

Assessment of COVID-19 vaccine booster dose acceptance, reluctance and concerns among elderly diabetes patients in Pakistan

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Abstract: People around the globe rumored so many things about the safety and efficacy of initial two doses and booster dose of Covid-19 vaccine, which eventually affected the acceptance of the only tool available against the fight between humans and virus. The aim of current study is to evaluate the acceptance and reluctance level among the population specifically elderly diabetes patients. The cross-sectional study was conducted during a time period of 3 months i.e. from July 2021 until September 2021. A 16-item questionnaire was used to assess the acceptance, reluctance, and concerns of the Covid-19 vaccine booster dose among elderly diabetes patients. A total of 497 responses were collected and analyzed. Approximately 32% of respondents believed that they need additional information about the Covid-19 vaccine booster dose will be ineffective due to not enough information about the potential side effects of the vaccine dose, while around 80% of respondents showed concerns about safety, efficacy, newness and not enough information about vaccine contents. Around 47.1% of respondents expressed robust concerns about possible side effects of the Covid-19 vaccine booster dose.

Keyword: Covid-19, vaccine, booster dose, elderly, diabetes.

INTRODUCTION

Initially, it was rumored and hypothesized that Covid-19 virus was emerged a laboratory in China. Though the research has been done on the genetic information and data analysis rejects the speculations made earlier (Maxmen and Mallapaty, 2021). The COVID-19 virus was first identified in Wuhan (China) at the end of 2019. The source where this virus is transmitted to humans is still not clear. Countries worldwide warned the public to take responsive care (Zhu, Wei *et al.*, 2020). The global Covid-19 outbreak has brought enhancement in consideration and concerns regarding the prevention and control of Covid-19 infection from both scientific and non-scientific communities (Dietz, Horve *et al.*, 2020).

Initially, short studies and surveys showed that some diseases like diabetes could also add to the risk in COVID-19 patients. Some recent research articles showed the apparent association of diabetes mellitus with a high risk of complications, prolonged hospitalization, and deaths in SARS-CoV-2 infected patients (Sacks, Pham *et*

al., 2020). So, patients with such diseases, which can take part in the severity of COVID-19 symptoms, should take more precautions to avoid the risk.

In 2020, a breakthrough was achieved during the pandemic when COVID-19 vaccines were approved and soon made available for everyone throughout the globe. Multiple surveys have discussed and emphasized general COVID-19 vaccination hesitancy among people (Biswas, Mustapha *et al.*, 2021). The misconception which is commonly raised includes competency of the vaccination that despite vaccination, there are chances of getting COVID-19 and the symptoms. The other question in the population, which have also initiated concern regarding the safety of vaccines, is due to rapid production and testing. To develop a trustful relationship between the people and government, awareness and educational programs have been launched, and transparency about the vaccination process should be considered (DeRoo, Pudalov *et al.*, 2020). Wang *et al.*, studied the trend of covid-19 vaccine hesitancy among diabetes patients of China, the study revealed alarming hesitancy for Covid-19 vaccine with 56.4% participants showing confused or unwilling to get vaccinated (Wang, Duan *et al.*, 2022).

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Another study assessing the hesitancy among patients with diabetes in Saudi Arabia revealed that only one-third of studied participants showed willingness to get vaccinated (Aldossari *et al.*, 2021).

In Pakistan, the elderly population with comorbidities and health care workers were considered as the most vulnerable population, and were the first group to be vaccinated upon the availability of vaccine. Acceptance of the COVID-19 vaccine has an extensive role in exterminating the infection worldwide. However, very few previous researches assessed the extent of COVID-19 vaccine booster dose acceptance and reluctance among the elderly population. Thus, this study aims to analyze the extent of acceptance and to have an overview of the concerns associated with the booster dose of the Covid-19 vaccine. The current survey questionnaire was adopted from a similar study based on the assessment of Covid-19 vaccine acceptance, hesitancy and reluctance among healthcare workers in Saudi Arabia (Islam *et al.*, 2022).

MATERIALS AND METHODS

Study design, venue, and duration

The cross-sectional study was conducted for the period of 4 months, i.e. from August 2021 until November 2021. The study was conducted among elderly patients residing in Karachi, Pakistan, who were fulfilling the eligibility criteria.

Eligibility criteria

The current study included patients with confirmed diagnosis of Diabetes Mellitus Type-2, and were on Insulin therapy. Only the elderly patients aged 50 or older, who have already received initial two doses of the Covid-19 vaccine, were considered eligible for the study. The respondents with missing responses were excluded from the study. Hospitalized patients, patients suffering from mental disorders, and hemodialysis-dependent patients were also excluded from the study.

Sample size and Sampling technique

The convenience sampling technique was utilized for collecting data from participants fulfilling the eligibility criteria. An online sample size calculator calculated the required sample size to be a minimum of 280 respondents (Raosoft, 2021).

Research instrument

An online survey form was generated using the Google Form platform and circulated over social media. A 16-item questionnaire was used to assess the acceptance, reluctance and concerns of Covid-19 vaccine booster dose among elderly diabetes patients. The first part of the questionnaire was about the demographics (age, gender, level of education, marital status and other associated comorbidities). The second section was comprised of 5-

items to assess the acceptance of the Covid-19 vaccine booster dose. The third section entailed of 3-items to analyze the reluctance of the Covid-19 vaccine booster dose. The items of the second and third sections were formulated on Likert-scale ranging from 1-to-5 score, where a score of 5 meant strongly agree while a score of 1 meant strongly disagree. The fourth section consisted of 3-items to analyze the concerns associated with receiving the Covid-19 vaccine booster dose. The items in the fourth section were dichotomous with Yes/No responses. All the respondents were requested to indicate their consent at the end of the survey. Participation remained voluntary, anonymous and confidential throughout the process.

Ethical approval

The study was approved by Institutional Review Committee of Iqra University North Campus (IU/IRC/22), Karachi, Pakistan.

STATISTICAL ANALYSIS

The demographic characteristics were analyzed using descriptive statistics. The items of the second and third sections, which included the Likert-scale responses, were analyzed as mean scores (scores ranging from 1-to-5) with 95% confidence in the interval and standard deviation (SD). The items of the fourth section were analyzed as percent response and percent of cases response. The categorical data were expressed as a number (n), frequency, and percentage (%) throughout the manuscript. The statistical analysis was done using SPSS v. 23, and Minitab software v. 18.

RESULTS

A total of 497 responses were collected and evaluated in the current study. Among respondents, the male respondents were 258 (51.9%), while female respondents were 239 (48.1%). Most respondents were between 50-60 years (N=292, 58.8%). Around half of the respondents, i.e. 240 (48.2%), were not illiterate with the level of education of matriculation or below. The common comorbidity among these chronic diabetes patients included hypertension (n= 24; 48.5%) and respiratory complications (n= 134; 27%). The demographic characteristics of the participants are summarized in table 1.

The mean score of the five-items for acceptance of the booster dose was 3.418 out of 5, with a standard deviation of 1.24.

Only one-fifth (n=93; 18.7%) of respondents were not confident of the accuracy of booster dose. A total of 303 (61%) were willing to receive the booster dose immediately upon availability and 317 (63.8%)

Table 1: Demographic characteristics of respondents

Characteristics	Frequency	%
Age		
50- 60	292	58.8
61- 70	141	28.4
Above 70	58	11.7
Gender		
Male	258	51.9
Female	239	48.1
Level of Education		
Doctorate	17	3.4
Masters	91	18.3
Graduation	149	30.0
Matric	134	27.0
Less Than Matric	106	21.3
Marital Status		
Single	41	8.2
Married	345	69.4
Widowed	84	16.9
Divorced	27	5.4
Other Common Comorbidities		
Hypertension	241	48.5
Acute/Chronic Kidney Diseases	93	18.7
Congestive Heart Failure	69	13.9
Respiratory Complications	134	27.0
Chronic Liver Diseases	41	8.2
Others	152	30.6

Table 2: Response distribution of Covid-19 vaccine booster dose acceptance

Items	Mean (95% CI of Mean)	SD	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I believe that vaccine is important to combat the COVID-19 pandemic	3.32 (3.20, 3.45)	1.44	126 (25.4%)	137 (27.6%)	107 (21.5%)	25 (5.1%)	102 (20.5%)
I think that the COVID-19 pandemic is a serious health condition	3.21 (3.08, 3.32)	1.42	107 (21.6%)	134 (26.9%)	118 (23.7%)	31 (6.3%)	107 (21.6%)
I am confident about the accuracy of the COVID-19 vaccine	3.47 (3.36, 3.58)	1.07	75 (15.1%)	215 (43.3 %)	114 (22.9%)	56 (11.3%)	37 (7.4%)
I am willing to get vaccinated immediately upon the availability of the booster COVID-19 vaccine.	3.53 (3.43, 3.62)	1.09	84 (16.9%)	219 (44.1%)	97 (19.5%)	69 (13.9%)	29 (5.6%)
I will vaccinate my children/spouse/family members if a vaccine is available immediately	3.56 (3.45, 3.66)	1.17	99 (19.9%)	218 (43.9%)	81 (16.3%)	59 (11.9%)	40 (8.0%)

respondents were willing to urge their immediate family members to receive the booster dose of Covid-19 vaccine. The perception of booster dose among the respondents was positive. Only 127 (25.2%) respondents believed that

the booster dose is not essential to combat the Covid-19 pandemic, and 138 (27.9%) respondents believed that the threat of the Covid-19 pandemic is over now and it is no more a severe health condition. The response

distribution for vaccine acceptance and perception is summarized in table 2.

Table 3 identifies the unwillingness of participants toward vaccination; the mean value was 2.94 (2.84-3.04) for a 95% confidence interval and SD 1.103, indicating the population is reluctant toward vaccination. The mean value of 3.34 (3.22-3.46) with SD 1.15 indicates the primary reason behind the reluctance is that respondents are concerned about potential side effects; this will be elaborated more in table 4, which enlists the concerns of the participants about the booster dose; this splits into

their general concern about the vaccine, lack of information that leads to their dissatisfaction with the booster dose and reasons behind their disbelief in the vaccine's efficiency. The safety and efficacy of the booster dose were the significant concern among the respondents. A total of 106 (21.3%) respondents expressed safety concerns, while 229 (46.1%) respondents showed concerns about the Covid-19 vaccine booster dose. Only 86 (17.3%) respondents replied that they did not need additional information regarding booster dose and felt confident about the vaccine dose with the available information.

Table 3: Response distribution of Covid-19 vaccine booster dose Reluctance

Items	Mean (95% CI of Mean)	SD	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I am reluctant to get a booster COVID-19 vaccine	2.94 (2.84, 3.04)	1.103	32 (6.4%)	147 (29.6%)	119 (23.9%)	155 (31.2%)	44 (8.9%)
I am worried that the rushed pace of testing the new booster COVID-19 vaccine may have failed to detect potential side effects or dangers	3.17 (3.07, 3.26)	1.032	45 (9.1%)	157 (31.6%)	155 (31.2%)	118 (23.7%)	22 (4.4%)
I am worried about the possible side effects of a vaccine for myself	3.34 (3.22, 3.46)	1.15	63 (12.7%)	171 (34.4%)	145 (29.2%)	73 (14.7%)	45 (9.1%)

Table 4: Response distribution of Covid-19 vaccine booster dose Concerns

Items	Responses		Percent of Cases
	N	Percent	
I have the following specific concerns(s) about the booster COVID-19 vaccine			
Efficacy	106	16.3%	21.3%
Safety	229	35.2%	46.1%
Newness, including not wanting to be the first to get the booster dose	117	18.0%	23.5%
Vaccine contents	95	14.6%	19.1%
No concerns	103	15.8%	20.7%
Total	650	100%	130.8%
I need additional information about booster COVID-19 vaccine for my satisfaction			
Compatibility with personal health conditions (e.g, allergies, comorbid	139	22.6%	28.0%
Safety and reliability of vaccine	172	28.0%	34.6%
Timing regarding the state of a pandemic, personal immunity	64	10.4%	12.9%
Recommendations from doctors or officials	153	24.9%	30.8%
I do not need additional information	86	14.0%	17.3%
Total	614	100%	123.5%
I believe that the booster COVID-19 vaccine is not effective because			
Change in virus strain	153	20.6%	30.8%
Less information available	159	21.4%	32.0%
Hastiness in vaccine development	104	14.0%	20.9%
Less information available about the safety of the vaccine	135	18.1%	27.2%
I do not have any concern	193	25.9%	38.8%
Total	744	100%	149.7%

DISCUSSION

Center for Disease Control (CDC) reported that the elderly population older than 50 years can contracting severe Covid-19 associated complications, including prolonged hospitalization and death (CDC, 2021). Elderly population with different comorbidities, especially diabetes mellitus, is considered a high-risk population due to increased morbidity and mortality among the Covid-19 patients (Puig-Domingo, Marazuela *et al.*, 2020). Powers *et al.* recommended to include diabetes patients in the prioritization group of individuals to get the Covid-19 vaccine dose (Powers, Aronoff *et al.*, 2021). Current study was conducted to observe the general perception of the willingness of the Covid-19 vaccine booster dose in the elderly diabetes Pakistani population and the factors associated with the hesitancy and reluctance of unwillingness to get vaccinated.

The current study participants responded with a positive attitude towards receiving the booster dose, with a mean score of 3.418 out of 5 for the three items exhibiting the acceptance of booster dose. A total of 400 (81.5%) respondents did not show their disagreement with receiving the booster dose. In comparison, 99 (19.9%) respondents showed unwillingness to urge their immediate family members to vaccinate with booster dose. Similar results were reported by Tokiya *et al.*, who reported that around 78.3% of respondents showed an inclination toward the Covid-19 vaccine booster dose (Tokiya, Hara *et al.*, 2022). Another study conducted among adult UAE nationals and residents showed an acceptance rate of 70% of respondents to receive the booster dose (Jairoun, Al-Hemyari *et al.*, 2022).

The lack of willingness to get vaccinated with the first and the second dose of Covid-19 vaccine was reported worldwide among the elderly population (McSpadden, 2021). Similar hesitancy was also reported regarding the willingness to get vaccinated with a booster Covid-19 dose (Tung *et al.*, 2022), even though covid-19 vaccine booster dose is equally important and proven to be effective in the prevention of complications with reduced mortality and morbidity (Batra *et al.*, 2022). Different misconceptions and the spread of conspiracy theories contributed to Covid-19 vaccine hesitancy in Pakistan (Khan *et al.*, 2020).

In the history of vaccine development, the Covid-19 vaccine was developed within an unprecedented period, which alone was enough to raise concerns in the mind of people worldwide (Chou and Budenz, 2020). In the current study, around two-thirds of respondents (n= 357, 71%) believe that the rushed pace of the vaccine development and testing of covid-19 vaccine is one of the contributing factors to their unwillingness to vaccinate with booster dose. Similar results were reported by Al-

Mulla *et al.*, around one-fourth of respondents showed unwillingness to vaccinate with the Covid-19 vaccine, citing the reason that the rushed pace of Covid-19 vaccine development worries the respondents about the failure to detect the possible side effects of the vaccine (Al-Mulla *et al.*, 2021).

In Pakistan, vaccine hesitancy is not new, especially resistance to the Polio vaccine in children remains a challenging issue until now despite well-coordinated efforts by WHO, UNICEF, CDC, Microsoft with the Government of Pakistan (Ataullahjan *et al.*, 2021, Mehmood *et al.*, 2022). Similar findings were reported for the first dose of the Covid-19 vaccine among the Pakistani population (Khan *et al.*, 2020). Misconceptions due to improper information about the polio vaccine were reported as the most prevalent factor in refusing vaccination among the regional population where the polio cases were detected in Pakistan (Zarak *et al.*, 2022). Like the scenario reported for the Covid-19 vaccine booster dose, around 159 (32%) respondents believed that they needed additional information about the Covid-19 vaccine booster dose will be ineffective due to insufficient information about the potential side effects of the vaccine dose. In comparison, around 80% of respondents showed concerns about safety, efficacy, newness and not enough information about vaccine contents. Around 234 (47.1%) respondents expressed robust concerns about possible side effects of the Covid-19 vaccine booster dose. A study by Bsoul *et al.*, assessing the beliefs and experiences about the concerns and side effects of Covid-19 vaccination, reported that around 35% showed strong concerns about the immediate and long-term side effects after the vaccine dose (Bsoul and Loomer, 2022).

CONCLUSION

The studied population of elderly diabetic patients shows concerns about the safety and effectiveness of vaccines that indicate the need for education to the general population, as vaccines are the only resort left in order to fight against disease and they should be implemented seriously and vigorously all over the population. Aggressive campaigns by public and private health sectors are needed in order to spread awareness within the population so that they agree to have booster dose courses, especially in patients that are at higher risk of the occurrence of COVID-19 especially in elderly patients with comorbidities.

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