



## Research Article

# Effect of perceived risk of covid 19 on protective behavioral changes among adult population in pakistan: A web-based cross-sectional study

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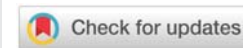
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## Abstract

The COVID-19 pandemic is still a global public health issue. Little is known about the treatment, therefore prevention plays a vital role to guard the high risk group. Thus understanding the effect of perceived risk on protective behaviors among our population is essential. The study aims to assess the effect of perceived risk of COVID 19 on protective behavioral changes among adult population in Pakistan. A web based survey was administered to Pakistani adults. Convenience sampling was adopted to assess the knowledge, protective methods and perceived risk towards COVID-19 among the population. Descriptive Analysis along with stepwise multivariable linear regression analysis was performed.

There were total of 185 respondents with valid responses. Risk perception mean score was 12.11 (SD=3.97) and the highest mean score was for risk of getting infection and risk of transmitting illness to loved ones that is 3.38 ( $\pm 1.28$ ) and 3.24 ( $\pm 1.40$ ) respectively. Avoiding people who are sick had the highest mean score of 4.25 ( $\pm 1.02$ ) among all protective practices. The linear regression analysis suggests that increase in one unit of risk perception is associated with increase in 0.39 units in overall protective behavior towards covid-19 after adjusting with other independent variables. Similarly, with an increase in 1 unit of knowledge is found to be associated with an increase of 0.045 units of in overall protective behavior (regression coefficient: 0.38, 95% 0.008-0.77) after adjusting with risk perception, gender and educational status. In the end, the study found that the risk perception along with gender, educational background and knowledge has significant impact on preventive behavior towards Covid-19.

## Introduction

The novel coronavirus disease that emerged at the end of 2019 began threatening the health and lives of millions of people after a few weeks. Highly contagious with the possibility of causing severe respiratory disease, it has quickly impacted governments and public health systems [1]. The world has responded by declaring it a public health emergency of national and international concern, as well as by adopting extraordinary measures to prevent its transmission and limit the outbreak. The rapid increase in the COVID-19 cases has not only elevated

the risk of death, but has also created unwanted psychological burden [2]. Millions of lives have been significantly altered, and a global, multi-level, and demanding stress-coping-adjustment process is ongoing [3].

To tackle problems associated with this pandemic, it is necessary to implement non-medical measures such as the promotion of personal protective practices (e.g. use of face masks and personal hygiene), imposing travel restrictions, and maintaining social distance from other individuals. To achieve the successful implementation of such measures recommend

by public health authorities, the willingness of the public plays a vital role [4]. However, it is found quite challenging to encourage the public to unconditionally follow these recommended preventive actions. Individual's risk perception of pandemic is one of the factors contributing to an increase in public participation in adopting preventive measures [5]. According to the Protection Motivation Theory (PMT), the intention of the general public to adopt protective measures is significantly influenced by high levels of perceived risk. The theory posits that public perception of the severity and vulnerability to a certain health threat determines their risk perception about a disease [6].

Danger is a dynamic, psychologically-oriented and socially-constructed phenomenon that is influenced by numerous factors, such as likelihood, magnitude, controllability, dread, catastrophic potential and hazard unfamiliarity [2]. People have the potential to adapt to new conditions if they feel that they are at risk of infection with a disease that could have significant health implications [2]. Therefore, during a new pandemic, getting information from various sources, such as public health professionals, the government, and the media, can increase individual's awareness about the disease that can affect their risk perception, and consequently, their adoption of preventive measures [7].

A study conducted in Pakistan concluded that the female population of Pakistan perceives greater risk as compared to males [8]. Another study concluded that 65% of the respondents believed that the risk of COVID-19 is greater than what is being communicated to the general public [9]. The most prevalent source of information reported by individuals regarding the COVID-19 was media (85%), followed by the health officials (13%).

There is a sense of public distrust among people about the dramatic pandemic scare over the media. Therefore, people fail to give attention to the advices conveyed to them. Furthermore, there is little known about the disease yet, which makes people uncertain about their choices. Further, there is a dearth in this area of knowledge particularly in this part of region. Thus, understanding the role of specific perceptions in motivating people to engage in precautionary behavior may help public health personnel to improve their messages about outbreak of new disease.

The aim of this study is to assess the effect of perceived risk of COVID 19 on adopting protective measures among adult population in Pakistan.

## Methodology

### Study design

A cross-sectional study was conducted on adult population of Pakistan aged 18 – 60 years. The study population was conveniently enrolled into the study.

### Survey collection tool

A self-administered survey questionnaire was designed

using Redcap and link of survey questionnaire was sent to study population through Facebook and WhatsApp. The survey questionnaire was developed based on previous studies related to risk perception and behavioral changes [7]. Questionnaire was divided into four parts. First part included information related to socio demographic details of study participants including their age, gender, educational status, profession, ethnicity and comorbidity.

Second part of questionnaire assessed knowledge of the study participants about COVID-19 including its mode of transmission, incubation period and standard preventive measures. One point was given for correct answer and no point was given on wrong answer. Total knowledge score was calculated by adding the score of all correct answers.

Third part of questionnaire included information about the frequency of using protective measures against COVID 19. This part of survey questionnaire is based on five-point Likert scale (5 being the highest and 1 being the lowest). Fourth part of questionnaire inquired about risk perception of COVID-19 including risk of acquiring infection, risk of getting severe illness and risk of dying. It was based on five-point Likert scale (5 being the highest and 1 being the lowest).

The questionnaire was pre-tested on 12 adult individuals to test the face validity of the questionnaire. Where the question was not comprehensible by the participant, it was modified.

### Data collection procedure

The survey was administered through social media. All the individuals in the target population was invited to be a part of this study. The URL link of this survey was developed using Redcap. Social media platform including Facebook and WhatsApp were used to share link of this survey with the study population.

### Data analysis

Data was analyzed using the statistical software STATA Version 16.0. The descriptive statistics were calculated as mean  $\pm$ SD/ median (IQR) as appropriate. Frequencies and proportions were computed for categorical variables. Knowledge score was calculated for each participant by adding all correct responses given. Total score of all components of risk perception was computed out of 20. Total score of protective behavior was computed for each individual. Ordinary least square was used to determine the relationship between adoption of protective measures (dependent Variable) and perceived risk (independent variable). Univariate analysis was done with a p-value of  $\leq 0.25$  used as a cut-off.as. Before analyzing the final model, assumption of Homoscedasticity and normality distribution of residuals was checked. Assumption of homoscedasticity was fulfilled. Normality assumption of residuals was assessed by normal probability plot, the data was normally distributed. Outliers were identified using Studentized residuals, leverage, and Cook distance using cut-off  $\pm 3$ ,  $\pm 0.5$  and  $\pm 1$  respectively. All variables significant at univariate analysis were put into multi variable model using a stepwise approach.

All variables in the multivariable model with  $p$ -value  $\leq 0.05$  was considered significant. Multicollinearity of the final model was assessed using VIF (Variance Inflation Factor).

### Ethical considerations

The ethical approval of the study was taken from Institutional Review Committee of Interactive Research Development. An electronic informed consent was taken from participants at the beginning of the survey while inviting the participants to join the study. The information of the participants was kept confidential and anonymous.

### Results

There were total of 185 respondents, 102 males and 82 females. The mean age of study participants was 31.29 (SD=8.35) years and ranged from 18 to 60 years. Majority of the participants (52.17%) were single. 47.57% attended at least bachelor's degree program and only 12.97% of respondents did not have any formal education. Nearly half of the respondents (48.65%) spoke Urdu as their mother tongue (Table 1).

29.34% claimed to have no contact outside their home. However, 27% of participants had more than 12 and 23.95% had contact with 5 to 12 people outside their home during last 24 hours. Most of the respondents (24.02%) used social media as the most common source of information to get updates about COVID-19, followed by websites (20.47%) and television (19.60%) (Table 2).

### Risk perception towards Covid-19

Related to risk perception, overall mean score was 12.11 (SD=3.97) and the highest mean score was for risk of getting infection and risk of transmitting illness to loved ones that is 3.38 ( $\pm 1.28$ ) and 3.24 ( $\pm 1.40$ ) respectively. The mean score of perception of risk of dying of respondents is 2.52 ( $\pm 1.18$ ) Tables 3,4.

### Precautionary health behavioral practice related to Covid-19

Avoiding people who are sneezing or coughing has the highest mean score 4.25 ( $\pm 1.02$ ) while the lowest mean score was removing mask while talking to other people (Table 5).

### Effect of risk perception on Precautionary health behavioral practice related to Covid-19

Total five outlying values were identified. Hence, only 180 observation were subjected to multiple linear regression model. The model then shows better fit with the data (adjusted  $R^2 = 74.72\%$ ) having four independent variables. Independent variables that were significantly associated with adaptation of protective behaviors in multivariable linear regression include risk perception towards covid-19, gender, educational status and knowledge towards covid-19 (Tables 5,6). Findings from multivariable regression suggests that increase in one unit of risk perception is associated with increase in 0.39 units in

overall protective behavior towards covid-19 after adjusting with knowledge, gender and educational status.(regression coefficient 0.39 (95% CI: 0.10–0.68,  $p$ -value: 0.007). Similar findings can be observed with overall knowledge towards Covid-19 stated that with an increase in 1 unit of knowledge is associated with an increase of 0.045 units of in overall protective behavior (regression coefficient: 0.38, 95% CI 0.008–0.77,  $p$ -value 0.045) after adjusting with risk perception, gender and educational status.

**Table 1:** Sociodemographic Characteristics of Participants.

Variable	n (%)
Age*	31.92 (+/-8.35)
Gender	c
Male	102 (55.43)
Female	82 (44.57)
Marital Status	
Single	96 (52.17)
Married	85 (46.20)
Divorced	3 (1.63)
Educational Status	
No Formal education	24 (12.97)
Primary	8 (4.32)
Secondary	32 (17.30)
Matric or Intermediate	33 (17.84)
Graduate	88 (47.57)
Mother Tongue	
Urdu	90 (48.65)
Sindhi	33 (17.84)
Pushto	14 (7.57)
Punjabi	21 (1.35)
Other	27 (14.59)
* mean (SD)	

**Table 2:** Number of Contacts Outside Home.

	n (%)
No contacts	49 (29.34%)
1-5	32 (19.16)
6-12	40 (23.95%)
More than 12	46 (27.54%)

**Table 3:** Common source of Information for Covid-19 (Multiple Response).

	n (%)
Internet Websites	104 (20.47%)
Social Media	122 (24.02%)
Family or friends	66 (12.99%)
Television	100 (19.69%)
Newspaper	36 (7.09%)
Doctor	42 (8.27%)
Government Agency	27 (5.31%)
Others	11 (2.16%)

**Table 4:** Risk Perception towards Covid-19.

Items (Scored by 5-Point Likert Scales)	Mean (SD)
Risk of getting Infection	3.38 (1.28)
Risk of getting a serious illness	2.98 (1.23)
Risk of dying	2.52 (1.18)
Risk of transmitting infection to loved ones	3.24 (1.40)

**Table 5:** Precautionary Behavior.

Behavior Item	Mean (SD)
Do you avoid people sneezing or coughing?	4.25 (1.02)
Do you avoid large gathering?	4.18 (1.01)
Do you avoid touching face, mouth, nose and eyes with unwashed hands?	3.91 (1.07)
Do you wash your hands appropriately for at least 20 seconds?	4.17 (0.93)
Do you avoid sick people?	4.11 (1.15)
Do you stay home from school and work?	3.29 (1.51)
Avoid travel to affected areas? (areas under smart lock down or areas with high number of cases)	4.16 (1.12)
Using handkerchief or tissue paper when sneezing or coughing?	4.06 (1.09)
Do you wear a mask?	4.36 (0.96)
If there is a need to talk to other people, do you remove your mask?	2.32 (1.29)
Do you wear gloves?	2.39 (1.37)
Do you use hand sanitizer when went outside home?	4.04 (1.17)
Do you adhere to the regulations of lock down?	4.02 (1.02)

**Table 6:** Univariate and Multivariable Analysis Results.

Variable	Unadjusted B (95% CI)	P-value	Adjusted B (95% CI)	p-value
Risk Perception towards covid-19	0.45 (0.13-0.77)	0.006	0.39 (0.10-0.68)	0.007
Gender				
Female				
Male	-4.59 (-7.12 - -2.06)	0.0001	-3.42 (-5.71- -1.13)	0.004
Education Status				
No education				
Primary	-6.29 (-12.60-0.025)		-6.97 (-13.13- 0.82)	
Secondary	5.55 (1.37-9.73)	0.0001	5.44 (1.35-9.54)	0.007
Matric/ Intermeidate	4.20 (0.057-8.35)		4.09 (0.076-8.11)	
Graduate/Post-Graduate	9.91 (6.34-13.48)		8.66 (5.08-12.23)	
Knowledge score related to Covid-19	0.60 (0.234-0.98)	0.001	0.38 (0.008-0.77)	0.045

## Discussion

Current research provides early evidence and timely assessment to help understand the effect of risk perception on the overall protective behavior towards the COVID-19 outbreak among the adult population of Pakistan.

Findings of our study showed that knowledge related to COVID-19 had a positive impact on overall protective behavior, which supports the findings of previous studies [10,11]. It is evident that people who are aware of any disease and its impact

are more likely to adopt healthy behaviors and precautionary measures to prevent themselves and others from the illness. On the other hand, certain studies did not support the relationship between knowledge and protective behaviors, reporting that knowledge does not necessarily lead to protective healthy behaviors [12,13]. This may explain the observation that although awareness of the pandemic is relatively strong, some individuals still do not comply with the protocols and precautionary measures defined by authorities. One of the significant findings in the current study is that participants perceived 1) risk of death, 2) risk of getting infected, 3) risk of transmitting infection to a loved one and 4) risk of serious illness as highly unlikely. This is evident with their mean score, but it creates an impacts on the overall protective behaviors. This finding is in agreement with a study conducted in Iraq, which reported respondents adopting precautionary measures including handwashing, wearing masks, wearing gloves and adherence with lockdown regulations [14]. Additionally, in a review conducted by Bish & Michie for identifying the essential attitudinal and demographics of different kinds of protective behavior, it was found that educational status is highly associated with increased chance of implementing protective behaviors [15]. Our analysis supports this finding as it shows that educational status is also associated with increased protective behavior adaptation. Respondents with more years of schooling were more likely to adopt healthy behaviors.

Results of our study shows that gender can also influence in protective behaviors towards COVID-19. These findings are consistent with the previous studies where females were found to be more engaged in protective behaviors compared to males [10]. This shows that women are more likely to practice healthy protective behaviors like wearing masks, washing hands, cleaning items and surfaces and reducing their exposure to affected areas like crowded places. This is somehow related to the perception of women being more vulnerable to illness [16]. This vulnerability of females makes them to be perceived as more susceptible to getting an illness. Therefore, to prevent themselves and their loved ones, they take better care of themselves and their surroundings.

Even though, the current research shows that the participants engage in prominent healthy protective behavior, certain protective behaviors have low mean score, including removing mask while talk to people and not wear gloves. It is evident from literature that change in behavior is quite challenging and also change in behavior can be an unstable and unsteady process that requires time and knowledge for understanding things and its significance.

## Research implications

Efforts are required to understand the factors that can promote precautionary behaviors in the time of Covid-19 pandemic. First, the complex nature of the transmission of infectious diseases indicates that actions by many individuals can have a substantial effect on an outbreak's trajectory. Individuals, however, do not take precautions if they do not have the knowledge on outbreak or have inaccurate or insufficient information. Therefore, in consistent with the





findings of our research, more detailed COVID-19 information predicted greater precautionary actions, combined with a fact that the origin and existence of COVID-19 are already myths and conspiracy theories. We recommend that campaigns should be developed to promote adequate knowledge about Covid-19 to address misinformation and misconception about the illness. Real risks may be low in unaffected areas, but there is a likelihood of elevated levels of risk perception due to the global media coverage of the pandemic. The scientific community can therefore exploit this to discover ways to better communicate threats to people without creating fear unnecessarily.

### Study limitations

One of the major advantages of this study is the ability to get timely responses in the situation where the data collection was difficult because of health reasons. Nonetheless, the current study has certain limitations. Firstly, the number of participants is small as compared to the target population. Secondly, practicality and notion of online surveys in this region is quite low as less numbers of people are aware of this. The use of online survey in this study may have resulted in the less representation of the uneducated and unprivileged individuals. It means that views of this segment of the society was left out in the study that raised an issue on study coverage. Therefore, findings of this study are not generalized to the whole study population. However, in the future, it is intended to conduct the similar survey targeting the general public using more comprehensive methods.

### Conclusion

The current study showed that risk perception can create impact on precautionary behaviors towards Covid-19 and knowledge significantly predicted precautionary behavior. Besides this, gender and educational status are also important variables significantly associated with the precautionary behaviors. Females are more likely to show precautionary behaviors as compared to males. We believed that awareness campaigns related to Covid-19 need to focus more on awareness of risks that are associated with infection for making individuals to be engaged in the precautionary behaviors.

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