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Assessment of public intention to get vaccination against COVID-19: Evidence from a developing country

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Abstract

Objectives: Widespread acceptance of the COVID-19 vaccine will be the next important step in fighting the novel coronavirus disease. Though the Pakistani government has successfully implemented robust policies to overcome the COVID-19 pandemic; however, studies assessing public intention to get COVID-19 vaccination (IGCV) are limited. The aim of this study is to deal with this literature gap and has also expanded the conceptual framework of planned behaviour theory. We have introduced three new considerations (risk perceptions of the pandemic, perceived benefits of the vaccine, and unavailability of vaccine) to have a better understanding of the influencing factors that encourage or discourage public IGCV.

Methods: Results are based on a sample collected from 754 households using an inclusive questionnaire survey. Hypotheses are tested by utilizing the structural equation modelling approach.

Results: The results disclose that the intention factors, that is, attitude, risk perceptions of the pandemic, and perceived benefits of the vaccine, impart positive effects on public IGCV. In contrast, the cost of the vaccine and the unavailability of the vaccine have negative effects. Notably, environmental concern has an insignificant effect.

Conclusions: Research findings emphasize the importance of publicizing the devastating impacts of COVID-19 on society and the environment, ensuring vaccination availability at an accessible price while simultaneously improving public healthcare practices.

KEYWORDS
coronavirus, COVID-19, intention to get COVID-19 vaccination, healthcare practice, vaccine

1 | INTRODUCTION

The novel Coronavirus (SARS-CoV-2) has produced devastating effects in terms of distorting the daily routine of the public worldwide.[1] Almost all countries have been severely affected by this pandemic.[2,3] As of July 2021, the confirmed COVID-19 cases have reached 195 M with 4.17 M deaths globally.[4] The Pakistani Ministry of Health reported the country's first COVID-19 case on 26th February 2020 in Karachi (the largest city of Pakistan). Within 15 days, the COVID-19 cases grew to 20, with Sindh province leading other provinces in the country.[5] Currently, the COVID-19 cases are increasing rapidly, and the situation is deteriorating.[6,7] According to government figures, Pakistan has a total of 1,008,446 confirmed COVID-19 cases, with 23,048 deaths as of 8 July 2021.[8]

Since the first COVID-19 positive case was reported in the country, the government of Pakistan has utilized all the resources with

maximum capabilities to ensure the state's obligations to its citizens. Several initiatives have been taken, such as hospital isolation wards, authorized tertiary care hospitals, testing and quarantine services, and case tracking to evade the transmission of novel Coronavirus in the country.[9] The state government declared the 'National Action Plan for Preparedness & Response to COVID-19' to guide how provincial governments and states across the country can effectively deal with the outbreak.[10] In addition, strict restrictions, that is, quarantine and social distancing policies, were also imposed. Despite these steps and actions, Pakistan's current challenge is the battle against the pandemic, which has recently attracted worldwide attention.[11]

Several guidelines have been put forward to prevent viral transmission around the world.[12] In this context, vaccination is adopted as a preventive tool to safeguard the public from being infected. It is believed that vaccines are the best shield against viruses in reducing morbidity and mortality.[13] However, its supply is inadequate in developing countries.[14] Previous studies were mainly centred on scrutinizing the environmental impacts of COVID-19. Among them, the first group of researchers focused on the epidemiology of COVID-19[15,16] and the interaction of environmental and climatic factors with COVID-19.[17,18] The second group of researchers investigated the impact of certain factors on the prevention of epidemics.[19,20] The third group of researchers focused on the situation review of disease profiles in order to devise preventive and control mechanisms,[21,22] while the fourth group of researchers investigated the influence of meteorological factors on the transmission of pandemics.[23,24] Despite previous researchers' longstanding interests, assessing public IGCV is of increasing concern and to the best of our knowledge, no study has been performed in the Pakistani context so far. Pakistan is a developing country with fewer resources and healthcare infrastructure in comparison to affluent economies.[25,26] The country ranks fifth in the world in terms of population.[27] According to WHO, Pakistan might become the next COVID-19 hotspot unless sufficient precautions are adopted.[28] Considering these circumstances, it has become prerequisite to perform a comprehensive study in the Pakistani perspective to bridge these research gaps. This paper is the first of its kind to examine public IGCV concerning the following important questions. (1) What are the possible influencing factors which may encourage or discourage public IGCV in response to the current pandemic? (2) How do these influencing factors shape public IGCV? Another motivation for conducting this study is to deepen academic analyses about the COVID-19 pandemic, which other researchers have not thoroughly investigated from the Pakistani perspective. For this purpose, we have expanded the conceptual framework of the theory of planned behaviour (TPB) by introducing three new factors.

The study stipulates threefold contributions. Firstly, the literature gaps encouraged us to advance the existing knowledge pool by identifying and analysing the influencing factors affecting public intention to get COVID-19 vaccination. Secondly, the conceptual mechanism of TPB is expanded by introducing the novel dimensions. For instance, these novel dimensions were never considered as the possible influencing factors that can affect public intention to get COVID-19 vaccination in any context before. Finally, the present work has extended research findings different from the former analyses. Pakistan is an underdeveloped country and the national economy is heavily burdened with the import of costly COVID-19 vaccines to control the spread of the pandemic. Pakistan's fragile economy is unable to bear such a burden. It is anticipated that the other developing countries are also facing the same problems related to the COVID-19. In this scenario, the case of Pakistan will be viewed as a symbolic model for other countries to understand this phenomenon. In addition, the findings of this study will assist other underdeveloped countries in formulating robust policies concerning the COVID-19 vaccine in their corresponding territories. To sum up, the present study conserves the novel research outcomes compared to the previous body of knowledge.

2 | METHODS

2.1 | Theoretical framework

Public intention to use a certain product is a complex process that involves a variety of factors.[29,30] In order to understand the dynamic nature of this process, a variety of theoretical frameworks have been employed by various researchers. For instance, some pioneer theories include self-efficacy theory (SET), social cognitive theory (SCT), green perceived value theory by,[31] theory of innovation diffusion,[32] the theory of reasoned action (TRA), and TPB.[33] However, TPB successfully scrutinizes public behaviour in comparison with other models, and researchers have widely adopted it in the healthcare domain to describe and forecast public behaviour.[34] Therefore, we have utilized TPB to establish the theoretical framework of this study. The TPB stipulates that behavioural intentions govern the behaviour of people. The behaviour is executed once people weigh the consequences of their actions, leading to a needed result.[35]

Three factors constitute behavioural intentions. These are (i) attitudes towards the behaviour, (ii) subjective norms, and (iii) perceived behavioural control. A general feeling of favourableness or unfavourableness for a particular behaviour is regarded as a person's attitude towards the behaviour.[36] People's attitudes are shaped by their striking convictions and the outcomes associated with a specific behaviour, while the cumulative beliefs about a product by peers and society are called subjective norms, and they think that an individual should follow this behaviour and comply with them. Perceived behavioural control is defined as individuals' opinions of how exciting to exhibit the behaviour of interest based on one's perceived enablers or impediments to that behaviour.[37]

TPB has stimulated a significant volume of empirical health behaviour research. Researchers assume that numerous elements influence the acceptance of a particular product or service in social, economic, and political terms.[38] Moreover, people are concerned about the environment, risk perceptions of the pandemic, safety practices, cost analysis of vaccine, benefits of the vaccine, and the unavailability of the vaccine. As a result, we have advanced the conceptual mechanism of TPB by incorporating three new factors. The perceived benefits of the vaccine are regarded as a public assessment of the positive consequences of getting vaccination in the form of reducing the transmission of the virus and enhancing the health

status, while the unavailability of vaccine (UAV) is defined as the struggle of individuals to be vaccinated. Figure 1 depicts the theoretical framework of the study. With the inclusion of novel factors, this framework would assist in examining public IGCV in a comprehensive way.

2.2 | Formulation of hypotheses

2.2.1 | Attitude

In behavioural medicine, attitude (ATT) is contemplated as the favourable or unfavourable responses towards the community's health problems. Literature[39] reported that research on ATT during the pandemic not only directs mitigation strategies but also provides an opportunity for future pandemic preparedness planning. Previous studies informed that there is a positive relationship between attitude and IGCV. Similarly,[40] uncovered that individuals have a positive attitude that exposure to airborne diseases could be reduced by getting the vaccine.[41] performed a survey in Greece to find the intentions of people towards vaccination during the COVID-19 pandemic. The findings disclosed that respondents exhibit a high level of willingness to get vaccinated along with keeping social distance, following public health measures, minimizing the usage of public transportation, and protecting themselves from infected people. The first hypothesis is formulated in the light of these findings as:

H1. *ttitude positively influences public intention to get COVID-19 vaccination.*

2.2.2 | Environmental concern

Environmental concern (ENC) is described as the degree to which people are familiar with environmental problems and are devoted to finding their solutions.[42] ENC is a critical factor that significantly influences public IGCV.[43] stated that people having a positive ENC carefully monitor the health conditions of other individuals and possess a favourable behaviour towards the COVID-19 vaccine. They anticipate that maintaining good health is a self-declared responsibility and comprehend it progressively.[44] reported that the concerns of prevalent health crises influence public IGCV. In another study,[45] found the positive consequence of ENC on IGCV. The second hypothesis is formulated considering these findings as:

H2. *Environmental concern positively influences public intention to get COVID-19 vaccination.*

2.2.3 | Cost of vaccine

Cost information is an important attribute that is often considered to assess the economic losses related to the buying process.[46] The outcomes of many studies confirm the negative association between cost (CST) and IGCV.[47] exposed that cost is the main barrier in getting the vaccination.[48] analysed the relationship between the high costs of vaccines and life-cycle management. The outcomes revealed that high costs increase the strain of patients, leading to adverse health effects by decreasing adherence to necessary medication. Although the price of the vaccine is reduced recently, it is still higher than the affordability of individuals living in developing countries.[49] These research outcomes allow us to devise the third hypothesis as:

H3. *Cost of vaccine negatively influences public intention to get COVID-19 vaccination.*

2.2.4 | Risk perceptions of the pandemic

Risk perceptions of the pandemic (RPS) positively contribute to shaping public IGCV. Public intention increases when individuals perceive their susceptibility to the pandemic and its severity. If the risk of infection is perceived as high, a quicker public response would be

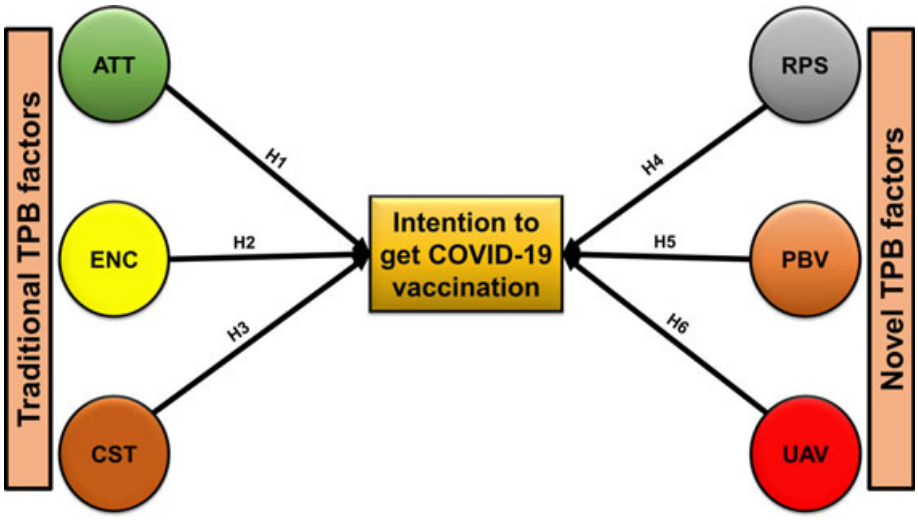

FIGURE 1 Theoretical framework depicting public IGCV. ATT, attitude; ENC, environmental concern; CST, cost of vaccine; RPS, risk perceptions of the pandemic; PBV, perceived benefits of vaccine; UAV, unavailability of vaccine

formed in terms of adopting protective behaviours.[50] The outcomes of former studies have revealed that risk perceptions play a critical role in shaping individuals' decisions to accept the vaccine. Several researchers have indicated that the social acceptance of the COVID-19 vaccine is positively influenced by risk perceptions. For instance,[51] analysed the factors affecting IGCV among American adults and reported that risk perceptions positively affect public intentions. Similarly,[52] examined public behaviour concerning the acceptance of the COVID-19 vaccine to prevent the spread of the pandemic. The results revealed that the risk perceptions of being infected with acute diseases persuade individuals to get the vaccination. Considering these outcomes, we devise the fourth hypothesis as follows:

H4. *Risk perceptions of the pandemic positively influence public intention to get COVID-19 vaccination.*

2.2.5 | Perceived benefits of the vaccine

Public understating and awareness about the vaccine's benefits in controlling and preventing the transmission of infectious viral diseases is termed as perceived benefits of vaccine (PBV).[53] They perceive that getting vaccination would minimize the spread of the virus in public gatherings and remind people to keep social distancing.[54] assessed the motivations behind getting vaccination among Chinese people and found that awareness of the Chinese population about climate issues and health consequences has rapidly increased. Consequently, they have formed positive beliefs regarding the benefits of the vaccine. The fifth hypothesis is formulated by anticipating these research findings as:

H5. *Perceived benefits of vaccine positively influence public intention to get COVID-19 vaccination.*

2.2.6 | Unavailability of vaccine

The UAV is related to the difficulty of individuals in getting the vaccine. The outcomes of former studies exposed that the UAV performs an insignificant role in individuals' choices to accept the COVID-19 vaccine. Several researchers have indicated that UAV negatively influences public IGCV. For instance,[55] analysed the factors affecting the IGCV in the United States. They reported that UAV is a critical barrier that negatively affects their intentions. In this regard,[56] examined the individuals' intentions concerning the acceptance of the COVID-19 vaccine in preventing the pandemic. Research results revealed that low intention is associated with the UAV, which is ineffective for controlling the Coronavirus. By taking into consideration these research outcomes, we devise the sixth hypothesis as:

H6. *Unavailability of vaccine negatively influences public intention to get COVID-19 vaccination.*

2.3 | Survey site, sample size, and selection of respondents

An inclusive survey (in the form of a questionnaire) was administered in the provincial capitals of Pakistan during November and December 2020. The fundamental rationale of selecting these provincial capitals is that the respondents to be surveyed belonged to the heterogeneous communities in these diverse cities of Pakistan. Another reason is that the provincial capitals have more COVID-19 patients than other areas of the country.

A total of 900 respondents were approached in person for the actual questionnaire survey. In order to reduce the sampling bias, random sampling was used by selecting every tenth individual to participate in the survey. The study results based on such a sample provide a fair representation of the population with all categories of education, age, income, gender, and marital status. Participants were given a thorough description of every aspect of the questionnaire. Every questionnaire gathered information on individuals' demographic characteristics and IGCV. Seven hundred fifty-four valid responses were received as a result of the questionnaire survey, representing 83.7% of the total responses. The following criteria were used to consider the response as valid. (i) The questionnaires should not have any missing or incomplete information. (ii) The questionnaires should not have multiple responses. (iii) The questionnaires should not have outliers. Outliers are erroneous or inaccurate observations that lie at an abnormal distance from other values in a dataset. In statistical analysis, it is essential to detect and eliminate outliers, as the presence of outliers in the data can bias study results. To avoid this problem, we identified the possible outliers from our collected dataset using the following important steps. (i) Examined the overall shape of the graphed data for important features, including symmetry and departures from assumptions. (ii) Examined the data for unusual observations that are away from the mass of data using the box plots graphical technique in SPSS (version 26) software. (iii) Again, using the SPSS (version 26) software, scrutinized the data for possible outliers using the Mahalanobis distance test. Six outliers were detected as a result of these steps, which were then removed from the dataset before performing the empirical analysis.

3 | RESULTS

3.1 | Demographic attributes of respondents

The authors analysed the collected data and tested the proposed hypotheses using SPSS and AMOS softwares. A 5-point Likert scale was used to assess the questionnaire items, with one being 'strongly disagree' to five 'strongly agree'. The demographic attributes of respondents are compiled in Table 1. The highest proportion of the participants (338, 44.8%) belonged to the middle-age cohort, followed by the young age cohort (234, 31%). The old-age cohort (182, 24.1%) is the third-largest group. Male were (403, 53.4%) compared to females (351, 46.5%) in our sample. Two hundred forty-nine

respondents (33%) belonged to the middle-income class having a per month income between Pakistani rupees (PKR) 31,001–40,000, followed by the lower-middle-income class (225, 29.8%) with a per month income between PKR 21,001–30,000. Besides, we classified participants into different stages of education. Of these respondents, (339, 44.9%) possess a college degree, whereas (246, 32.6%) have a high school education. The majority of people (248, 32.8%) are healthcare workers in our sample. Married people (307, 40.7%) constitute the largest proportion of our sample, followed by the unmarried (267, 35.4%) and divorced (180, 23.8%) groups.

TABLE 1 Demographic attributes of respondents

Features	Options	Frequency	(%)
Age	18–35	234	31
	36–55	338	44.8
	Above 55	182	24.1
Gender			
	Male	403	53.4
	Female	351	46.5
Income (PKR)			
	<20,000	39	5.2
	21,001–30,000	225	29.8
	30,001–40,000	249	33
	40,001–50,000	168	22.3
	>50,000	73	9.7
Education			
	High school	246	32.6
	College degree	339	44.9
	Graduate	169	22.4
Occupation			
	Lawyer	73	9.6
	Teacher	127	16.8
	Own business	209	27.7
	Healthcare worker	248	32.8
	Other	97	12.8
Marital status			
	Married	307	40.7
	Unmarried	267	35.4
	Divorced	180	23.8

3.2 | Summary statistics and discriminant validity findings

The interrelationship among variables was tested using correlation analysis. The analysis generated significant correlations among the variables. The discriminant validity was investigated employing the average variance extracted (AVE)'s square root. Results support the discriminant validity, as the square root of AVE is greater than its correlation with other constructs.[50] The results are reported in Table 2. Next, using AVE and item loadings, a convergent validity analysis was conducted to assess the degree to which the items are potentially associated.[35] The outcomes confirmed that the values of AVE for each variable exceeded 0.50, emphasizing that the latent variables retained more than 50% variance. The reliability of items was investigated by calculating Cronbach-α. The results show that the value of Cronbach-α for all variables exceeded the minimum acceptable value of 0.70, as recommended by,[46] confirming the reliability of the data. Composite reliability (CR) analysis was conducted to assess the uniformity of all variables' items. The analysis shows that the values of CR are higher than the least acceptable value of 0.70. The results are compiled in Table 3.

3.3 | Hypotheses and structural model results

We tested the proposed model and the hypothesized relationships. It was found that 74% of the variance in dependent variable (IGCV) was explained by independent variables that is, ATT, ENC, CST, RPS, PBV, UAV ($R^2 = 0.74$, $p = 0.001$). It exhibited that the modelled independent variables accounted for a considerable amount of explained variations in public IGCV. A curve estimation and SEM algorithm based on covariance were carried out to scrutinize the linkages in the model, which provided a high *f*-value, implying linearity among all

TABLE 2 Factors' correlations and discriminant validity analysis

Factors	ENC	RPS	PBV	ATT	CST	UAV	IGCV
ENC	(0.712)						
RPS	0.326	(0.824)					
PBV	0.267	0.489	(0.822)				
ATT	0.353	0.376	0.523	(0.753)			
CST	0.170	0.544	0.417	0.305	(0.779)		
UAV	0.342	0.252	0.177	0.330	0.223	(0.837)	
IGCV	0.296	0.569	0.504	0.419	0.725	0.236	(0.737)

Note: Diagonal values in parentheses represent the root square of AVEs.
Abbreviations: ATT, attitude; ENC, environmental concern; CST, cost of vaccine; RPS, risk perceptions of the pandemic; PBV, perceived benefits of vaccine; UAV, unavailability of vaccine.

TABLE 3 Factor loadings and results of reliability analysis

Factors	Items	Standard loadings	AVE	CR	Cronbach-α
Attitude			0.567	0.901	0.903
ATT1	I possess a positive attitude towards COVID-19 vaccination	0.560			
ATT2	I possess a positive attitude that vaccination would save me from getting infected	0.831			
ATT3	I want to get vaccination before meeting with people	0.721			
ATT4	I want to get vaccination while going out	0.657			
ATT5	I have a positive attitude that everybody should get COVID-19 vaccination	0.900			
ATT6	I believe that vaccination is beneficial for society during the pandemic	0.915			
ATT7	I possess a favourable attitude that vaccination has a positive outcome on society	0.615			
Environmental concern			0.507	0.805	0.804
ENC1	I am anxious about the environmental impacts of the COVID-19 pandemic	0.729			
ENC2	I am worried about the spreading of SARS-CoV-2 among masses in my country	0.744			
ENC3	I think that the risk of infecting others will decrease if I get COVID-19 vaccination	0.686			
ENC4	I am anxious about climate change due to the consequences of COVID-19	0.678			
Cost of vaccine			0.607	0.885	0.891
CST1	COVID-19 vaccine is costly to buy	0.886			
CST2	Price is a big concern for me when getting COVID-19 vaccination	0.971			
CST3	I do not have enough money to buy COVID-19 vaccine	0.700			
CST4	I cannot manage to buy COVID-19 vaccination for my family	0.672			
CST5	I think that buying COVID-19 vaccination have an extra burden on my expenditures	0.504			
Risk perceptions of the pandemic			0.680	0.937	0.938
RPS1	COVID-19 is a severe pandemic	0.776			
RPS2	People without getting COVID-19 vaccination are susceptible to get infection	0.802			
RPS3	It is risky to go out without receiving COVID-19 vaccination	0.940			
RPS4	I feel safe after getting COVID-19 vaccination in the public gatherings	0.969			
RPS5	One should get COVID-19 vaccination during the pandemic situations	0.832			
Perceived benefits of vaccine			0.676	0.936	0.937
PBV1	I believe that COVID-19 vaccination is an effective precautionary measure	0.643			
PBV2	I believe that COVID-19 vaccination will protect my health	0.837			
PBV3	I believe that COVID-19 vaccination reduces the chances of getting infected	0.804			
PBV4	I believe that COVID-19 vaccination reduces the chances of viral diseases	0.860			
PBV5	I believe that COVID-19 vaccination will reduce my exposure to the novel SARS-CoV-2 virus	0.851			
PBV6	I do not fear going out after getting COVID-19 vaccination	0.818			
PBV7	I believe that the society will get protected from viral diseases if people start getting COVID-19 vaccination	0.899			

TABLE 3 (Continued)

Factors	Items	Standard loadings	AVE	CR	Cronbach-α
Unavailability of vaccine			0.700	0.921	0.918
UAV1	COVID-19 vaccine is unavailable in the market	0.729			
UAV2	I think that there is less supply of COVID-19 vaccine in the country	0.806			
UAV3	I have a difficulty in obtaining COVID-19 vaccination	0.903			
UAV4	Unavailability of vaccine demotivates me to get COVID-19 vaccination	0.861			
UAV5	I am unable to get COVID-19 vaccination because there is no vaccine available in the hospital	0.867			
Intention to get COVID-19 vaccination			0.544	0.826	0.823
IGCV1	The effectiveness of vaccination in controlling the spread of airborne viruses encourage me to get COVID-19 vaccination.	0.622			
IGCV2	I have the intention to spend extra on COVID-19 vaccination	0.709			
IGCV3	I strongly recommend others to get COVID-19 vaccination	0.654			
IGCV4	Overall, I have the intention to get COVID-19 vaccination	0.598			

Note: Extraction method: Maximum Likelihood, Rotation method: Promax with Kaiser normalization.

relationships. This finding is consistent with the previous work of.[57] For checking multicollinearity issue, regression was run and the values of variance inflation factor (VIF) were obtained. According to,[58] the VIF values must not be greater than 10. The findings indicate that the model did not have a multicollinearity issue because the VIF values are within the recommended range for all variables and are in line with the findings of.[59] The results are reported in Table 4.

Figure 2 displays the path diagram of SEM. According to the research framework of the study, we tested the impact of influencing factors on public IGCV using path analysis. After controlling the demographic constructs, the structural paths of *H1* ($\beta = 0.08$, $p < 0.01$), *H4* ($\beta = 0.11$, $p < 0.01$), and *H5* ($\beta = 0.12$, $p < 0.05$) indicate that ATT, RPS, and PBV have a significant and positive impact on public IGCV. Thus, H1, H4, and H5 were accepted. It was found that public intention decreases due to an increase in vaccine cost and the UAV, as the variables (cost of vaccine) *H3* ($\beta = -0.10$, $p < 0.001$) and (unavailability of vaccine) *H6* ($\beta = -0.00$, $p < 0.01$) negatively affects public IGCV. Accordingly, H3 and H6 were accepted. On the contrary, the structural path did not validate hypothesis *H2* ($\beta = 0.65$) as the variable 'environmental concern' impart an insignificant impact on public IGCV and was rejected. Table 4 illustrates the structural paths and the results of the hypotheses.

4 | DISCUSSION

This study assesses public behaviour by analysing the factors that affect the intention of Pakistani people to receive COVID-19 vaccination. Possible influencing factors that may inspire or prevent them from getting vaccination are identified and analysed. The conceptual mechanism of TPB has been expanded by introducing three novel dimensions. A widespread survey was carried out in the provincial capitals of Pakistan, and data analysis was performed by employing SEM. The results indicate that ATT, RPS, and PBV have significant effects on public IGCV. CST and UAV are found to have a prohibition effect, whereas ENC imparts an insignificant effect. With a focus on examining public IGCV, the current study would serve as a practical manual for organizations, stakeholders, and practitioners associated with the health industry in controlling the spread of the COVID-19 outbreak by identifying the relationship among all influencing factors that affect the public acceptance of COVID-19 vaccination.

Research findings supported the hypothesis that ATT positively affects public IGCV.[40] highlighted that attitude plays a vital role because individuals think that vaccination could reduce the probability of getting infected from viral respiratory diseases. Similarly, the study of Reference 60 concluded that attitude has a favourable impact on the IGCV. As a result of the current COVID-19 pandemic, a growing number of individuals understand that getting vaccination can help prevent the spread of the pandemic and assist in resolving health problems. A recent study conducted by Shmueli[61] also reported that attitude was a significant predictor of public IGCV.

Literature[45] identified that IGCV is positively affected by ENC. We anticipated that similar behaviour would be observed among Pakistani people as well. The findings of the present study, however, have an insignificant impact. A possible explanation might be associated with the urge for which people get the vaccination. In contrast to developed countries, the developing countries spend less on the health sector,[62] posing a tremendous burden on the healthcare system during the pandemic such as COVID-19. In such a situation, the governments have to divert their partial burden of healthcare expenditures to the general public,[63] for instance, in the form of paid vaccination shots made available through private medical institutions and hospitals. Unlike countries that have experienced pandemics,[64] people in Pakistan have never experienced such kind of pandemic

TABLE 4 Results of hypotheses

Hypotheses	Structural paths	β-value	f-value	Result	VIF	R^2
H1	ATT → IGCV	0.08**	216.6***	Accepted	1.634	0.74
H2	ENC → IGCV	0.65	167.5***	Rejected	1.871	
H3	CST → IGCV	−0.10***	120.4***	Accepted	1.783	
H4	RPS → IGCV	0.11**	224.8***	Accepted	1.376	
H5	PBV → IGCV	0.12*	129.4***	Accepted	1.282	
H6	UAV → IGCV	−0.00**	138.6***	Accepted	1.809	

Note: ***p < 0.00, **p < 0.01, *p < 0.05.

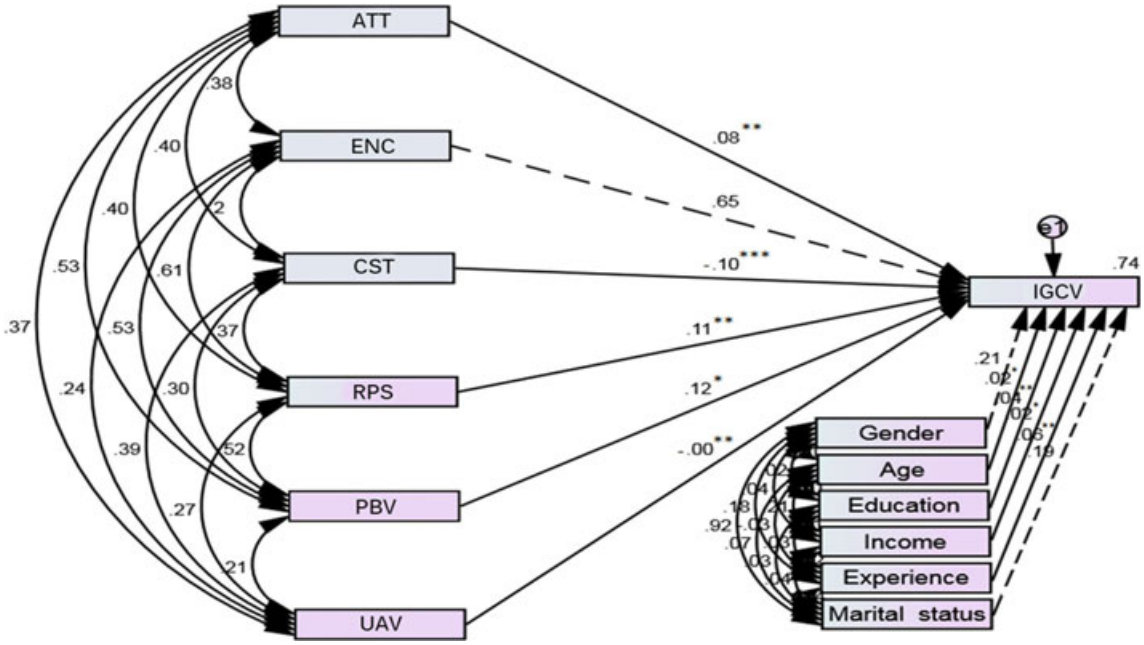

FIGURE 2 Path diagram of SEM. Significant and insignificant paths are indicated by continuous and dashed lines respectively. ***p < 0.00, **p < 0.01, *p < 0.05

before.[65] Consequently, they attach low priority to vaccination. The lack of a robust policy framework is another reason for this behaviour. These findings are in harmony with Reference 66 as they assessed COVID-19 preparedness and transition strategy in Bangladesh. The authors found that the country lacked the preparedness to deal with the spread of COVID-19, which has both immediate and long-term consequences for health, and economy. Lack of planning and cooperation, unequal allocation of resources, low infrastructure, compliance to government bureaucracy, absence of coherent crises management, and inconsistent decision making have resulted in a perilous position with dire consequences and numerous uncertainties in the coming days.

Research results supported our hypothesis that public IGCV is negatively influenced by cost. The findings of previous researches support our results, as Reference 48 exposed that cost has a negative impact on public IGCV, specifying that cost is a primary obstacle to accept new advancements in the healthcare sector. Similarly,[47] uncovered that public IGCV is shaped by cost. One likely reason might be that the COVID-19 vaccine is cheaper in developed countries like the USA, UK, China, Germany, and France as compared to Pakistan. Therefore, a middle-income household in Pakistan cannot afford high costs and does not dare to get the vaccination. Previous findings confirmed the role of risk perceptions in shaping public IGCV during pandemics and are parallel with our research results. Further,[33] found that risk perception has a positive impact on people's intentions to practice epidemic prevention. It implies that increasing people's awareness of the infection's severity, susceptibility, and fatality will increase their intention to adopt epidemic prevention measures.[67] examined public behaviour towards receiving COVID-19 vaccination among French healthcare workers. The findings revealed that 75% of the healthcare workers intend to get the vaccination against COVID-19. The possible factors that motivate individuals' IGCV include fewer chances of being infected with SARS-CoV-2 and controlling the spread of airborne diseases. In another research,[68] scrutinized public intention to participate in a COVID-19 vaccine clinical trial. They reported that older age, male gender, worry about COVID-19, being a healthcare practitioner, and perceived risk were linked with the acceptance of COVID-19 vaccine.

Hypotheses results indicate that PBV has a significant effect on public IGCV. These results corroborate previous studies in which

researchers noticed that individuals base their decisions on a positive assumption about the features of the product they choose to purchase.[29] People accept to receive COVID-19 vaccination if they recognize the perceived advantages linked with its usage.[53] In this context,[69] administered a nationwide online survey in China to understand COVID-19 vaccine demand hesitancy among the general public. The authors concluded that PBV has a positive and significant effect on vaccination intention. As the awareness of Pakistani individuals about health problems is increasing, they are developing positive beliefs about getting the vaccination to surmount these problems. Research results further specify that public IGCV is negatively influenced by UAV and is supported by the former research findings.[56] The possible factors that could discourage them from getting the COVID-19 vaccine include the difficulty and struggle in obtaining vaccination in the particular area of individuals residence. Besides, they think that the COVID-19 vaccine is costly due to the less supply in the market, leading to the unacceptability of getting the vaccination. Owing to this situation, the ease and the availability of the vaccine would help as important dynamics to foster more confidence in getting COVID-19 vaccination in the future.

The current study also has some limitations, which need to be addressed by future researchers. Firstly, we only focused on factors that can influence public intention to get COVID-19 vaccination and overlooked other potential factors such as social distance, school/ mall closing, etc., which could promote the spread of COVID-19. Subsequent research should discuss these factors in detail for more meaningful results. Secondly, a sample size of 754 households is not enough for the generalizability of the findings. Finally, only the provincial capitals of the country were selected for data collection. Future studies should expand their survey to other geographical regions to generate comprehensive results all over the country.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Conceptualization, Muhammad Irfan. *Data curation*, Muhammad Irfan, Munir Ahmad. *Methodology*, Muhammad Irfan. *Software*, Muhammad Irfan. *Formal analysis*, Muhammad Irfan. *Writing - original draft*, Muhammad Irfan. *Writing - review & editing*, Munir Ahmad, Abdul Latif Shahid, Wasim Iqbal, Rajvikram Madurai Elavarasan, Siyu Ren, Abid Hussain.

ETHICAL APPROVAL

This study was approved by the ethics committee of the Nankai University, China (No. 745-3).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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