Research Article

Perceptions About COVID-19 Disease and Vaccination Against it Among Adults in Lahore

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Abstract

Background: Vaccination against COVID-19 disease is the best available option for its prevention. However, many people in Pakistan were hesitant to get vaccinated against this disease.

Objective: The main aim of this study was to find out the perceptions of people in Lahore about COVID-19 disease and vaccination against it.

Methods: In a cross-sectional design, a questionnaire comprising of 40 questions was administered to 420 working class adults (18-70 years; both males and females) in Western Lahore with informed consent. Data were analyzed by using various statistical tests including logistic regression. A $p < 0.05$ was considered significant.

Results: Eighty percent of the respondents got vaccinated against COVID-19 disease. Protection against the disease was the main reason to get vaccination. The odds of vaccination against COVID-19 was 3.14 times more among assistants (a job level between manager and worker) compared to workers adjusted for age, gender, conveyance, place of living, income, education, and smoking (AOR=3.14;95% CI; 1.49-6.64). The odds of vaccination against COVID-19 was 1.88 more among participants owning their home compared to participants living in rental places, adjusted for age, gender, conveyance, income, education, and smoking (AOR=1.88;95% CI; 1.01-3.49). Similarly, odds of having vaccinated were more than 7 times and 6 times among those with high school education and college level education compared to illiterate subjects after adjustment with covariates (AOR=7.55, 95% of CI; 2.26-25.21 and AOR=5.97;95% of CI; 1.87-19.11, respectively).

Conclusion: Acceptance of vaccination against COVID-19 was quite high (80%) among working middle class adults in Lahore.

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Introduction

The COVID-19 pandemic has been a huge challenge to humanity in recent times. The severity of the disease compelled scientists and researchers to engage in global effort to make vaccine against COVID-19. Vaccination is considered as one of the most effective health interventions. The availability of vaccine was possible in February 2021 in Pakistan. Since then, 245,094,738 vaccine doses have been administered, and 121,045,166 people have been fully vaccinated till 22, April 2022

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(https://covid.gov.pk/). The COVID-19 vaccines give protection against the SARS-CoV-2 virus by eliciting an immune response to the infection[1]. Several vaccines against COVID-19 have been developed which include traditionally developed inactivated, live-attenuated and protein/adjuvant vaccines. Presently, there are more than 12 vaccines that have been used in various countries, including mRNA based vaccines (Pfizer-BioNTech and Moderna), vaccines based on viral vector (AstraZeneca, Cansino and Gamaleya), inactive virus (Sinovac and Sinopharm) and attenuated virus (Codagenix) vaccines.[2,3]

Despite high incidence and mortality rates of COVID-19, it has been observed that many people around the world do not consider it to be a real disease and quite a few of them are reluctant towards the administration of vaccine. Vaccine hesitancy, or people's reluctance to get safe and recommended vaccination, is becoming a rising global concern.[4] The level of hesitancy is dependent on various factors such as complacence, inconvenience, and misplaced belief of not getting the disease. A study showed that 20% of American people were not willing to receive vaccine and another 31% were not sure of its effectiveness.[5] In Pakistan, the vaccine hesitancy remains a challenge as people still show concerns regarding the poor quality of vaccine and religious prohibition regarding certain ingredients.[6] The data from a few studies have shown that the acceptance of vaccine was mainly for personal protection against COVID-19, however fear about the side effects was also a common cause of vaccine hesitancy.[7] Apart from a study from Zakar et al on population of Punjab, there is hardly any report in the literature with focus on population in Lahore on the subject of vaccine hesitancy and acceptability.[8] Moreover, the above mentioned study also included rural and semi-urban population of Punjab, and more than 30% of the recruited subjects were unemployed. The present study is undertaken to find out the perceptions of adults about COVID-19 disease and vaccination against it among working people of Johar Town, Faisal Town, Sabzazar, Eithad Town and Kabir Town Lahore. Another aim of this study was to determine the causes of hesitancy towards vaccination among the working middle class population in Lahore.

Methods

This is a cross sectional study for which a questionnaire comprising of 40 questions was developed to find out the perceptions and views of people towards COVID-19 disease and vaccination against it. For this purpose, a middle-class general population in Lahore, especially the working individuals in local markets were targeted. The recruited subjects had different educational backgrounds and belonged to different age groups. The data were collected through a brief 10-minute interview with study subjects after obtaining their informed consent. An expert immunologist of international repute assessed the content validity of the questionnaire. Before going for our survey, we got ethical approval from the Biochemical and Bioethical Safety Committee of the University of Management and Technology, Lahore. We also did a pilot run of our survey to get feedback from people to check the appropriateness of the question-naire. Keeping in view the other surveys on this topic and considering error margin of 5% and level of signifi-cance of 95%, a sample size of 400 was found to be adequate.[9] We conducted our survey from August 2021 to November 2021 in local markets and workplaces in Johar Town and adjoining towns in Lahore. The recruit-ment of subjects was through a non-random convenient sample design. EpiData 3.1 was used for data entry after which the data was exported to SPSS (Statistical Package for the Social Sciences) version 23 for analysis. Inclusion and exclusion criteria: Both males and females with an age range from 18 years to 70 years were included in the study. Moreover, vaccinated and non-vaccinated people were also included. Pregnant females and those subjects unwilling to participate were excluded from this study.

A written informed consent was obtained from each included participant. The first section of the questionnaire was on the demographic characteristics of the study participants. The second section was mainly about their perceptions and views about COVID-19 disease and vaccination.

For statistical analysis, the data were entered in SPSS (Statistical Package for the Social Sciences) version 23. Percentages and frequencies were calculated for variables in different categories. For continuous variables, mean +/- standard deviation was obtained. The Chi

square test, independent sample t test and logistic regression were used for analysis of the data. A $p<0.05$ was considered as statistically significant.

Results

Four hundred and twenty subjects were recruited for this study. The data collected from the subjects included gender, marital status, mode of conveyance, profession, place of living (rented or ownership), monthly income, education level and smoking status. Overall, mean age of participants was 29.2 +/-10.04 years, while mean age of males was 30.18 +/-10.19 years and of females was 27.1 +/- 9.41 years. The variables mentioned above were further categorized into subcategories and the proportions of these subcategories have been shown in Table 1.

The details of the opinions expressed by respondents regarding COVID-19 have been shown in Table 2. This survey found that a vast majority of people considered COVID-19 as a threat. Protection against the disease was the major reason for the 80% vaccinated subjects followed by the employers' requirement that employees should get vaccinated. Twenty percent were infected with COVID-19 before vaccination and majority of them had self-isolated

Table 1: *Univariate analysis of respondents vaccinated and nonvaccinated against COVID-19*

Characteristics		Total (n=420)	Vaccinated (n=335)	Non-vaccinated (n=85)	P-value
Gender	Male	286 (68)	210 (63)	76 (89)	< 0.01
	Female	134 (32)	125 (37)	9 (11)	
Marital status	Single	236 (56)	192 (57)	44 (52)	0.36
	Married	184 (44)	143 (43)	41 (48)	
Mode of conveyance	None	49 (12)	42 (12)	7 (8)	< 0.01
	Bicycle	3 (1)	1 (0)	2 (2)	
	Motorbike	230 (55)	168 (50)	62 (73)	
	Car	138 (33)	124 (27)	14 (16)	
Profession	Manager	151 (36)	117 (35)	34 (40)	< 0.01
	Assistant	146 (35)	132 (39)	14 (16)	
	Worker	123 (29)	86 (26)	37 (44)	
Rented place	Yes	114 (27)	84 (25)	30 (35)	0.06
	No	306 (73)	251 (75)	55 (65)	
Monthly income	PKR 80 000 and above	80 (19)	67 (20)	13 (15)	0.52
	PKR 40 000 - 79 999	100 (24)	81 (24)	19 (22)	
	PKR 20 000 - 39 999	196 (47)	155 (46)	41 (48)	
	Below PKR 20 000	44 (10)	32 (10)	12 (14)	
Education level	No education	20 (5)	9 (3)	11 (13)	< 0.01
	Primary	37 (9)	24 (7)	13 (15)	
	High school	97 (23)	81 (24)	16 (19)	
	College	266 (63)	221 (66)	45 (53)	
Smoking status	No smoking	281 (67)	232 (69)	49 (58)	0.11
	Occasional (3-4 times/month)	20 (5)	14 (4)	6 (7)	
	Regular	119 (28)	89 (27)	30 (35)	
Smokeless tobacco	None	380 (90)	310 (92)	70 (82)	0.01
	Supari	27 (6)	18 (5)	9 (11)	
	Ghutka	7 (2)	5 (2)	2 (2)	
	Naswaar	6 (1)	2 (1)	4 (5)	

P-value was obtained by using the Chi square test; variables expressed as n(%)

Table 2: *Proportions of opinions expressed by respondents regarding COVID-19 (n=420)*

Opinions of respondents regarding COVID-19		n (%)
Do you think Covid-19 is a threat?	Yes	310 (74)
	No	70 (17)
	No opinion	40 (10)
Do you believe that vaccine is good for protection against Covid -19?	Yes	311 (74)
	No	60 (14)
	No opinion	49 (12)
Have you been vaccinated against COVID-19?	Yes	335 (80)
	No	85 (20)
If yes, what was the reason for being vaccinated?	Protection against the disease	246 (59)
	Travel restrictions	27 (6)
	Job protection/salary	49 (12)
	SIM closure	13 (3)
	Not applicable	85 (20)
Were you infected with COVID-19 disease after vaccination	Yes	36 (9)
	No	384 (91)
If yes, were your symptoms mild?	Yes	31 (7)
	No	5 (1)
	Not applicable	384 (91)
Were you infected with COVID-19 disease before vaccination	Yes	86 (20)
	No	334 (80)
If yes, did you self-isolate at home?	Yes	77 (18)
	No	9 (2)
	Not applicable	334 (80)
If no, were you admitted in hospital/quarantine center?	Yes	8 (2)
	No	1 (0)
	Not applicable	411 (98)
Did anyone else in your family get COVID -19 disease?	Yes	173 (46)
	No	227 (54)
Are you worried about your family and friends contracting COVID-19?	Yes	255 (61)
	No	105 (25)
	No opinion	60 (14)
Are you following COVID-19 SOPs as suggested by WHO and the government?	Yes	245 (58)
	No	39 (9)
	Sometimes	136 (32)
If no, why are you not following SOPs?	Laziness	17 (4)
	Do not think it is necessary	18 (4)
	Covid-19 is not a real disease	4 (1)
	Do not know about the SOPs	0 (0)
	Not applicable	381 (91)
Do you think washing hands frequently, using sanitizers, and wearing facemasks help prevent COVID-19?	Yes	309 (74)
	No	43 (10)
	No opinion	68 (16)
Do you think maintaining social distance is an effective way to prevent COVID-19?	Yes	306 (73)
	No	46 (11)

	No opinion	68 (16)
Do you wear a facemask whenever you go out in public?	Yes	211 (50)
	No	29 (7)
	Sometimes	180 (43)
Do you know about the government's efforts to vaccinate everyone in Pakistan?	Yes	346 (82)
	No	44 (10)
	Not sure	30 (7)
Would you want to get yourself and your family vaccinated?	Yes	290 (69)
	No	86 (20)
	No opinion	44 (10)
Would you be worried if COVID-19 vaccination is not available for you?	Yes	164 (39)
	No	201 (48)
	No opinion	55 (13)
Do you think there would be undesirable effects of the vaccination?	Yes	203 (48)
	No	108 (26)
	no opinion	109 (26)
Are you afraid of any adverse effects of the vaccination?	Yes	167 (40)
	No	164 (39)
	No opinion	89 (21)
Do you think that vaccination is necessary for protection against COVID-19?	Yes	293 (70)
	No	53 (13)
	No opinion	74 (18)

Table 3: *Logistic regression models depicting association of respondent's demographic characteristics with their vaccination status (n=420)*

Characteristics		95% CI			95% CI		
		Crude OR	Lower	Upper	Adjusted OR	Lower	Upper
Age		1.02	0.99	1.04	1.05*	1.01	1.09
Gender	Male	Ref			Ref		
	Female	5.03*	2.43	10.38	4.21*	1.86	9.54
Own Conveyance	No	Ref			Ref		
	Yes	0.63	0.27	1.45	0.90	0.33	2.46
Profession	Worker	Ref			Ref		
	Assistant	4.06*	2.07	7.95	3.14*	1.49	6.64
	Manager	1.48	0.86	2.55	1.11	0.55	2.23
Rented place	Yes	Ref			Ref		
	No	1.63	0.98	2.71	1.88*	1.01	3.49
Monthly income	Below PKR 20 000	Ref			Ref		
	PKR 20 000 - 39 999	1.42	0.67	2.99	0.93	0.40	2.18
	PKR 40 000 - 79 999	1.60	0.70	3.67	0.83	0.31	2.20
	PKR 80 000 and above	1.93	0.79	4.71	0.99	0.31	3.16
Education	No education	Ref			Ref		
	Primary	2.26	0.74	6.84	2.17	0.64	7.31
	High School	6.19*	2.21	17.35	7.55*	2.26	25.21
	College	6.00*	2.35	15.33	5.97*	1.87	19.11
Smoking status	No	Ref			Ref		
	Yes	0.60*	0.37	0.98	1.29	0.70	2.38
Smokeless tobacco consumption	No	Ref			Ref		
	Yes	0.38*	0.19	0.75	0.84	0.38	1.84

**p-value < 0.05* *OR=Odds ratio; CI=confidence interval; Ref=reference*

themselves at home. In response to the questions regarding precautionary measures adopted by people, only a small percentage of people did not follow SOPs either due to their laziness or thought that it was not necessary. Most people thought that washing hands frequently, using sanitizers and wearing face-masks helped in preventing COVID-19 infection. However, only half of them considered wearing masks in public to be an effective way to prevent the incidence of COVID-19. Regarding vaccination, only 20% of them were hesitant to receive it. Nearly half of the respondents were afraid of adverse effects of vaccination however majority of study subjects thought that vaccination was necessary for protection against COVID-19.

Univariate analysis of characteristics of respondents vaccinated against COVID-19.is shown in Table 1. This survey identified that the trend of getting vaccinated did differ significantly with gender ($p<0.01$) in which males were more vaccinated than females. Regarding profession, people working at manager and assistant levels were more vaccinated than the workers were. Regarding education, people with college and high school level of education were more vaccinated than people with primary level education and no education. Those using smokeless tobacco were less likely to get vaccinated. Level of vaccination did not differ significantly with factors like marital status ($p=0.36$), living in a rental place ($p = 0.06$), monthly income ($p = 0.52$) and smoking ($p = 0.11$).

After obtaining the results of univariate analysis, the data were subjected to logistic regression and adjusted for all the significant variables from Table 1 to find out the odds of having vaccination. As shown in Table 3, odds of vaccination against COVID-19 was 1.05 times with every 1-year increase in age, adjusted for gender, conveyance, profession, place of living, income, edu-cation, and smoking. In other words, vaccination appears more common among older subjects. The odds of vaccination against COVID-19 was 4.21 times more among females compared to males, adjusted for age, conveyance, profession, place of living, income, education, and smoking

The odds of vaccination against COVID-19 was 3.14 times more among Assistants compared to Workers, adjusted for age, gender, conveyance, place of living, income, education, and smoking. The odds of vaccination against COVID-19 was 1.88 times more among participants owning their house compared to participants living in a rented place, adjusted for age, gender, conveyance, profession, income, education, and smoking.

Regarding education, vaccination against COVID-19 was relatively more among participants with higher education. The odds of having vaccinated were more than 7 times among those with high school level education and nearly 6-fold among those with college level of education, when the model was adjusted for age, gender, conveyance, profession, income, and smoking.

Discussion

The vaccine efficacy against COVID-19 is determined by its coverage as herd immunity can only develop if the rate of vaccination is high among the population. Therefore, it is critical to understand the intentions and actions of the public when it comes to vaccination in order to safeguard the most vulnerable population.[10] In this study, we embarked on finding out the perceptions of the general population about COVID-19 disease and vaccination against it along with the factors related to the COVID-19 vaccine hesitancy in a population of Lahore. It was carried out with the objective that our findings would be of help to public health officials to further develop an effective vaccine program for COVID-19 to achieve herd immunity and prepare the masses to combat the spread of any new variant of SARS-CoV 2.

In this study, the responses were taken from the working class of different areas of west Lahore such as Johar Town, Sabzazar, Faisal Town, Kabir Town and Eitehad Town. Although some similar studies have been conducted based on different populations such as healthcare workers of Pakistan,[11] general populations of Indonesia, India,[12] Pakistan and China,[13,14] yet there are hardly any surveys on working middle class population.

There was a general perception that Pakistan would be among the few countries where people would be least intended to get vaccinated.[15] However, results of our survey showed that the working class of our population was well informed about this disease, and 80% of people were already vaccinated. These results are similar to another study which showed that 70% of people of

Pakistan were inclined to get vaccinated, and acceptance was higher among males.[16] Another study conducted by Chaudhary and colleagues in Islamabad showed higher acceptance among more educated.[10] Their findings support our results that high school and college graduates are more than 6 times likely to be vaccinated compared to uneducated people. This shows that the public awareness campaigns about vaccination against COVID-19 are more urgently needed for the uneducated working-class people to effectively combat the spread of the disease.

A study published in Nature Medicine pointed out that the vaccine acceptance was very low among the low and middle income countries (66.5%).[4] Another study by Ansar et al reported refusal rate towards COVID-19 vaccination to be 40%,[17] and the main reason was vaccine containing "Non-Halal" components. The current survey carried out in Lahore showed acceptance to be 80% among the working-class people. This could be because of increased awareness of the masses in Lahore about the safety and limited side effects of the available vaccines in the country and the restrictions imposed by the employers to have mandatory vaccination. Another study mainly based on population of Sindh showed that 45% participants were hesitant to receive vaccine against COVID-19.[18] The reluctance among some of the segments of society in Pakistan was due to religious belief of vaccine containing non-Halal components and lack of knowledge and education about the risks of the disease.[19] Since the acceptance rate of COVID-19 vaccine is linked with high level of education and better income,[20] it can be conjectured that educated and people with better socio-economic status are less likely to fall victim of the negative campaigns about vaccination in social media. Moreover, protection against the disease is the major factor for getting vaccinated. While Qamar et al reported higher acceptance of vaccine among males.[16] In our survey we found that the odds of vaccination was 4 times more among females.

Our study has a few limitations as well. We collected the data for our survey from the western areas of Lahore, which would limit the generalizability of our findings to the whole of Lahore. Moreover, we targeted people in urban areas thus our results would be limited to urban population. The number of male participants turned out to be more than the females; however, we adjusted the data for gender in the regression model. In this study, we only focused on the working-class individuals especially those working in markets; therefore, these data would not represent other socio-economic classes of the society.

In a communication, from Government of Pakistan, the major challenge against COVID-19 had almost been overcome and National Command Operation Center (NCOC) which reported 59.4% of the Pakistani people got vaccinated was closed and the remaining task of dealing with COVID-19 was handed over to the Ministry of Health.[21] This is suggestive that we are getting closer towards herd immunity. However, the variants of SARS CoV 2 continue to emerge, even in the countries which had had 100% immunization, therefore, there is no room for complacency. Reemergence of COVID-19 in some of the areas in China is a cause of concern for all the countries that the war against COVID-19 is not won as yet.[22] Recent emergence of a Coronavirus variant BA.2.86 ("Pirola") which has more than 30 mutations in its spike protein in at least 6 countries has raised concerns among the international community.[23] Though the Centers for Disease Control and Prevention has announced that the existing tests for its detection appear to be valid, the challenge remains for its control for the developing countries, especially Pakistan where surveillance has considerably decreased.[23] Recent news from Moderna that its vaccine is effective against this new variant provides a bit of relief, however the fact remains that this virus in one form or another is going to hang around for a considerable period of time. Unfortunately, the authorities in Pakistan do not appear to have taken any measures to address this new challenge. There is a need to vaccinate our young population who have not been vaccinated yet. Moreover, there are segments of the society where vaccination have not taken place. We should make every effort to reach out to them. Surveillance of people arriving at our airports from different countries where majority of people have not been vaccinated such as Africa must be done routinely to avoid spread of new variants of SARS CoV 2. Implementation of protective measures such as using facemasks, washing hands, and avoiding large gatherings, especially in closed areas should be made part of our daily life until the battle against the disease is won.

Conclusion

A vast majority of middle-class people working in the West of Lahore had received vaccination against Covid-19, primarily for protection purposes. Educated and those belonging to a better socioeconomic class were more likely to be vaccinated against this disease compared to uneducated and people of low socioeconomic strata.

Ethical Approval: The Bioethical and Biosafety Committee of University of Management and Technology, Lahore approved the study vide. Ref # UMTL SBBC-2021-07.

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Authors' Contribution

QJ: Conceived the project, data collection and entered the data in EpiData,, manuscript writing

MK: Conceived the project, supervised all steps, interpretation of data, manuscript writing

SPI: Analysis and interpretation of data, manuscript writing

MPI: Conceived the project, supervised all steps, interpretation of results, manuscript writing

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