ISSN: 2515-8260 Volume 08, Issue 04, 2021

EXTENDED PARALLEL PROCESS MODEL IN COVID-19 RISK PERCEPTION AND RISK ASSESSMENT AMONG GENERAL POPULATION

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Abstract

Background: The COVID-19 pandemic has been transmitted worldwide rapidly. Present study was done to assess perceived risk by EPPM(Extended Parallel Processing Model) and the risk of COVID-19 infectionamong general population.

Methods: Cross sectional study was conducted among 185 general population ofChitradurga district. Questionnaire had three parts, 1. Socio-demographic data along with habits and co-morbidities. 2. Risk perception questions (29) with efficacy, defensive response and perceived threats. 3. A predesigned semi-structured questionnaire (24 questions) regarding their attitudes and practices towards COVID 19. Based on which their risk was assessed depending on score.. Chi-square, ANOVA, t-test and binary logistic regression was applied to find significant association.

Results: Among 185 study participants, majority were elders (>60 years) 25.5%, 100 (54.05%) were males, 108 (58.37%) belonged to nuclear family. Perceived risk scores were almost same in all the categories. A total of 106 (57.3%) participants were engaging in danger control processes and 79(42.7%) in fear control processes. Among population, 32.08%, and 44.30% people were in high and medium risk of infection respectively. Everybody is in risk. 85.27% frequently washed hands with soap or sanitizer, 76.8% used mask regularly when they go out, 74.26% do not wash their dress once they come from outside, 70.37% do not wash their shoes, 54.64% use mass transport. Among socio-demographic variables education, type of family and travel history were significantly associated with risk of infection.

Conclusion: Perceived risk was equal in almost all classes. The attitude and practice towards COVID 19 during pandemic was not so impressive.

Keywords: Assessment, COVID-19, EPPM, infection, risk score

Introduction

No detailed elaboration is required for this global pandemic ushered in by the Coronavirus disease 2019 (COVID-19). Public Health Emergency of International Concern (PHEIC) was declared on 30 January by the World Health Organization (WHO) for the coronavirus outbreak and a pandemic on 11 March 2020[1].

The pandemic caused by SARS-CoV-2 has swept through the world causing unpreceloss of lives and livelihood. Successful outbreak containment requires sound knowledge of the disease and a positive attitude among affected population[2].Research efforts in China revealed that an optimistic attitude among general population was conducive to gain victory over COVID-19 pandemic[3].

Of late, the second wave of the infection and new variants of the virus have also surfaced across the world. Various control measures are adopted globally; however, the success and effectiveness of the control measures are suffering from people's attitude and practices towards the pandemic. To ease the pandemic controlling of COVID-19 in India, there is a crucial need to understand the people's consciousness of COVID-19 at this complex situation. Maintaining hygiene practices, like proper hand washing, wearing a mask and staying at home, all are recommended for controlling the spread of the disease and breaking the transmission chain[4].

There are several factors which may affect COVID- 19 response behaviors[5].Of these, the extended parallel process model (EPPM) is extremely relevant[6].

The EPPM (also referred to as Threat Management or Fear Management) describes how rational considerations (efficacy beliefs) and emotional reactions (fear of a health threat) combine to determine behavioral decisions. This model predicts that fear of a health risk like COVID-19 can cause either adaptive, self-protective actions or maladaptive, self-defeating actions. When perceptions of a threat are strong and perceived levels of efficacy are high, the model predicts self-protective behavior. When perceptions of a threat are strong, but perceived levels

of efficacy are low, the model predicts maladaptive denial or rejection of protective behaviors. By asking questions just like the ones above, people in an intended audience are classified as having either high or low levels of perceived efficacy and either high or low levels of perceived threat[7].
Thus, so as to influence people's behavior to follow the COVID-10 health recommendations it's important to know how people perceive the COVID-19 pandemic, how they are assessing these risks and the way such assessments might lead them to change their behaviors. This study aimed to know how people have perceived the COVID-19 outbreak using the components of the EPPM (efficacy, defensive responses and perceived treat) and the way these might contribute to possible behavioral responses to the prevention and control of the disease and also to assess the risk of COVID-19 infection among general population of Chitradurga.

Methodology

Study design: This was a community based-cross sectional study that was carriedout in Chitradurga, Karnataka.
Data collection and participants: Data was collected using a predesigned semi-structured questionnaire. Participants were recruited by house to house survey in urban field practice area of Basaveshwara Medical College and Hospital, Chitradurga. There was no specific exclusion criterion for participating in this survey except age. Anyone who was aged more than18 years of age were eligible to participate. Those who were willing to participate in the study were asked to complete the questionnaire.
Sample size estimation: The sample was 97, considering Z for 95% confidence interval is 1.96, P = 0.5 (assuming that 50% of people would either be engaged in danger control or fear control processes) and d = 0.1 (precision = 10%).
As such we estimated at least 97 participants would be requiring for the study to have a power of 80% at 5% significant level. However, in practice 185 individuals participated in the study.
The study questionnaire:A predesigned semi-structured questionnaire was used to collect the data. This questionnaire was developed based on a literature review of the EPPM-based risk perception assessments of other infectious diseases.The Cronbach's alpha coefficients for the dimensions ranged from 0.7 to 0.8, which indicated acceptable internal consistency fothe questionnaire. The questionnaire was pilot tested with a sample of 20, based on which their risk was assessed depending on the risk score. The questionnaire had three parts.
First part had basic characteristics data such as age, gender, education, occupation, residence,monthly family income, history of smoking and alcohol consumption and presence of co-morbidities.
Second part had 29 risk perception questions, which were divided into three pre-defined dimensions[8].

1. Efficacy (perceived self-efficacy and perceived response efficacy) with 13 items. The perceived self-efficacy included six items measuring participants' beliefs about their ability to perform the recommended responses to the COVID- 19. The response efficacy included seven items measuring participants' beliefs about the effectiveness of the recommended preventive responses to the COVID-19.
2. Defensive response (denial, reactance and avoidance): This dimension included eight items measuring people's beliefs about their perception of the risk of COVID-19.
3. Perceived threats (susceptibility and severity). This dimension included eight items measuringbeliefs about the magnitude of the COVID-19 and about their risk of experiencing the disease.

Each item was rated on a 5-point Likert scale (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree) giving an overall obtained score ranging from 29 to 145. The rating for items belonging to defensive response was re-coded so that the direction of scoring is same as the other two dimensions.
Third part had 24 questions related to attitude and practices of respondents towards COVID-19 and risk assessment. Of these, 22 had options to answer as yes or no. Thirteen questions among these were selected to assess risk of infection. The scores were calculated individually and cumulative scores were obtained for all. Based on the acquired scores out of total score thirty nine, the risk of infection was assessed[1].

Scoring

Part two of the questionnaire was scored as follows:

1. Risk perception: Using the following simple linear transformation [Obtained score-the lowest possible score/the highest possible score-the lowest possible score] × 100, the obtained scores were converted into a score of 0 to 100 where lower scores indicated lower risk perception and the higher scores indicated higher risk perception.
2. Danger control and fear control: We subtracted the perceived threat score from the perceived efficacy score (self-plus response-efficacy divided by two), resulting in a discriminating value. The discriminating value could be either positive or negative. A positive value meant that a person was engaging in danger control processes because their perceived efficacy was stronger than their threat perceptions. In other words, a person was likely to engage in some level of protective behaviors with regard to the specific health threat. A negative value meant that a person was engaging in fear control processes because their threat perceptions were stronger than their perceptions of efficacy. In these cases, a person was likely to engage in fear control

processes and was probably not protecting himself or herself against the specific health threat.

Part three of the questionnaire was scored as follows:
Risk category according to acquired risk score

Acquired Score	Risk Category
20 or more	Extreme High Risk of Infection
15 to less than 20	High Risk of Infection
10 to less than 15	Medium Risk of Infection
5 to less than 10	Low Risk of Infection
Less than 5	No Risk of Infection

Statistical analysis: Statistical analyses were performed using the Statistical Package for Social Science, Version 20, for Windows (SPSS Inc., Chicago, IL, USA). The normality of the data was analyzed using a Kolmogorov-Smirnov test and the normal distribution of data was confirmed. The characteristics of the participants were summarized as numbers, percentages, or means with standard deviations, where appropriate. Analysis of variance (ANOVA), t-tests, and chi-square were used to compare the study sub-groups. Binary logistic regression was applied to find the significant association between the demographic variables and the risk. In all tests, a value of $p < 0.05$ was considered statistically significant.

Results

Demographic characteristics: Table 1 shows the basic characteristics of the study subjects (100 males, and 8females). The mean age of the respondents was 37.0 (SD = 11.1) years. Majority were more than 40 years. Most of them belonged to socio-economic class IV i.e. 62 (33.5%). 22.2% and 18.9% had a habit of smoking and alcohol respectively. When their BMI was calculated 111(60%) were overweight, and 41(21%) were obese.

Table 1: Characteristics of study Participants [n=185]

Variable		Frequency (%)
Age	<20 years	21 (11.4%)
	20-30 years	23 (12.4%)
	30-40 years	29 (15.7%)
	40-50 years	43 (23.2%)
	50-60 years	22 (11.9%)
	>60 years	47 (25.4%)
Gender	Male	100 (54%)
	Female	85 (46%)
Education	Profession	3 (1.6%)
	Graduate/PG	17 (9.2%)
	Post-high school/diploma	30 (16.2%)
	High school	47 (25.4%)
	Middle school	34 (18.4%)
	Primary school	30 (16.2%)
	Illiterate	24 (13%)
Occupation	Profession	9 (4.9%)
	Semi-profession	9 (4.9%)
	Clerical/shop owner/farmer	37 (20%)
	Skilled worker	11(5.9%)
	Semi-skilled worker	45 (24.3%)
	Unskilled worker	23 (12.4%)
	Unemployed	51 (27.6%)
Socio-economic status	Class I	13 (7%)
	Class II	31 (16.8%)
	Class III	48 (26%)
	Class IV	62 (33.5%)
	Class V	31 (16.7%)

History of Smoking	Yes	41 (22.2%)
	No	144 (77.8%)

History of consumption of alcohol	Yes	35 (18.9%)
	No	150 (81.1%)
BMI	Underweight	3 (1.6%)
	Normal	30 (16.2%)
	Overweight	111 (60%)
	Obesity I	29 (15.7%)
	Obesity II	11 (6%)
	Obesity III	1 (0.5%)
Co-morbidities* (Multiple answers)	Absent	77 (41.6%)
	Hypertension	65 (35.1%)
	Diabetes Mellitus	31 (16.8%)
	Asthma	17 (9.2%)
	CHD	2 (1.1%)
	Cancer	6 (3.2%)
	Tuberculosis	7 (3.8%)
	Others	2 (1.1%)
	No	164

Perceived risk of the coronavirus disease: The perceived risk for all participants based on EPPM by basic characteristics is shown in Table 2. The results by age revealed that there was not much change in different age groups regarding perceived self-efficacy, response efficacy, denial, reactance, avoidance, threat susceptibility and threat severity. Women had higher but not significant scores than men for self-efficacy, defensive response, threat susceptibility and severity. Men had higher response efficacy scores for the COVID-19 than women. The average scores across all dimensions showed no significant change across all education and occupational levels. Perceived risk scores were not so different among different BMI cases.

Table 2: Risk perception based on the EPPM by basic characteristics of study sample

Variables		**Efficacy**		**Defensive response**			**Threats**	
		Self-efficacy	**Response efficacy**	**Denial**	**Reactance**	**Avoidance**	**Susceptibility**	**Severity**
Age	<20 years	65.5 (1.7)	81.9 (2.15)	25.05 (3.1)	22.3 (2.2)	27 (2.5)	66.3 (2.9)	76.1 (0.85)
	20-30 years	66 (2.1)	81.8 (1.9)	24.13 (2.5)	21.5 (2.3)	27 (2.5)	64.3 (3.03)	75.9 (0.77)
	30-40 years	66.7 (1.93)	82.1 (2.1)	24.5 (2.7)	21.4 (2.6)	27.0 (2.2)	64.8 (2.8)	75.9 (0.77)
	40-50 years	66.05 (1.85)	81.8 (2.02)	25.4 (2.5)	21.6 (2.3)	27.6 (2.5)	65.5 (2.5)	76.2 (0.72)
	50-60 years	66.2 (1.8)	82.7 (2.1)	25.3 (2.7)	21.8 (2.4)	26.8 (2.2)	64.5 (2.5)	75.7 (0.7)
	>60 years	65.7 (2.02)	82.04 (1.8)	24.7 (2.4)	20.9 (2.6)	27.7 (2.5)	64.3 (3.2)	75.7 (0.8)
	p value	0.405	0.702	0.933	0.519	0.924	0.342	0.497
Gender	Male	65.9 (2.04)	82.2 (1.9)	24.7 (2.5)	21.3 (2.3)	27.3 (2.4)	64.7 (2.8)	75.9 (0.8)
	Female	66.1 (1.8)	81.8 (1.9)	25.2 (2.7)	21.7 (2.5)	27.3 (2.4)	65.1 (3)	76 (0.7)
	p value	0.318	0.302	0.348	0.338	0.334	0.447	0.125
Education	Profession	66.3 (2.5)	79.3 (0.6)	25.7 (0.6)	19.3 (2.3)	25.3 (1.5)	65 (2.6)	76 (0)

	Graduate/PG	65.9 (1.9)	82.1 (1.9)	24.7 (2.9)	20.6 (2.2)	27.3 (2.4)	64.9 (2.1)	75.8 (0.8)
	Post-high school/diploma	66 (1.9)	82.6 (1.9)	24.9 (2.7)	22.1 (2.5)	26.5 (2.03)	65 (3)	75.9 (0.8)
	High school	66.02 (1.9)	81.6 (1.9)	25 (2.8)	21.4 (2.5)	27.4 (2.5)	65.1 (3.2)	76 (0.8)
	Middle school	66.2 (1.9)	82.2 (1.9)	25 (2.3)	21.6 (2.2)	27.9 (2.5)	64.6 (2.8)	75.8 (0.8)
	Primary school	65.9 (1.9)	82.2 (2.1)	24.5 (2.7)	21.3 (2.5)	27.4 (2.4)	65.2 (2.8)	75.8 (0.75)
	Illiterate	65.9 (2.1)	81.8 (1.8)	25 (2.7)	21.8 (2.5)	27.5 (2.5)	64.3 (3.2)	76.2 (0.9)
	p value	0.465	0.079	0.376	0.908	0.427	0.650	0.655
Occupation	Profession	66.56 (2.1)	81.44 (2.2)	24.89 (1.4)	20.78 (2.5)	27.11 (2.5)	65.44 (2.3)	76.22 (0.4)
	Semi-profession	66.56 (2.4)	82.44 9(1.8)	26.00 (2.7)	20.89 (2.8)	26.67 (2.3)	64.00 (2.6)	76.00 (1.0)
	Clerical/shop owner/farmer	66.11 (1.6)	82.05 (2.1)	24.73 (2.6)	21.30 (2.5)	26.59 (2.1)	65.14 (2.9)	75.89 (0.7)
	Skilled worker	65.91 (1.7)	82.91 (1.9)	24.82 (2.6)	22.27 (2.8)	27.18 (2.5)	65.64 (2.8)	75.91 (0.7)
	Semi-skilled worker	65.76 (1.9)	82.00 (1.9)	24.71 (2.5)	21.11 (2.1)	27.80 (2.3)	64.58 (2.9)	75.96 (0.8)
	Unskilled worker	66.61 (2.2)	81.70 (2.1)	24.87 (2.8)	22.09 (2.4)	27.57 (2.8)	64.48 (2.7)	75.78 (0.8)
	Unemployed	65.75 (1.8)	81.98 (1.9)	24.98 (2.7)	21.78 (2.4)	27.41 (2.4)	65.06 (3.1)	75.98 (0.8)
	p value	0.258	0.484	0.509	0.799	0.234	0.906	0.355
Socio-economic status	Class I	66.15 (2.1)	82.54 (2.2)	25.38 (1.9)	22.15 (2.2)	27.77 (2.3)	65.31 (3.2)	76.23 (0.6)
	Class II	66.03 (1.8)	81.39 (2.0)	25.52 (2.4)	21.58 (2.5)	27.74 (2.2)	64.94 (2.6)	75.94 (0.8)
	Class III	66.02 (1.8)	82.29 (1.8)	25.17 (2.7)	20.98 (2.3)	27.44 (2.2)	65.04 (2.8)	75.85 (0.8)
	Class IV	66.06 (1.9)	81.79 (1.9)	24.26 (2.6)	21.94 (2.5)	26.71 (2.5)	64.73 (3.2)	76.02 (0.8)
	Class V	65.84 (2.2)	82.45 (2.2)	24.87 (2.7)	21.06 (2.4)	27.61 (2.4)	64.74 (2.8)	75.81 (0.8)
	p value	0.116	0.507	0.849	0.873	0.142	0.706	0.537
BMI	Underweight	66.33 (1.5)	82.67 (2.5)	25 (3.6)	20.67 (2.8)	28.33 (1.5)	66.33 (1.2)	75.67 (0.6)
	Normal	65.97 (1.8)	82.2 (2.1)	24.6 (2.6)	2167 (2.7)	27.2 (2.3)	65.8 (2.9)	76.03 (0.8)
	Overweight	65.99 (1.8)	81.75 (1.9)	24.93 (2.6)	21.59 (2.3)	27.30 (2.4)	64.77 (2.8)	75.88 (0.8)
	Obesity I	66.17 (2.1)	82.79 (1.9)	25.17 (2.6)	21.21 (2.4)	27.41 (2.5)	64.69 (3.1)	76.14 (0.8)
	Obesity II	66 (2.4)	81.91 (2.1)	24.27 (2.4)	21.09 (2.8)	27.18 (2.6)	63.73 (2.7)	75.73 (0.8)
	Obesity III	65 (1.8)	83 (1.9)	27 (1.6)	21 (2.4)	25 (2.3)	64 (2.6)	77 (0.7)
	p value	0.353	0.156	0.165	0.495	0.807	0.916	0.523

Table 3: Danger control and fear control of the study sample

Variables		Danger control (n=106)	Fear control (n=79)	Total	Chi-square, p value
Age	<20 years	11 (10.37%)	10 (12.66%)	21 (11.4%)	1.549, 0.90
	20-30 years	14 (13.21%)	09 (11.39%)	23 (12.4%)	
	30-40 years	18 (16.98%)	11 (13.92%)	29 (15.7%)	
	40-50 years	26 (24.53%)	17 (21.52%)	43 (23.2%)	
	50-60 years	13 (12.26%)	09 (11.39%)	22 (11.9%)	
	>60 years	24 (22.64%)	23 (29.11%)	47 (25.4%)	
Gender	Male	55 (51.89%)	45 (56.96%)	100 (54%)	0.469, 0.49
	Female	51 (48.11%)	34 (43.04%)	85 (46%)	
Education	Profession	01 (0.95%)	02 (2.53%)	3 (1.6%)	5.39, 0.49
	Graduate/PG	09 (8.49%)	08 (10.13%)	17 (9.2%)	
	Post-high school/diploma	20 (18.87%)	10 (12.66%)	30 (16.2%)	
	High school	29 (27.36%)	18 (22.78%)	47 (25.4%)	
	Middle school	18 (16.98%)	16 (20.25%)	34 (18.4%)	
	Primary school	19 (17.92%)	11 (13.92%)	30 (16.2%)	
	Illiterate	10 (9.43%)	14 (17.73%)	24 (13%)	
Occupation	Profession	03 (2.84%)	06 (7.59%)	9 (4.9%)	12.08, 0.06
	Semi-profession	05 (4.72%)	04 (5.06%)	9 (4.9%)	
	Clerical/shop owner/farmer	23 (21.69%)	14 (17.73%)	37 (20%)	
	Skilled worker	10 (9.44%)	01 (1.27%)	11(5.9%)	
	Semi-skilled worker	26 (24.53%)	19 (24.05%)	45 (24.3%)	
	Unskilled worker	16 (15.09%)	07 (8.86%)	23 (12.4%)	
	Unemployed	23 (21.69%)	28 (35.44%)	51 (27.6%)	
Socio-economic status	Class I	06 (5.66%)	07 (8.86%)	13 (7%)	7.53, 0.11
	Class II	18 (16.98%)	13 (16.46%)	31 (16.8%)	
	Class III	26 (24.53%)	22 (27.85%)	48 (26%)	
	Class IV	43 (40.57%)	19 (24.05%)	62 (33.5%)	
	Class V	13 (12.26%)	18 (22.78%)	31 (16.7%)	
History of Smoking	Yes	16 (15.09%)	25 (31.65%)	41 (22.2%)	7.18, 0.007
	No	90 (84.91%)	54 (68.35%)	144 (77.8%)	
History of consumption of alcohol	Yes	14 (13.21%)	21 (26.58%)	35 (18.9%)	5.27, 0.02
	No	92 (86.79%)	58 (73.42%)	150 (81.1%)	
BMI	Underweight	01 (0.94%)	02 (2.53%)	3 (1.6%)	4.84, 0.43
	Normal	14 (13.21%)	16 (20.25%)	30 (16.2%)	
	Overweight	65 (61.32%)	46 (58.23%)	111 (60%)	
	Obesity I	18 (16.98%)	11 (13.93%)	29 (15.7%)	
	Obesity II	08 (7.55%)	03 (3.79%)	11 (6%)	
	Obesity III	0	01 (1.27%)	1 (0.5%)	

Danger control and fear control: Table 3 shows the discriminating values indicating danger control and fear control scores based on different socio-demographic characteristics. A total of 106 (57.3%) participants were engaging in danger control processes and 79(42.7%) in fear control processes. The respondents in former group were more likely to engage in preventive

behaviors while those in the latter group were more likely to delay recommended responses for preventing themselves from the COVID-19. There were significant differences in danger and fear control scores among the people with history of smoking and alcohol consumption. Table 4 describes the attitude and practices of respondents towards COVID-19 disease.

Table 4: Attitude and practices of respondents towards COVID-19 and risk assessment

Questions	Positive responses
Frequently washed hands with soap or sanitizer	94 (50.8%)
Regular use of mask	118 (63.8%)
Used mask with frequent washing	156 (84.3%)
Put off their clothes when come from outside	82 (44.3%)
Washed their shoes when come from outside	33 (17.8%)
Used public transport	94 (50.8%)
Usually spent times with friends, regularly	86 (46.5%)
Maintained social distances	62 (33.5%)
Sneezed between elbows	64 (34.6%)
Frequently touched mouth or eyes or nose	85 (45.9%)
Usually drink tea/coffee from road side tea shops	65(35.1%)
More than 3 Days in a week ate roadside snacks	73 (39.5%)
Regularly cleaned work or home or classroom table·	63 (34.1%)
Usually cleaned mobile with sanitizer	36 (19.5%)
Usually touched mobile phone with unwashed hands·	25 (13.5%)
Regularly dealt with sick people or health worker	19 (10.3%)
Usually shared food or water bottle with others	48 (25.9%)
Often ate half or semi cooked fish, meat, eggs or vegetables	36 (19.5%)
Recently visited corona virus infected area	12 (6.5%)
Recently met with people came from abroad (corona affected area)	2 (1.1%)
Had COVID19 symptoms at your work places or near work place	9 (4.5%)
Family member(s) caught corona infection	7 (3.8%)
Has Quarantine facilities near the house or workplace	10 (5.4%)
Home or work places cleaned everyday with sanitizer·	51 (27.6%)

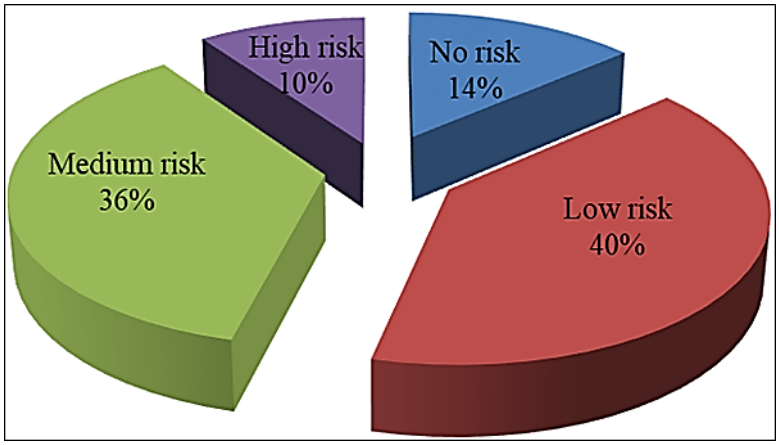

Fig 1: Risks of Infection among study participants

Table 5: Binary logistic regression based on demographic factors towards risk of infection

Variable	Odds Ratio	95% CI
Age (<30 years vs> 30 years)	2.790	1.215-6.405
Gender (male vs female)	2.474	1.283-4.774
Education (upto HSC vs above HSC)	1.134	0.535-2.403
Occupation (Unemployed vs Employed)	0.326	0.137-0.772
Religion (Hindu vs Muslims)	0.723	0.245-2.138
Type of family (Nuclear vs Joint)	0.898	0.44-1.832
Socio-economic status (class I&2 vs 3,4 &5)	0.815	0.363-1.829
BMI (Normal vs Obesity)	0.438	0.201-0.956

Multiple binary logistic regression analysis on demographic factors towards risk of infections (risk score) has shown in Table 5. Among the independent variables age, (OR: 2.79, CI: 1.215-6.405) gender, (OR: 2.474, CI: 1.283-4.774) occupation (OR: 0.326, CI: 0.137-0.772) and BMI (OR: 0.438, CI: 0.201-0.956) were significantly associated with risk of infections.

Discussion

This EPPM-based study was conducted to assess the risk perceptions, overall perceived danger and fear control processes.The study provides a timely assessment and initial evidence related to the risk perceptions and psychological responses of 185 individuals. In this study, the risk perception was evaluated through three dimensions of the EPPM including efficacy (self-efficacy and response efficacy), defensive response (denial, reactance and avoidance) and threat (susceptibility and severity).

The study results showed that 57.29% of respondents were motivated by danger control responses and 42.7% by fear control responses. This indicates that more than half of all participants had high perceived efficacy (i.e., self-efficacy and response efficacy). According to the EPPM, two cognitive appraisals might initiate after a person learns about a health risk: one related to the threat it poses and a second related to the efficacy to follow the recommended responses. When the threat of COVID-19 is perceived to be more significant and efficacy is low, people are usually act to protect themselves from the fear rather than the danger itself (fear control process). Conversely when perceived efficacy is significantly high, even if the perceived treat would be high, people usually are motivated to protect themselves from the danger and could manage the threat (danger control process).[9] In a similar study conducted in Iran it was found that a total of 56.4% of participants were engaging in danger control processes and 43.6% in fear control processes[8].

Individuals usually use psychological defense strategies to control their fears. These strategies include denial, avoidance, and reactance. Our results showed that higher defensive response scores correlated with better responses from participants. Defensive avoidance occurs when individuals block out feelings and thoughts about a threat or ignore further information about it, for example, switching the television channel or skipping COVID-19-related news. People in younger age groups had lower reactance scores and lower self-efficacy scores, indicating that younger people tended to take more risks and ignore health recommendations[10].

According to the WHO, older people are at higher risk of contracting COVID-19[11].However, some studies reported that after the initial stage of a pandemic the media attention to the topic declined and perceived susceptibility and severity declined accordingly[12-14].Where as in our study all age groups had almost equal susceptibility.

The study results indicate that nearly half of study participants are not well aware about the COVID-19 and the upcoming hazardous situation. To prevent or reduce the infection rates, people need to get information and act accordingly. In this pandemic situation, attitude and practices towards COVID-19 did depend on the information they got and subsequently acted accordingly. Doremalen*et al.*[15] showed that coronavirus can be transmitted through cloths and shoes. Similar results were found in our study.Only few people (19.5%) clean their mobile phones or touched mobile phone with unwashed hands (13.5%). Due to massive spreading news, most of the people are avoiding for going to corona affected areas (93.5%) and also avoiding to come in touch of the people who are coming from abroad or corona affected areas (98·9%). 3.8% respondents informed that their family members were infected with coronavirus that made them in extreme risk categories of infection.

As advised by outcomes from earlier studies about age and gender patterns of risk-taking manners[16]men, elders and different occupations are more prone to get involved in risk-taking performances. Comparing the recent work on KAP towards COVID19 of Chinese population[17] attitude and practices were not that level because of socioeconomic and health care systems. Proper health education and mass awareness programs would be helpful for improving attitudes and maintaining safe practices. Appropriate preventive measures, healthy practices, and instructions must be strictly implemented by the government with the help of concerned agencies and organizations.

Conclusion

More than half of participants were motivated by danger control. This indicated that more than half of participants had high perceived efficacy (i.e., self-efficacy and response efficacy). The attitude and practice towards COVID 19 during pandemic was not so impressive. Proper health education and mass awareness programs would be helpful to improve the same. Indeed, the knowledge provided by the current study will likely contribute to the effectiveness of COVID-19 control and prevention measures.

Acknowledgement: We acknowledge all the study participants who agreed to take part in the study.

Ethical issues: Institutional Ethics Committee clearance was obtained before the start of the study.

Conflict of interest: None declared**.**

Author's contribution: All the authors contributed in preparing the plan, conducting the study, manuscript preparation along with processing.

Funding: Nil.

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