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Impact Of Health Communication Via Social Networking Sites On Preventive Behavior Intentions: The Mediating Effect Of Risk Perception, Protective Measures And Self-Efficacy

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Abstract

COVID 19 coronavirus is one of the most contagious diseases in the history of the world. Therefore, this study was conducted to tackle the concern of creating preventive behavior among the public. The current study attempted to propose a hypothetical structural equation model to examine the connection among social networking sites, risk perception, protective measures, self-efficacy, and preventive behavior. The current empirical research was held in Azad Kashmir, Pakistan. The researcher used internet source to collect questionnaires. The study results specified that social networking sites and control variables have no positive significant and direct association with preventive behavior. The study found that social networking sites effect indirectly on preventive behavior through risk perception, protective measures, and self-efficacy. Risk perception, protective measures, and self-efficacy have an optimistic significant and direct relation with

preventive behavior. The conceptual framework provides valuable data for practitioners and policymakers to boost preventive behavior by implementing suitable, recommended precautions by using social networking sites.

Keywords: Social networking sites, risk perception, protective measures, self-efficacy, preventive behavior intentions

Introduction

World health organizations are struggling to find a way to control the spread of coronavirus nCov-2019, which identified with the symptoms of pneumonia in Wuhan (Y. Liu, Lv, Tang, & Differences, 2021), China, in the mid of December 2019 ((WHO), 2020; Bogoch et al., 2020). Coronavirus appeared to be one of the dangerous diseases in the history of the world. To date, it has killed more than 12 lacs people around the world, and almost 27 million have been infected. It is having a devastating impact on human, social, and economic aspects of the global economy. Its drastic spread might alter the structure of world economies and disrupt health care systems.

One of the main factors that aggravated the Corona outbreak in the country was the systematic failure to exchange current information with the community. The breakdown of traditional ways increased the usage of Social networking sites by the people to get timely information (M. Lee, Ju, & You, 2019). Social networking sites have become an alternate source of perceived facts while traditional media cannot arrange for sufficient information. According to the report of the Pakistan Telecommunication Authority (PTA), the use of the internet increased by 15% during coronavirus lockdown in the country. Thus, the Pakistani community grew social networking sites to gain widespread access to the important COVID-19 related information during the outbreak (Lee et al., 2016; Yoo et al., 2018).

Given the effected increase in the utilization of social networking sites during the COVID-19 epidemic, it is surprising that the information exchange public's engagement through Social networking sites significantly influences their preventive behaviors. Pakistan is among those countries which are at significant threat due to this fatal disease. The government officials, experts, and complete health system are trying their best to save the country from the destructive potential of this disease and control its spread as much as they can. On the other hand, officials and experts also warn that in case of any mishandling or spread of this disease, the country's healthcare facilities are not well equipped to manage or deal with the resulting situations. In the case of the spreading of Coronavirus, the officials and experts are worried about a more significant surge in infections that they fear our health system collapse.

Scientists worldwide recommend preventive behavior as it is the only solution or tool to combat the threat from this disease. The capability of this fatal disease to hurt human beings has been recognized all over the world. However, people in most countries generally and specifically in

developing countries like Pakistan are not taking it seriously. Therefore, this study aimed to address the creation of preventive behavior among people, particularly. In this regard, the most essential factor is recognizing the exposure of social media. Along with social media exposure, knowledge about the disease and the exchange of information also plays a vital role in developing preventive behavior and combating this disease. Therefore, the researchers designed a survey based on these indicators to see the sights of these relationships and their importance in dealing with COVID 19 Coronavirus.

This study is structured in different sections; literature review in Section 2 and Section 3 provides hypothesis relationship between the variables with diagram and structured hypothesis. Section 4 presents the research method, data collection process, analyzing results, and verifying the hypotheses. Section 5 consists of a discussion and conclusion.

Literature review

The role of SNS in evolving pandemics

SNS implements different tools to attain and spread facts with others. However, these social networking sites add to the social erection concerning risk related information. During the outbreak of any infectious disease and adversities such as the 2011 Tsunami, Earthquake in Pakistan in 2008, Social networking sites have contributed significantly to exchanging information from time to time about the critical situation (Yi & Kuri, 2016). When these uncertain conditions occur in the country, Social networking sites have played an essential tool as an available connection for individuals to share facts with their friends, family, and fellow citizen. According to the prior investigation, Facebook and Twitter found an active source of information, experiences, and opinions about the epidemic during the HINI 2009 virus(Ahmed, Bath, Sbaffi, Demartini, & Journal, 2019). During an infectious disease outbreak in China in 2003, Chinese citizens faced a critical situation to acquire information from traditional media. At that time, Chinese individuals found the internet as an alternative source to obtain facts (Tai & Sun, 2007).

During the epidemic crisis, SNS has become a necessary feature of risk communication, and it comes with the progressive innovation of Web 2.0. For example, during HINI 2009, the United States used Twitter and Facebook to communicate with their communities about public health issues. This method enables the organization to build an affirmative reputation and make the public attention to their receptiveness, preparedness, and integrity for impending epidemic crises (Wan & Pfau, 2004).

During the MERs outbreak, social networking sites have participated firsthand in controlling infectious diseases because infectious diseases quickly spread from one to another. So, there is no alternative way to communicate with society except the internet. In a critical time, people can perceive information and exchange it through social networking sites with their friends, neighbors,

and family related to the disease at any time (Jang & Baek, 2019). For example, (Ding & Zhang, 2010) said that HINI flu was reported first through social media sites. Due to this reason, private and government health institutes used social networking sites to notify the current emerging condition of diseases such as Ebola and Zika outbreak (Lazard et al., 2015; Chan et al., 2018).

H1: Direct relationship between the use of Social networking sites and preventive behavior among people from Corona COVID-19 affected areas.

Social networking sites on risk perception

In this modern time, reducing the public's risk perception can be significantly achieved by social media (Snyder & Rouse, 1995). People do not know about health-related issues during an infectious disease, so they usually depend on social media to learn about the risk issues. Previous studies have revealed that social networking sites have significantly influenced health issues during Avian flu and H1N1 flu (Boudewyns, Himelboim, Hansen, & Southwell, 2015; Oh, Paek, & Hove, 2015). Risk perception refers to the conceptual module of risk and health communication area. Risk perception generally elaborates on the people's negative estimation of possibilities of health issues or instances of which the disease can occur. Previous research designated risk perception into two dimensions (Pask & Rawlins, 2016), severity refers to public's perception about the harmfulness and seriousness while, susceptibility refers to the possibility of experience regarding an infectious disease outbreak (El-Toukhy, 2015; Rimal & Real, 2003). In particular, during any infectious disease outbreak, people do not rely on the perceptive factors of severity and susceptibility but also use practical aspects of worry about health-related issues (Freimuth & Hovick, 2012; Oh et al., 2015).

Some key components can significantly influence risk perception (Coleman, 1993; Dudo, Dahlstrom, & Brossard, 2007), while Paek et al. (2016) evidenced the same. Some years ago, when people did not know about the infectious disease outbreak, they relied on traditional media such as newspapers and TV and engaged in recreation as a substantial information source (Lin and Lagoe, 2013; You and Ju, 2015). Health agencies used media to deliver information and news regarding health emergencies. So, the media helped people recognize the estimation of risk and shaped their perception of health-related issues. But after the progressive innovation of Web 2.0, people have changed their use of media; now, people have recently engaged and habited by SNS such as Twitter, Facebook, and YouTube, etc. (Mano, 2014; Lin et al., 2016). In elaborating on social media's influence on risk perception, some previous studies suggested that the digital source can be an effective source during intense interpretations of the risk problems (Snyder & Rouse, 1995). Today, networking sites of social media have become a significant source of information related to the SARS-CoV-2 virus outbreak (Cinelli et al., 2020). So mainly, risk perception is a vital source to mediate social networking sites' effect on preventive behavior, which escalates the desired preventive behavior during, for example, the Coronavirus outbreak.

H2: There is a direct relationship between the use of Social networking sites and risk-perception among people from Corona COVID-19 affected areas.

H3: There is a direct relationship between risk perception and preventive behavior among people from Corona COVID-19 affected areas.

H8: Risk perception mediates the effect between the use of Social networking sites and preventive behavior among people from Corona COVID-19 affected areas.

Social networking sites on protective measures headed for preventive behavior

Non-pharmaceutical precautions such as wearing masks, hand hygiene, quarantine, cancellation of any gathering events, and workplace and educational institute's closures lead to preventing physical transmission of an infectious disease (Group, 2006; Aledort et al., 2007). They have become a credible source to significantly influence the extent of the epidemic (Leung, Lam et al., 2003, Halloran, Ferguson et al., 2008). Properly hand washing with good alcoholic sanitizer and soap is offered by the health experts to avoid the feast of transmission of the virus during outbreaks (Rubin et al., 2009b), and this strategy has become ultimate of researched preventive precaution and behavior (Lin et al., 2014). Numerous studies revealed that hand hygiene and wearing mask are the most effective protective measures in reducing infection (Pittet, 2001 and Aledort et al., 2007). Medical experts recommended wearing masks and using alcoholic hand sanitizers for handwashing as an essential strategy for public and health workers to prevent the epidemic during the outbreak (WHO, 2014).

Therefore, it is essential to quantify the possible possessions of information on preventive information on the outbreak of COVID-19. We hypothesize that communicating COVID-19 related information through social networking sites positively affects protective measures towards the Coronavirus outbreak. Specifically, this study emphasizes the active routine of SNS by means of a health communication in promoting intense hand hygiene and wearing the mask; these are vital components of protective measures in the COVID-19 outbreak guideline ((WHO), 2020) to prevent physical spread.

H4: There is a direct relationship between the use of Social networking sites and protective measures among people from Corona COVID-19 affected areas.

H5: There is a direct relationship between protective measures and preventive behavior among Corona COVID-19 affected areas.

H9: Protective measures mediate the effect between the use of Social networking sites and preventive behavior among people from Corona COVID-19 affected areas

Social networking sites on Self efficacy to preventive behavior

Self-efficacy pertains to conviction in their capability to perform the complex undertaking (Bandura, 1990). During an infectious disease outbreak, an individual believes that the competency influences their behavior to fight against the problem, such as they do for adequate management(Yıldırım & Güler, 2020). Previous research suggested that preventive behavior focuses on two dimensions (Li et al., 2014). According to the expended parallel process model (EPPM) (Witte, 1992; Witte, 1994), it is necessary to comprehend an individual's knowledge and react during a contagious disease outbreak. It depends on two essential dimensions of willingness to operational processes in the course of a contagious disease outbreak; perceived threats and self-efficacy (Balicer et al., 2010 and Zhang et al., 2015). When both dimensions are high, at that point, people are probably recommended preventive behavior to avoid the threats of risks during an infectious disease outbreak.

Individuals with low self-efficacy probably feel powerless to fight with any problematic situation to engage in preventive behavior (Yıldırım & Güler, 2020). Self-efficacy is also considered one of the most critical dimensions of preventive behavior for the duration of a catching disease outbreak. For example, for the duration of the 2009 influenza eruption in the Netherland, perceived self-efficacy took preventative measures to control the infectious virus outbreak (Shi & Smith, 2016). During public health issues like the Coronavirus, self efficacy shows an essential part in encouraging the public to overwhelm their problematic social conditions (Yıldırım & Güler, 2020). Social media is intended to modify individuals' desires, concentration and get essential news (Lin & Lu, 2011). Specifically, when individuals use social networking sites, they seek and acquire information related to the current social problem (Hyun & Kim, 2015). Thus, people utilize SNS to satisfy their particular desires and formulate self efficacy in the direction of preventive behavior. So, during uncertain conditions such as the Coronavirus outbreak, an individual holds different self-efficacy levels and relies on social networking sites to acquire information toward preventing behavior.

H6: There is a direct relationship between the use of Social networking sites and self-efficacy among people from Corona COVID-19 affected areas.

H7: There is a direct relationship between self-efficacy and preventive behavior among people from Corona COVID-19 affected areas.

H10: Self-efficacy mediates the effect between use of Social networking sites and preventive behavior among people from Corona COVID-19 affected areas

Control variables

Social factors are considered connected with the following during an infectious disease outbreak, preventing precaution regarding preventive behavior. Education and income have been shown as critical socioeconomic components that influence preventive behavior (Lau et al., 2003; Lau et al., 2007; Liao et al., 2011; Kim & Jung, 2017). But some studies argued that the elderly (Tang & Wong, 2004) and females (J. Lau et al., 2003) have a higher likeliness to use preventing measures such as wearing a mask, hand washing with alcoholic hygienic, etc. Similarly, numerous researches investigated a significant relationship between socioeconomic components and preventive behavior that individuals with a higher level of education, elderly, and females tend to avoid joining events and public places during the epidemic condition. While one study reported that in the course of the outbreak of swine flu in the UK in 2009, people with low income, jobless and lower educational levels also likely to avoid crowded places and use public transport (Rubin et al., 2009b).

Therefore, it appeared that social factors tend to influence preventive behavior, but some research did not manifest a relationship existing between social determinants and avoidance behavior (Bish & Michie, 2010). It is also critical to evaluate the effects of all social and economic factors on specific categories of preventive behavior. Still, we will examine the potential impact of societal determinants on preventive behavior during the epidemic of COVID-19, with the following hypothesis.

H11a: There is a direct relationship between gender and preventive behavior among people from Corona COVID-19 affected areas.

H11b: There is a direct relationship between education and preventive behavior among people from Corona COVID-19 affected areas

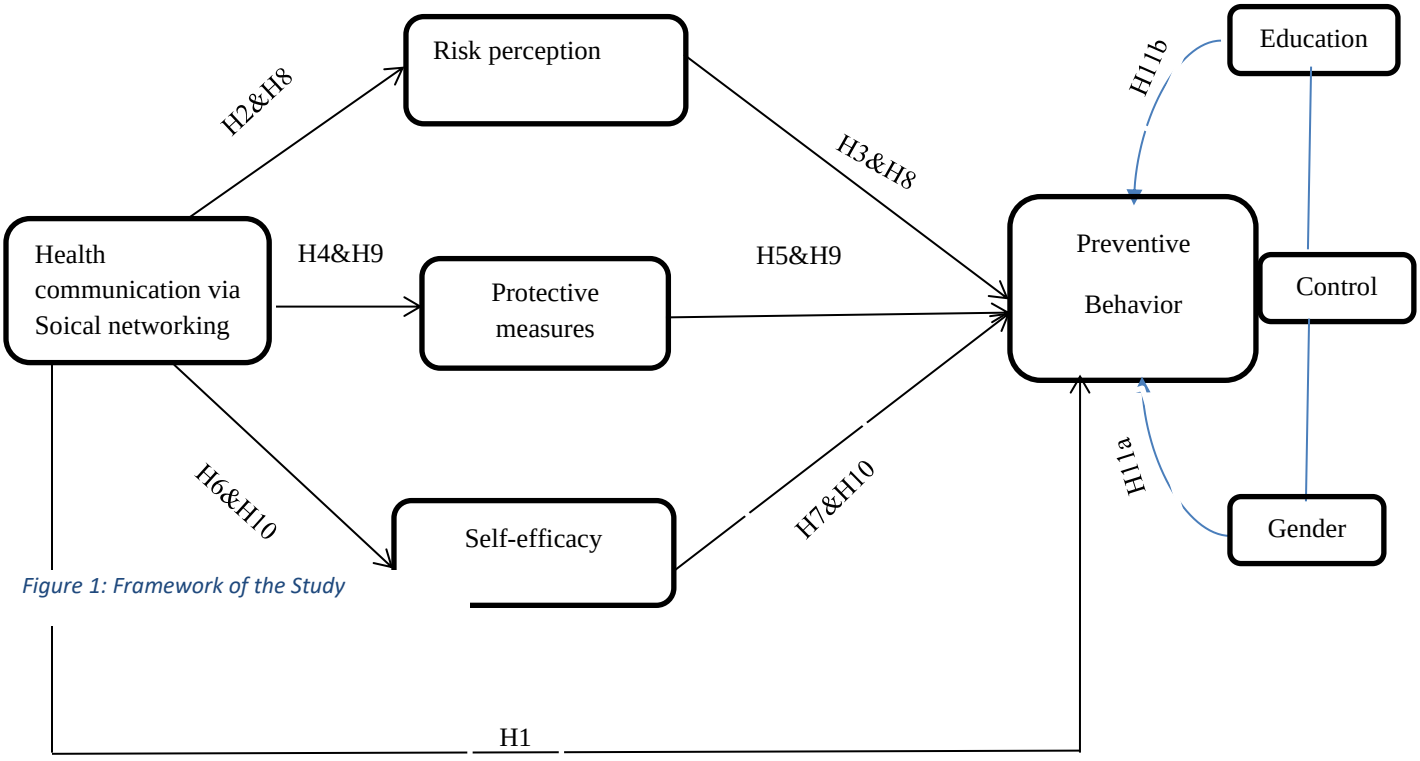

Figure 1: Framework of the Study

Research Methodology

Research methods play an essential role in the achievement of the overall objectives. Different principles and methods are used for collecting and evaluating the research data. This section explained the primary data collection and data analysis sampling technique with the systematic procedure used to identify the current objectives—a study conducted during the COVID-19 outbreak in March 2020. During covid-19, it was very difficult to get a questionnaire physically so we used social networking sites; through non-probability sampling. The reason behind the selection of non-probability is that we captured the whole state of Azad Kashmir, Pakistan so it was very difficult to select another sampling method during covid-19. So researchers conducted an online survey utilizing different social networking sites such as Instagram, Twitter, Facebook, WhatsApp, and Email. A researcher posted the questionnaire link to Azad Jammu and Kashmir, Pakistan's different social groups on different social networking sites. A connection was established, and the organized survey was distributed to respondents via questionnaire link through various social networking platforms such as Facebook, Twitter, WhatsApp, and email. The choice of online data collection utilizing social networking platforms was made to uphold the social distancing philosophy. This study is focused on individuals from various geographic locations of Azad Jammu and Kashmir, Pakistan.

Measurement items of variables were gathered from previous research for an initial list of items. Social networking sites (Laranjo et al., 2015), self-efficacy (Phua, 2013), risk perception (Yue et al., 2020; Zhu, Deng, & Health, 2020), protective measures (Meier et al., 2020) and preventive behavior (P. L. J. C. Liu, Behavior, & Networking, 2020). Convenience sampling is proposed to select the respondents, which allows sizeable respondents. Consequently, this research probable a minimum sample size of 500 in this study.

To check the research questionnaire's efficiency before applying data collection, a researcher conducted a pilot test to check the inside consistency between the variables. T-test and Chi-square tests were used to compare the consistency between the first and last 100 respondents based on socio-economic factors, including gender, education, and age. There were no significant differences observed between the groups of response at ($p > 0.05$). According to Table 1, out of 500 respondents, 361(72.2%) were male, and 139 (27.8%) were female. The questions related to the research objectives, such as social networking sites, protective measures, risk perception, self-efficacy, and preventive behavior.

Total numbers of 500 respondents were selected through the convenience sampling technique. A survey link was dispersed to all of them, and the first 500 respondents were chosen for analysis. They were selecting data analyzed with SPSS AMOS 24. The theorized structural relationship among observed variables assessed based on the structural model-direct model, mediation for testing the hypotheses. This presented two structural models used for analysis. They were bootstrapping used for the mediation/indirect hypothesis (Preacher & Hayes, 2008). The bootstrapping technique is a supplementary method proposed for mediation analysis to determine the magnitude of the indirect effect, determine the statistical significance of the estimate, and get a sense of the distribution of the estimated parameter (Mallinckrodt et al., 2006).

Table 1:

Variable	**Category**	**Frequency**	**Percentage**
Gender	Male	361	72.2
	Female	139	27.8
Age (Years)	20-30	79	15.8
	31-40	150	30.0
	41-50	100	20.0
	51-60	80	16.0
	61-above	91	18.2
Qualification	Bachelors	114	22.8
	Masters	192	38.4
	Postgraduates	132	26.4
	Diplomas	51	10.2
	Others	11	2.2

1-10000	48	9.6
10000-20000	99	19.8
20000-30000	165	33.0
30000-40000	113	22.6
40000-above	75	15.0

Variables Measurement

To calculate the reliability and validity of the research, we espoused measurement items from prior empirical analyses. All variables measured using multiple different items and were comprised on a five-point Likert scale, ranged from 1 to 5 (strongly disagree to 5 strongly agree). The hypothesis measured based upon a scale used in different studies (Bae & Chang, 2020; Breakwell, Fino, & Jaspal, 2021; Ko, Cho, & Roberts, 2005; G James Rubin, Richard Amlôt, Lisa Page, & Simon Wessely, 2009a; W. Yoo & Choi, 2020). A descriptive statistic for the sociodemographic components is shown in Table 1.

We first analyzed the reliability of all variables by calculating Cronbach's alpha; this model utilized, which expresses the inside consistency between items. The ideas of reliability and validity are used to examine the effectiveness of research. These criteria illustrate how successfully a methodology, approach, or test assesses something. Reliability is defined as the consistency of a measure, while validity is defined as the correctness of a measure. The reliability examination technique is usually used to estimate measure, and give material about the relations among singular objects in the scale. Subsequently, all the developed variables show a one-dimensional and goodness fit model. In contrast, Cronbach's alpha estimates lie between 0.80 to 0.92, indicating a great sign of internal consistency and reliability. The values of all variables surpassed the limit of 0.7 according to the standard of (Nunnally, 1994). By evaluating the factor loadings, the convergent validity of the estimation items acquired and composite reliabilities factor loadings are between 0.65 to 0.92, which is above the recommended level of 0.35. Hence, they are all at a significant level (Hair et al., .1995). Average variance estimation was calculated to test the discriminant validity. According to the results in table 2, the values of CR lies between 0.81 to 0.90 (all values surpassing the threshold of 0.7) (C. Fornell & D. F. J. J. o. m. r. Larcker, 1981; Hair, 2009). At the same time, the value of AVE ranged from 0.55 to 0.78 (these values are also exceeding the threshold of 0.5) (C. Fornell & D. F. J. J. o. m. r. Larcker, 1981; Hair, 2009). These consequences showed that all the variables have adequate convergent validity.

Table 2: validity and reliability

Construct	**Mean**	**SD**	**Items**	**Factor loading**	**AVE**	**CR**	**Ca**
Social networking sites	3.78	0.54	SNS1 SNS2	0.76 0.72	0.55	0.81	0.80

			SNS3	0.65			
			SNS4	0.67			
Risk Perception	3.53	0.55	RP1	0.95	0.61	0.89	0.88
			RP2	0.76			
			RP3	0.70			
			RP4	0.83			
Protective	3.76	0.68	PM1	0.73	0.71	0.88	0.86
Measures			PM2	0.90			
			PM3	0.82			
			PM4	0.76			
Self-efficacy	3.57	0.71	SE1	0.87	0.77	0.93	0.92
			SE2	0.85			
			SE3	0.70			
			SE4	0.81			
Preventive	3.59	0.75	PB1	0.71	0.78	0.90	0.90
Behavior			PB2	0.78			
			PB3	0.81			
			PB4	0.92			

Structural Equation Model

Structural Equation Model technique used to check the relationship between hypotheses. Figure 2 and Table 3 showed the statistical consequences of all relations. The degree of fit analyzed by using the following indicators: absolute fit measures, containing chi-square minimum/df statistic, usually this statistic used to assess the inside discrepancy between the hypothesis, root mean square error of approximation (RMSEA); goodness-of-fit (Amalia, Maupa, Parawansa, & Entrepreneurship), incremental fit measures, including normed fit (NFI), the comparative fit (CFI); and parsimonious fit measures, including parsimony goodness-of-fit (PGFI) and normed parsimony fit (PNFI) indices were calculated to assess the goodness of fit according to the threshold of (Hu & Bentler, 1999). The most commonly used indices are CFI and NFI; both values are greater than the threshold (Hu & Bentler, 1999). Both indices measure the appropriate improvement in the hypothesis model fit. RMSEA index defines how glowing the hypothesized model fit sample data. Table 2 shows that all the indicators have in acceptable ranges.

According to table no.4, the diagonal components are the square root values of AVEs and the other components are Pearson correlation coefficients between the constructed variables. All outcomes showed adequate discriminant validity between the construct (C. Fornell & D. F. Larcker, 1981). The square roots of all the constructed AVEs are higher than the correlation among all variables. Values 1 to 7 mean (1= Social networking sites to 7=Gender)

Values 1 to 7 means (1= Social networking sites to 7=Gender).

Table 3: Overall fit index of the CFA model

Fit Index	Score	Recommended threshold value
Absolute fit measures		
CMIN/df	2.16	≤2[a]; ≤ 5[b]
RMSEA	.030	≤0.8[a]; ≤0.10[b]
Incremental fit measures		
NFI	.919	≥0.90[a]
AGFI	.937	
CFI	.926	≥0.90[a]
Parsimonious fit measures		
PGFI	.075	The higher, the better

Table 4: correlations

	1	**2**	**3**	**4**	**5**	**6**	**7**
Protective measures							
Social networking sites	.22**						
Self-efficacy	.24**	.45**					
Risk perception	.18**	.38**	.29**				
Preventive behavior	.45**	.22**	.40**	.36**			
Education	-0.03	-0.03	-0.08	-0.02	-0.01		
Gender	0.02	0.02	-0.08	-0.04	-0.01	-0.01	

*= Significant at 5% Significance level & **= Significant at 10% Significance level

Table 5: Regression Weights: (Group number 1 - Default model)

			β	S.E.	C.R.	P	effect	Decision
Protective measures	<--	Social networking sites	.216	.051	4.934	***	+	Supported
Risk perception	<--	Social networking sites	.377	.044	9.088	***	+	Supported
Self-efficacy	<--	Social networking sites	.448	.051	11.203	***	+	Supported

Preventive behavior	<--	Social networking sites	-.072	.058	-1.586	.113	-	Not Supported
Preventive behavior	<--	Self-efficacy	.290	.042	6.940	***	+	Supported
Preventive behavior	<--	Risk perception	.250	.048	6.215	***	+	Supported
Preventive behavior	<--	Protective measures	.369	.042	9.642	***	+	Supported
Preventive behavior	<--	Gender	.014	.057	.363	.717	-	Not Supported
Preventive behavior	<--	Education	.027	.026	.713	.476	-	Not Supported

For H1 related to the positive effect of Social networking sites on preventive behavior, according to the consequences of Social networking sites on preventive behavior with a value of (β = -.072, p > 0.001), it's confirmed that there exists no significant direct relationship between social networking sites and prevention behavior. While H2, H4, and H6 related to the direct relationship between social networking sites and risk perception, protective measures, and self-efficacy. According to the result of H2 (β = .377, P <.001), risk perception has a direct positive significant relationship with health communication via social networking sites. H4 (β = .216, P <.001) predicted that receiving information convinced individuals to use protective measures towards preventive behavior during a COVID-19 disease outbreak. According to the result of H5 (β = .448, P <.001) it proved that there exists a significant direct relationship between self-efficacy.

Confirming the supported result of H3 (β = .250, P <.001), the relationship between risk perception and preventive behavior has significantly correlated to each other. H5 (β = .369, P <.001) and H7 (β = .290, P <.001) had significant direct effect on preventive behavior. According to the estimated model results, all hypotheses have a significant positive relationship between variables, proving that social networking sites and preventive behavior would be mediated by risk perception, protective measures, and self-efficacy. The results also showed that the H8a (β = .014, P >.001 and H8b (β = .027, P >.001) had no significant effect between control variables and preventive behavior. It means that no specific kind of gender and education play an important role during an infectious disease outbreak. The outcomes are shown in table 4 to validate the mediating role of (risk perception, protective measures, and self-efficacy) in the relationship between social networking sites and preventive behavior. H8, H9, and H10 predicted that receiving a higher level of health information led to a higher level of reducing risk perception, using protective measures, and boosting self-efficacy for COVID-19 resulted in a greater level of preventive behavior. However, risk perception, protective measures, and self-efficacy mediate health communication through social networking sites and preventive behavior. Therefore, all mediated hypothesizes were supported.

In this study, the indirect effect of social networking sites on preventive behavior was .388. So, it means there exists a full mediation in the relationship between social networking sites and preventive behavior.

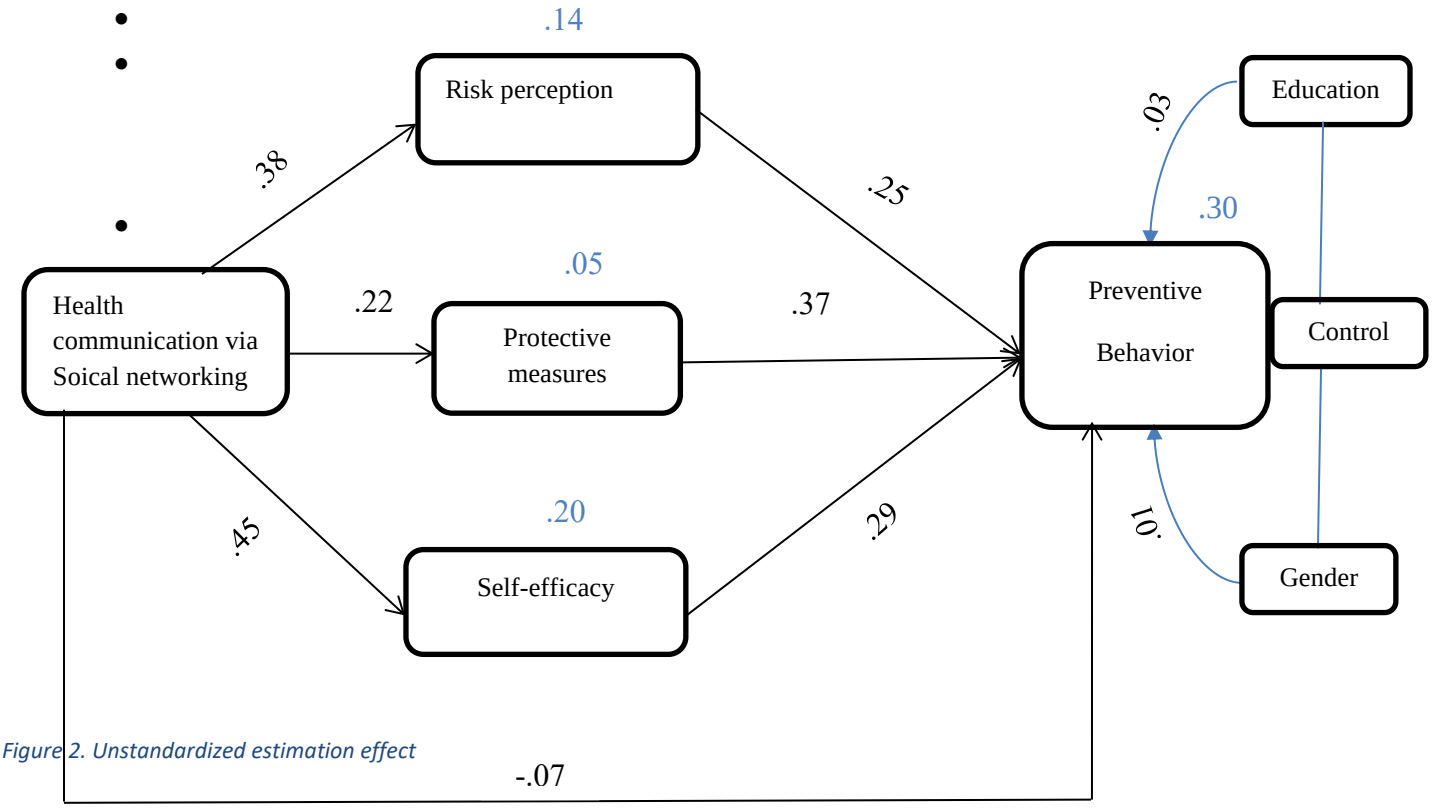

Figure 2. Unstandardized estimation effect

Table 6: Total Effect

	Social networking sites	Education	Gender	Self-efficacy	Risk Perception	Preventive behavior
Direct effect						
Self-efficacy	.568					
Risk Perception	.401					
Protective Measures	.251					
Preventive behavior	-.092	.018	.021	.292	.301	.405
Indirect effect						

Preventive behavior	.388					
Total effects						
Preventive behavior	.297	.018	.021	.292	.301	.405

Discussion

The aim purpose of the current study was to observe the effect of health communication vis social networking sites related to COVID-19 information on risk perception, protective measures, and self-efficacy and consequent the influence of these variables on COVID-19 preventive behavior. Our results support the health communication via social networking sites and their recommended precaution underlying the mechanisms in an exclusive health context. The finding concerning the direct effect of Social networking sites during the COVID-19 outbreak in Azad Kashmir, Pakistan, demonstrated that Social networking sites have unique influences on preventive behavior through risk perception, protective measures, and self-efficacy. Health communications through social networking sites have a positive relation with risk perception towards preventive behavior. Social networking sites played a significant role in reducing public risk during an infectious disease outbreak.

As individual effectively follow activities that they catch satisfaction and they continuous get current relevant information, the purpose of pursuing information, and they subsidizing to improve the level of self-efficacy (Fogg & Iizawa, 2008). Many studies have empirically proven the relationship between Social networking sites and self-efficacy (Shaw, Hawkins, McTavish, Pingree, & Gustafson, 2006). On the other hand, during an infectious disease outbreak, an individual can encounter a great deal to get relevant information about the current scenario from most used Social networking sites such as Facebook, YouTube, and Twitter, etc. For example, during the time of the HINI virus, users of Twitter have increased sharply after the pandemic announcement by WHO (Chew & Eysenbach, 2010). Similarly, when the first case of death registered during the outbreak of MERS in South Korea, the largest peak of exchange information appeared on June 2, 2005 (Hui, Perlman, & Zumla, 2015). In the case of COVID-19 preventive behavior intention, there was a remarkable distinction between social networking sites and preventive behavior. As expected, to receive COVID-19 health information through social networking sites were positively associated with preventive behavior with the indirect effect of risk perception, protective measures, and self-efficacy. At the same time, there was no specific level of gender and education direct associate with preventive behavior.

Conclusion

The started COVID-19 outbreak in China has significantly broken the certainty of life of humans and economies across the world. Social networking sites play a significant role as an alternative

source of information during an infectious outbreak when all information sources disclose or delay. This study evaluated the influence of health communication via social networking sites on preventive behavior through the indirect impact of risk perception, protective measures, and self-efficacy during the 2020 Corona outbreak in Azad Jammu and Kashmir, Pakistan. The data was gathered and examined during the outbreak in Azad Kashmir, Pakistan, in 2020. This research observed how Social networking sites play a vital role in expressing preventive behavior during the Coronavirus outbreak in Azad Kashmir, Pakistan. Considering these consequences, policymakers, government agencies, and public health officers need to use social networking sites as an information source to manage the economic and social distraction caused by COVID-19 effectively. To strategical optimization of tools, the different applications of theory ground models substantiate careful consideration. For example, the blog mediated crisis communication models (Jin & Liu, 2010). Digital communication models (Jin, Liu, & Austin, 2014) can help individuals provide and receive and share crisis information through social networking sites. In developing nations such as Pakistan, there is no excess to promptly sustain and control the surveillance network during an infectious disease outbreak. As a result, due to inadequate resources, most developed countries have adopted social networking platforms as a means of contact to prevent and monitor the transmission of infectious diseases in society (Eke, 2011). As a result, Social networking sites can offer a simple monitoring technique that estimates the real-time spreading of infectious diseases and direct preventative infection response strategies.

References

(WHO). (2020). World Health Organization; Novel coronavirus (2019-nCoV): Situation report – 8. Retrieved from https:// www.who.int/docs/default-source/coronaviruse/situation-reports/20200128-sitrep-8-ncov-cleared.pdf

Ahmed, W., Bath, P. A., Sbaffi, L., Demartini, G. J. H. I., & Journal, L. (2019). Novel insights into views towards H1N1 during the 2009 Pandemic: a thematic analysis of Twitter data. 36(1), 60-72.

Aledort, J. E., Lurie, N., Wasserman, J., & Bozzette, S. A. (2007). Non-pharmaceutical public health interventions for pandemic influenza: an evaluation of the evidence base. BMC public health, 7(1), 208.

Amalia, M., Maupa, H., Parawansa, D. J. H. J. o. A. B., & Entrepreneurship. (2021). The Influence of Social Media Marketing and Electronic Word of Mouth (E-WOM) on Brand Equity and Its Impact on Purchasing Decisions Case Studies on Briton English Education. 4(1), 65-73.

Bae, S. Y., & Chang, P.-J. (2020). The effect of coronavirus disease-19 (COVID-19) risk perception on behavioural intention towards 'untact'tourism in South Korea during the first wave of the pandemic (March 2020). Current issues in tourism, 1-19.

Balicer, R. D., Barnett, D. J., Thompson, C. B., Hsu, E. B., Catlett, C. L., Watson, C. M., . . . Links, J. M. (2010). Characterizing hospital workers' willingness to report to duty in an influenza pandemic through threat-and efficacy-based assessment. BMC public health, 10(1), 436.

Bandura, A. (1990). Perceived self-efficacy in the exercise of control over AIDS infection. Evaluation and program planning, 13(1), 9-17.

Bish, A., & Michie, S. (2010). Demographic and attitudinal determinants of protective behaviours during a pandemic: a review. British journal of health psychology, 15(4), 797-824.

Bogoch, I. I., Watts, A., Thomas-Bachli, A., Huber, C., Kraemer, M. U., & Khan, K. (2020). Potential for global spread of a novel coronavirus from China. Journal of travel medicine, 27(2), taaa011.

Boudewyns, V., Himelboim, I., Hansen, D. L., & Southwell, B. G. (2015). Stigma's effect on social interaction and social media activity. Journal of Health Communication, 20(11), 1337-1345.

Breakwell, G. M., Fino, E., & Jaspal, R. (2021). The COVID-19 Preventive Behaviors Index: Development and validation in two samples from the United Kingdom. Evaluation the health professions, 44(1), 77-86.

Chan, M.-p. S., Winneg, K., Hawkins, L., Farhadloo, M., Jamieson, K. H., & Albarracín, D. (2018). Legacy and social media respectively influence risk perceptions and protective behaviors during emerging health threats: A multi-wave analysis of communications on Zika virus cases. Social Science & Medicine, 212, 50-59.

Chew, C., & Eysenbach, G. (2010). Pandemics in the age of Twitter: content analysis of Tweets during the 2009 H1N1 outbreak. PloS one, 5(11).

Cinelli, M., Quattrociocchi, W., Galeazzi, A., Valensise, C. M., Brugnoli, E., Schmidt, A. L., . . . Scala, A. (2020). The covid-19 social media infodemic. arXiv preprint arXiv:2003.05004.

Coleman, C.-L. (1993). The influence of mass media and interpersonal communication on societal and personal risk judgments. Communication Research, 20(4), 611-628.

Ding, H., & Zhang, J. (2010). Social media and participatory risk communication during the H1N1 flu epidemic: A comparative study of the United States and China. China Media Research, 6(4), 80-91.

Dudo, A. D., Dahlstrom, M. F., & Brossard, D. (2007). Reporting a potential pandemic: A risk-related assessment of avian influenza coverage in US newspapers. Science communication, 28(4), 429-454.

Eke, P. I. (2011). Using social media for research and public health surveillance. Journal of dental research, 90(9), 1045.

El-Toukhy, S. (2015). Parsing susceptibility and severity dimensions of health risk perceptions. Journal of Health Communication, 20(5), 499-511.

Fogg, B., & Iizawa, D. (2008). Online persuasion in Facebook and Mixi: A cross-cultural comparison. Paper presented at the International conference on persuasive technology.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18(1), 39-50.

Fornell, C., & Larcker, D. F. J. J. o. m. r. (1981). Evaluating structural equation models with unobservable variables and measurement error. 18(1), 39-50.

Freimuth, V. S., & Hovick, S. R. (2012). Cognitive and emotional health risk perceptions among people living in poverty. Journal of Health Communication, 17(3), 303-318.

Group, W. H. O. W. (2006). Nonpharmaceutical interventions for pandemic influenza, national and community measures. Emerging infectious diseases, 12(1), 88.

Hair, J. F. (2009). Multivariate data analysis.

Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal, 6(1), 1-55.

Hui, D. S., Perlman, S., & Zumla, A. (2015). Spread of MERS to South Korea and China. The Lancet. Respiratory medicine, 3(7), 509.

Hyun, K. D., & Kim, J. (2015). Differential and interactive influences on political participation by different types of news activities and political conversation through social media. Computers in Human Behavior, 45, 328-334.

Jang, K., & Baek, Y. M. (2019). When information from public health officials is untrustworthy: The use of online news, interpersonal networks, and social media during the MERS outbreak in South Korea. Health communication, 34(9), 991-998.

Jin, Y., & Liu, B. F. (2010). The blog-mediated crisis communication model: Recommendations for responding to influential external blogs. Journal of Public Relations Research, 22(4), 429-455.

Jin, Y., Liu, B. F., & Austin, L. L. (2014). Examining the role of social media in effective crisis management: The effects of crisis origin, information form, and source on publics' crisis responses. Communication Research, 41(1), 74-94.

Kim, J., & Jung, M. (2017). Associations between media use and health information-seeking behavior on vaccinations in South Korea. BMC public health, 17(1), 700.

Ko, H., Cho, C.-H., & Roberts, M. S. (2005). Internet uses and gratifications: A structural equation model of interactive advertising. Journal of advertising, 34(2), 57-70.

Laranjo, L., Arguel, A., Neves, A. L., Gallagher, A. M., Kaplan, R., Mortimer, N., . . . Lau, A. Y. J. J. o. t. A. M. I. A. (2015). The influence of social networking sites on health behavior change: a systematic review and meta-analysis. 22(1), 243-256.

Lau, J., Yang, X., Tsui, H., & Kim, J. (2003). Monitoring community responses to the SARS epidemic in Hong Kong: from day 10 to day 62. Journal of Epidemiology & Community Health, 57(11), 864-870.

Lau, J. T., Kim, J. H., Tsui, H. Y., & Griffiths, S. (2007). Anticipated and current preventive behaviors in response to an anticipated human-to-human H5N1 epidemic in the Hong Kong Chinese general population. BMC Infectious Diseases, 7(1), 18.

Lazard, A. J., Scheinfeld, E., Bernhardt, J. M., Wilcox, G. B., & Suran, M. (2015). Detecting themes of public concern: a text mining analysis of the Centers for Disease Control and Prevention's Ebola live Twitter chat. American Journal of Infection Control, 43(10), 1109-1111.

Lee, C.-J., Zhao, X., & Pena-y-Lillo, M. (2016). Theorizing the pathways from seeking and scanning to mammography screening. Health communication, 31(1), 117-128.

Lee, M., Ju, Y., & You, M. (2019). The Effects of Social Determinants on Public Health Emergency Preparedness Mediated by Health Communication: The 2015 MERS Outbreak in South Korea. Health communication, 1-11.

Li, T., Feng, J., Qing, P., Fan, X., Liu, W., Li, M., & Wang, M. (2014). Attitudes, practices and information needs regarding novel influenza A (H7N9) among employees of food production and operation in Guangzhou, Southern China: a cross-sectional study. BMC Infectious Diseases, 14(1), 4.

Liao, Q., Cowling, B. J., Lam, W. W. T., & Fielding, R. (2011). The influence of social-cognitive factors on personal hygiene practices to protect against influenzas: using modelling to compare avian A/H5N1 and 2009 pandemic A/H1N1 influenzas in Hong Kong. International Journal of Behavioral Medicine, 18(2), 93-104.

Lin, C. A., & Lagoe, C. (2013). Effects of news media and interpersonal interactions on H1N1 risk perception and vaccination intent. Communication Research Reports, 30(2), 127-136.

Lin, K.-Y., & Lu, H.-P. (2011). Why people use social networking sites: An empirical study integrating network externalities and motivation theory. Computers in Human Behavior, 27(3), 1152-1161.

Lin, L., Savoia, E., Agboola, F., & Viswanath, K. (2014). What have we learned about communication inequalities during the H1N1 pandemic: a systematic review of the literature. BMC public health, 14(1), 484.

Lin, W.-Y., Zhang, X., Song, H., & Omori, K. (2016). Health information seeking in the Web 2.0 age: Trust in social media, uncertainty reduction, and self-disclosure. Computers in Human Behavior, 56, 289-294.

Liu, P. L. J. C., Behavior,, & Networking, S. (2020). COVID-19 information seeking on digital media and preventive behaviors: the mediation role of worry. 23(10), 677-682.

Liu, Y., Lv, X., Tang, Z. J. P., & Differences, I. (2021). The impact of mortality salience on quantified self behavior during the COVID-19 pandemic. 110972.

Mano, R. S. (2014). Social media and online health services: A health empowerment perspective to online health information. Computers in Human Behavior, 39, 404-412.

Meier, K., Glatz, T., Guijt, M. C., Piccininni, M., Van Der Meulen, M., Atmar, K., . . . Zamanipoor Najafabadi, A. H. J. P. o. (2020). Public perspectives on protective measures during the COVID-19 pandemic in the Netherlands, Germany and Italy: A survey study. 15(8), e0236917.

Mallinckrodt, B., Abraham, W. T., Wei, M., & Russell, D. W. (2006). Advances in testing the statistical significance of mediation effects. Journal of counseling psychology, 53(3), 372.

Nunnally, J. C. (1994). Psychometric theory 3E: Tata McGraw-Hill Education.

Oh, S.-H., Paek, H.-J., & Hove, T. (2015). Cognitive and emotional dimensions of perceived risk characteristics, genre-specific media effects, and risk perceptions: The case of H1N1 influenza in South Korea. Asian Journal of Communication, 25(1), 14-32.

Paek, H.-J., Oh, S.-H., & Hove, T. (2016). How fear-arousing news messages affect risk perceptions and intention to talk about risk. Health communication, 31(9), 1051-1062.

Pask, E. B., & Rawlins, S. T. (2016). Men's intentions to engage in behaviors to protect against human papillomavirus (HPV): Testing the risk perception attitude framework. Health communication, 31(2), 139-149.

Phua, J. J. J. o. C. (2013). Participating in health issue-specific social networking sites to quit smoking: how does online social interconnectedness influence smoking cessation self-efficacy? , 63(5), 933-952.

Pittet, D. (2001). Improving adherence to hand hygiene practice: a multidisciplinary approach. Emerging infectious diseases, 7(2), 234.

Rimal, R. N., & Real, K. (2003). Perceived risk and efficacy beliefs as motivators of change: Use of the risk perception attitude (RPA) framework to understand health behaviors. Human communication research, 29(3), 370-399.

Rubin, G. J., Amlôt, R., Page, L., & Wessely, S. (2009a). Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: cross sectional telephone survey. Bmj, 339.

Rubin, G. J., Amlôt, R., Page, L., & Wessely, S. (2009b). Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: cross sectional telephone survey. Bmj, 339, b2651.

Schultz, F., Utz, S., & Göritz, A. (2011). Is the medium the message? Perceptions of and reactions to crisis communication via twitter, blogs and traditional media. Public relations review, 37(1), 20-27.

Shaw, B. R., Hawkins, R., McTavish, F., Pingree, S., & Gustafson, D. H. (2006). Effects of insightful disclosure within computer mediated support groups on women with breast cancer. Health communication, 19(2), 133-142.

Shi, J., & Smith, S. W. (2016). The effects of fear appeal message repetition on perceived threat, perceived efficacy, and behavioral intention in the extended parallel process model. Health communication, 31(3), 275-286.

Snyder, L. B., & Rouse, R. A. (1995). The media can have more than an impersonal impact: The case of AIDS risk perceptions and behavior. Health communication, 7(2), 125-145.

Tai, Z., & Sun, T. (2007). Media dependencies in a changing media environment: The case of the 2003 SARS epidemic in China. New Media & Society, 9(6), 987-1009.

Tang, C. S.-k., & Wong, C.-y. (2004). Factors influencing the wearing of facemasks to prevent the severe acute respiratory syndrome among adult Chinese in Hong Kong. Preventive Medicine, 39(6), 1187-1193.

Wan, H.-H., & Pfau, M. (2004). The relative effectiveness of inoculation, bolstering, and combined approaches in crisis communication. Journal of Public Relations Research, 16(3), 301-328.

WHO. (2014). World Health Organization Infection prevention and control of epidemic-and pandemic-prone acute respiratory infections in health care: World Health Organization.

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. Communications Monographs, 59(4), 329-349.

Witte, K. (1994). Fear control and danger control: A test of the extended parallel process model (EPPM). Communications Monographs, 61(2), 113-134.

Yi, C. J., & Kuri, M. (2016). The prospect of online communication in the event of a disaster. Journal of Risk Research, 19(7), 951-963.

Yıldırım, M., & Güler, A. J. D. s. (2020). COVID-19 severity, self-efficacy, knowledge, preventive behaviors, and mental health in Turkey. 1-8.

Yoo, S.-W., Kim, J., & Lee, Y. (2018). The effect of health beliefs, media perceptions, and communicative behaviors on health behavioral intention: An integrated health campaign model on social media. Health communication, 33(1), 32-40.

Yoo, W., & Choi, D.-H. (2020). Predictors of expressing and receiving information on social networking sites during MERS-CoV outbreak in South Korea. Journal of Risk Research, 23(7-8), 912-927.

You, M., & Ju, Y. (2015). The influence of outrage factors on journalists' gatekeeping of health risks. Journalism & Mass Communication Quarterly, 92(4), 959-969.

Yue, C., Liu, C., Wang, J., Zhang, M., Wu, H., Li, C., & Yang, X. J. T. I. j. o. s. p. (2020). Association between social support and anxiety among pregnant women in the third trimester during the coronavirus disease 2019 (COVID-19) epidemic in Qingdao, China: The mediating effect of risk perception.

Zhang, L., Kong, Y., & Chang, H. (2015). Media use and health behavior in H1N1 flu crisis: the mediating role of perceived knowledge and fear. Atlantic Journal of Communication, 23(2), 67-80.

Zhu, H., Deng, F. J. I. J. o. E. R., & Health, P. (2020). How to influence rural tourism intention by risk knowledge during COVID-19 Containment in China: mediating role of risk perception and attitude. 17(10), 3514.

Appendix-1

Please tick **(✓)** in each item the number that best describe your response.

1=SD: Strongly Disagree, **2**=**D:** Disagree, **3 = N:** Neutral, **4= A:** Agree, **5= SA:** Strongly Agree

	Social Networking Sites (SNS)	SD	D	N	A	SA
SNS1	How often did you post/receive information about Covid-19 on SNS					
SNS2	Do you think Social networking sites are the best way of post/receive information about Covid-19					
SNS3	Social networking sites are the best source of post/receive information during infectious disease like Covid-19					
SNS4	How often did you post/receive information about Covid-19 on SNS					
	Self-efficacy					
SE1	I am fully informed about Covid-19 via Social networking sites					

SE2	I can recover even if I face Covid-19 situation					
SE3	I can avoid Covid-19 infection					
SE4	I can figure out how to avoid Covid-19 infection					
	Risk Perception					
RP1	There is a high likelihood of acquiring COVID-19 in general					
RP2	There is a high likelihood that I can't acquire COVID-19 due to effective help by Social networking sites					
RP3	There is a high likelihood of dangerous COVID-19 compared to other diseases					
RP4	There is a high likelihood chances of dying from COVID-19					
	Protective Measures					
PM1	Washing your hands regularly with soap and water					
PM2	Wearing a face mask when out in public					
PM3	Avoiding hospitals or general practices					
PM4	Reducing the number of people, you meet over a day					
	Preventive Behavior					
PB1	Avoid any non-essential local travel					
PB2	Avoid any non-essential international travel					
PB3	Keep informed about COVID-19 in the Pakistan by watching the news					
PB4	Continue to see people outside of your household					