|  | May Be | 150 | 58.82 |
| Do you think Covid-19 vaccinations should be compulsory? | Yes | 121 | 47.45 |
|  | No | 134 | 52.55 |
| What should be the minimum length of time a testing process? | Between 3–6 months | 83 | 32.55 |
|  | 6months To 1 Year | 53 | 20.78 |
|  | Between 1–2 years | 55 | 21.57 |
|  | Between 2–5 years | 37 | 14.51 |
|  | More than 5 years | 27 | 10.59 |
| I would be more likely to get the vaccine if it was required to travel internationally. | Strongly disagree | 26 | 10.20 |
|  | Disagree | 36 | 14.12 |
|  | Neither agree nor disagree | 91 | 35.69 |
|  | Agree | 72 | 28.24 |
|  | Strongly agree | 30 | 11.76 |

This table summarizes participants' views on COVID-19 vaccines and related policies. When asked if the COVID-19 vaccine would end the pandemic, 18.82% said yes, 22.35% said no, and 58.82% were uncertain. Regarding compulsory COVID-19 vaccinations, 47.45% supported it, while 52.55% opposed it. Opinions on the minimum length of the vaccine testing process varied: 32.55% preferred 3-6 months, 20.78% opted for six months to 1 year, 21.57% suggested 1-2 years, 14.51% recommended 2-5 years, and 10.59% believed it should be more than five years. For international travel requirements, responses were 10.20% strongly disagree, 14.12% disagree, 35.69% neutral, 28.24% agree, and 11.76% strongly agree.

more significant proportion, 22.35%, thought it would not, while the majority (58.82%) were uncertain. The respondents were nearly split on the issue of compulsory vaccination, with 47.45% supporting it and 52.55% opposing it. Opinions on the appropriate length of the vaccine testing process varied, with 32.55% favoring a testing period between 3 to 6 months, 20.78% opting for half a year to 12 months, 21.57% suggesting 1 to 2 years, 14.51% recommending 2 to 5 years, and 10.59% believing it should be more than 5 years. Responses were mixed when inquired whether they were more inclined to receive the vaccine if required for international travel. A minority strongly disagreed (10.20%) or disagreed (14.12%), while 35.69% neither agreed nor disagreed. A significant portion agreed (28.24%) or strongly agreed (11.76%) (Table 4).

## Concerns, Trust, Willingness, and Payment Regarding COVID-19 Vaccine

A significant majority (58.43%) acknowledged that the COVID-19 vaccine could lead to long-term health issues, while 41.57% disagreed. Regarding the speed of vaccine testing, 32.16% were firmly in favor, and 37.25% were in favor of the idea that hurried testing might miss possible side effects or hazards. About 27.45% were unsure. A small percentage disagreed (2.35%) or strongly disagreed (0.78%). These results suggest widespread apprehension about the adequacy of the testing process for the vaccine. Most respondents (61.96%) believed vaccine producers provide safe and effective vaccines, whereas 38.04% did not trust them.

The majority of respondents, 84.71%, indicated their willingness to receive the COVID-19 vaccine given sufficient information, while 15.29% expressed disagreement. Participants were almost evenly split regarding their desire to pay for the COVID-19 vaccine, with 47.84% willing to pay and 52.16% not willing to pay (Table 5).

## Sources of Information on COVID-19 Vaccines

75.69% of the respondents stated that they received information about COVID-19 vaccines from the internet or streaming sources. A smaller yet significant portion of participants (11.37%) rely on television as their source of information. Only 4.31% of participants use printed paper as their source of information. A few participants (2.75%) get their information from radio broadcasts. Other unspecified sources account for 5.88% of the participants' information. This category includes other mediums not explicitly listed in the survey (Fig. 2).

## Challenges in Accepting the COVID-19 Vaccine

The largest group of participants (38.43%) were neutral regarding the belief that COVID-19 vaccine safety and effectiveness data are fabricated. A total of 30.97% of participants expressed varying degrees of agreement (16.86% somewhat agree, 7.84% agree, and 6.27% strongly agree) that the data is fabricated. Conversely,

**Table 5:** Concerns, trust, willingness, and payment regarding COVID-19 vaccine

| | Response | Frequency | % |
|---|---|---|---|
| Concerns regarding safety of Covid-19 vaccine | | | |
| I think the covid-19 vaccine will cause lasting health problems for me. | Agree | 149 | 58.43 |
| | Disagree | 106 | 41.57 |
| | Strongly agree | 82 | 32.16 |
| I am worried that the rushed pace of testing for a new covid-19 vaccine will fail detect potential side effects or dangers. | Agree | 95 | 37.25 |
| | Not sure | 70 | 27.45 |
| | Disagree | 6 | 2.35 |
| | Strongly disagree | 2 | 0.78 |
| Trust on Covid-19 vaccine | | | |
| Do you trust vaccine producers to provide safe and effective vaccines? | Yes | 158 | 61.96 |
| | No | 97 | 38.04 |
| Willingness to take vaccination against Covid-19 | | | |
| I will take the covid-19 vaccine, if I will be given adequate information about it. | Agree | 216 | 84.71 |
| | disagree | 39 | 15.29 |
| Willingness To Pay | | | |
| Would you be willing to pay for the Covid-19 vaccine? | Yes | 122 | 47.84 |
| | No | 133 | 52.16 |

This table presents participants' concerns and attitudes towards the COVID-19 vaccine. When asked if they believe the COVID-19 vaccine will cause lasting health problems, 58.43% agreed, and 41.57% disagreed. Concerns about the rushed pace of vaccine testing revealed that 32.16% strongly agreed, 37.25% agreed, 27.45% were unsure, 2.35% disagreed, and 0.78% strongly disagreed. Regarding trust in vaccine producers, 61.96% trusted them to provide safe and effective vaccines, while 38.04% did not. When asked about willingness to take the vaccine if given adequate information, 84.71% agreed, and 15.29% disagreed. Concerning willingness to pay for the vaccine, 47.84% were willing to pay, while 52.16% were not.
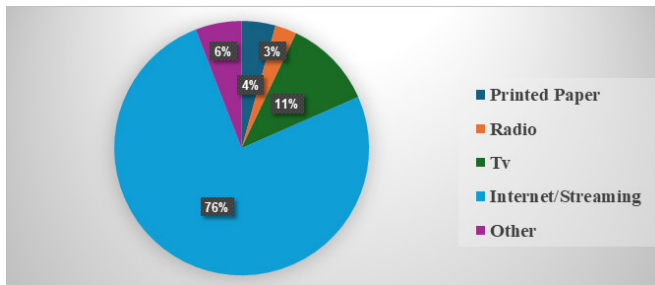


This figure illustrates the primary sources from which participants obtained information about COVID-19 vaccines. Most participants (75.69%) reported using the internet or streaming sources. A significant portion (11.37%) relied on television. 4.31% of participants used printed papers, while 2.75% got their information from radio broadcasts. Other unspecified sources accounted for 5.88% of the participants' information.

**Fig. 2:** Sources of Information

30.59% of participants disagreed to varying extents (13.73% somewhat disagree, 9.80% disagree, 7.06% strongly disagree). The largest group (36.08%) were undecided on whether the vaccine might cause COVID-19. A significant portion (47.46%) disagreed (28.24% disagree, 19.22% strongly disagree) with the concern that the vaccine could cause COVID-19. A smaller but notable group (16.47%) was worried about this potential issue (10.59% agree, 5.88% strongly agree) (Table 6).

The research discovered a notable connection between how participants viewed the safety of COVID-19 vaccines and effectiveness data and their willingness to vaccinate, with a *p-value* of 0.010. Participants who were neutral or

**Table 6:** Barriers to Covid-19 vaccine uptake

| | Response | Frequency | % |
|---|---|---|---|
| | | 18 | 7.06 |
| Covid-19 vaccine safety and effectiveness data is fabricated. | Strongly disagree | 25 | 9.80 |
| | Disagree | 35 | 13.73 |
| | Somewhat disagree | 98 | 38.43 |
| | Neutral | 43 | 16.86 |
| | Somewhat agree | 20 | 7.84 |
| | Agree | | |
| | Strongly agree | | |
| | | 16 | 6.27 |
| I am worried that the vaccine itself will give me Covid-19. | Strongly disagree | 49 | 19.22 |
| | Disagree | 72 | 28.24 |
| | Neither agree nor disagree | 92 | 36.08 |
| | Agree | 27 | 10.59 |
| | Strongly agree | 15 | 5.88 |

The table summarizes participant responses regarding concerns about COVID-19 vaccine safety and effectiveness. A notable portion expressed uncertainty (38.43%) regarding the fabrication of vaccine data, while others varied in their levels of agreement or disagreement. Additionally, worries about contracting COVID-19 from the vaccine varied, with a majority (36.08%) remaining neutral.

**Table 7:** Association between perception of vaccine safety and effectiveness data and willingness to get vaccinated

| | | Willingness to get vaccinated | | P-value |
|---|---|---|---|---|
| Response | | Yes | No | |
| Covid-19 vaccine safety and effectiveness data is fabricated? | Neutral | 54 | 44 | |
| | Somewhat agree | 21 | 22 | |
| | Somewhat disagree | 18 | 17 | |
| | Strongly agree | 2 | 14 | 0.010 |
| | Strongly disagree | 10 | 8 | |
| | Disagree | 18 | 7 | |
| | Agree | 7 | 13 | |

The table displays the association between participants' willingness to vaccinate based on their perceptions of COVID-19 vaccine safety and data fabrication effectiveness. Significant associations were observed between respondents' perceptions and willingness to vaccinate (p-value = 0.010). Participants who were neutral or disagreed with the fabrication perception showed a higher desire to vaccinate than those who somewhat agreed, agreed or strongly agreed.

strongly disagreed with the perception of fabricated data were more willing to vaccinate than those who somewhat agreed or strongly agreed (Table 7). Participants' willingness to get vaccinated showed a strong correlation with their perceptions of the minimum length of the testing process time for the COVID-19 vaccine, as evidenced by a *p-value* of 0.001. Those with a neutral stance displayed a relatively balanced willingness to get vaccinated, while those who agreed with more extended testing periods showed a decreased willingness. Conversely, participants who disagreed with longer testing times were more willing to get the vaccine (Table 8).

An analysis was conducted to examine the connection between the level of education and the willingness of participants to receive the COVID-19 vaccine.

The results showed a notable association, with a p-value of 0.042, indicating statistical significance. Interestingly, individuals with a graduate or professional education level demonstrated a greater willingness to get vaccinated than those with lower education levels, such as post-graduate, intermediate, or school education (Table 9). The research

**Table 8:** Association between minimum length of a testing process time and willingness to get vaccinated

| | | Willingness to get vaccinated | | p-value |
|---|---|---|---|---|
| | Response | Yes | No | |
| Minimum length of a testing process time | Neutral | 54 | 44 | 0.001 |
| | Somewhat agree | 21 | 22 | |
| | Somewhat disagree | 18 | 17 | |
| | Strongly agree | 2 | 14 | |
| | Strongly disagree | 10 | 8 | |
| | Disagree | 18 | 7 | |
| | Agree | 7 | 13 | |

The table presents participants' willingness to get vaccinated in relation to their perceptions of the minimum length of the testing process time for COVID-19 vaccines, showing a significant association (*p-value* = 0.001). Participants who expressed neutrality or disagreement with longer testing times demonstrated a higher willingness to vaccinate than those who somewhat agreed, agreed or strongly agreed with more extended testing periods.

**Table 9:** Association between level of education and willingness to get vaccinated

| | | Willingness to get vaccinated | | p-value |
|---|---|---|---|---|
| | Response | Yes | No | |
| Level of education | Graduate/Professional | 80 | 95 | 0.042 |
| | Post-graduate | 40 | 25 | |
| | Intermediate | 10 | 4 | |
| | School | 0 | 1 | |

The table illustrates the association between participants' willingness to get vaccinated and their level of education, revealing a statistically significant association (*p-value* = 0.042). Notably, individuals with a graduate or professional education level were more willing to vaccinate than those with post-graduate, intermediate, or school education levels.

**Table 10:** Association between perception of lasting health problems and willingness to get vaccinated

| | | Willingness to get vaccinated | | p-value |
|---|---|---|---|---|
| | Response | Yes | No | |
| Perception of long-lasting health problems with covid-19 vaccine | Agree | 56 | 93 | 0.001 |
| | Disagree | 74 | 32 | |

The table depicts the association between respondents' willingness to get vaccinated in relation to their perception of long-lasting health problems associated with the COVID-19 vaccine, demonstrating a significant association (*p-value* = 0.001). Those who agreed with concerns about lasting health problems were less willing to get vaccinated than those who disagreed.

also examined how participants' trust in the long-term health issues related to the COVID-19 vaccine impacted their readiness to receive it. The findings showed a significant association, with a *p-value* of 0.001. Notably, participants who expressed concern about lasting health problems displayed a markedly lower willingness to get vaccinated than those who did not share this perception. Conversely, those who did not believe in lasting health problems were more inclined to receive the vaccine (Table 10).

## DISCUSSION

The study provides comprehensive insights into COVID-19 vaccine perceptions, concerns, and related factors within the surveyed population. Key findings reveal a mixed landscape of vaccine acceptance, with notable implications for public health policy and communication strategies. Firstly, the study shows a substantial gender imbalance in participation, with a higher representation of males (459.9%) than females (50.1%).[12] This gender distribution pattern contrasts with findings from a study conducted in Italy, where a higher proportion of females participated. Additionally, the age distribution of respondents shows that the highest number of participants falls within the 31 to 40 age group (25.4%), which aligns with findings from a similar study conducted among Chinese adults.[13] Education level emerged as a significant determinant of vaccination willingness, with higher-educated individuals showing greater eagerness to receive vaccination. A cross-sectional study in Indonesia revealed similar findings, with most participants being university graduates or post-graduates.[14]

The surveyed population expressed widespread worries concerning the safety and effectiveness of COVID-19 vaccinations. Many expressed uncertainty or skepticism about fabricated vaccine safety and effectiveness data. This finding, which resonates with a study conducted by Daniel Freeman *et al.*, underscores the urgent need for transparent and accurate communication about vaccine safety and effectiveness to address these concerns and mitigate vaccine hesitancy.[15]

Trust that vaccine manufacturers will deliver safe and effective vaccines varied among respondents, with a majority expressing trust but a notable minority expressing skepticism. This finding aligns with a survey conducted in the UAE, where most participants trusted vaccine producers, indicating the importance of building trust in vaccination campaigns.[16] The study also explored perceptions regarding the duration of the testing process for COVID-19 vaccines. While a significant proportion favored shorter testing periods, there was also considerable support for more extended testing periods. These findings mirror those from a survey conducted in the US, highlighting the need for thorough testing while balancing the urgency of vaccine development.[17] Concerns about potential long-lasting health problems associated with COVID-19 vaccines were prevalent among the surveyed population. This finding underscores the importance of addressing public concerns and providing accurate information to mitigate vaccine refusal.

## Conclusion

The findings of this study are particularly relevant in the current context, where news regarding serious adverse effects associated with COVID-19 vaccines is making headlines. Amidst growing concerns and vaccine hesitancy, understanding public perceptions and addressing misconceptions are critical for effective vaccination campaigns.

In summary, the findings of this research regarding the COVID-19 vaccine acceptance and perceptions offer valuable guidance for policymakers, public health officials, and communication experts in navigating the current landscape of vaccine hesitancy and addressing public concerns. By prioritizing transparency, trust-building, and evidence-based communication, stakeholders can bolster vaccination efforts and contribute to achieving widespread vaccine uptake, ultimately mitigating the effects of the COVID-19 outbreak and saving lives.

## Acknowledgment

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