ORIGINAL RESEARCH

Assessment of risk perception and adoption of safety measures during Covid-19 pandemic in Pakistan: a survey study through mobile application

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Abstract

This coronavirus disease's impact, effect, and spread largely depend on how people behave and react mindfully. According to the knowledge, attitude, and practices (KAP) theory, the only way to war against COVID-19 is to ensure allegiance to all Pakistanis' controlled maneuvers nationwide. To control this pandemic, the determination of safety measures practiced by people and their associated factors are of great importance. This study aimed to explore Pakistani's perception of the economic and psychological risks related to COVID-19 and the association of perceived risks with adopting safety measures. The was conducted among 1,058 Pakistanis using a self-developed survey questionnaire from March 15 to June 15, 2020 - using a mobile application. The analysis revealed that more participants agreed that (i) Covid 19 is associated with economic threats to the overall economy, (ii) social media and the Government is causing more psychological threat than the virus, and (iii) personal and imposed safety measures should be observed during the spread of the virus. Moreover, regression analysis indicates that economic and psychological threats were significantly and positively correlated with personal safety measures but not government-imposed safety measures. Moreover, economic and psychological threats are significant predictors of personal safety measures. This study is helpful as it is the first to inform about the threats associated with this pandemic and their association with safety measures practiced by Pakistan's population.

Keywords Pakistan · COVID-19 · Safety measures · Perceived economic risk · Perceived psychological risk

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1 Introduction

As an underdeveloped country in central Asia, Pakistan suffered immensely due to COVID-19 or, technically speaking, the Severe Acute Respiratory Syndrome (SARS-Cov-2) (One Planet Nations Online 2020). Sindh, as the most populated province, reported the topmost confirmed cases (132,084), and Punjab with the second lead of confirmed cases (97,760) until the mid of September 2020 (Government of Pakistan 2020). This unremittingly augmenting number is quite bothersome and upsetting (Hayat et al. 2020). Recent literature suggests that risk perception predicts social distancing practices in the Arab population during the COVID-19 pandemic (Abdelrahman 2020). Research on the Chinese population suggests that risk perception positively affects perceived understanding and safety behaviors (Xie et al. 2020). Empirical evidence from a study conducted in South America suggests that risk

perception is associated with adopting preventive behaviors and attitudes (Zeballos et al., 2021).

During the current pandemic, the information provided through various sources, such as health professionals, the Government, and social media, can increase people's awareness about the risk and, consequently, their adoption of preventive measures. Literature suggests that the WHO has declared the COVID-19 pandemic as a social media infodemic after the accelerated misinformation spread worldwide, leading to panic among people (Hao and Basu 2020). A news channel also claimed that social media's anxiety spread faster than the virus. (Muwahed 2020). According to Cellan-Jones 2020 people gained information mainly through social media regarding the facts about COVID-19. The public's willingness plays a crucial role in implementing and practicing preventive measures during pandemics. One primary factor in adopting safety measures by the public is their perception of risk related to pandemics (Ibuka et al. 2010; Van der Weerd et al. 2011), which aligns with the Protection Motivation Theory proposed by Rogers (1975). The theory posits that the public's perception of the severity and vulnerability to health threats determines their risk perception of the disease. Therefore, their intention to adopt safety measures is significantly influenced by the perceived risk associated with different aspects of a pandemic.

Another factor contributing to adopting safety measures concerning a disease threat is trust. The trust and confidence model ascertains that trust is crucial in managing any threat. It affects people's judgment about the related risks and benefits of threats, indirectly affecting the implementation of preventive measures. Trust is also believed to affect the public's hearing, interpretation, and response to public health messages by the Government. Therefore, effective crisis communication and trust levels in the Government during the current pandemic are crucial (Siegrist and Zingg 2014).

Therefore, this survey study aimed to explore Pakistani's perceived economic and psychological risks related to COVID-19 and its association with their opinion on adopting necessary safety measures. A survey was designed to gain insight into the Pakistani population's opinion on adopting personal and government-imposed safety measures and the perceived economic and psychological risks of the COVID-19 Pandemic.

2 Methods

This survey was conducted with a correlational study design from March 15 to June 15, 2020; using mobile application survey was conducted among 915 Pakistanis by using a self-developed survey questionnaire. The Ethical Review Board of COMSATS University Islamabad, Lahore campus approved the study with a letter number. Ref. No. CUI/LHR/HUM/0150 on February 20, 2020.

Participants from Punjab, Sindh, Islamabad (Capital), Khyber Pakhtoon Khuwan (KPK), Balochistan, and Azad Kashmir voluntarily participated in the study. Data was collected using mobile application. The link to download the application was sent to the participants via E-mail and different social media channels after their consent for voluntary participation in the survey through a convenient sampling technique.

The mobile application survey questionnaire had three parts: informed consent, demographic information, and survey questions. The mobile application had different sections directing the participants to pages stating the study's nature, purpose, and inclusion criteria. The application also directed the participants to the informed consent section, asking for their voluntary participation. Another page led them to the demographic information sheet asking gender, age, marital status, work status, family system, home country. Also, on this page, they were asked about the current or previous history of any diagnosed psychiatric disorder with response options 'yes' or 'no.' For the participants responding 'yes' to this question, the survey was ended with a final gratitude note and for the rest of the participants responding 'no' to this screening item, the form directly to the next page asking about the presence of any physical disability with response options 'yes' or 'no.' The following page led them to a question asking about the residential status as Pakistani residents with response options 'yes' or 'no.' The participants responding 'no' to physical disability question and 'yes' to Pakistani residential status were directed to the final survey questionnaire. The survey was composed of 14 survey questions on the adoption of Personal safety measures, two on the adoption of Imposed safety measures, two on perceived economic risks, and two on opinions about perceived psychological risks related to the COVID-19 Pandemic (see Table 1). For all questions, answers were scored on a 5-point Likert scale ranging from 1 (Strongly Disagree), 2 (Disagree), 3 (No Opinion), 4 (Agree), to 5 (Strongly Agree). To control the confounding effects of individual variables, specific exclusion criteria were developed. Those participants were excluded from the study who (a) were suffering from any psychological or medical disorder, (b) could not read English, (c) were not residents of Pakistan, and who had any physical disability.

3 Results

Descriptive statistics were calculated for demographics, showing that data was not equitably distributed across groups for different demographic variables. Therefore,

Table 1 *The survey Questionnaire of the study*

Variables	Question No	Survey Questions
Personal Safety Measures	2	People should stay at least 2 feet away from other people to prevent the spread of the virus.
	3	People should not allow visitors to their residences to prevent the spread of the virus.
	4	People should Stay at home to prevent the spread of the virus.
	5	Family members should not share things like towels and utensils to prevent the spread of the virus.
	6	One should contact the loved ones online/on the phone instead of in person to prevent the spread of the virus.
	7	To prevent virus spread, one should contact the loved ones online/on the phone instead of in person.
	13	One should wash hands frequently to prevent the spread of the virus.
	14	People should continue going about their daily lives while taking proper precautions.
Imposed Safety Measures	8	Closing public places and Educational Institutes is the best way to prevent the spread of disease.
	9	Total lockdown/curfew would not work to control the spread of the corona virus. (This item was reverse-scored)
Perceived Economic Risks	1	Coronavirus is a more significant threat to the world's economy than to my health.
	10	The daily wagers cannot survive in a total lockdown situation.
Perceived Psychological Risks	11	The role of media is developing more panic in people than the virus itself. Psychological threat.
	12	The role of government is likely to produce more frustration in people than the virus itself. Psychological threat.

Table 2 Descriptive Statistics of demographics (N = 915)

Variables	Categories	Frequency (%age)
Location	Punjab	350(38.25)
	Sindh	300(32.79)
	Islamabad (ICT)	120(13.11)
	Khyber Pakhtun Khuwan	100(10.93)
	Balochistan	25(2.74)
	Azad Kashmir	20(2.18)
Age groups	Adolescents	262 (29)
	Emerging adults	412 (45)
	Adults	241 (26)
Gender	Men	199 (22)
	Women	716 (78)
Marital status	Married	286 (31)
	Single	629 (89)
Work status	Student	516 (56)
	Working	301 (33)
	Non-working	98 (11)
Family structure	Nuclear	557 (61)
	Joint	358 (39)

Table 3 *Descriptive statistics of study variables*

Variables	M(SD)	Median	A	Observed Range
Economic Threat	5.57(1.79)	6	0.73	0–8
Psychological Threat	5.21 (1.91)	6	0.62	0–8
Personal safety measures	21.75 (3.85)	22	0.61	0–28
Imposed safety measures	5.78 (1.70)	6	0.69	0–8

Table 4 *Correlations between Study Variables*

	Variables	1	2	3	4
1	Economic Threat	-	0.16**	0.21**	−0.05
2	Psychological Threat		-	0.13**	0.02
3	Personal safety measures			-	0.33**
4	Imposed safety measures				-

Note. * = $p < .05$, ** = $p < .001$

group differences in study variables were not calculated for the disproportionate data across different groups. The total sample of this survey is comprised of 915 participants from Pakistan. A total of 1,058 participants completed the survey. Out of these,143 were excluded from the study based on exclusion criteria. The final analysis was done on the rest of the 915 participants. Of these, 262 (29%) were adolescents, 412 (45%) were emerging adults, and 241 (26%) were adults. The respondents belonged to all provinces and regions of Pakistan, with 350 (38.25%) from Punjab, 300 (32.79%) from Sindh, 120 (13.11%) from Islamabad (ICT), 100 (10.93%) from Khyber Pukhtoon Khuwan, 25 (2.74%) from Balochistan and 20 (2.18) belonged to Azad Kashmir. All other characteristics of the respondents are summarized in Table 2.

Data were analyzed in SPSS version 23. All study variables were calculated using descriptive statistics and alpha reliabilities (see Table 3). Table 3 shows that all study variables' data were positively skewed, with more responses towards the agreeable end Likert response format. In addition, it shows that more participants agree that **(i)** Covid 19 is associated with perceived economic risks, (ii) social media and the Government are causing more psychological risks than the virus, and (iii) personal and government-imposed safety measures should be observed during the spread of the virus.

Next, correlations between all study variables were calculated and presented in Table 4. Correlation coefficients showed that perceived economic and psychological risks were significantly and positively correlated with personal safety measures but not imposed safety measures.

Table 5 *Opinion about Economic and Psychological Threat Predicting Personal Safety Measures*

Predictors	Personal safety measures (Criterion)								
	Model 1			Model 2			Model 3		
	B	SE	B	B	SE	β	B	SE	β
Gender	0.73	0.32	0.08*	0.69	0.31	0.07*	0.72	0.31	0.08*
Age	0.22	0.16	0.06	0.19	0.15	0.05	0.20	0.15	0.05
Marital status	−0.20	0.23	−0.04	−0.12	0.22	−0.02	−0.12	0.22	−0.02
Work status	−0.04	0.22	−0.01	−0.04	0.22	−0.01	−0.07	0.22	−0.01
Family system	−0.28	0.27	−0.04	−0.31	0.27	−0.04	−0.32	0.26	−0.04
Economic threat	-	-	-	0.44	0.07	0.21***	0.40	0.07	0.19***
Psychological threat	-	-	-	-	-	-	0.21	0.06	0.11**
Model fit	$F_{(5,906)} = 1.77$			$F_{(6,905)} = 8.17***$			$F_{(7,904)} = 8.55***$		
R^2	0.01			0.05			0.06		
R^2change	0.01			0.04			0.01		

Note. *$p < .05$, **$p < .01$, ***< 0.001

Finally, hierarchical regression analyses were calculated to predict personal safety measures from perceived economic and psychological risks after controlling for potential confounding variables due to demographics (see Table 5). Notably, only personal safety measures but not government-imposed safety measures were assessed as a criterion variable in regression analyses because perceived economic and psychological risks were significantly correlated with personal safety measures. For calculating the regression analyses, demographic variables were entered as predictors of personal safety measures at the first step. Table 5 shows that gender only was found a significant predictor. In the second step, the perceived economic risk was added as a predictor after controlling for demographics. It turned out to be a significant predictor in explaining personal safety measures. Finally, the perceived psychological risk was added as a predictor after controlling demographics and economic risks in a third step. This variable turned out to be a significant predictor of personal safety measures in the presence of other predictors.

4 Discussion

This survey study's findings highlight the importance of perception of risks associated with a pandemic and trust in increasing their participation in adopting preventive measures. Therefore, practitioners can utilize and develop these responding models to a pandemic when facing new threats. Furthermore, this study's findings align with the discussed Protection Motivation Theory (Rogers,1975).

The majority of the survey participants perceived that COVID 19 pandemic is associated with economic threats to the country's overall economy. The current pandemic has increased the economic pressure, which has created more panic about the situation (Fegert 2020). According to the international monetary fund (IMF) report and the federal board of revenue (FBR) of Pakistan, a revenue loss of 300 billion Pakistani rupees is expected (Chohan 2020). Therefore, Pakistan expects a significant blow to its economy because of this COVID-19 pandemic (Majid 2020). In line with these empirical pieces of evidence, the participants' opinion is quite valid.

The participants also believed that social media and the Government are causing more psychological risks than the virus itself. According to the Pakistan Telecommunications Authority, most study participants were adolescents and emerging adults who are the primary users of internet services (Pakistan Telecommunication Authority 2020). Although the information is easily accessible through social media platforms, at the same time, there is a risk of misinformation as well, which then creates panic. The opinion might have arisen due to the misinformation regarding social media's pandemic (Hayat et al. 2020).

Due to the perceived threats, most participants had a favorable opinion about the safety measures that should be practiced during the pandemic, aligning with the protection Motivation theory. Furthermore, a study's findings indicate that most participants followed precautionary measures and practiced them due to their perceived threats through the government-generated awareness campaigns (Zhong 2020). Thus, it can be said that our participant's knowledge regarding safety measures and their motivation to protect themselves lead them to a positive opinion towards participation in safety practices during the pandemic.

Regression analysis revealed that perceived economic and psychological risks significantly positively correlated and predicted personal safety measures, but not government-imposed safety measures. In line with this are the study's findings by Kachanoff et al. (2020), where they measured psychological threats of COVID-19, their impact on well-being, and public adherence to health behaviors. Realistic and symbolic threats predicted increased anxiety and decreased well-being among psychological threats.

Furthermore, the realistic threat to COVID 19 predicted increased self-reported compliance, whereas the symbolic threat predicted less self-reported compliance with safety practices. The natural and perceived threat to disease significantly impacts people's physical and psychological health (O'Leary 2018) and the country's economy (Smith et al. 2009). Therefore, the participants perceived a threat to physical health and the economy, which predicted their opinion on practicing personal safety measures like wearing a mask, washing hands frequently, and maintaining social distance.

Trust between governors and the governed could be seen as essential to facilitating good governance of the pandemic. The majority of the participants had an opinion not to follow the government-imposed safety measures. Pakistan has a history of dealing with epidemics, where the Government and the masses required a high level of preparedness. The local Government and social media have made efforts to reduce this contagious disease's transmission (Malik and Muazzam 2018). Every citizen has a different criterion for evaluating different government institutions on which their trust level depends (Fisher et al. 2010). Trust in Government plays a crucial role in society's response to pandemics. Literature suggests that a high level of trust is necessary to implement government-made policies and the public's compliance. Trust in the Government leads to compliance in following health policies such as quarantine, COVID testing, social distancing, and other measures (Van Bavel 2020). This lack of trust may explain the later adoption of restrictive policies (Toshkov 2020). Overall, these suggest that trust is indeed related to compliance and, potentially, as a result, mortality rates.

While considering the findings of this study, some limitations should also be highlighted. First of all, the study was conducted during the strict lockdown in Pakistan and keeping in mind, the safety measures had to be an online survey design using mobile application. Therefore, the responses were collected from those participants only who had access to internet services and had android mobile. Secondly, the sample size is also not large enough as most of the people did not respond to the online survey questionnaire as they are used to when studies were carried out physically. Third, sample clustering also happened as most participants were adolescents and young adults, limiting the study's generalizability. Fourth, as the survey questionnaire was in English, only those participants responded who could understand the language, limiting the sample size. Despite all the limitations, the researchers needed to conduct this survey to gain public opinion when the novel Coronavirus reached Pakistan. Today, online surveys have become a practical method of researching pandemics. However, since these findings pertain to the initial period of the pandemic in Pakistan, a more extensive longitudinal study should be conducted in the current time to guide policymakers in understanding its bio-psycho-social impact.

5 Conclusion

Globally, efforts are being made to eliminate or minimize the adverse effects of COVID-19 on people's economic, physical and mental health. Therefore, it is essential to empirically determine people's opinions regarding the pandemic and how they feel threatened. Furthermore, to control this pandemic, the determination of safety measures practiced by people and their associated factors are of great importance. Therefore, this study is helpful as it is the first to inform about the threats associated with this pandemic and their association with safety measures practiced by Pakistan's population.

Declarations

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