

## Acceptance and Perceptions of COVID-19 Booster Dose; A Survey among Residents of Rawalpindi

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### ABSTRACT

**Objective:** To determine public acceptance of COVID-19 booster dose, to know about perceptions and possible barriers regarding the vaccine.

**Study Design:** Analytical cross-sectional study.

**Place and Duration of Study:** Conducted regarding the acceptance and perception of the vaccine booster dose among the residents of Rawalpindi Pakistan, from Jun till Aug 2022

**Methodology:** The sample size was 320 and collected using convenient sampling technique. The study included residents of Rawalpindi between ages 18 and 65. Google forms based on Health Belief Model were used for data collection. Data analysis was done using SPSS version 28 and summary statistics were produced using frequencies, percentages and mean. Chi-square test was also used to determine associations between categorical variables.

**Results:** The results revealed that 74% of the participants' primary reason for getting booster dose was their own safety while major barrier to booster dose vaccination was side effects related to vaccine-62%. 81.3% people were willing to get the booster dose and 87.9% people agreed to receive booster dose for free. Chi-square test indicated a significant association between acceptance and perceived susceptibility, benefits and severity.

**Conclusion:** In conclusion, our findings reveal that majority of people were willing to get booster dose primarily for own safety. However, counselling is required to decrease the perceived barriers to vaccination regarding side effects of the vaccine.

**Keywords:** Booster dose, COVID-19, Health belief model, Health safety, Pakistan, Rawalpindi, Vaccination.

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### INTRODUCTION

The COVID-19 epidemic has caused a humanitarian disaster that has never before existed. Since COVID-19 spread, researchers have been working quickly and together to produce vaccinations. It has been a remarkable feat of human ingenuity to develop a safe & effective vaccine against the SARS-COV-2 virus at a blazing pace.<sup>1</sup> With an efficient immunization, COVID-19 is now very much preventative & treated.

Vaccine hesitancy, a widespread issue in many nations, including Pakistan, hinders this worldwide endeavour. Additionally, the effectiveness of the COVID-19 vaccines that have been approved against variants is still unknown; however, according to a recent case study, the effectiveness of the two doses of the BNT 162b2(mRNA) and ch Ad 0x1(adenovirus vector) vaccines remained at 88% and 67%, respectively.<sup>2</sup> Four months after the second dose of BNT162 (tozinamerah; Pfizer-BioNtech), studies conducted in Qatar indicated a significant decline in effectiveness against SARS-COV-2 infection.<sup>3</sup> Beginning in the summer of 2021, break-through infections caused by

the SARS-COV-2 delta strain started to appear.

The more recent omicron form, which frequently affects people who have received all of their vaccinations, is characterized by immune evasion.<sup>4</sup> Unvaccinated people with prior SARS-COV-2 infections are much more likely to become sick again.<sup>5</sup> Health experts are looking into the need for extra immunization in light of the newer, more virulent SARS-COV-2 viral strains and the potential for losing protection after vaccination. Experts in infectious diseases have considered whether booster shots are necessary for specific vulnerable groups or the entire community to build immunity and provide protection against circulating new variations.

Israel took the initiative to provide boosters for senior people above 60 years of age on July 30, 2021, while several other nations are presently providing a third booster shot for the general population. Beginning in late September 2021 in China.<sup>2</sup> On September 14, 2021, COVID-19 booster shots were made available in the United Kingdom.<sup>6</sup> On November 19, 2021, US health regulators extended full eligibility for booster injections to everyone who has received all recommended vaccinations. The National Advisory Committee on Immunization in Canada has advised

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booster vaccinations for persons with moderately to severely weakened immune systems. The European Center for Disease Control (ECDC) advised vaccine boosters for all adults on November 24, 2021, with a focus on those over 40. Malaysia (over 18 years, mandatory for over 60 years, those vaccinated with Sinovac and high-risk groups), Bahrain (Sputnik V, all over-18 years, at least six months after second dose), Indonesia (health workers only, wider population planned in 2022), and the United Arab Emirates (mandatory for people inoculated with Sinopharm vaccine) are among the nations in Asia and the Middle East that have such requirements.

However, the UK Joint Committee on Vaccination and Immunization advised giving a booster dose of either the BNT162b2 or a half dose of mRNA-1273 (Moderna) vaccine no earlier than six months following the end of the first vaccination course.<sup>7,8</sup>

Pakistan launched its booster program in January, 2022. The inefficiency of vaccination combined with misapprehensions and false notions among the people have turned it into a topic of controversy among the masses.

Populations' levels of COVID-19 vaccination acceptance also varied greatly. According to a cross-sectional study done in the US, vaccination rates were 90.9% and vaccination willingness rates were 94.5%.<sup>9</sup> 84.80% of participants in a research conducted in China reportedly agreed to get the COVID-19 booster shot. According to a survey conducted in India, 70% of participants indicated that they would be open to receiving vaccinations.<sup>10</sup> COVID-19 vaccination booster recommendations were released by Pakistan's National Command and Operation Center (NCOC). These recommendations state that healthcare workers, adults over the age of 18, and immunocompromised people of all ages are all eligible for booster doses. Booster vaccinations from Sinovac, Sinopharm, Pfizer, or Moderna are permitted.

Although several researches have looked at how individuals feel about the COVID-19 immunization campaigns, little is known regarding Pakistani booster acceptability and perception. Understanding the demand for booster dosages in Pakistan is crucial because the public continues to be alarmed by worries about the variations and length of protection they provide. The study's goal is to assess the public's acceptance of COVID-19 boosters using a self-administered online survey in order to close the gap in booster vaccine acceptance in Pakistan. Additionally,

this survey aims to investigate how the study sample's perceptions of COVID-19 booster doses and its contributing elements. The investigation of booster acceptance and perceptions will aid in the production of empirical data to enhance the administration of COVID-19 boosters.

## METHODOLOGY

An analytical cross sectional epidemiological study regarding the acceptance and perception of COVID-19 vaccine booster dose was conducted among the residents in the district of Rawalpindi Pakistan. The questionnaire based study was conducted among the residents of Rawalpindi Pakistan. The study was conducted from May 2022 till October 2022. The study duration period was 6 months. The sampling technique employed was convenient sampling. The sample size was calculated to be 320 by using the Raosoft sample size calculator. With a confidence interval (CI) of 95%, error margin of 5.45% and response distribution of 50%.

All residents of Rawalpindi between 18-65 years of age were included in this study. The study was explained to the respondents verbally before they were enrolled and their informed consent was also taken in writing. All the people unwilling to give consent to fill the questionnaire as well as the people below 18 years & above 65 years of age were excluded from the study.

Google forms based on Health Belief Model were used for data collection among the residents of Rawalpindi. The Questionnaire used was modified a little to make it more relevant to our study. The questionnaire was divided into three main parts. A) The demographics B) The knowledge about the disease and previous vaccination status and C) The acceptance and perceptions regarding the COVID-19 booster dose.

The first part contained information regarding the demographic data like name, age, gender, residence and marital status, level of education, employment status, occupation and income of the people.

The second part assessed the knowledge of people regarding the disease and vaccines along with previous vaccination status and past medical history. It consisted of three main domains. First one assessed the source of information regarding COVID-19, the previous vaccination status and cases of the disease in their close proximity. In the second one, knowledge about the new and existing variants and booster dose was tested. Lastly, the reason for getting the booster dose was asked when provided for free by the Government of Pakistan.

The third part of the questionnaire consisted of the perceptions and acceptance regarding COVID-19 and its vaccines and included 16 questions, each of which was responded to on a 5-point Likert scale and converted into binary variables like strongly agree to strongly disagree and for the risk of infection, the variables ranged from very severe to very low. It was divided into two domains. The first one asked about the susceptibility of the getting infected by the virus and the efficacy of boosters to extend protection against it and the scale ranged from low, moderate, high and very high to severe. The second domain consisted of questions that assessed the public opinion about severity of the variants, the efficacy of vaccine and boosters, the barriers in receiving the booster dose and cues to action. It again varied from strong agreement, agreement, neutrality and disagreement to strong disagreement.

Google forms based on health belief model were used for data collection among the residents of Rawalpindi Pakistan. Data on the knowledge of the disease, vaccine, booster doses, health seeking behavior and the reasons for rejecting and accepting the booster dose was collected. Data analysis was done using Statistical Package for Social Sciences-SPSS version 28 and summary statistics were produced using frequency, percentages and mean. Chi-square test was also used to determine associations between acceptance and perception and between acceptance and age, educational status and employment status. The data was double checked to verify that the entire variables were properly documented and to detect any missing or erroneous values during data entry. A *p*-value of < 0.05 was considered significant. Pie charts and Bar graphs were also used to display the results.

**RESULTS**

**Socio-demographic Characteristics**

All the participants were residents of Rawalpindi Pakistan. About 50.3% were male and 49.7% were female. About 88.7% respondents aged between 18-45 years; about 56.9% were married, 40.6% were single and 2.5% were widow. About 51.9% were employed, 23.5% were unemployed and 22.8% were students. About 1.6% of the respondents had no formal education and 98.4% were educated.

About 30.31% received information regarding COVID-19 booster dose from mass media and 26.25% from social media.

About 86.9% of respondents had suspected or confirmed cases in their close contacts. About 28.4% of

the respondents knew about Delta and Omicron variants.

**Acceptance**

About 88.1% respondents agreed to receive COVID-19 booster dose if the government of Pakistan was providing it for free. About 81% of the respondents were willing to get booster dose.

About 55.3% of the respondents perceive that booster dose is completely safe and approved by health authorities. About 62.19% of the respondents perceive that booster dose has side effects.

Acceptance rate for booster dose was different among different socio-economic groups. Willingness to get booster among employed respondents was 82.5% versus 72.8% among unemployed. It was even higher among students with a percentage of 98%. Significant association was found between acceptance & employment status of respondents (*p*=0.031).

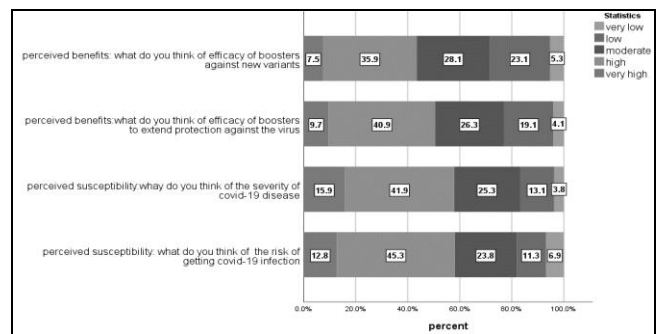


Figure: Perceived Benefits and Susceptibility of booster dose among the respondents.

Table-I: Perceived Barriers of Booster Dose among Respondents

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Perceived Barriers: The booster dose is completely safe and approved by health authorities	14.7%	40.6%	21.9%	14.7%	8.1%
Perceived Barriers: The booster dose does not have any side effect	7.2%	23.1%	7.5%	49.1%	13.1%
Perceived Barriers: I have Reservations Regarding content of the Vaccine	4.4%	20.3%	24.1%	30.0%	21.3%
Perceived Barriers: There is a Risk that the Vaccine itself may cause an infection	4.7%	19.4%	25.3%	32.5%	18.1%

Willingness to get booster was higher among educated than respondents with no formal education with the former having a percentage of 82% compared to 40% of the latter. Significant association was found between educational status & acceptance of booster dose (*p*=0.007).

Acceptance was the highest among participants aged between 18 to 25 years having a percentage of 90%. Significant association was found between willingness to get booster dose & age groups ( $p=0.016$ )

About 74.38% respondents were willing to get booster dose for their own safety, about 7.81% due to travel restrictions and 6.25% due to job security.

**Perceptions**

In terms of HBM factors, about 58.12% of the participants perceived a high to very high risk of getting COVID-19 infection. About 40.94% agreed with high efficacy of booster dose to extend protection against virus and only 43.44% agreed with high to very high efficacy of booster dose against new variants. About 55.32% of the respondents agreed that booster dose is completely safe.

About 55.3% of the respondents perceive that booster dose is completely safe and approved by health authorities. About 62.19% of the respondents perceive that booster dose has side effects.

About 69.06% have easy access to booster dose. About 54.69% think that vaccine protects them from getting infected and about 50.94% think that they can live a normal lifestyle after getting booster dose. (Table-II).

**Table-II: Perceived Severity, Self-Efficacy and Cues to Action Among Respondents**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<b>Perceived Severity: The Variants have a high risk of Infection</b>				
12.2%	30.3%	27.5%	21.6%	8.4%
<b>Perceived Severity: The Variants can cause more Severe Illness than Original Strain</b>				
6.3%	27.5%	25.9%	31.3%	9.1%
<b>Self-Efficacy: I have easy access to Booster Dose</b>				
35.0%	34.1%	14.7%	8.8%	7.5%
<b>Self-Efficacy : I do not have time to get Booster Dose</b>				
7.5%	13.8%	15.0%	33.4%	30.3%
<b>Cues to Action: Vaccine Protects me from Getting Infected</b>				
16.3%	38.4%	22.8%	15.0%	7.5%
<b>Cues to Action: I can lead a normal lifestyle after getting booster dose</b>				
17.5%	33.4%	26.6%	16.3%	6.3%
<b>Others: I am not sure about getting a booster dose</b>				
6.9%	15.0%	24.4%	25.9%	27.8%
<b>Others: Scary Information about the Vaccines is Rampant on Social Media</b>				
17.5%	33.1%	25.0%	17.8%	6.6%

Chi square test indicated that there is significant association between booster acceptance and perceived susceptibility ( $p=0.001$ ), acceptance and perceived benefits ( $p=0.000$ ), acceptance and perceived severity:

the variants can cause more severe illness than original strain ( $p=0.001$ ), between acceptance and perceived severity: the variants have a higher risk of infection than original strain ( $p=0.027$ ). Also significant association was found between acceptance and cues to action ( $p=0.000$ ),  $p$ -value  $<0.05$  was considered significant.

**DISCUSSION**

Study was done to determine public acceptance of COVID-19 booster dose in Rawalpindi, Pakistan. The study was compared with a study conducted in China about booster acceptance and perception. Booster acceptance in China was 84.8% that was close to acceptance in Rawalpindi Pakistan that is 87.9%.<sup>2</sup> In another study conducted in Pakistan, the willingness to get booster dose was found to be 72% which is close to our study (81%).<sup>11</sup> 44% of the people regarded the booster dose safe and effective against the virus. (55.32% and 40.94% in our study). 53% people were of the view that the vaccine and booster dose extends protection against the virus which was again consistent with our study (54.69%).<sup>11</sup>

Another study conducted in Sindh, Pakistan, revealed that only 48.6% people were willing to get the booster shots. Out of those, 45.2% were employed and 6.2% were students. 47.4% people thought the vaccine to be effective.<sup>11</sup> This study was highly contrasting to our study where majority of the sample was willing to get the booster dose and had a high employment status as well.

A similar study was conducted in United Arab Emirates which revealed that 70.2% people were willing to get booster dose. 44.6% of those were from the educated masses. 35.1% regarded the vaccine as unsafe with certain side effects.<sup>12</sup> A survey conducted in KSA revealed 64.7% expressed willingness to get vaccine.<sup>13</sup> In some countries acceptance rate was low such as in Jordan it was 28% and Kuwait 23.6%. High acceptance was found in Malaysia 94.3% and Indonesia 93.3%.<sup>14</sup> In contrast, the booster acceptance was found to be 55% in Russia and 90% in China according to Literatur.<sup>14</sup> Higher booster acceptance rate may be due to appearance of new variant omicron with high infectivity rate.

It was indicated that respondent's age 26-35 years and with no formal education showed lower booster acceptance while employment and education was linked to higher booster acceptance with willingness to get booster was highest among educated that is 82% that was consistent with studies in China where

higher. High acceptance rate in our study could be due to the nature of study design. As it was an online questionnaire, educated people are more likely to engage in online surveys.

According to a study conducted in Egypt, the fear of spreading the disease to one's family, particularly one's parents, or of contracting it oneself was the main driver of vaccination (77% and 35.1%, respectively), which is consistent with our study's finding that 74.38% of participants agreed to receive a booster shot for their own safety.<sup>15</sup>

One significant conclusion was that people who believed they were more likely to contract COVID-19 (42.5%) were more inclined to consent to vaccination.<sup>12</sup> In line with the findings of our investigation, another study also indicated that general community members in Saudi Arabia and among Chinese healthcare staff accepted the COVID-19 vaccine despite significant perceived risk.<sup>13,16</sup>

Based on HBM, our findings suggested that acceptance of COVID-19 booster is significantly influenced by perceived advantages, perceived susceptibility, and perceived severity to vaccination.

High COVID-19 vaccine efficacy was shown to be the most preferred quality in a discrete choice experiment (DCE) carried out in China. Vaccination efficacy has been identified as a major predictor of vaccine adoption. According to the findings of our survey, 43.44% of respondents agreed that booster doses against new variations have high to very high efficacy, and 40.94% believed that booster doses extend protection against viruses.<sup>2</sup>

Regarding perceived barriers, about 62.19% of respondents believed that the booster dose had side effects, which is consistent with the findings of a cross-sectional study conducted in China, where 58.4% of respondents expressed vaccination hesitancy due to uncertainty about the vaccine's effectiveness and safety in the real world, respectively.<sup>17</sup> Public health intervention initiatives should include raising vaccine effectiveness perceptions while lowering fears of side effects and safety concerns.<sup>2</sup>

Fortunately, it appears that vaccine reluctance is decreasing as more knowledge about the security and efficacy of vaccines becomes available.<sup>18</sup> Nevertheless, there are still some aspects of socio-demographics including age, education, and employment position that influence people's decisions to receive the vaccine and need to be addressed.<sup>19</sup>

The research was only conducted in one vicinity that is Rawalpindi so it has limited generalizability.

## CONCLUSION

In conclusion, our findings reveal that majority of people were willing to get booster dose primarily for their own safety. However, counselling is required to decrease the perceived barriers to vaccination regarding side effects of the vaccine.

**Conflict of Interest:** None

## Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

ZR: SFM: Idea, Write up, Analysis, Review of manuscript & approval for the final version to be published.

MR: Data entry, Data Collection, Data analysis, Result, Referencing & approval for the final version to be published.

SV: Methodology, Abstract, Editing & approval for the final version to be published.

MT: Discussion, Literature review, Data Collection, & approval for the final version to be published.

AT: Data collection, introduction & approval for the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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