

# A Cross-sectional Study on Risk Perception of COVID-19 and its Determinants among the Residents in Mangalore

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## Abstract

**Background:** The success of battle against COVID-19 was depended on public adherence towards infection control measures, which is greatly affected by risk perception of COVID-19. Assessing risk perception can provide valuable insights into their awareness, beliefs, and attitudes toward the pandemic; and assessing the determining factors that influence risk perception is crucial for designing effective public health interventions for future public health emergencies as well.

**Objectives:** The study intended to assess risk perception of COVID-19 and factors influencing it.

**Methodology:** A community based cross sectional study, by house-to-house visit was conducted among 323 participants during period of 2020-2022. Multistage sampling was adopted. Adults more than 18 years of age, who head their families were included. A pre-tested semi-structured validated questionnaire was used for data collection by interview method. Chi-square was used to test association.

**Results:** Among 323 participants, 96% had low risk perception of COVID-19. Most of the participants had good knowledge, positive attitude and good practice of preventive measures of COVID-19. Mass media was the most common source of COVID-19 related information. There was significant association between attitude towards preventive measures of COVID-19 and risk perception (p value 0.02).

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**Conclusion:** Majority of the participants had low risk perception of COVID-19; good knowledge, positive attitude and good practice of preventive measures of COVID-19. This finding indicates that public health interventions probably were effective, fostering a balanced and informed understanding of the risks.

**Keywords:** COVID-19; risk-perception; rural; pandemic

## Introduction

The WHO declared the SARS-CoV-2 outbreak as a pandemic on March 11, 2020, due to its alarming levels of spread across the globe.<sup>[1]</sup> The coronavirus disease (COVID-19) had an enormous impact on all aspect of human life including health, the economy, and politics.<sup>[2]</sup>

Compared to developed countries, low and middle-income countries (LMICs) were hit the hardest by the pandemic because of their already overburdened health systems, special challenges related to scarce resources, unsatisfactory infrastructure, competing health priorities and lack of access to reliable information for households in resource-poor settings.<sup>[3]</sup>

The first case in India, was detected on 27th January, 2020, in Trissur. A 20-year-old female presented with history of dry cough and sore throat to the Emergency Department of General Hospital, Trissur, Kerala. There was travel history from Wuhan city, China to India, on January 23, 2020 owing to COVID-19 outbreak situation there.<sup>[4]</sup>

During the first wave a prompt nationwide lockdown was imposed in March, 2020, which helped in containing the pandemic, rather flattening the epidemic curve.<sup>[5]</sup> However, a country like India, which is densely populated and which has a high internal migration, will always be at risk of multiple waves of infection during such pandemics. The situation can worsen with adverse impacts, such as large number of fatalities and long-term complications as seen during COVID-19 pandemic.<sup>[3]</sup>

WHO endorsed infection prevention and control (IPC) measures to alleviate COVID-19 spread.<sup>[6]</sup> The lessons learned from the past still underscore the importance of IPC measures to prevent future outbreaks. The success of battle against COVID-19 was depended on public adherence towards IPC measures, which is greatly affected by their knowledge and attitudes towards preventive measures of COVID-19.<sup>[7]</sup> In addition to the physical threat, the outbreak

also causes psychological distress, depression, and stigmatization.<sup>[8]</sup> Social stigma can prevent people from seeking health care immediately, which can lead to disease spread among the population.<sup>[9]</sup>

Assessing risk perception can provide valuable insights into their awareness, beliefs, and attitudes toward the pandemic. Determining the factors that influence risk perception is crucial for designing effective public health interventions. In view of the above, this study was planned to assess risk perception of COVID-19 and factors influencing it.

## Aims and objectives:

1. To assess risk perception of COVID-19 among the residents in the rural field practice area of a teaching hospital in Mangalore
2. To assess and factors influencing risk perception of COVID-19 among the residents in the rural field practice area of a teaching hospital in Mangalore

## Methodology

A community based cross sectional study was conducted by house-to-house visit among residents of rural field practice area of a teaching hospital in Mangalore. Adults above 18 years of age, who are the heads of their families were included. In case of their absence during two consecutive visits, an adult in the family who is also involved in the decision making, was interviewed. Any house found locked during the second visit which was done 5 days after the first visit was excluded and the next house was visited.

Referring to an earlier similar study, the risk perception was found to be 57.6 %.<sup>[7]</sup> Sample size was calculated by using the formula  $4pq/L^2$ . Considering  $p = 57.6$ , and allowable error ( $L$ ) = 10% of  $p$ , with a confidence interval of 95%, a sample size of 294 was obtained. Further, a non-response rate of 10% was added. Finally, the sample size was estimated to be 323. Study was conducted from October 1<sup>st</sup> 2020 to September 31<sup>st</sup> 2022.

Multistage sampling was adopted to select the houses. There are 16 areas under the rural field practice area. To decide the number of houses to be selected from each area, Probability Proportional to Size (PPS) was adopted. To select the house from each area, a list of houses maintained in the record of rural health training centre was used as sampling frame and houses were selected using Simple Random Sampling till a total sample size of 323 was achieved.

Apre-tested semi-structured validated questionnaire was used for collection of data by interview method. The questionnaire contained 3 parts, which was elicited and analysed using Likert scale. The part 1 was used to obtain the socio-demographic information of the respondent like age, sex, education, occupation, etc. Part 2 included questions on risk perception of COVID-19. Part 3 included questions on knowledge, attitude and practice of preventive measures of COVID-19. The content of the tool was validated by four expert professionals from the field of Community Medicine. Data was collected using interview technique from the selected individuals.

#### Statistical analysis:

The data was entered in Microsoft excel and analyzed using IBM SPSS trial version 28. All categorical data are presented in proportions. Continuous data was grouped and presented in proportion. Chi-square test was used to test the association between risk perception and selected variables. A p value of less than 0.05 was considered as statistically significant.

#### Operational definition:

**Risk perception:** people's beliefs and feelings about the possibility of COVID-19 infection. It was measured by five-point Likert scale and its score. The overall scores were categorized into two group as high-risk perception and low risk perception based on the score obtained.

**Ethical Clearance:** Ethical clearance was obtained from Institutional Ethics Committee (AJEC/REV/57/2021 dated 18/02/2021). For conducting the study, the purpose and the procedure was briefed to the respondents in the local language. Informed consent was obtained from each participant.

## Results

**Table 1: Distribution of the participants according to age (n=323)**

Variables	Categories	Frequency	Percentage (%)
Age	25-45	131	40.6
	46-60	103	31.9
	60 and above	89	27.6
Gender	Male	196	60.7
	Female	127	39.3
Religion	Hindu	159	49
	Muslim	152	47.1
	Christian	12	3.7
Education	Pre primary	55	17
	Primary	88	27.2
	Upper primary	72	22.3
	Secondary	64	19.8
	Senior Secondary	17	5.3
	Graduation and above	27	8.4
Occupation (modified Kuppuswamy scale)	Professional	2	0.6
	semi professional	18	5.6
	clerical, shop owner, farmer	20	6.2
	skilled worker	22	6.8
	semi-skilled	127	39.3
	Unskilled	27	8.4
	Unemployed	107	33.1

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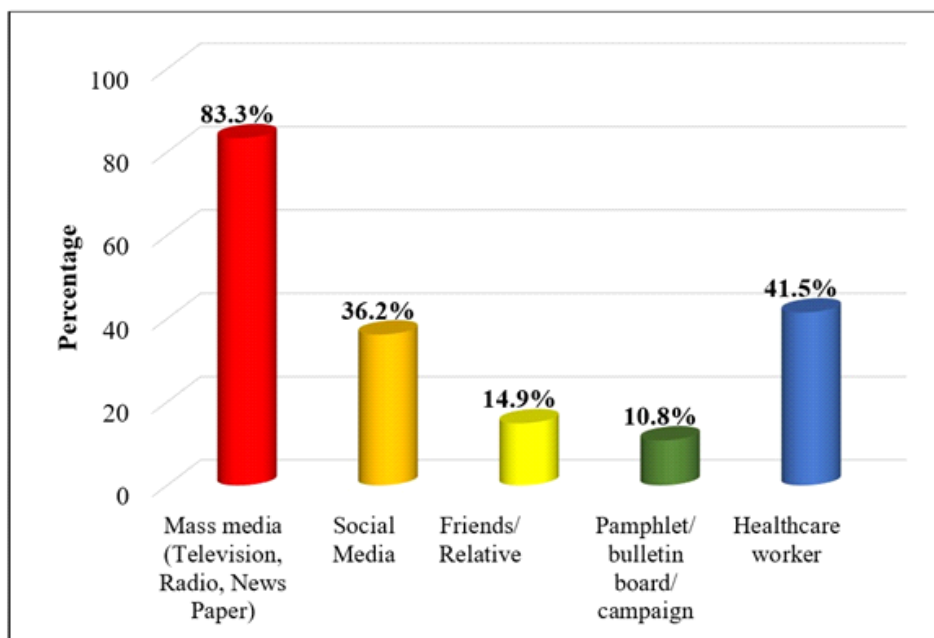
Type of family	Nuclear family	198	61
	Joint family	74	23
	Three generation family	51	16
APL/ BPL card *	APL	105	32
	BPL	212	66
	Antyodaya card	6	2

\*APL- Above Poverty Line, BPL- Below Poverty Line (based on the type of ration card they hold)

A total of 297 individuals participated in the study. Their demographics are as given in table 1. Mean age of the participants was 51.11 ± 12.462 years. More than half of the study participants were male. The semi-professional category in occupations includes teachers

any healthcare worker in their family, 47 (15%) had healthcare worker in family. Only 12 (3.7%) had history of COVID-19 infection in the house. Also 9 (2.7%) respondents gave history of COVID-19 infection in themselves

Majority, 276 (85%) respondents didn't have



\* includes multiple response

**Figure 1: Distribution of participants according to source of COVID-19 related information\***

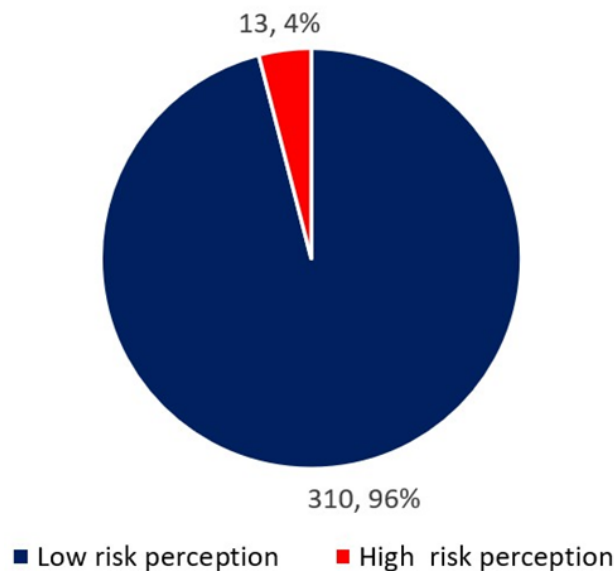
In the present study most common source of information was mass media, followed by healthcare workers and social media. (figure 1)

**Table 2: Distribution of study population according to risk perception of COVID-19 (n=323)**

Question	Not At All n (%)	Slightly Likely n (%)	Not Sure n (%)	Very Likely n (%)	Extremely Likely n (%)
Do you think that you are likely to become infected with COVID-19	186 (57.6)	63 (19.5)	65 (20.1)	8 (2.5)	1 (0.3)

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Are you worried that your family member/friend might be infected with COVID-19	197 (61.0)	54 (16.7)	52 (16.1)	18 (5.6)	2 (0.6)
Even if person is in good health, chance of getting infected with COVID-19 is high	67 (20.7)	87 (26.9)	92 (28.5)	76 (23.5)	1 (0.3)
Compared to most people of your age, your risk of getting COVID-19 is high	205 (63.5)	23 (7.1)	79 (24.5)	16 (5)	0
Do you think that people in your present location are likely to contract COVID-19	173 (53.6)	42 (13)	96 (29.7)	11 (3.4)	1 (0.3)
Do you fear that in spite of taking proper precautions, you could get infected with COVID-19	118 (36.5)	99 (30.7)	71 (22)	35 (10.8)	0
People with comorbidities are at higher risk of getting infected with COVID-19	105 (32.5)	43 (13.3)	78 (24.1)	93 (28.8)	4 (1.2)
Vaccinated people are at lower risk of getting infection	103 (31.9)	144 (44.6)	43 (13.3)	33 (10.2)	0



**Figure 2: Distribution of study population according to risk perception of COVID-19 (n=323)**

Risk perception was measured by five-point Likert scale and its score. Majority i.e. 310 (96%) had low risk perception and 13 (4%) had high risk perception of COVID-19 (figure 2).

Similarly, knowledge, attitude and practice were accessed. It was found that, Knowledge of preventive measures of COVID-19 was good in 315(97.5%) participants and average in 8 (2.5%) participants.

None of the participants had poor knowledge. 317 (98.1%) participants had positive attitude towards preventive measures and whereas negative attitude was seen in only 6 (1.9%) participants. practice of preventive measures was good in 205 (63.5%) participants, average in 116 (35.9%) participants and poor in 2 (0.6%) participants. Majority,270 (83.6%) had low stigma and 53 (16.4%) had high stigma towards COVID-19.

**Table 3: Distribution of study participants according to risk perception of COVID-19 and socio-demographic factors (n= 323)**

Socio demographic characteristics	Frequency	Low Risk perception (n=310)	High Risk perception (n=13)	Test statistic value	p value
<b>Age</b>					
Less than 60	234	225 (96.2 %)	9 (3.8 %)	0.070#	0.758
60 and above	89	85 (95.5 %)	4 (4.5 %)		
<b>Gender</b>					
Male	196	186 (94.9 %)	10 (5.1 %)	1.498*	0.221
Female	127	124 (97.6 %)	3 (2.4 %)		
<b>Type of family</b>					
Nuclear family	195	187 (95.9 %)	8 (4.1 %)	0.008*	0.930
Joint family	128	123 (96.1 %)	5 (3.9 %)		
<b>APL/ BPL card</b>					
APL	105	103 (98.1 %)	2 (1.9 %)	1.810#	0.235
BPL	218	207 (95.0 %)	11 (5.0 %)		
<b>Occupation</b>					
employed	216	207 (95.8 %)	9 (4.2 %)	0.034#	0.9
Unemployed	107	103 (96.3 %)	4 (3.7 %)		
<b>Education</b>					
Illiterate	55	54 (98.2 %)	1 (1.8 %)	0.836#	0.704
Literate	268	256 (95.5 %)	12 (4.5 %)		

\* Obtained by Chi-square test, # Obtained by Fisher's Exact test

Categories were combined during analysis to align with the requirements of statistical testing.

Chi square test was done to find association between socio-demographic characteristics and risk

perception (table 3). However, on statistical analysis, there is no significant association between risk perception and socio-demographic characteristics

**Table 4: Distribution of study participants according to risk perception of COVID-19 and other factors (n= 323)**

	Frequency	Low Risk perception (n=310)	High Risk perception (n=13)	Test statistic value#	p value
<b>Presence of healthcare worker in family</b>					
Yes	47	45 (95.7 %)	2 (4.3 %)	0.008	0.9
No	276	265 (96.0 %)	11 (4.0 %)		
<b>History of COVID-19 infection for any member in the house</b>					
Yes	12	12 (100 %)	0	0.523	0.9
No	311	298 (95.8 %)	13 (4.2 %)		

# Obtained by Fisher's Exact test

Association between risk perception and source of information like mass media, friends/relatives,

Pamphlet/bulletin board/campaign and healthcare worker was not found statistically significant.

Irrespective of the presence of healthcare worker in family and History of COVID-19 infection for any member in the house, majority of the participants had low risk perception of COVID-19. However, out of 12 respondents those who gave history of COVID-19

infection in the family, all the participants (100%) had low risk perception regarding COVID-19 (Table 4). However, on statistical analysis, there is no significant association between risk perception regarding COVID-19 and history of COVID-19 infection.

**Table 5: Association of risk perception of COVID-19 with knowledge, attitudes and practice towards preventive measures of COVID-19 (n= 323)**

	Frequency	Low Risk perception (n=310)	High Risk perception (n=13)	Test statistic value <sup>#</sup>	p value
<b>Knowledge</b>					
Average	8	8 (100 %)	0	0.344	0.9
Good	315	302 (95.9 %)	13 (4.0 %)		
<b>Attitude</b>					
Negative	6	4 (66.7 %)	2 (33.3 %)	13.595	0.021
Positive	317	306 (96.5 %)	11 (3.5 %)		
<b>Practice</b>					
Poor	118	114 (96.6 %)	4 (3.4 %)	0.194	0.775
Good	205	196 (95.6 %)	9 (4.4 %)		

*# Obtained by Fisher's Exact test*

Irrespective of the knowledge of preventive measures, all participants had low risk perception of COVID-19. However, it was not found to be statistically significant. Among participants who had positive attitude, 96.5% had low risk perception, whereas only 3.5% had high risk perception. On statistical analysis, there was significant association between attitude towards preventive measures of COVID-19 and risk perception. (p value 0.02) (table 5). Temporality of the association between practice of COVID-appropriate behavior and the risk perception isn't possible with the cross-sectional study. One way of representing would be that: 3.4% of people with poor practice and 4.4% people with good practice had perceived themselves to be at high risk. These proportions were not significantly different from each other (Table 5).

## Discussion

### *Risk perception of COVID-19*

Risk perceptions refer to people's beliefs and feelings about the possibility of disease or other harms to health. Perceived risk is a key predictor of both motivation to take protective action, and subsequent performance of health behaviors geared

at alleviating the threat.<sup>[10]</sup> Risk perception is a feature of protection-motivation theory.<sup>[11]</sup> It is a response to a threat, which can predict perceived risk influencing protective behaviors.

In the present study 96% of the participants had low risk perception of COVID-19 and majority were not worried about the COVID-19 issue. Similar results were also reported in a study conducted by Kokane N et al in Maharashtra during September 2020.<sup>[10]</sup>

A study conducted by He Shan et al in China in 2020 stated that people are worried about getting infected by COVID-19.<sup>[12]</sup> Whereas in the present study, majority were not worried about the COVID-19 issue and most of the participants were not worried for themselves or for their family members. This difference could be because of the reason that the study was conducted after two waves of COVID-19 and as a result, perceived risk was lesser compared to the studies conducted during first wave of COVID-19.

A study conducted in Tamil Nadu assessed risk perception and behavioral changes during the first wave of COVID-19. It found that approximately two-thirds of participants perceived a risk of contracting COVID-19, particularly among younger adults (ages 20-39) and urban residents.<sup>[13]</sup> In contrast, the present

study indicated that 96% of participants in Mangalore had low risk perception despite demonstrating good knowledge and positive attitudes towards preventive measures. This difference may also be due to the difference in timeline during which the study was conducted. The public health interventions may have been effective, fostering a balanced and informed understanding of the risks.

#### *Factors associated with risk perception of COVID-19*

Studies conducted across different parts of India indicate that risk perception is greatly influenced by demographic factors, including place of residence (rural vs. urban), level of education etc. A similar study carried out in Tamil Nadu revealed that people who were less educated and who resided in rural areas often perceive risk at lower levels.<sup>[13]</sup>

In the present study factors like age, gender, education, occupation etc. were not found to be significantly associated with risk perception. However, in a study conducted by Kokane N et al in Maharashtra there is statistical significance in perceived risk and age, history of COVID-19 infection; and no statistical significance was seen in gender and education with total perceived risk.<sup>[10]</sup> In the present study positive attitude was significantly associated with low-risk perception.

The study was conducted during a specific period of the pandemic, which may have influenced participants' perceptions based on the prevailing situation at that time. As the global situation transitions to a post-pandemic phase, public perceptions and behaviors may have evolved, highlighting the need for ongoing research to understand these changes and inform future public health strategies.

### **Conclusion**

Only 4% of residents in the rural field practice area of a teaching hospital in Mangalore perceived a high risk of encountering COVID-19. Factors associated with this high-risk perception of COVID-19 was negative attitude, as per statistical significance. Other factors which leaned towards having higher risk-perception were: elderlies, males, nuclear families, employed individuals, literates, BPL card holders, positive history of a family member developing a disease and good knowledge. Overall, the study

showed that majority of the rural residents had good knowledge, positive attitudes, good practice, low stigma in conjunction with low-risk perception, with most common source of information regarding all of the above being mass media. This in turn represents the effective IEC effort by different authorities in reaching rural India. So, at times of pandemics, the utility of mass media, social media etc. should be given as much importance as the information being passed on by the healthcare workers.

The study has certain limitations. Social desirability bias could not be addressed, as participants may have provided responses that they perceived to be socially acceptable rather than entirely truthful. This is shown in the difference between proportion of individuals with positive attitudes and good practice. The strengths of the study were that it adopted a community-based approach, gathering information directly from community. Now that the study shows overall positive long-term impact of multi-sectoral involvement, future research could adopt a longitudinal design throughout the outbreaks to assess changes in KAP over time and to understand the rapidity and changing impacts of interventions.

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**Patient Consent Declaration:** The authors certify that they have obtained all appropriate patient consent.

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