COVID Related Original Research

Protection Motivation, Social Distancing and Behavioural Changes during COVID-19 Pandemic

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ABSTRACT

Background: The study aimed at ascertaining the effect of protection motivation on behavioral changes in the society.
Methodology: 357 respondents from four districts of a state of eastern India participated in the study. These two variables when taken together, adversely affected well-being of people. Factor analysis was computed to extract factors of two scales. Step wise multiple regression was computed to regress protection motivation and background variables separately on health safety and social distancing. Another set of regression analysis added social distancing to protection motivation to predict their effects separately on loneliness, hostility and anxiety.
Results: The results suggested that the arousal of protection motivation moderated social distancing behavior during COVID 19 pandemic. The findings revealed that people adopted defensive measures when they perceived high potential threat of health and estimated usefulness of social distancing behavior. People had more negative experiences of loneliness and anxiety and showed hostility during lockdown. The results are interpreted in the light of risk aversion management.

Keywords: protection motivation, social distancing, well-being, risk aversion, health management.

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INTRODUCTION

The study was designed to measure the effect of perceived potential threat of COVID 19 pandemic on behavioural changes in the society. Social distancing has suggested some preventive behavioural measures which are essential for health risk management. At the same time, social distancing has widened emotional and social gaps between people. These behavioural changes at the societal level are expected to stay for health risk management. The arousal of protection motivation moderates social distancing. These two variables when taken together, adversely affect psychological well-being of people.

Protection motivation behaviour is a tendency to assess the perceived health threat and an intention to perform for health management. Protection motivation triggers two cognitive processes-threat appraisal and coping appraisal. Threat estimates three cognitive processes: a. severity of events, b. the probability of occurrence of events and c. the efficacy of the recommended coping responses [1]. Coping appraisal is an estimation of individual's capacity to perform risk preventive behaviour. Risk preventive behaviours can be grouped into three broad categories; a. response efficacy, b. self-efficacy and c. cost efficacy. Response efficacy explains the perceived effectiveness of the recommended risk preventive behaviour. Self-efficacy response demands a strong belief in one's capabilities to organise and execute course of actions to avert potential threats. Coping appraisal also considers response cost that an individual estimate while performing the recommended practices. There exist no substantive studies on behavioural changes that stems from the need for protection motivation. Some basic models of risk aversive behaviour explain dynamics of behavioural changes during COVID 19 pandemic [2-3]. At any given time, a risk aversive behaviour occurs

when both the capability and opportunity are present and when a person is more motivated to enact that behaviour than any other [3]. Another plausible explanation to behavioural change is cognitive dissonance. People change their behaviour when the available information contradicts beliefs and values. They adopt at least three strategies to avoid dissonance [4]. Prospect theory of judgement argues that people make judgement after comparison of positive and negative consequences of any action available to them [5]. Conflict theory of decision making [6] lays emphasis on decision taken under stressful condition. PRIME theory narrates that behavioural changes at any moment result from the competing impulses and inhibitions operating at that moment [7].

Social distancing as non-pharmaceutical preventive measure requires further research to scale its impact especially on individual and social behaviour. Social distancing is a cost-effective epidemic control strategy if it is applied with a high degree of caution [8]. Many mathematical models have been formulated to predict the effect of social distancing on infectious disease control outcomes [9]. Structure of social contacts specifies linkages among people across age, gender, income and other sociological variables [10]. Wasdin and Prasad [11] in a study noted that Bengaluru slum dwellers kept engaging in economic activities at the cost of social distancing. Adolescents in US were more socially responsible while complying with social distancing [12]. Adolescents who stayed home, had less anxiety and less depression compared to those who stayed away from home. Stigmatization and doubts over the credibility of social-relationship are some of the negative consequences of social distancing which might covary with COVID 19. At the same time, some positive behavioural changes are expected to be assimilated in the lifestyle. In African society social distancing was a painful exercise [13]. The African sense of personhood and belonging to the community are so high that social relations move around it. In a study it was observed that isolation and social distancing were effective during short-term lockdown [14]. The time line study disclosed that lockdown had adverse effects on mental make-up when period was extended. In Italy it was found that self-quarantine was not effective beyond a time limit [15].

Recent studies explain that social distancing and isolation though effective measure to control the pandemic, generate enormous cost to people's mental health [15-17]. Many studies in the West [15,18] confirmed that people of collectivistic culture experienced more loneliness when their perceptual deficit was more than the expectation. Hostility and self-isolation bear a significant relationship [19]. Self-isolation for a longer period results in hostility. In a recent study it was reported that quarantined and isolated individuals were more anxious and had post-traumatic stress symptoms [20]. 28% people were found anxious about non-specific symptoms and mutation effect of this infectious disease. People unwillingly modified their lifestyle and dietary habits.

High uncertainty and low predictability of COVID 19 threaten people's physical as well as mental health. People develop negative emotions and appraise poorly cognitive processes [21-22]. Behavioural immune system explains that people tend to develop avoidance behaviour when faced potential health threat [22]. Perceived risk theory [23] explains that public emergencies trigger more negative emotions and thereby, affect cognitive assessment. Prolonged deprivation of social contacts produces negative emotions, reduce immune functions and disrupt processes of normal physiological mechanisms. People overreacted to COVID 19 pandemic in absence of appropriate guidance from the state authorities. It led to avoidance behaviour and blind conformity [22]. In another study it was found that people showed their negative emotions (e.g., anxiety, depression and indignation) and were more sensitive to social risks [23]. They were concerned more about their health and family while less about friends. Social risk judgement was higher and life satisfaction lower after COVID 19 [22]. Uncertainty about sources of disease and non-availability of vaccination made people more suggestive. People's fear of potential risk and lack of controllability caused by COVID 19 brought higher risk judgement [24]. Quarantined persons felt rejected from their neighbours. They were not invited on many social gatherings and were treated differently with fears and suspicion. Sometimes, they faced critical comments on health issues [25]. Studies in the west report that the quarantined persons had post-traumatic disorder [26]. Acceptability of such persons at job places was very critical while maintaining social distancing. The isolated persons during Severe Acute Respiratory Syndrome (SARS) epidemic experienced acute anxiety and fear after recovery [25]. A cohort study reported high post stress-traumatic disorder (PSTD) after SARS outbreak [26]. Isolation and quarantine for a longer period resulted in mood disorder, guilt feeling, loneliness and insomnia [27].

Hypotheses

There exists paucity of researches on behavioural changes during COVID 19 pandemic in India. Based on some previous studies in the West a few hypotheses were formulated:

Hypothesis 1: When people perceive potential health threat, they will comply with social distancing,

Hypothesis 2: When people perceive potential threat and follow social distancing, there will be negative experiences of loneliness, hostility and anxiety.

Hypothesis 3: When people perceive less advantage of preventive measures, they will not follow social distancing.

METHODOLOGY

Participants

The study was conducted on four districts of a state of eastern India where number of positive cases in the containment areas of red zone were high and people remained home-quarantined for more than two months. 357 respondents randomly selected for the study, resided in the containment areas. They were individually approached after lockdown. Of them 254 were male and 103 females. Their average age was 42.7 years. Their educational qualification ranged from higher secondary to post-secondary and income varied between 4.00 and 8.56 lakh per annum. Of them 77 per cent resided in urban setting and the remaining 23 per cent in the rural areas.

Instruments

Initially it was decided to compute factorial properties of the multidimensional scales with the help of varimax rotation followed by orthogonal method. All scales followed standard operating procedures of item analysis before final administration.

1. **Protection Motivation Scale:** It refers to the need for health management and an intention to cope with the critical situation. The study adopted Mac Donell's scale [28]. Initially it had seven sub-components (severity, vulnerability, extrinsic reward, intrinsic reward, response-efficacy, self-efficacy and cost-efficacy) having 21 items. It was contextually modified and subject to factor analysis. The factor analysis of the scale resulted in three interpretable factors accounting for 72.58 per cent of the total variances. These factors were: a. severity, b. reward and c. response efficacy. The eigen values of the extracted factors were: 4.32, 4.18 and 3.78 respectively. The Cronbach alpha of each factor was: .78, .71 and .68 respectively.
2. **Social Distancing Scale:** It refers to physical distance which is spatially defined between persons for breaking a chain of social contact. The scale was developed with the help of a panel of experts. It had 17 items covering mainly two broad dimensions: physical distancing and social distancing. Each dimension constituted some behavioural strategies to counter potential threat. The factor analysis of the scale yielded two major factors: a. health safety strategy and b. social distancing strategy accounting for 70.34 per cent of the total variances. The eigen values of these factors were: 4.87 and 4.37 respectively. The Cronbach alpha of each factor was: .73 and .76 respectively [29].
3. **Well-Being Scale:** It constitutes three indicators-loneliness, hostility and anxiety. Loneliness is an unpleasant experience while hostility is a reaction to the perceived situation. Anxiety is a mental state that prevails with some unknown reasons. The scale consisted of 12 items. Each dimension had four items. The intra-item and inter-item total correlation of the scale was fairly high ($p < .01$). The Cronbach alpha coefficient of each dimension was: .67, .72 and .69 respectively [30].

The study collected a list of the containment areas across districts from the state health department. This included a number of cases of isolated and recovered persons as well. A team of well-trained investigators approached the respondents in the sampled districts and established rapport with them. A focus group discussion (FGD) was organised in some places to elicit more information about COVID 19. The total time taken during data collection was about one and half months.

RESULTS

Proportional Mean and Relative Standing of Factors

Since the emerged factors had varying number of items, proportional mean was computed for each scale and was further ranked to indicate the relative standing of each factor (table 1). Severity was a prominent factor of protection motivation followed by response-efficacy confirming a perceptual impression of potential threat and an intention to avert it. It directed people to take some preventive measures as and when required. People insisted more on personal health safety measures than social distancing. They modified their behaviour to cope with the emerging situation.

Table 1: Mean, SD and Proportional Mean with Rank of all Factors

Factors	Range of mean scores	Range of SD	Proportional mean	Rank
Response-Efficacy (9)	3.34-4.07	.69-102	3.77	2
Severity (6)	3.79-4.21	.68-1.17	3.87	1
Reward (6)	3.12-3.36	1.12-1.24	3.23	3
Health Safety (8)	2.89-3.79	1.15-1.28	3.25	1
Social Distancing (9)	3.22-4.13	1.09-.1.16	3.21	2

Note: Figures in parenthesis against dimension show number of items

Intercorrelation among Variables

Table 2 shows intercorrelation among variables. All variables by and large, were significantly related to each other. People adopted both social distancing behaviour and health safety measures (r .19, $p < .01$) when they had an intention to respond to the situation. People adopted both health safety and social distancing behaviours when they perceived severe health threat ($r < .01$). Response-efficacy significantly correlated with health safety behaviour (r .28, $p < .01$). Other than response-efficacy all factors were related to loneliness, hostility and anxiety ($p,< .01$). Reward, health safety and social distancing made negative relationships with anxiety. Respondents showed more anxiety when they did not perceive any advantage of social distancing. However, social distancing and health safety measures had positive relationships with loneliness and hostility. More they adopted social distancing, more they experienced loneliness and were hostile to the situation ($r < .01$). All dimensions of well-being were significantly related to each other ($r < .01$).

Table 2: Correlation Matrix among Variables

Variable	Response -Efficacy	Severity	Reward	Health Safety	Social Distancing	Loneliness	Hostility	Anxiety
Response-Efficacy	-	.31**	.19**	.28**	.32**	-.07	.09	.04
Severity		-	.11*	.19**	.21**	.24**	.18**	-.06
Reward			-	.19**	.22**	.15**	,19**	-.23**
Health Safety				-	.19**	.25**	.28**	-.32**
Social Distancing					-	.26**	.30**	-.34**
Loneliness						-	.25**	.21**
Hostility							-	.18**
Anxiety								-

Note. **Significant at .01 level, *df* 355

Step wise Multiple Regression Analysis

Step wise regression analysis was computed separately at two levels. At the first level protection motivation was regressed on social distancing. At the second level both protection motivation and social distancing were regressed on each dimension of well-being. Protection motivation moderated social distancing which

in turn, contributed to well-being. A set of eight predictors (three factors of protection motivation-response-efficacy, severity and reward and five background variables- age, education, income, area and gender) were regressed on social distancing. At the second level a set of ten predictors (eight previous predictors and two additional predictors of social distancing-health safety and social distancing) were regressed on each dimension of well-being. The purpose of stepwise multiple regression analysis was to eliminate some of the superfluous variables and also to partial out multi-collinearity effects separately on social distancing and well-being. Another analysis known as *shrunken R* was computed to minimise biases in R and $R^{2.}$ The obtained results are displayed in table 3-7.

Altogether three predictors, namely severity followed by response-efficacy and age significantly contributed to health safety behaviour accounting for 44 per cent of the total variances. An overall F (6, 350) was found significant 3.64, $p < .01$. A sequence of variables revealed that severity of health threat was a prominent predictor followed by response-efficacy and age. The shrunken R was .39 showing less bias in estimation of health safety behaviour.

Similarly, four predictors, severity, response-efficacy, reward and income significantly determined social distancing behaviour explaining 48 per cent of the total variances. People who perceived severe health threat, responded effectively to diffuse the health crisis. An intention to respond to the situation helped them protect from health risk. Income emerged as significant predictor to social distancing behaviour (*beta* .22). The shrunken R was .41 suggesting less bias in estimation of social distancing behaviour. The result supported hypothesis 1. The study confirmed that the need for protection motivation moderated social distancing behaviour. The arousal level of protection motivation was an important factor which determined appropriateness of social distancing behaviour.

Table 3: Regression Analysis of Health Safety

Variable	r	R	beta	Std. error of beta	F
Severity	.19	.48	.46	.33	4.67**
Response-efficacy	.28	.45	.35	.18	4.59**
Age	.19	.31	.26	.20	3.14**

Note: Multiple R .66, an overall F (6,350) 3.64, $p < .01$

Table 4: Regression Analysis of Social Distancing

Variable	*r*	R	beta	Std. error of beta	F
Severity	.32	.29	.22	.09	3.96**
Response-efficacy	.21.	.35.	.46	.12	4.21**
Reward	22.	.33	.43	.18	4.11**
Income	.19	.21	.25	.22	3.67**

Note: Multiple R .69, an overall F (6, 350) 3.23, $p < .01$; **

At the second level two factors of social distancing were added to a list of predictors to determine each dimension of well-being. Altogether 10 predictors were regressed on loneliness. Of them four predictors, severity, reward, age and social distancing behavioural strategy to prevent health risk explained loneliness accounting for 52 per cent of the total variances. Again, severity of potential threat emerged as prominent factor that caused loneliness (F 4.65, $p < .01$). An intention to respond to potential threat motivated people to keep away from social contacts. People across age experienced loneliness during health emergency. (table 1.5). An overall F was found significant ($p < .01$). The shrunken R was .36 showing less bias in estimation of loneliness.

Social distancing and personal health safety behaviour followed by reward component of protection motivation contributed to hostility. They significantly predicted hostility accounting for 46 per cent of the total variances (F 3.36, $p < .01$). Less social contact and more personal safety measures made people more

hostile. Reward was a negative predictor of hostility meaning that people experienced less promoting element in protection motivation (*beta* -.39). The shrunken R was .41 confirming less bias in estimation of hostility.

Sequentially, health safety behavioural measure followed by an intention to respond effectively to the situation and social distancing behaviour determined anxiety explaining 41 per cent of the total variances. The need for personal safety measures and a desire for responding to potential threat made people more anxious. They kept practicing social distancing to avert health risk. All these factors individually or jointly determined anxiety. The shrunken R was .40 indicating less bias in estimation of anxiety (table 7). An overall F was found significant (p <.01). The above all three results substantiated hypothesis 2. Protection motivation made its presence felt in all cases. Hence, the hypothesis 3 could not be substantiated. Findings made it obvious that protection motivation when conjoined with social distancing behaviour, had an adverse effect on psychological well-being. All three indicators of well-being selected for the study substantiated the fact that the need for protection motivation and social distancing behaviour resulted in negative experiences of mental health.

Table 5: Regression Analysis of Loneliness

Variable	r	R	beta	Std. error of beta	F
Severity	.24	.43	.32	.12	4.65**
Reward	.15	.38	.28	.09	3.78**
Age	.17	.29	19	.07	3.66**
Social distancing	.26	.35	.39	.16	6.73**

Note: Multiple R .72; an overall F (6, 350) 3.59, p< .01**

Table 6: Regression Analysis of Hostility

Variable	R	R	beta	Std. error of beta	F
Social distancing	.30	.42	.23	.11	3.65**
Health safety	.28	.39	.36	07	3.56**
Reward	-.19	.31	-.39	.12	2.79**

Note: Multiple R .68; an overall F (6, 350) 3.36, p< .01**.

Table 7: Regression Analysis of Anxiety

Variable	r	R	beta	Std. error of beta	F
Health safety	.26	.47	.43	.11	4.22**
Response-efficacy	.31	.41	.38	.07	3.56**
Social distancing	.19	.28	.27.	.09	3.36**

Note: Multiple R . 64; an overall F (6, 350) 3.22, p< .01**

DISCUSSION

The study attempted to capture some behavioural changes during COVID 19 pandemic. It was a resultant of forced- compliance and induced-fear of infectious disease. Both cognitive and coping appraisal processes accounted for behavioural modifications. People evaluated potential threat more seriously and expressed their intention to respond to the situation. The need for protection motivation moderated social distancing both at individual and social levels. By the same token, both the need for protection motivation and social distancing behaviour yielded to negative experiences in terms of loneliness, hostility and anxiety. Previous studies lend support to the findings [21,25]. When people could not derive any reward from preventive health measures, they reacted to the restrictions imposed on them. The study could partly support hypothesis 3. People perceived severity and vulnerability of infectious disease at the cognitive level but followed more

defensive strategies to neutralize health risk. Risk aversion behaviour offers a plausible explanation of defensive behaviour [31]. Risk aversion refers to a preference for certain situation over a risky situation. Although an absolute risk aversion is not possible, people assess situational events and then, take risk accordingly. Potential threat to health did not allow to take absolute risk. Rather it was a perceptual impression and its appraisal which provides a space whether to comply with the social distancing. People justified their behaviour to resolve dissonance at the cognitive level. Another plausible explanation is restraining forces that prevails during the critical situation. This restraining force inhibits social contacts and social relationships. At the cognitive level cohesive forces remain active to stimulate the processes of social networks from where people get their social energy. These two contradictory forces balance the social networks. In case restraining forces are greater than cohesive forces, social network becomes disrupted. Social distancing discourages catabolic processes of social contacts. Do people take risk in Indian society especially, when uncertainty exists?

The previous research [31] suggest that risk aversion in health emergency was high. People did not hold risky assets in poor health condition. When risk vulnerability was high people opted for risk aversion strategy to portfolio management. People having high medical expenses averted risk behaviour [32]. Risk aversion tendency especially in poor health condition restricts selection of absolute risk behaviour. Probably, this was one of reasons to oscillate between the actual and desirable behaviour. People had a different stand on personal health safety and showed mild deviation from social distancing. They preferred to remain in a comfortable zone where social behaviour can be justified even if it is not socially acceptable. Restraining forces adversely affect well-being of people. Previous researches [13] confirm that low social contacts produce loneliness, hostility and anxiety in people. This was not an unusual phenomenon to notice poor mental health under stressful situation. Most important event was to delink social contacts for a longer period. The prolonged deprivation of social network further deteriorates mental health. In case personal health measures are unwillingly accepted, it may gradually disappear during time gap.

The findings may be applied to understanding health risk management programme. Many behavioural issues need to be addressed. The changing situations are critical but challenging. People need to accept it and live with the changing order of the society.

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