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Relationship between Vaccine Hesitancy and Psychological Distress in Elderly Population of South Punjab

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Abstract

Vaccines have eliminated and prevented several deadly diseases, yet they face skepticism from the public. This research aimed to find the moderating role of optimism in elderly people on the relationship between vaccine skepticism of COVID-19 booster dose and the psychological distress because of it. The purpose of this research was to find out hesitant attitude of elders towards COVID-19 booster dose, explore level of psychological distress among elderly people who were already vaccinated and find out life optimism among elderly people (age range of 45-65 years, *M*=55.75, *SD*=6.51). Correlational research design and systematic random sampling technique were used to collect data from elders (*n*=427, M= 264, F=161). The data was collected from different cities of Punjab province namely Muzaffargarh, Lodhran, Multan, and Bahawalpur. Vaccine skepticism, psychological distress and optimism were checked using "Oxford COVID-19 Scale of Vaccine Hesitancy, Kessler Psychological Distress Scale (K-10) and Revised Life Orientation Test (LOT-R). Data was analysed using Correlation*, t* test, and *ANOVA*. The results found a positive relationship between psychological distress and life orientation. On the other hand, vaccine hesitancy was found to be negatively correlated with psychological distress and life orientation. The males were found high on vaccine hesitancy and psychological distress. People above age 60 years had lowest psychological distress.

Keywords: COVID-19, Experience of COVID-19 Vaccine**,** Vaccine, Vaccine Hesitancy

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Introduction

Vaccines are saving millions of lives each year and are considered as the most effective tools, public intercedes available for preventing COVID-19 infection and its after-effects. Vaccines mitigate the transmissibility of viruses (Helmey et al., 2020). Vaccines are one of the most effective goods that produce results without costing a lot of money if implemented (Hussein et al., 2015). Vaccine hesitancy and skepticism among the population is one of the major difficulties to achieve such goals worldwide (Rodrigues & Plotkin, 2020). Vaccine safety is one of major concern of people and they doubt that it would leave ill effects along the benefits (Ehreth et al., 2003). This phenomenon is much prevalent in older adults. It causes great hurdles toward the widespread acceptance of vaccines (Coustasse et al., 2021). Major reasons that cause vaccine hesitancy can be categorized into three sub-categories: the harms-benefits of vaccines; awareness about benefits issues; myths, religious, cultural, gender, or social class factors. Major problems found are distrust in vaccination, fear of side effects, and lack of details on immunization services (Marti et al., 2017).

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World Health Organization (WHO) defined vaccine hesitation as the unwillingness to get vaccines or the occurrence of trepidation before making decision of whether to get vaccine or not (Neumann-Böhme et al., 2020).

Different conspiracies related to COVID-19 vaccines harms are the cause of the hesitant attitude of elderly people aged above 50 years (Freeman et al., 2020). So, they believe in any source of information related to COVID-19 booster dose and they are less likely to have acceptance towards them. Older adults view vaccines as of no use. That is why elder adults who are already vaccinated are psychologically less distressed. High optimism is found in people of such age groups who are already been vaccinated (Larson et al., 2013).

The present research intended to disambiguate the skeptical attitude of older adults towards COVID-19 booster dose interrelating psychological distress. Optimism is taken as a moderator that has modified the relationship between vaccine skepticism and psychological distress.

In September 2020, a study was conducted in Japan (Bartlette et al., 2001) on the vaccine hesitation. Vaccine willingness was measured by demographic variables like gender, age, group of residence and found the significant role of these variables in vaccine hesitation among participants. A nationwide survey study was also conducted on vaccine hesitancy in U.S. The primary study outcome was COVID-19 vaccine acceptance scale. Potential predictors include socio-demographic factors, such as age, gender, local healthcare facility, education, ethnicity, healthcare worker profession, family income, residence regions and pre vs post 'vaccine launch' period (Mondal et al., 2021). Vaccination campaigns are affected because of skepticism and vaccine hesitancy. In order to develop awareness on the importance of vaccine, online survey was conducted in a population of parents in Italy referring to four pediatric practices in which they assessed potential vaccine adequacy in relation to socio-demographic attributes, attitudes toward general vaccination methods, perception of personal health and of the impact of COVID-19. Bivariate analysis were used to correlate demographic and health-related characteristics with non-acceptance of COVID-19 vaccine and to compare vaccine-related features in participants who declared to be not willing or willing to receive the vaccine (Napolitano et al., 2018).

Understanding the two levels of skepticism toward an approved COVID-19 vaccine and the psychological and political drivers of this doubt is crucial for promoting vaccination willingness through effective health communication (Rodrigues & Plotkin, 2020). In order to achieve this, a study examined the levels and independent variables of willingness to use a COVID-19 vaccine in large, representative surveys from 8 Western democracies that vary both in terms of the pandemic's severity and politically: Denmark, France, Germany, Sweden, Italy, United Kingdom, and the U.S. (n = 9889). Findings show a wide range in countries' willingness to immunise people, from 79% in Denmark to 38% in Hungary (Ehreth et al., 2003).

Doubtful attitude towards the efficiency and safety by less than half of the population of third world countries has hindered efforts of vaccination. It's not the first time, public has shown skepticism towards the ways designed to protect them against any harmful diseases or mitigation of the calamity caused by viruses. Since the outbreak of COVID-19 (Goodman et al., 2020), public had skeptical attitude towards the prevention strategies such as wearing masks, social distancing and even the concept of COVID-19 existence (Pekosz et al., 2020).

Three factors such as confidence, convenience, complacency ascertain vaccine acceptability (Al-Mohaithef & Padhi, 2020). The governments can elucidate confidence as the trust of public that vaccines will be available for all the masses as they are safer to use. Sureness in the Healthcare system of government can also define availability of vaccines (Kilbourne et al., 2006).

A major obstacle to the global world response of alleviating the calamity caused as a result of outbreak is the prevailing hesitancy of getting vaccines and conspiracy theories made by the people. Millions of people have died as a result of the highly contagious Corona virus (COVID-19). People took the lethality of COVID-19 for granted. Although, there are now effective COVID-19 vaccinations available because of the great work done by WHO, but anti-vaccine attitude, fears of unknown side-effects and skepticism pose a barrier to vaccine uptake and distribution. Since vaccines were first introduced, there has been vaccine hesitancy. Anti-vaccination beliefs are more often than not resistant to scientific and medical agreement because they are a product of cultural debates rather than scientific ones (Patil et al., 2021). As mainstream media is the mainstay to the awareness campaigns, it has also played its role in spreading conspiracy theories. People are thus, unaware of the staggering impacts, vaccines have on them.

However, there is little information available related to vaccine acceptance in low socio-economic nations where mass vaccination is not yet started. Delay in vaccination could lead to the inception and spread of new variations that can control immunity conferred by prior illness, understanding the factors influencing COVID-19 vaccine adoption is of worldwide concern (Riehm et al., 2021). Vaccine skepticism is a developing public health issue on a global scale. It is detrimental to the consolidation of vaccination program successes and the eradication of diseases that are the target of vaccines. While people of all ages are susceptible to COVID-19, older people are at a higher risk of getting serious illnesses because of physiologic changes brought on by ageing as well as medical disorders and comorbidities (Palmer et al., 2021).

Large increases in mental distress were caused by the COVID-19 pandemic. The use of COVID-19 vaccinations is anticipated to considerably lower health risks, enhance social and economic consequences, and maybe improve mental health. Patients with COVID-19 experienced psychological effects (Sallam, 2021). There were also general community problems with mental health. Numerous studies show that in many nations around the world, there are higher levels of psychological discomfort, including anxiety and suicidal ideation (Reiter et al., 2020). Early in the epidemic, there was a dramatic rise in mental health distress in the US, which afterwards partially subsided. The COVID-19 pandemic caused considerable increases in mental health distress, which peaked in April but improved since then and returned to that level by August (Dratva et al., 2003). As per one study, older adults show lower stress and better emotional regulation than youngsters but if we consider the magnitude of pandemic and different researches (Biber et al., 2020), there's prevailing concern of mental health deterioration.

Psychological factors play a major role in the occurrence and seriousness of vaccine-related adverse effects. The results have been generalised over numerous vaccination kinds; thus, they might be pertinent to the COVID-19 vaccination. The risk of social isolation and loneliness increases as a result of the physical distance recommendations made to stop the spread of the COVID-19. These outcomes include depression, anxiety cognitive decline, and death rate. Together,

social isolation and extra psychological effects of the pandemic (such as anxiety and grief) highlight the need of older individuals' intervention efforts (Bang et al., 2017). One study (Steptoe et al., 2015) suggested that there are psychological reasons why university students are reluctant to get vaccinated, and addressing these reasons may raise vaccination rates (Marshall et al., 2015).

Objectives

The present study was conducted with the objectives to:

1. Find out hesitancy of older adults towards COVID-19 booster dose.
2. Find out the gender differences in vaccine hesitancy, psychological distress and life orientation.
3. Find out the vaccine hesitancy across age groups.
4. Find out the role of life orientation in vaccine hesitancy in older adults.

Hypotheses

1. There is a correlation among vaccine hesitance, psychological distress, and life orientation.
2. The females have more vaccine hesitancy, psychological distress and life orientation than males.
3. The people of higher age groups will have more vaccine hesitancy and psychological distress than people of lower age groups.
4. The life orientation moderates the relationship between vaccine hesitancy and psychological distress.

Method

Research design

Cross sectional research design was used to find out the vaccine skepticism and psychological distress in elderly people along with the moderating role of optimism.

Sampling

Our research employed a random sampling technique, collecting data from diverse cities in southern Punjab, including Muzaffargarh, Bahawalpur, Lodhran, Multan and Bahawalpur. Notably, participants without major diseases such as diabetes and heart disease were included in the study. The sample size was *n*=427 consisting of 264 males and 161 females.

Tools

Kessler Psychological Distress Scale

The Kessler Psychological Distress Scale (K10) [is a simple measure of psychological distress. The K10 scale involves 10 questions about emotional states each with a five-level response scale. The measure can
be used as a brief screen to identify levels of distress. Each item is scored from one 'none of the time' to five 'all of the time'. Scores of the 10 items are then summed, yielding a minimum score of 10 and a maximum score of 50. Low scores indicate low levels of psychological distress and high scores indicate high levels of psychological distress (Kessler et al., 2003).

Life Orientation Test Revised

Developed by psychologist Michael Scheier and colleagues (1994), the Revised Life Orientation Test (LOT-R) is a 10-item scale that measures how optimistic or pessimistic people feel about the future. Respondents use a 5-point rating scale (0 = strongly disagree; 4 = strongly agree) to show how much they agree with 10 statements about positive and negative expectations. These statements include "In uncertain times, I usually expect the best" and "If something can go wrong for me, it will." Four items are "filler" statements that are not scored (Scheier et al., 1994).

COVID-19 Hesitancy Scale

This is a seven-item measure, derived from a study with 5,114 UK adults, quota sampled to match the population for age, gender, ethnicity, income, and region. Item specific response options, coded from 1 to 5, are used. A 'Don't know' option is also provided, which is excluded from scoring. Higher scores indicate a higher level of vaccine hesitancy. The Oxford COVID-19 Vaccine Hesitancy Scale scores are associated with the Vaccine Hesitancy Scale (Shapiro et al.,

2018), r=0.47, p< 0.001. The Cronbach's alpha is 0.97 (Freeman et al., 2020).

These scales were translated into Urdu.

Procedure and Ethical Considerations

The standard procedure of forward and backward translation and committee approach were used to translate the scales. Participants were provided with a concise overview of their role in the current research prior to being asked to complete the questionnaire. Explicit consent and willingness to participate were obtained before any data collection occurred. In cases where an individual indicated a lack of willingness or declined participation, they were politely instructed to return the questionnaire without any obligation to proceed. It is important to note that this research protocol received approval from the relevant institutional authority to ensure ethical conduct throughout the study.

Participants were guaranteed the confidentiality of their details before receiving the data. Data were collected from the population of 50+ age old. It took about 20 minutes to fill out the questionnaires, but some people also refused to fill out the questionnaires. After the data was collected, it was analyzed and further interpreted using IBM SPSS 25.

Results

Table 1

Frequency Distribution of Demographic Variables (n=425)

Demographic Variables	Characteristics	F	%
Gender	Male	264	62.1
	Female	161	37.9
Age Groups (years)	40-50	95	22.4
M=55.75	51-60	250	58.8
SD=6.51	61+	80	18.8

The Table 1 gives the information regarding frequency distribution of demographic variables in the study. There were total of 425 members in the study. Around 62% were males and 38% were female participants. Majority of the volunteers (59%) belonged to 51-60 years age group while there were 22% and 19% participants in the 40-50 and 61+ age group respectively. The mean age of the participants was 55.75 (*SD*=6.51).

Table 2

Correlation among Vaccine Hesitancy, Psychological Distress, and Life Orientation (n=425)

Variables	*M*	*SD*	1	2	3
Vaccine Hesitancy	20.32	6.36	-		
Psychological Distress	29.44	10.23	-.02	-	
Life Orientation	14.31	3.64	-.01	.42**	-

**p<.01

The Table 2 describes the correlation for validating a relationship among vaccine hesitancy, psychological distress and life orientation. There is a statistically significant positive relationship between psychological distress and life orientation. On the other hand, vaccine hesitancy was found to be

negatively correlated with both psychological distress and life orientation.

Table 3
Result of t Test (n=425)

Gender	**Male (*n*=264)**		**Female (*n*=161)**				
Variables	***M***	***SD***	***M***	***SD***	***t***	**df**	***p***
Vaccine Hesitancy	30.24	10.00	28.14	10.50	2.04	290	.04
Psychological Distress	20.83	5.84	19.47	7.08	2.05	423	.04
Life Orientation	14.29	3.78	14.35	3.41	-.16	423	.87

The Table 3 gives the results of t test computed to find out gender differences in vaccine hesitancy, psychological distress and life orientation. The results of *t*-test are statistically significant for vaccine hesitancy and psychological distress. There were found significant gender differences in vaccine hesitancy and psychological distress. The males were found high on vaccine hesitancy and psychological distress than females. There was no gender difference in life orientation.

Table 4
Analysis of Variance (N=425)

Age Groups	**41-50 y**	**51-60 y**	**61+ y**	***F* (2)**	***p***
Variables	***M (SD)***	***M (SD)***	***M (SD)***		
Vaccine Hesitancy	21.14 (6.14)	19.84 (6.35)	20.82 (6.60)	1.74	.17
Psychological Distress	31.66 (10.79)	29.40 (10.03)	26.95 (9.69)	4.69	.01
Life Orientation	14.90 (3.74)	14.16 (3.57)	14.08 (3.69)	1.61	.20

The Table 4 describes the results of ANOVA computed to find age wise differences in vaccine hesitancy, psychological distress and life orientation. The results of ANOVA are statistically significant for only psychological distress. The people of 41-50 years group had the max psychological distress and people of 61+ years had the lowest psychological distress. There were no age wise differences in vaccine hesitancy and life orientation.

Table 5
Moderation Analyses with Life Orientation as Moderator (N=425)

Effect	**Interaction Coefficients**	**SE**	**95% CI *LL***	**95 % CI *UL***	***t***	***p***
Interaction (Vaccine Hesitancy*Life Orientation)	.02	.01	-.01	.06	1.29	.19

IV=Vaccine Hesitancy; DV=Psychological Distress; M=Life Orientation
Model 1. Bootstrapping=10,000 samples; 95% CI=Corrected 95% Confidence Intervals, LL=Lower Limit, UL=Upper Limit, $p<0.05$

The results of moderation analysis of life orientation have been outlined in Table 5. The analyses with 10,000 samples revealed a statistically not significant interaction effect of

life orientation on relationship between vaccine hesitancy and psychological distress.

Discussion

The present research sought to examine for the first time, vaccine skepticism correlating psychological distress in older people with data collected from different cities of Southern Punjab including Muzaffargarh, Lodhran, Multan, and Bahawalpur. Further, the moderating role of optimism was also inspected.

Demographic factors such as education, area, socioeconomic status was evaluated in the demographic sheet attached as a front page with the questionnaires. The statistically significant results support the alternative hypothesis, providing evidence for the existence of the anticipated effect. However, it is crucial to consider the broader context, practical implications, and potential limitations in interpreting the research findings. It was hypothesized that male older adults are less skeptical to receive booster dose than females and those older adults will be more distressed who are above the age of 60 and are already vaccinated. It was also hypothesized that there is less prevalence of anxiety in older adults and old age people are more optimistic about their health. Results found a significant association between psychological distress and life orientation while vaccine hesitancy was negatively correlated with the other two variables. The males were found high on vaccine hesitancy and psychological distress and there was not significant relationship found between vaccine hesitancy and psychological distress. Results further revealed that psychological distress was high in older adults of 51-60 years as compared to older adults in 41-50 years.

The reset analyses with 10,000 bootstrap samples explained a statistically not significant interaction effect of life orientation on relationship between vaccine hesitancy and psychological distress. Previous research revealed that people living in urban areas were less anxious to be vaccinated than those in rural areas. There are contrasting reports of how gender affects in the education about vaccine, wherein some males were more likely to accept the vaccine than females, compared to others reporting higher acceptance among females (Malik et al., 2020). Viewing the results of previous study, our findings are quite unique and novel.

Limitations and Suggestions

One of the limitations of the study is that data was collected mostly from hospital settings. In hospitals, people are already distressed seeing their loved ones under serious conditions. They are frustrated because of hike in medical tests charges and medicines. Thus, this can affect their responses to the questions being asked.

While collecting data, collection in a peaceful environment will give more accurate results.

Implications

This study underscores the critical role of optimism among the older adults in moderating the relationship between COVID-19 booster dose skepticism and psychological distress. The findings emphasize the need for targeted interventions addressing vaccine hesitancy and fostering life optimism, especially among males who exhibited higher levels of both hesitancy and distress. Tailored strategies for individuals above the age of 60 could prove instrumental in mitigating psychological distress, contributing to more effective public health initiatives in the ongoing battle against COVID-19.

Conclusion

This is one among very few studies that look into skeptical attitude of older adults towards COVID-19 booster dose correlating with two

other variables in Pakistan. Three significant findings are: -

1) There's a positive relation between psychological distress and life orientation.
2) Older adults of age 41-50 years' experience more psychological distress than the older adults who are above 60.
3) No significant relationship found between psychological distress and vaccine skepticism. Pakistan is a place of residence to an infinite number of older adult groups based on location, religion, language, caste, and economic status. Therefore, no single study can apprehend the intricacies of these subgroups; So, there is a need to conduct multi-site studies in different parts of Pakistan with greater sample sizes.

Contribution of Authors

Zunaira Mubeen: Conceptualization, Investigation, Methodology, Data Curation, Formal Analysis, Writing – Original Draft

Ammara Noor: Investigation, Methodology, Data Curation, Formal Analysis, Writing – Original Draft

Arif Nadeem: Methodology, Writing - Reviewing & Editing

Conflict of Interest

There is no conflict of interest declared by the authors.

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The authors declared no source of funding.

Data Availability Statement

The datasets of the current study are not available publicly due to ethical reasons but are available from the corresponding author [Z.M.] upon the reasonable request.

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