

Acceptance, perception and awareness regarding COVID-19 vaccination among general population in Karachi, Pakistan

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Received: April 2022 Accepted: May 2022; Published: June 1, 2022.

Citation: Tafazzul Hyder Zaidi et al., Acceptance, perception and awareness regarding COVID-19 vaccination among general population in Karachi, Pakistan. World Family Medicine. 2022; 20(6): 29-39. DOI: 10.5742/MEWFM.2022.9525052

Abstract

Introduction: Even though the coronavirus disease 2019 (COVID-19) outbreak was first reported in late 2019 in Wuhan, China, it is still prevalent across the globe and continues to create mayhem. According to WHO, on March 26, 2021, SARS-CoV-2 virus has infected a total of 125 million people worldwide and caused 3 million casualties. There have been 14.5 million confirmed cases in Southeast Asia, out of which 6.5 lac confirmed cases of COVID-19 are from Pakistan alone, with 14,028 deaths. In Sindh, Pakistan, there have been 2.6 lac confirmed cases of COVID-19 out of which 2 lac 56 thousand have recovered while 4,487 died. Since the outbreak, countless research has been undertaken pertaining to the virus transmission cycle and different countries have strived to come up with a vaccine to protect the masses. The continued

dissemination of this coronavirus vaccine emphasizes the role of international collaboration in the development of vaccines and therapeutics. Factors contributing towards vaccine hesitancy include unknown adverse effects of the vaccine, perceived threats, lack of awareness, religious beliefs, myths surrounding the pandemic and vaccine, lack of confidence in the health system and lack of community awareness about vaccine-preventable diseases. Moreover, since the vaccine is new and there is a lack of research pertaining to its efficacy and detrimental effects, people are reluctant to get vaccinated. The findings of this study might help the government figure out the best way to introduce mass vaccination programs in Pakistan and other South Asian countries. Moreover, lockdowns and social distancing may be eased if a COVID-19 vaccination offers immune defense, which will be beneficial for the country's economy.

Objective: To gauge the percentage of citizens who are willing to become vaccinated, their overall attitude towards the vaccination programs and the factors contributing towards vaccine hesitancy at the COVID Vaccination Center, Jinnah Post Graduate Medical Center, Karachi, Pakistan.

Methodology: A cross sectional study from May 2021 to August 2021 was conducted at the COVID Vaccination Center, Jinnah Post Graduate Medical Center in Karachi. The study was conducted on 400 persons who were either the vaccination staff of the COVID Vaccination Center or the persons coming for COVID vaccination. The sampling technique was non probability purposive sampling. The data was collected by rotating a structured questionnaire. The questionnaire was given to the data collectors who distributed them to the vaccination staff and the visitors. Written consent was taken from the participants and all ethical considerations and research protocols were observed. Data was collected in the form of pre-tested self-administered questionnaires. In order to standardize the questionnaires, a pilot study was conducted among research participants for the purpose of examining content validity. Data collected was analyzed using SPSS software version 20. The statistical analysis was conducted with 95% confidence interval and a p-value of <0.05 was taken as threshold of statistical significance.

Results: 400 subjects were approached to fill in the questionnaires. The age group of participants was less than 25 years were 48.2% (n=204), 25 to 50 years were 38.8% (n=164) and more than 50 years were 7.6% (n=32). Males were 40.0% (n=169) while females were 54.5% (n=231). Among the participants 40.4% (n=171) were married and 54.1% (n=229) were unmarried. Coming to the educational background, the majority had a bachelor's degree or beyond. Not Formally educated were 1.7% (n=7), those who studied till fifth grade or below were 1.2% (n=5), those educated up until matriculation were 3.3% (n=14), those who were intermediate educated were 14.3% (n=63), Diploma holders were 31% (n=131) and those who were university educated were 42.5% (n=180). When the participants were asked about their opinion regarding their health status, 21.5% (n=91) said it was excellent, 47.8% (n=202) said it was good, 21.3% (n=90) said it was fair, while 4% (n=17) said it was poor. When the participants were asked whether they were suffering from any illness (e.g: asthma, high BP, diabetes mellitus), 16.3% (n=69) said yes while 78.3% (n=331) said no. When the participants were asked whether COVID-19 existed, 86.5% (n=366) said yes while 8% (n=34) said no. When asked if COVID-19 was dangerous, 82.7% (n=350) said yes while 11.8% (n=50) said no. Replying to the question had the participants ever been infected by COVID in past, 13.9% (n=59) said yes while 54.8% (n=274) said no. When asked whether any members of their family, friends or neighbours had been affected by COVID-19, 61.9% (n=262) said yes and 32.6% (n=138) said no. When asked

had they ever heard about COVID-19 vaccination, 39% (n=165) said yes and 55% (n=235) said no. 92.7% (n=392) said yes while 1.9% (n=8) said when asked whether had they received COVID-19 vaccination, 39% (n=165) said yes while 61% (n=235) said no. When those who had not taken the vaccine were asked the reasons for not doing so, 6.5% (n=28) said that the COVID-19 vaccine was not effective, 9.5% (n=40) said that it had side effects, 4.7% (n=20) believed that they had alternate protection against COVID-19 while 36.9% (n=156) gave other reasons. When the participants were asked whether they considered themselves at risk of getting COVID-19, 43.7% (n=185) said yes, 27.2% (n=115) said no and 23.6% (n=100) said that they were not sure. Replying to the question would they prefer a vaccine with lower efficacy for the time being, 50.6% (n=214) said yes and 44% (n=186) said no. When asked which vaccine would they prefer, 35.5% (n=150) said Sinopharm/Sinovac (China), 5.2% (n=22) said Sputnik-V (Russia), 3.1% (n=13) said AstraZeneca (United Kingdom), 17.5% (n=74) said Pfizer (USA), 18.9% (n=80) said any vaccine and 14.4% (n=61) were not in favour of any vaccine. When asked in detail regarding the participants' major concerns and reservations regarding COVID 19 vaccine, about 29.6% (n=125) participants did not trust a vaccine made in such a short period of time, 35.7% (n=151) trusted the vaccine and 29.3% (n=124) were not sure. When asked whether the Vaccine's contents were not permissible in their religion, 7.1% (n=30) agreed, 60.3% (n=255) disagreed and 27.2% (n=115) were not sure. When asked whether they did not need a vaccine as they had already contracted COVID-19, 8% (n=34) agreed, 70.7% (n=299) disagreed and 15.8% (n=57) were not sure. Replying to the question whether the Vaccine could cause infertility, 7.8% (n=33) agreed, 49.9% (n=211) disagreed and 36.9% (n=156) were not sure. When the participants were asked whether COVID-19 vaccine was a conspiracy of the West, 17% (n=72) agreed, 52.2% (n=221) disagreed while 25.3% (n=107) were not sure. Responding to the question whether the participants would wait and see vaccine outcomes on other recipients, 38.8% (n=154) agreed, 45.4% (n=132) disagreed while 10.4% (n=44) were not sure. Responding to the question that vaccination would not be effective for different mutated forms, 34.3% (n=145) agreed, 23.9% (n=121) disagreed and 36.4% (n=154) were not sure. When asked whether they suspected that Vaccine inserts a chip inside the body, 6.9% (n=19) agreed, 59.8% (n=253) disagreed while 27.9% (n=118) were not sure. When the participants were asked whether they would get a booster dose if required, 49.4% (n=209) said yes and 22.7% (n=96) said no. When asked what were their reason/s for getting vaccinated, 51.1% (n=216) said that they wanted to protect their family and friends, 21.7% (n=92) said that they were at high risk of contracting COVID 19, 1.9% (n=8) said that they were suffering from co-morbidities while 15.4% (n=65) gave other reasons and 4.5% (n=19) said that they did not want to get vaccinated.

Conclusion: The population's acceptance rate for COVID-19 vaccine is only thirty nine percent according to this study. In this research, key characteristics are emphasized that have significant consequences for formulating vaccine policy that maximizes vaccine uptake. Religious leaders should be involved in developing successful communication strategies, particularly for low-income families. Public messaging should dispel any worries about the vaccine's safety and efficacy, as well as emphasize the vaccine's potential for containing the pandemic.

Keywords: COVID Vaccination+ Acceptance+ Health-care workers+ general population

Introduction

Even though the coronavirus disease 2019 (COVID-19) outbreak was first reported in late 2019 in Wuhan, China, it is still prevalent across the globe and continues to create mayhem. According to WHO, on March 26, 2021, SARS-CoV-2 virus has infected a total of 125 million people worldwide and caused 3 million casualties. There have been 14.5 million confirmed cases in Southeast Asia, out of which 650,000 confirmed cases of COVID-19 are from Pakistan alone, with 14,028 deaths. In Sindh, Pakistan, there have been 260,000 confirmed cases of COVID-19 out of which 256 thousand have recovered while 4,487 died (1). Despite the implementation of prophylactic measures like social distancing and other transmission-mitigation strategies in most countries during the pandemic, most citizens are at an increased risk of getting severely ill and consequently, dying from COVID19 since no cure has been discovered so far. Most importantly health-care workers, the elderly, and those with preexisting medical conditions are particularly vulnerable, (2,3,4) hence the COVID-19 pandemic will not end until herd immunity is well developed within the population, which is normally acquired by infection or vaccine (5). Since the outbreak, countless research has been undertaken pertaining to the virus transmission cycle and different countries have strived to come up with a vaccine to protect the masses. The continued dissemination of this coronavirus vaccine emphasizes the role of international collaboration in the development of vaccines and therapeutics (6). CoronaVac, an inactivated virus vaccine; Moderna's mRNA1273, an mRNA candidate; Johnson & Johnson's JNJ78436735, an adenovirus-based vaccine; Pfizer's BNT162b2, an mRNA-based vaccine; Sinovac's SARS-CoV-2 vaccine, an inactivated vaccine; CanSino's Ad5-nCoV, a viral vector vaccine; sputnik V, an adenovirus vaccine; and Inovio's INO4800, a DNA plasmid vaccine are among the vaccines deemed front-runners (7). As of March 24, 2021, a total of 462 million vaccine doses had been administered worldwide out of which Pakistan received 520,000 vaccine doses (1). Despite the free of cost administration of COVID-19 vaccine, the public is reluctant to get vaccinated. World Health Organization (WHO) reported ten global health risks in 2019, including vaccine hesitancy (8), which is described as a delay in accepting or refusing vaccinations despite the availability of vaccination services (9). Factors contributing towards vaccine hesitancy include unknown adverse effects of the vaccine, perceived threats, lack

of awareness, religious beliefs, myths surrounding the pandemic and vaccine, lack of confidence in the health system and lack of community awareness about vaccine-preventable diseases. Moreover, since the vaccine is new and there is a lack of research pertaining to its efficacy and detrimental effects, people are reluctant to get vaccinated (10,11,12).

According to our knowledge, the research conducted on the newly launched corona vaccine hesitancy in the citizens of Karachi, Pakistan is scarce. Through our research we evaluated the acceptance of COVID-19 vaccination among the general population including health care workers in order to determine factors contributing towards vaccine hesitancy, and the outlook of HCWs on vaccination, as it is critical for easing public fears. The findings of this study might help the government figure out the best way to introduce mass vaccination programs in Pakistan and other South Asian countries. Moreover, lockdowns and social distancing may be eased if a COVID-19 vaccination offers immune defense, which will be beneficial for the country's economy.

Objective

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Methodology

A cross sectional study from May 2021 to August 2021 was conducted at the COVID Vaccination Center, Jinnah Post Graduate Medical Center in Karachi. The study was conducted on 400 persons who were either the vaccination staff of the COVID Vaccination Center or the persons coming for COVID vaccination. The sampling technique was non probability purposive sampling. The data was collected by rotating a structured questionnaire. The questionnaire was given to the data collectors who distributed them to the vaccination staff and the visitors. Written consent was taken from the participants and all ethical considerations and research protocols were observed. Data was collected in the form of pre-tested self-administered questionnaires. In order to standardize

the questionnaires, a pilot study was conducted among research participants for the purpose of examining content validity. Data collected was analyzed using SPSS software version 20.0. The statistical analysis was conducted with 95% confidence interval and a p-value of <0.05 was taken as the threshold of statistical significance.

Results

400 subjects were approached to fill in the questionnaires. The age group of participants less than 25 years were 48.2% (n=204), 25 to 50 years were 38.8% (n=164) and more than 50 years were 7.6% (n=32). Males were 40.0% (n=169) while females were 54.5% (n=231). Among the participants 40.4% (n=171) were married and 54.1% (n=229) were unmarried. In regard to the educational background the majority had a bachelor's degree or beyond. Not Formally educated were 1.7% (n=7), those who studied till fifth grade or below were 1.2% (n=5), those educated up to matric were 3.3% (n=14), those who were intermediate were 14.3% (n=63), Diploma holders were 31% (n=131) and those who were university educated were 42.5% (n=180). Regarding their occupation, almost 27.9% (n=118) were students, 11.8% (n=50) were teachers, 21.7% (n=92) were doing private jobs, 9.2% (n=39) were doing government jobs, 7.8% (n=33) were housewives, 8.3% (n=35) were doctors and 7.3% (n=33) were businessmen. 45.2% (n=191) were living in a joint family system while 49.4% (n=209) were living as nuclear families. When the participants were asked how many people were living in their houses, 44.2% (n=187) had less than five persons living there while 50.4% (n=213) had more than five persons living in their houses. When asked about the participants monthly income, 13.7% (n=58) were earning less than PKR 25,000/- (USD 135) per month, 25% (n=110) were earning between PKR 25,000-PKR 50,000 (USD 135-USD 270) per month, 32% (n=136) were earning between PKR 100,000-to PKR 200,000 (USD 540-USD 1080) per month and 7.8% (n=33) were earning more than PKR 200,000 (USD 1080) per month. When the participants were asked about their opinion regarding their health status, 21.5% (n=91) said it was excellent, 47.8% (n=202) said it was good, 21.3% (n=90) said it was fair, while 4% (n=17) said it was poor. When the participants were asked whether they were suffering from any illness (for example: asthma, high BP, diabetes mellitus), 16.3% (n=69) said yes while 78.3% (n=331) said no. When the participants were asked whether COVID-19 existed, 86.5% (n=366) said yes while 8% (n=34) said no. When asked if COVID-19 was dangerous, 82.7% (n=350) said yes while 11.8% (n=50) said no. Replying to the question had the participants ever been infected by COVID in past, 13.9% (n=59) said yes while 54.8% (n=274) said no. When asked had any members of their family, friends or neighbours been affected by COVID-19, 61.9% (n=262) said yes and 32.6% (n=138) said no. When asked had they ever heard about COVID-19 vaccination, 39% (n=165) said yes and 55% (n=235) said no. 92.7% (n=392) said yes while 1.9% (n=8) said no. When asked whether had they received COVID-19 vaccination, 39% (n=165) said yes while 61% (n=235) said no. When those who had not taken the vaccine were asked the reasons for not doing so, 6.5% (n=28) said

that the COVID-19 vaccine was not effective, 9.5% (n=40) said that it had side effects, 4.7% (n=20) believed that they had alternate protection against COVID-19 while 36.9% (n=156) gave other reasons. When the participants were asked whether they considered themselves at risk of getting COVID-19, 43.7% (n=185) said yes, 27.2% (n=115) said no and 23.6% (n=100) said that they were not sure. Replying to the question would they prefer a vaccine with lower efficacy for time being, 50.6% (n=214) said yes and 44% (n=186) said no. When asked which vaccine would they prefer, 35.5% (n=150) said Sinopharm/Sinovac (China), 5.2% (n=22) said Sputnik-V (Russia), 3.1% (n=13) said AstraZeneca (United Kingdom), 17.5% (n=74) said Pfizer (USA), 18.9% (n=80) said any vaccine and 14.4% (n=61) were not in favour of any vaccine. When the participants were asked whether they would receive COVID-19 vaccination if recommended by a doctor, 79% (n=334) said yes while 15.6% (n=66) said no. Replying to the question asked would they recommend COVID-19 vaccination to their family and friends, 73.8% (n=312) said yes, 12.3% (n=52) said no, while 8.5% (n=36) said not sure. Regarding which sector will you prefer in order to get vaccinated, when asked would they pay privately PKR 12000 (USD 64) to get vaccinated as against free of cost COVID 19 Vaccination provided by the government, 28.6% (n=121) said yes while 66% (n=279) said no. When asked in detail regarding the participants' major concerns and reservations regarding COVID 19 vaccine, about 29.6% (n=125) participants did not trust a vaccine made in such a short period of time, 35.7% (n=151) trusted the vaccine and 29.3% (n=124) were not sure. When asked whether the Vaccine's contents were not permissible in their religion, 7.1% (n=30) agreed, 60.3% (n=255) disagreed and 27.2% (n=115) were not sure. When asked whether they did not need a vaccine as they had already contracted COVID-19, 8% (n=34) agreed, 70.7% (n=299) disagreed and 15.8% (n=57) were not sure. Replying to the question whether the Vaccine could cause infertility, 7.8% (n=33) agreed, 49.9% (n=211) disagreed and 36.9% (n=156) were not sure. When the participants were asked whether COVID-19 vaccine was a conspiracy of the West, 17% (n=72) agreed, 52.2% (n=221) disagreed while 25.3% (n=107) were not sure. Responding to the question whether the participants would wait and see vaccine outcomes on other recipients, 38.8% (n=154) agreed, 45.4% (n=132) disagreed while 10.4% (n=44) were not sure. Responding to the question that Vaccination would not be effective for different mutated forms, 34.3% (n=145) agreed, 23.9% (n=121) disagreed and 36.4% (n=154) were not sure. When asked whether they suspected that Vaccine inserts a chip inside the body, 6.9% (n=19) agreed, 59.8% (n=253) disagreed while 27.9% (n=118) were not sure.

When the participants were asked whether they would get a booster dose if required, 49.4% (n=209) said yes and 22.7% (n=96) said no. When asked what were their reasons for getting vaccinated, 51.1% (n=216) said that they wanted to protect their family and friends, 21.7% (n=92) said that they were at high risk of contracting COVID 19, 1.9% (n=8) said that they were suffering from co morbidities while 15.4% (n=65) gave other reasons and 4.5% (n=19) said that they did not want to get vaccinated.

Figure 1

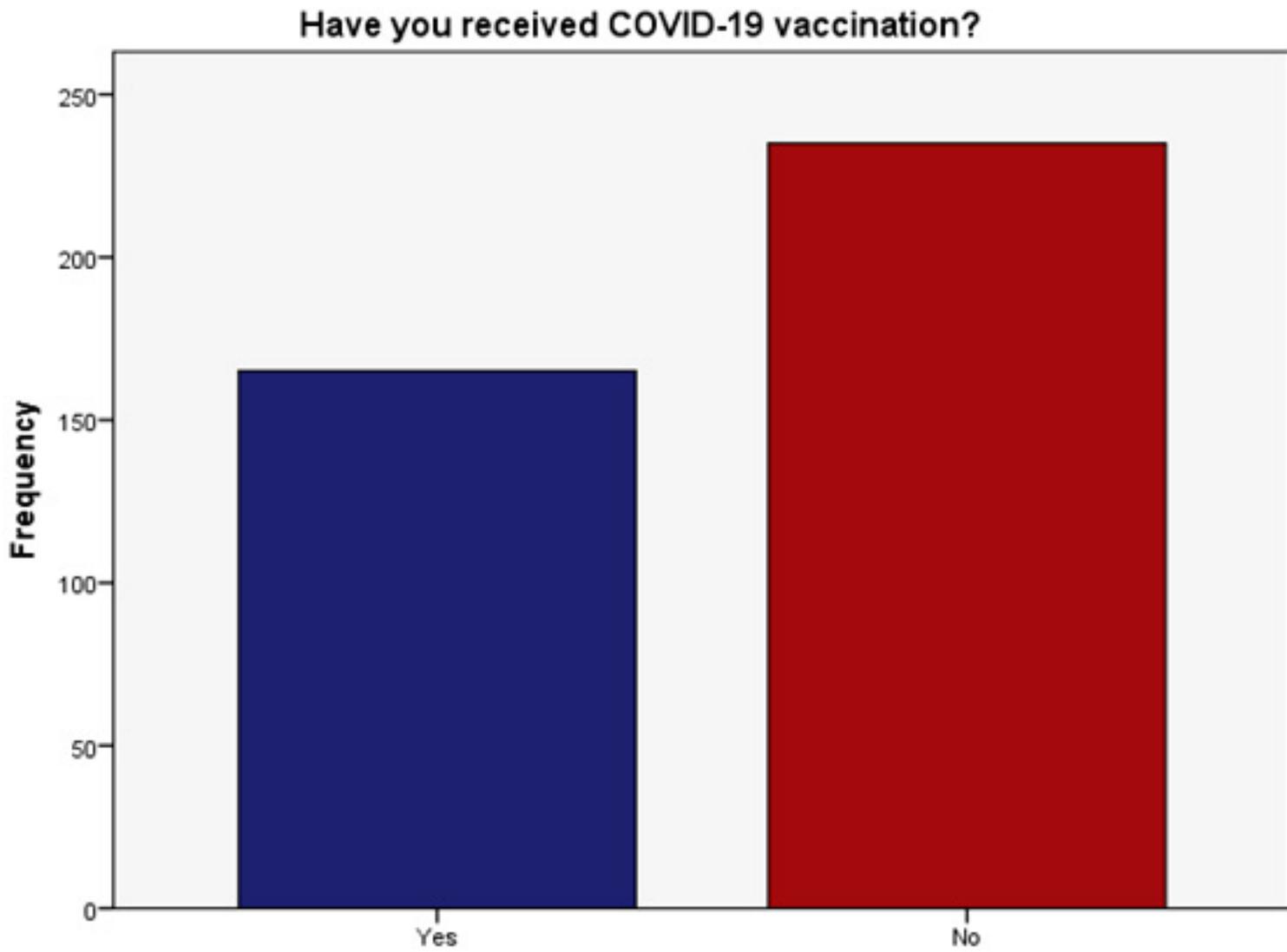


Figure 1 illustrates that when the participants were asked whether they had received COVID-19 vaccination, 39% (n=165) said yes while 61% (n=235) said no.

Figure 2

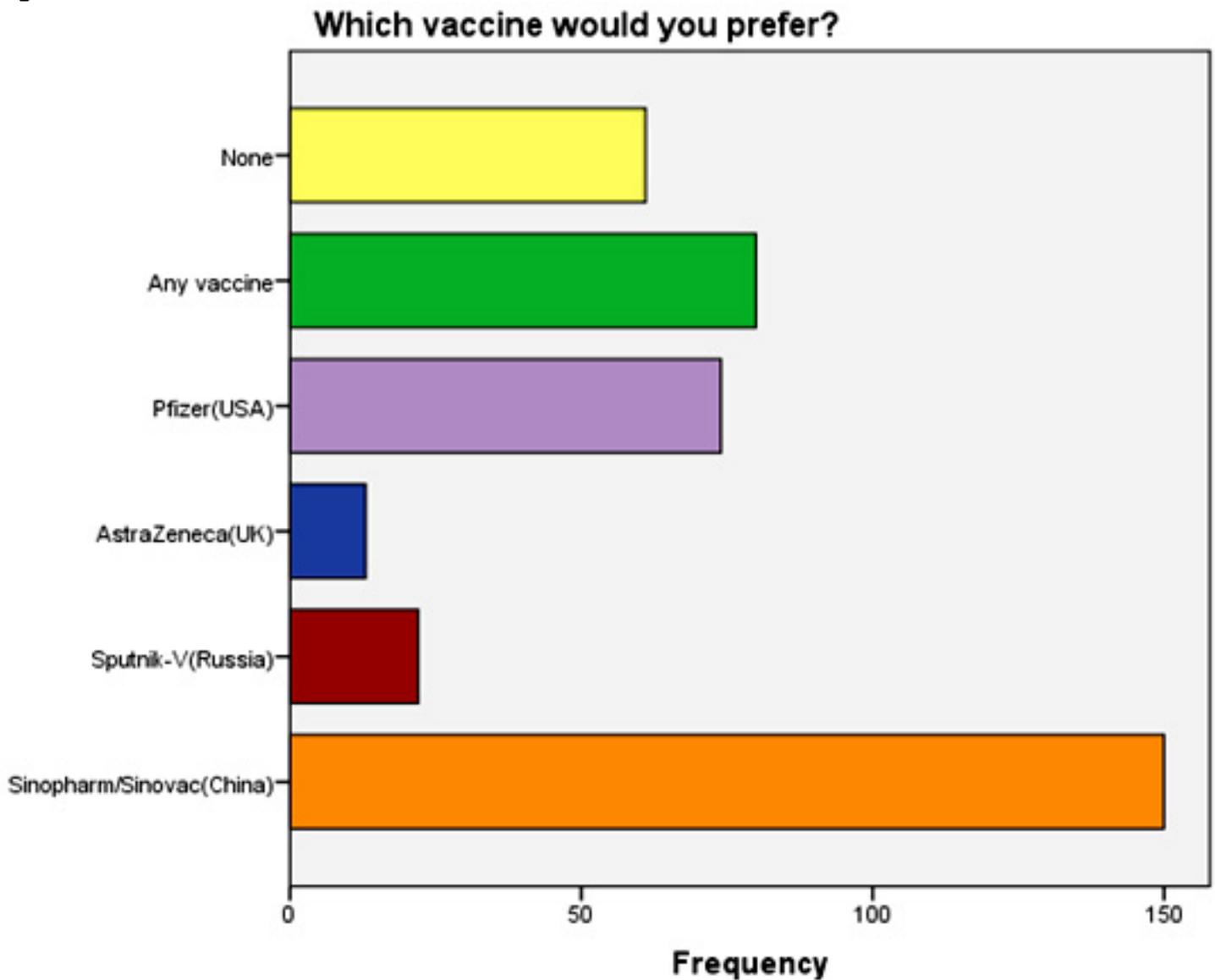


Figure 2 illustrates that when asked which vaccine would they prefer, 35.5% (n=150) said Sinopharm/Sinovac (China), 5.2% (n=22) said Sputnik-V (Russia), 3.1%(n=13) said AstraZeneca (United Kingdom), 17.5% (n=74) said Pfizer (USA), and 18.9%(n=80) said any vaccine and 14.4 (n=61) were not in favour of any vaccine.

Figure 3

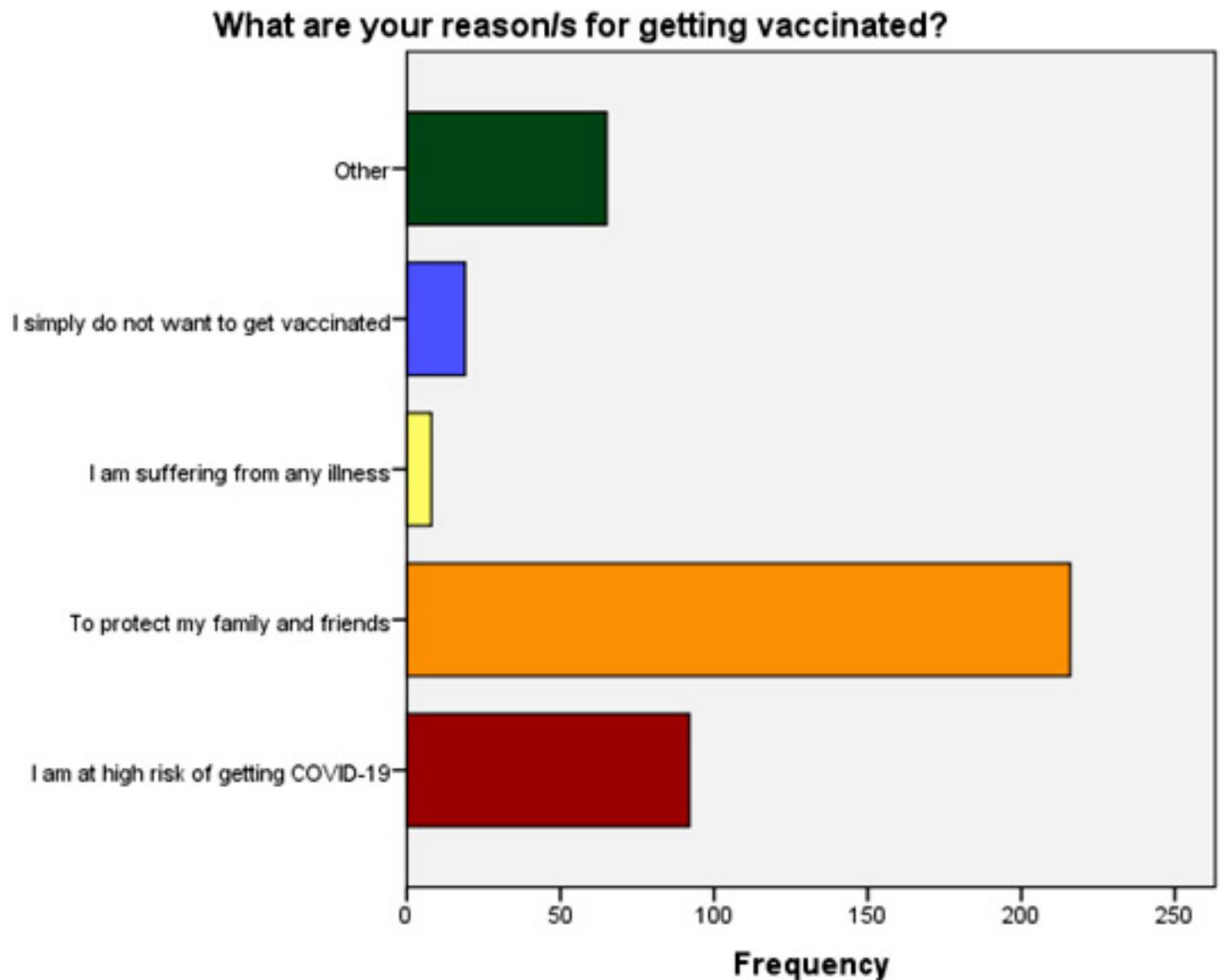


Figure 3 illustrates that when asked what were the participants reasons for getting vaccinated, 51.1%(n=216) said that they wanted to protect their family and friends, 21.7%(n=92) said that they were at high risk of contracting COVID 19, 1.9%(n=8) said that they were suffering from co-morbidities while 15.4%(n=65) gave other reasons and 4.5%(n=19) said that they did not want to get vaccinated.

Figure 4

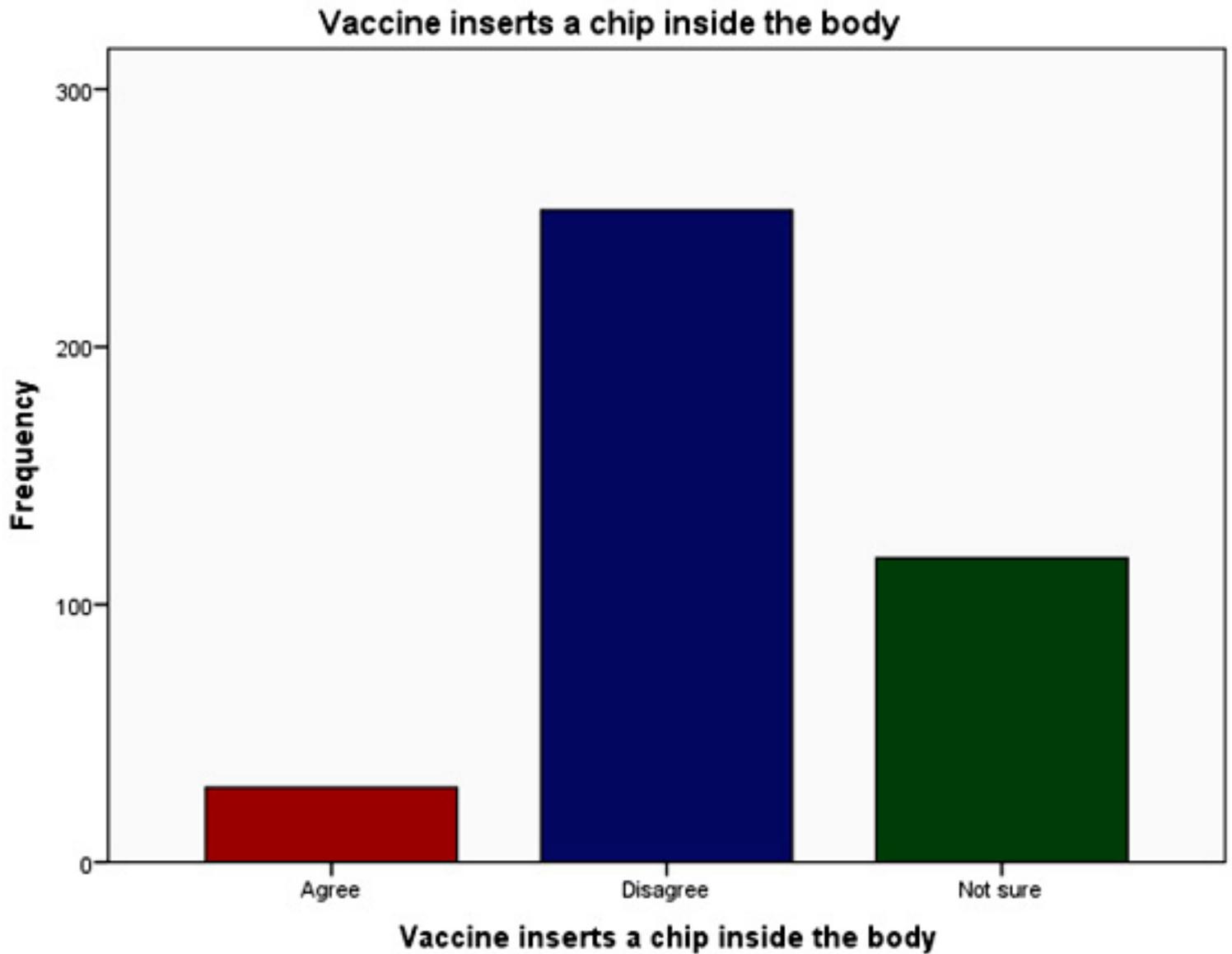


Figure 4 illustrates that when the participants were asked whether they suspected that Vaccine inserts a chip inside the body, 6.9% (n=19) agreed, 59.8%(n=253) disagreed while 27.9% (n=118) were not sure.

Table 1

Concerns regarding vaccine	Agree	Disagree	Not sure
Don't trust a vaccine made in such a short period of time	125 (31.3%)	151 (37.7%)	124 (31%)
Vaccine's side effect profile is high	101 (25.5%)	157 (39%)	142 (35.5%)
Don't need a vaccine as I have already contracted COVID	34 (8.4%)	299 (74.8%)	67 (16.8%)
Vaccine's contents are not permissible in my religion	30 (7.4%)	255 (63.8%)	115 (28.8%)
Vaccine can cause infertility	33 (8.3%)	211 (52.7%)	156 (39%)
COVID-19 is a conspiracy of West	72 (18%)	221 (55.2%)	107 (26.8%)
I will wait and see vaccine outcomes on other recipients	164 (41%)	192 (48%)	44 (11%)
Vaccination process is not clear	91 (22.8%)	237 (59.2%)	72 (18%)
Vaccination won't be effective for different mutated forms	145 (36.3%)	101 (25.3%)	154 (38.4%)
Vaccine inserts a chip inside the body	29 (7.3%)	253 (63.2%)	118 (29.5%)

Table 1 lists the prevailing concerns regarding vaccine present in our society and opinion of people regarding it. The majority of concerns on which the people disagreed were that they don't need vaccine despite contracting COVID-19 (74.8%), vaccine is not permissible in their religion (63.8%), vaccine inserts a chip in the body (63.2%) and that COVID-19 is a conspiracy of the West (55.2%). The points on which most people agreed upon were that they will wait and see vaccine outcomes on other

Discussion

This research was undertaken during Pakistan's third and fourth COVID-19 waves, when the number of confirmed cases approached 4000 each day, with the peak number of cases were 8,495 on May 6, 2021 (13). At this time, Pakistani citizens aged 18 and up, as well as health-care employees, were eligible for free vaccinations if they registered online or via SMS. Seniors over the age of 65 were eligible for walk-in vaccinations (14). Several conspiracy theories regarding vaccination efforts are a significant barrier to controlling vaccine-preventable diseases in Pakistan. Vaccine reluctance with a religious grounding develops in the general public due to a schism between the government and religious intellectuals (15).

400 subjects were approached to fill in the questionnaires. The form was predominantly filled by females (57.8%), amongst the participants more than half lie in the category of 18-25 age group (51%) and most of the respondents were unmarried (57.3%). In regard to the educational background majority i.e. (45%) had a bachelor's degree or beyond, almost (32.8%) were university or diploma students while only (1.8%) had no formal education. Health-care workers comprised about 151 (37.8%) of the respondents. Many people lived in a family comprising more than 5 family members (53.2%) and income wise a great chunk of the population earns between 50k-100k per month (34%).

Vaccine preference is a significant aspect in the population's acceptance of vaccines in a society. The outcomes of our study shed light on the key factors that influence a person's decision on which vaccine to administer. The cost of the vaccine, its availability, and its side-effect profile were the most critical factors we discovered when it came to vaccination preference. According to our findings, 37.5 percent of citizens chose Sinopharm/Sinovac because it is freely available throughout the city at government-run centers. The cost of the vaccination is significant because most people are unable to meet their basic needs, so how will they be

able to pay for a vaccine? Aside from that, when asked whether they would be prepared to pay for a vaccination, 69.8% of the public said no. Our findings are consistent with a study conducted in Indonesia, which found that 67 percent of individuals were willing to receive free vaccination (16). Our findings contradicted those of a study conducted in China, which found that vaccination cost had no influence on vaccine preference (17). The reason for this is that the study was conducted in an elite setting where people could afford an expensive vaccine, whereas in our setting, where 34% of the population earns between 50,000 to 100,000 PKR, it is not possible for them to pay, and they would prefer to remain unvaccinated rather than pay for vaccine.

Because many individuals prefer not to go to other places, availability is also a big factor contributing to a person's vaccine preference. As a result, 20% of people claimed they don't have a preference and will get vaccinated with whichever vaccine is offered at the center.

According to the WHO's statistical research and comparison of vaccines, 18.5 percent of respondents in our survey desired to acquire Pfizer since it is the most effective vaccine accessible in our city. This was also discovered in a study conducted in the United Kingdom, where consumers enthusiastically welcomed vaccines with greater efficacy rates but were hesitant to accept vaccines with lower efficacy rates (18).

The purpose of the research aimed to investigate the reasons behind vaccine denial and acceptance in order to better educate the public about their fears. The risk of contamination was found to be the most important factor in vaccine acceptance, as high probability of getting infected correlates with improved precautionary measures. As communities become more aware of the pandemic, the contagious nature of the corona virus is compelling people to receive vaccine.

Concerns regarding vaccines play a crucial role in determining whether a society accepts vaccines or not. The discoveries of our research shed light on the primary considerations that influence whether a person should receive the vaccine. The most pressing concerns about vaccination preference that we came across were the following: Efficacy of vaccine for different mutated forms, side effect profile of vaccines, Conspiracy beliefs, Confidence in the vaccine, Vaccine made in a brief time frame.

According to our results (41%) of our population agreed that they will wait and see the vaccine outcome on other recipients; moreover only (37.7%) respondents disagreed that they don't trust the vaccine while the rest of them agreed, expressing no confidence or were unsure about the vaccine created in such a brief time frame which contrasts with the US where 67% of the sample agreed that they will accept the vaccine (22). This pandemic has created chaos in Pakistan because a majority of our population is not literate enough to make a decision, also, the majority of them are influenced by rumours and have a higher tendency to believe in conspiracies. In addition, Pakistan's healthcare system is not considered adequate to deal with any emerging side effects.

Moreover only (18%) of the respondents in Pakistan believed that COVID-19 is a man-made disease or conspiracy of the west which indicates that conspiracy beliefs are showing signs of waning, on the contrary 58.5% of the respondents of research conducted in Jordan believed that Covid-19 is a conspiracy (23). Thanks to social platforms in Pakistan which are constantly raising awareness regarding the vaccine.

Furthermore (38.4%) people were not sure and (36.3%) agreed that the vaccine won't be effective for different mutated forms because since the emergence of the Delta variant people have agreed on the fact that even those people who were fully vaccinated got infected by Covid-19 and a number of deaths have been reported of people who were previously vaccinated which has created doubts in masses. According to a survey of low and middle-income nations, Pakistan showed the lowest vaccination acceptance rate (24). Vaccine acceptance rates have been shown to rise with income and literacy rates.

In addition, 39% of participants were unsure, whereas 8.3% believed that vaccines can cause infertility which is slightly lower than that of a Jordanian survey where 23.4% of the respondents stated that COVID-19 vaccines will cause infertility (23). Considering the fact that Pakistan is a country where masses still believe that polio and other vaccines cause infertility, infertility conspiracies against COVID-19 vaccine might take some time to wane. Even though studies have been done and COVID-19 infection has been shown to affect sperm parameters in the acute phase of infection the impact on fertility from vaccine uptake is largely unknown (25). Furthermore 29.5% were doubtful and only 7.3% believed that the COVID-19 vaccine is a way to implant microchips into people to control them. While according to a Jordanian research (27.7%) of the

respondents showed the concern of microchips (23). In any case, the scientific community should address these concerns, as the rapid pace of vaccine development does not appear to jeopardize the safety and quality of vaccinations, at least in the short term (26).

Conclusion

The population's acceptance rate for COVID-19 vaccine is only thirty nine percent according to this study. In this research, key characteristics are emphasized that have significant consequences for formulating vaccine policy that maximizes vaccine uptake. Religious leaders should be involved in developing successful communication strategies, particularly for low-income families. Public messaging should dispel any worries about the vaccine's safety and efficacy, as well as emphasize the vaccine's potential for containing the pandemic.

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