Original Research Article

Risk perception and intent to take precautionary actions against COVID-19 among adult population during pandemic in Nepal

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Abstract

This cross-sectional study sought whether there was an association between COVID-19 risk perception and the intention to take precautionary health measures among Nepalese adults aged 20 to 60 years. A multi-stage sampling technique was used to select study participants in this study. With the help of Kobo Toolbox application programs, field enumerators interviewed 1072 adults from 14 districts of Nepal in March and April of 2021. In the study, the average age of participants was 35.11 years. Over half (52%) of them were women, and 44% were the Brahmins and Chhetri caste. Apart from perceived susceptibility, the study showed that the largest group (41%) of respondents had the lowest level of perceived susceptibility. Only a few (14.8%) of respondents expressed a strong intention to take safe measures (M=1.14 ±0.35). The study results indicated that four constructs of the health belief model such as perceived severity, barriers, benefits, and self-efficacy were positively correlated (>0.05) with taking protective health measures. In contrast, perceived susceptibility was not associated (0.53) with the intention to take protective health measures. Overall, Nepalese people are reluctant to act against COVID-19 because of their low-risk perception which makes it necessary to raise public awareness regarding COVID-19.

Keywords: association, COVID-19, Nepalese, precautionary action, risk perception, self-efficacy

Introduction

Risk is a major concern, and qualitative characteristics are viewed as critical facets (Rohrmann & Renn, 2000). Risk is an assessment of the possibility of an incident occurring and the severity of the consequences if it does (Inouye, 2014). The perception of risk is considered to be a predictor variable (Rundmo & Nordfjærn, 2017) for the spread of COVID-19. Risk perception is the ability of an individual to discern a certain amount of risk. A person's capacity to perceive a specific amount of risk is known as risk perception (Rohrmann & Renn, 2000). It is a belief about the chance of injury or loss and subjective assessment of a risk's features and severity made by individuals(Inouye, 2014). Perceived risk is assessing the likelihood as well as the consequences of an unknown occurrence (Darker, 2013). A person's risk perception is critical in persuading them to change their health habits (Abraham & Sheeran, 2015). However, how a person perceives a risk is not always indicative of the actual risk (Reintjes et al., 2016).

Yet, there is a common idea that having a high-risk perception leads to better readiness since people who have a high-risk perception usually have a better understanding of what to do in a crisis (Calvello et al., 2016; Shreve et al., 2014).

Even Nepal could not remain untouched by the risk of Covid-19 (Sharma, Khanal, Acharya, Adhikari, et al., 2021). Migrants returned from India have been a main source of COVID-19, which helped spread it across rapidly in all seven provinces and 77 districts of Nepal (Khanal, Van Teijlingen, et al., 2021). According to the records till mid-October 2022, more than 1 million people have been infected with COVID-19 in Nepal and more than 12 thousand people have lost their lives (Ministry of Health and Population, 2022). The government, public health professionals, and policy makers became alarmed by this increasing trend. COVID-19 is a risk event for the public in affected areas (Acharya, Budhathoki, et al., 2022). In Nepal, it is unknown what the status of health literacy (Khanal, 2019; Khanal, Sharma, et al., 2021) of COVID-19 is, which determines protective health behaviors (Lau et al., 2022). As well, it is unclear how being involved or exposed to a risk event at the moment affects people's perception of the risk (Qian & Li, 2020). Risk perceptions are an important component of behavioral change theories. When COVID-19 risk perception is low, safe behaviors are less likely to be used. If some populations are at a lesser risk, external costs may be enforced on others (Barrios & Hochberg, 2020).

The current COVID-19 outbreak offers an opportunity to explore the association between risk exposure and public perception of risk. This can lead to different perceptions about the disease and preventative behaviors among people (Acharya, Devkota, et al., 2022). Therefore, it is essential for developing effective strategies for communicating risk (Asefa et al., 2020). We are aware of certain researchers who have discovered a connection between public risk perceptions of COVID-19 and health-protective behaviors. There is a consistent, significant, and positive correlation between it and the use of preventative health behaviors, such as masks and social isolation (Schneider et al., 2021). This study has explored how the public perceive the risk of COVID-19 and how they intend to protect themselves. This can serve as an invaluable tool for risk managers and policymakers to identify public attitudes toward COVID-19 and develop appropriate prevention and control measures. So, this study focused to examine the association between risk perception of Nepalese people and intent to take precautionary health action regarding the COVID-19 pandemic.

Methods and Materials

Study Design

A cross-sectional study design was adopted in this study. Adults from seven provinces of Nepal took part in the study. Due to a lockdown imposed by the Government of Nepal (GoN and local authorities) data collection for this study began on March 1, 2021, and ended on April 27, 2021.

Study Area

The study was conducted in Nepal's seven provinces. Two districts were chosen purposively from each province as per the magnitude of the COVID-19 pandemic. Those districts were selected where the population density and risk of COVID-19 was higher compared to other districts in the province (Lamichhane et al., 2022). A total of 14 districts were selected for this study. They were: Sunsari and Dhankuta from Province One; Saptari and Parsa from the Madhes Province; Kathmandu and Chitwan from the Bagmati Province; Baglung

and Kaski from the Gandaki Province; Rupandehi and Banke from the Lumbini Province; Surkhet and Dailekh from the Karnali Province; and Kailali and Bajhang from the Sudurpaschim Province were selected.

Participants and Sampling

Participants were people between the ages of 20 and 60 who resided in the chosen districts. We have chosen the particular age group because they were from productive age and higher chance of mobility on that age group. Samples were selected using a multistage sampling technique. While 14 districts from seven provinces were purposefully selected in the first phase, we made sure at least one rural municipality and one municipality were included in the second stage based on similar criteria. The final stage was to assign two primary sample units (two clusters/wards) to each rural/municipality, which we decided randomly. At the cluster, there was a list of adult population available [20-60 years]. In the fourth stage, 25 households from each cluster/PSU were randomly selected. Overall, the study included a sample size of 1400 from 14 districts of seven provinces. However, due to the pandemic situation of COVID-19 we were able to collect the response from 1072 respondents only.

Table 1

Sample Size of the Study

Province	Districts	Sample distributed	Response received	Total
Province 1	Sunasari	100	94	185
	Dhankuta	100	91	
Madhesh	Saptari	100	96	161
	Parsa	100	65	
Bagmati	Kathmandu	100	98	178
	Chitwan	100	80	
Gandaki	Baglung	100	56	117
	Kaski	100	61	
Lumbini	Rupandehi	100	95	188
	Banke	100	93	
Karnali	Surkhet	100	81	140
	Dailekh	100	59	
Sudurpashchim	Kailali	100	62	103
	Bajhang	100	41	
Total		1400	1072	

The following formula was used to determine the sample size from the selected cluster/PSU.

$$n = \frac{t^2(p.q)}{d^2}.\text{Def}$$

Where n is the sample size required, t is linked to 95% confidence interval for cluster sampling (2.045) instead of (z = 1.96), p is the estimated proportion of the variables=0.5, q is 1−p, and d is the degree of accuracy (d= 0.05), and Def is Design effect=3. Non-response rate=.10

$$n = \frac{2.045^2(0.5 \times 0.5)}{0.5^2} \times 3 = 1255$$

Final sample size n= 1255/ (1-0.10)= 1400

Data Collection Tool

Survey questionnaire was used for data collection. The data were collected utilizing online application named KoboToolbox. The KoboToolbox is a data collection software online available at free of cost. The structured interview was divided into two parts. The first section contained socio-demographic information such as age, gender, caste, province, marital status, educational attainment, area of living occupation, and family types. The risk perception responses made up the second part of the data collection tool. Twenty-five five-point Likert-type items were developed using the Health Belief Model's five constructs: perceived vulnerability (4 items), severity (5 items), benefits (4 items), barriers (6 items), and self-efficacy (6 items).

The final section concerned the intention of taking COVID 19 precautionary health actions. Three items related to hand hygiene, social/physical distance, and the use of surgical masks were constructed as five-point Likert-type in this section. All responses were assessed using five sequential graded/closed-end questions: strongly agree, agree, neutral, disagree, and strongly disagree. The total scores/responses were tallied and then converted to percentiles to determine the level of risk perception. Scores of perceived level > 66% were rated high, those of 33-66% were considered medium, and ≤ 33 were considered low (Khanal, Van Teijlingen, et al., 2021). On the rating scale strongly disagree, disagree, and neutral were regarded as low, while agree and strongly agree were rated high, to measure the level of intent to take precautionary health action.

Validity and Reliability of the Tools

The final data collection tool was pretested among 40 individuals in Nepal's Kathmandu, Chitwan, Rupandehi, and Surkhet districts who live in rural and urban areas not served by the PSU. The test's Cronbach's alpha was calculated and found to be 0.75, which indicated relatively high internal consistency between the items and hence was considered acceptable to the researchers for administration. A webinar-based discussion was held to revise the study tool. After doing the pre-testing, we also consulted with a statistician. As a result of the field experience, some questions were added and some were eliminated. For example, the self-efficacy construct has a total of 4 items that we have created. One of them was that 'when I wash my hands and wear a mask, I feel protected from illness'. According to results of a pilot study, respondents became confused when there were two variables on one item. Later, we divided them into two separate items and added a total of 5 items under it. In the same way, items called using herbal drinking were added to the Protective behavior to protect COVID-19 section after the pilot test.

Data Collection Procedure

Data was collected by field enumerators utilizing mobile technologies through the Kobo Toolbox application program. KoBo Toolbox is a free tool for collecting mobile data that is available on Android and iOS platforms (UNHCR, 2016). It enables the collection of data both

online and offline (KoBO Tool Box, 2022). Before the enumerators headed out into the field, they were given training on how to use the Kobo Toolbox. The respondents were provided information on research ethics such as obtaining consent before the interview, voluntary participation, right to refuse at any time, data confidentiality, and anonymity. Field enumerators followed safety protocols to prevent virus transmission during data collection. The enumerators collected data from respondents' homes, workplaces, or places of meetings. Although the sample size was aimed to be 1400 by formula, we could only collect 1072 responses due to field challenges including the GoN imposed lockdown in various districts commencing on April 28, 2021. We had to abruptly stop data collection at this point as no mobility was possible during the lockdown and almost 85% (1072/1255) of the total sample completed.

Variables and Statistical Analysis

The respondents' levels of risk perception were the independent variables, while their intention to take preventive measures was the dependent variable. To determine the association between the variables, descriptive statistics in terms of frequency, percentage, central mean, standard deviation, and bivariate (chi-square test) analysis were used. IBM SPSS Statistics 20 was used for the statistical analysis.

Ethical Considerations

The research proposal was submitted to the Nepal Health Research Council's ethical committee. The Nepal Health Research Council (NHRC) reviewed and approved the study proposal on January 26, 2021 (# 649/2020). The study followed all of the NHRC's research ethics standards throughout the research process.

Results

Respondents' Characteristics

The average age of the participants in the study was 35.11 years, and a high proportion (42.9%) of the total sample fell between the ages of 20 and 29 years. Slightly more than half (52%) of the respondents were female. Similarly, 44% of the respondents were from rural areas. Based on caste, the same percent (44%) belonged to the Brahmin, Chhetri, Dashnami, and Thakuri castes. Nearly one out of ten respondents (9%) was illiterate, 15.2% attended primary school, 40.4% attended secondary school, and 36% had graduated from a college or university. One-third of the respondents' primary occupation was agriculture. The majority of respondents (58.5%) said they came from a nuclear family, while nearly half (48.1%) said they had up to five members.

Table 2

Risk Perception Level of COVID 19 of the Respondents

Risk perception	Low (1)	Medium (2)	High (3)	Mean	SD
Perceived Vulnerability	440 (41)	282 (26.3)	350 (32.6)	1.916	.854
Severity	400 (37.3)	407 (38)	265 (24.7)	1.874	.777
Barriers	431 (40.2)	285 (26.6)	356 (33.2)	1.93	.854
Benefits	432 (40.3)	503 (46.9)	137 (12.8)	1.724	0.674
Efficacy	402 (37.5)	554 (51.7)	116 (10.8)	1.733	0.642

The largest percentage of participants reported a low-risk level for each construct of risk perception, among these, perceived susceptibility was low for a significant portion (41%) of participants. About one-third (32.6) perceived a high level of susceptibility. Additionally, it was shown that their situation was inadequate in terms of perceived severity (37.3%), perceived barriers (40.2%), perceived benefits (40.3%) and perceived self-efficacy (37.3%). High levels of perceived self-efficacy (10.8 percent) and advantages received far fewer responses than medium or low levels. Furthermore, respondents ranked perceived barriers and vulnerability as the greatest single factor across all perceptions, with perceived self-efficacy and perceived benefits receiving the lowest percentage of responses. (Mean=1.73, Standard Deviation=0.864) (Table 1).

Intention to Take Protective Health Action Regarding COVID 19

Looking at the response to the intention to adopt a protective attitude towards COVID 19, it was found that the higher proportion of the respondents had a positive intention. Over half of the respondents responded that they intend to practice physical/ social distance, intend to wash hands frequently, and intend to buy and wear a surgical mask. However, one-fourth of the respondents did not have a positive attitude towards safe behavior. About 15 percent of respondents were unsure about their intention to take protective action regarding COVID 19 (Table 2).

Table 3

Respondents' Intention to Take Protective Health Behavior Regarding COVID-19

Intend to adopt protective behavior	SDA*	DA	Not sure	A	SA
I intend to practice social/physical distancing	125 (11.7)	35 (12.6)	157 (14.6)	501 (46.7)	154 (14.4)
I intend to wash my hand frequently	117 (10.9)	143 (13.3)	147 (13.7)	509 (47.5)	156 (14.6)
I intend to buy and wear a surgical mask	117 (10.9)	139 (13)	165 (15.4)	495 (46.2)	156 (14.6)
Level of Intention to take protective Action					
Level of Intention	Category	N (%)	Mean	SD	
	Low	913 (85.2)	1.14	0.35	
	High	159 (14.8)			
	Total	1072 (100)			

Note. *SDA: Strongly Disagree, DA: Disagree, A: Agree, SA: Strongly Agree

According to the study results, a higher proportion of respondents stated that they intended to adopt some safe behaviors (ie, physical distance, hand washing) to avoid COVID-19, but the overall score for this was very low among most respondents (85.2%). Only 14.8 percent of respondents show a strong intention to take safe measures (M, 1.14, SD 0.35) (table 2).

Association between Risk Perception and Intent to take Protective Health Action

The Bivariate analysis (Chi-square test) was considered to determine the association between respondents' risk perception and their intention to take protective action. The results of this study revealed that four constructs of the health belief model have a positive association with the intention to adopt a protective health action. But there was no association between perceived vulnerability and intention to take protective health behavior regarding COVID 19 (Table 4).

Table 4

Bivariate Analysis of Association of Risk Perception to Take Protective Health Action

Variables	Categories	Intention		Chi-square	P-value
		Low	High		
	Low	379 (41.5)	61 (38.4	1.25	0.533
Perceived vulnerability	Medium	242 (26.5)	40(25.2)		
	High	292 (32)	58 (36.59)		
	Low	368 (40.3)	32 (20.1)	62.022	0.000
Perceived severity	Medium	358 (25.6)	49 (30.8)		
	High	187 (20.5)	78 (49.1)		
	Low	320 (35)	114 (26.5)	68.20	0.000
Perceived barriers	Medium	262 (28.7)	111 (69.8)		
	High	331 (36.3)	25 (15.7)		
	Low	423 (46.3)	9 (5.7)	331.05	0.000
Perceived benefits	Medium	442 (48.4)	61 (38.4)		
	High	48 (5.3)	89 (56)		
	Low	394 (43.2)	8 (5)	289.12	0.000
Perceived self-efficacy	Medium	479(52.5)	75 (47.2)		
	High	40 (4.4)	76 (47.8)		

Discussion

The current study found that there is a high percentage of Nepalese adults who perceive vulnerability and perceived barriers to being slightly greater than perceived severity, perceived self-efficacy, and perceived benefits. It is consistent with our study that older people in eastern Nepal showed greater fear of COVID-19 (Yadav et al., 2021). According to a survey of Nepalese healthcare professionals, their perception of the risk of COVID-19 is higher than that of our study participants (Sharma et al., 2020). Possibly, health workers know more about COVID-19, which might account for this difference. However, some of the related studies of adults in other countries have yielded better results than our study. For example, (Shahin & Hussien, 2020) conducted a comparative study among the general population demonstrating that Saudi Arabian participants had a considerably higher mean perception of seriousness than Egyptian and Jordanian participants. When the mean perception of susceptibility to COVID-19 ratings from different countries were compared, it was discovered that Saudi Arabian participants had significantly higher mean scores for the possibility of catching COVID-19. When compared to the population samples from the other two countries, the Saudi Arabian population sample scored much better in self-efficacy (Shahin & Hussien, 2020) . Egypt's

population sample had the considerably lowest self-efficacy mean score for dealing with COVID-19 across the board than Jordanian and Saudi Arabian participants. The risk perception level regarding COVID-19 was moderate to high in the next study done among adults in Myanmar (Mya Kyaw et al., 2020). According to a survey done in Hong Kong, substantial levels of perceived risk (perceived susceptibility to (89%) and severity of (97%) COVID-19 were found (Kin On Kwok et al., 2020). The next study discovered that 86% of participants believed the sickness was harmful, and they were worried about the risk of contracting the virus through themselves or their family members (Abdelhafiz et al., 2020). Yıldırım and Güler (2020) revealed that those with a high perception of COVID-19-related perceived risk had a higher degree of severity and were negatively associated with COVID-19-related self-efficacy, suggesting they are at higher risk of the disease and have a lower ability to engage in the behaviors required for treatment; however, some people thought they were at low risk (Wise et al., 2020). The perceived likelihood of a COVID-19 epidemic in Australia was rated quite high by respondents (Faasse & Newby, 2020). In India, the majority of people (60%) said they were not at risk of coronavirus (Kuang et al., 2020). Which is a little more than the facts of our study. A greater mean of risk perception and a positive perception of COVID-19 prevention and control were revealed in the current Bangladesh study (Mannan & Mannan, 2020). In Ethiopia, most people perceived susceptibility and seriousness of COVID-19 (Asnakew & Kerebih Asrese, 2020).

There is robust evidence that levels of belief in the efficacy of suggested behaviors for illness prevention are major determinants of behavior (Bish & Michie, 2010). Looking at the response to the intention to adopt a protective attitude towards COVID 19, it was found that the majority of the respondents had a positive intention. According to study results, participants' intention to follow protective health behaviors regarding COVID-19 is generally problematic. More than half of the participants (52 percent; 95 percent CI=47.61–54.80) intend to take personal preventive actions, according to the study (Andarge et al., 2020). Shahin and Hussien (2020) said the majority responded absolutely when asked if they expected to take the required precautions against the new coronavirus. Egypt's population sample scored much lower than the populations of the other two nations when it comes to the intention to take precautionary measures and implement preventative tactics in the face of the COVID-19 epidemic. The participants saw protective measures positively. The participants had a positive attitude towards protective measures (Abdelhafiz et al., 2020). The disparity between studies could be due to multiple factors (Khanal, 2020) such as awareness, the perceived threat of illnesses, and job training. These evidences indicate that knowing the threat does not ensure that participants will take precautionary measures (Sharma, Khanal, Acharya, & Acharya, 2021).

The health belief model is developed to predict risky behavior (Bish & Michie, 2010) and is widely used in screening health behavior (Janz & Becker, 1984). Some health behavior theories suggest that as a perceived threat increases, an individual should be more likely to take preventive measures (Fullerton et al., 2021). According to the findings of our study, four constructs of the health belief model have a positive associated with the intention to take protective health action. In the case of COVID 19, however, in our study, there was no association between perceived vulnerability and the intention to adopt protective health measures. It is concluded that greater perceived susceptibility to developing SARS is associated with avoidance behavior (Bish & Michie, 2010). So, our study supports that perceived

vulnerability is necessary but not a satisfactory condition for precautionary action (van der Pligt, 1998). A study done among the health care providers in Saudi showed similar results to our study that there was a significant positive correlation between COVID-19 behavioral intention and other constructs of the Protection Motivation Theory (PMT), including perceived severity (r=0.272) perceived vulnerability (r= 0.248), self-efficacy (r=0.218), response-efficacy (r=0.167), and response-cost (r=0.13). Findings of this study showed that the coping appraisal of PMT (particularly self-efficacy and response-efficacy) was highly significantly associated with COVID-19 protective behaviors compared to the threat appraisal (Mortada et al., 2021). Due to unconfirmed beliefs regarding mechanisms of transmission, the incidence of avoidance behaviors was quite high. Perceived severity and susceptibility were related to some of the avoidance behaviors and emotional distress characteristics (Lau et al., 2010). The findings imply that during the new coronavirus pandemic, vulnerability, perceived threat, and fear can dramatically boost involvement in preventative behaviors (Murat Yıldırım et al., 2021). The subjective norm and perceived behavioral control of participants were found to have a strong relationship with their desire to practice PPMs (Andarge et al., 2020; Bronfman et al., 2021). When respondents considered the risk of lead exposure to be serious and recognized the benefits of exercising health-protective activities, they were more willing to do so (Cooper et al., 2020). However, diabetes patients with high perceived risk were not more likely to have plans to adopt a better lifestyle in the future year (Hivert et al., 2009).

Strengths and Limitations of the Study

To our knowledge, this is the first study conducted in Nepal regarding the risk perception and intention to take precautionary action against COVID-19 among Nepali people. This study explores the relationship between risk perception of COVID-19 and the intention to take precautionary action. It also draws attention to some of the issues that relevant stakeholders should raise while conducting risk communication. Despite this, there are some limitations to the study. There may be selection bias because the study purposefully selected the districts based on the magnitude of the problem. Attributed to the reason that we collected data from the respondents in a single and first visit, response and recollection biases may occur. Similarly, due to lockdown, 1062 samples could be included out of the proposed 1,400 samples. This is another drawback of this study. Moreover, this study is based on a cross-sectional design that may not reveal causal relationships between variables. Hence, to examine risk perception and take precautions, a mixed or multimodal approach may be a better approach.

Conclusion

According to the findings of the current study, Nepalese people have a low-risk perception and are reluctant to take COVID-19 actions. In addition, they were less likely to take preventative health measures in general. There is no statistically significant association between respondents' perceived susceptibility and their intention to take preventive health measures, but there is an association between respondents' perceived severity, benefits, barriers, and self-efficacy. According to these results, contextual risk control policies should be formulated and implemented taking into account the diverse backgrounds of the population. This may make it possible for the Nepalese to be better informed about COVID--19's threat. As a result, this finding could be useful for public awareness and risk communication efforts addressed at Nepalese nationwide.

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