



Individual and group level risk factors in preventive health and panic buying behaviors during COVID-19 pandemic in India

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Abstract

The present research explored individual and group level risk factors in preventive health and panic buying behaviors during the COVID-19 pandemic in India. Perceived susceptibility, perceived severity, COVID-19 anxiety, and personal identity were considered individual-level risk factors. Group based identities such as family, religious groups, and identification with one's nation were considered as group level risk factors. Standardized scales have been used to measure all the constructs under study. Data were collected electronically from 305 Indian respondents. Hierarchical regression analysis in SPSS Version 22 was used to test the hypotheses. Results showed that personal identity and identification with the nation predicted preventive health behavior. Panic buying behavior was predicted by the location of the respondents (containment versus non-containment zones), perceived severity, and one's personal identity. The interplay of individual and social factors is reflective of both individual and collective agencies in the adoption of preventive health behaviors, while only individual-level factors led to panic buying behavior. The findings of this study have implications for curbing, managing, and reinforcing desirable and non-desirable behavior during the present pandemic as well as in the future as well.

Keywords COVID-19 pandemic · Preventive health behavior · Panic buying behavior · Individual risk factors · Group level risk factors

Introduction

The prevailing COVID-19 pandemic unleashed a health crisis witnessed the world over, that demands a change in the behavior of people to curb its transmission. As the spread of the novel coronavirus remains unabated in many parts of the world and the resurgence of new variants of COVID-19 have made life more complicated, therefore, preventive health behavior seems to be one of the important ways to curb the transmission of the COVID-19 virus (e.g., Chen et al., 2020). It is heartening to note that vaccines have been developed, but preventive health behaviors will still be needed (e.g., Murphy et al., 2021) until a large section of

the people are inoculated. It has been observed that people also engage in behaviors such as panic buying of essential items, food products, sanitizing/disinfecting products and medicines during the pandemic (Arafat et al., 2020a; Harper et al., 2020; Sobirova, 2020; VanDyke et al., 2020). Risk perception and perceived threats have been considered important predictors of preventive health behavior (Abdelrahman, 2020; Commodari, 2017; Dryhurst et al., 2020; Yıldırım, et al., 2020), and also for panic buying behavior (Arafat et al., 2020c; Bentall et al., 2021; Billore & Anisimova, 2021; Chua et al., 2021; Leung et al., 2021; Yuen et al., 2020). According to Dryhurst et al. (2020), perceived threat and risk perception can be understood as multi-faceted constructs, comprising of cognitive, affective, social and cultural components. The present research aimed to explore various kinds of risk factors leading to preventive and panic buying behaviors in the current pandemic following the Health belief model (HBM; Hochbaum, 1958; Rosenstock, 1960, 1974) and Social identity theory (SIT; Tajfel & Turner, 1979, 1986).

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Preventive Health and Panic Buying Behaviors: The Role of Individual and Social Level Risk Factors

Risk perception refers to people's cognitive and affective judgments about the likelihood of negative occurrences such as injury, illness, disease, and death. Perceived susceptibility and perceived severity are two cognitive risk factors (e.g., Champion & Skinner 2008; Yıldırım et al., 2020). Evidence indicates that both perceived susceptibility and severity alone or in combination can lead to positive behavioral change (Mullens et al., 2004; Yıldırım et al., 2020) as well as panic buying behavior (Arafat et al., 2020a, b; Bhushan, 2020b). Personal identity is another cognitive factor and it can lead individuals to have direction, convictions, goals and future expectations from life (Baray et al., 2009). Moreover, personal identification would enable people to maintain a sense of certainty and efficacy amidst the viral outbreak (Reicher & Haslam, 2006) thereby assisting them to reassess their functioning in terms of their perceived personal risks and vulnerability. This in turn would lead people to engage in preventive health behaviors (Oh et al., 2020) and prod people to engage in hoarding essential items (VanDyke, et al., 2020). Along with the three cognitive risk factors outlined above, COVID-19 anxiety has been considered as an affective risk factor in the present study which would lead to preventive health (Alrubaiee et al., 2020) and panic buying behavior (Arafat et al., 2020c; Yuen et al., 2020) during the current pandemic.

In addition to the individual level factors, the present research also focused on social level risk factors (such as various social identities) leading to preventive health behaviors. During mass emergencies and disasters, new kinds of social relationships evolve leading to the development of social identity which would result in solidarity, collective action, resilience (Drury, 2012), and better quality of life including wellbeing (e.g., Kharshiing et al., 2020). However, social identity would also lead to reduced disease risk perception, which in many cases results in unhealthy behaviors. For example, Hult Khazaie and Khan (2019) found that attendees in mass gatherings felt less vulnerable to disease when they felt a strong sense of shared identity with fellow attendees. In India (the site of the present research), many mass social and religious gatherings took place during the Covid-19 pandemic without following proper Covid-19 protocols (e.g., Ahuja & Banerjee, 2021; Krishnan, 2021). Therefore, it is necessary to examine behavior during the pandemic through the lens of SIT as shared identity may become a peril as people might not even perceive risk in the first place because "in-group members are considered 'safe' – paving the way for risky behavior to occur when one's guard is down" (Cruwys et al., 2020, p. 587). In the context of the present research,

we focused on only those group memberships that have a clear ideological and normative framework within them, such as the individual's family (Sani & Bennett, 2009), religious group (Baray et al., 2009) and nationality (Jetten et al., 2020). These social identities have implications for preventive health as well as panic buying behaviors during the ongoing COVID-19 pandemic.

Preventive Health and Panic Buying Behaviors: Theoretical Perspectives

Health belief model (HBM) in the 1950s was originally developed to explore people's unwillingness to participate in the prevention and detection of diseases in health programs (Hochbaum, 1958; Rosenstock, 1960). In the coming years, the application of HBM observed a magnitude of research studies in examining the direct effects of HBM constructs on health behaviors (Janz & Becker, 1984; Zimmerman & Vernberg, 1994). HBM has been recognized to play a fundamental role in understanding how people respond to symptoms (Kritsch, 1974) and behave in response to diagnosed illness, particularly concerning following their medical regimens (Becker, 1974; see also, Rosenstock et al., 1994). Following the successful application of HBM in planning intervention programs for analyzing behavioral responses towards diseases, researchers have sought to understand the applicability of the model within the context of the current pandemic and its potential to explain preventive health behaviors (e.g., Barakat & Kasemy, 2020; Shahnazi et al., 2020; Eichenberg et al., 2021). Moreover, panic buying behaviors have also been explained with the help of HBM within the context of COVID-19 (Chua et al., 2021). Some studies have explored perceived threats and risk perception as possible factors leading to panic buying behaviors (e.g., Arafat et al., 2020b, c; Yeun et al., 2020), however, to the best of our knowledge, Chua et al. (2021), has undertaken one of the first studies in examining panic buying behaviors exclusively from the HBM perspective. According to the researchers, panic buying can be seen as consumer behavior, which is undertaken to "preventing oneself from experiencing a stock out of essential products by ensuring an available inventory of personal supply" (Chua et al., 2021, p. 3). Interestingly, the researchers have also pointed out that panic buying can also be observed as a method of 'protecting oneself' from putting one at risk, as buying supplies in large amounts, reduces the number of future shopping trips, which in effect, reduces the chance of being exposed to the external environments. There are six core components of HBM (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and perceived self-efficacy), and these have been examined in explaining people's engagement in preventive health as well as panic

buying behaviors during the current pandemic as highlighted above. However, in the context of the present study, we have focused on cognitive risk factors (perceived susceptibility, and perceived severity), and an affective risk factor COVID-19 anxiety) at the individual level of analysis. Furthermore, personal identity is another cognitive risk factor focused in the current research as there is evidence that personal identity share quite a substantial content domain of self-efficacy (Baray et al., 2009; Reicher & Haslam, 2006). Affective risk factors were not originally propounded in HBM; however, it is now widely believed that risk factors are a multi-faceted construct (e.g., Dryhurst et al., 2020), comprising of cognitive, affective, and social risk factors (social risk factors are taken up later in the context of SIT).

HBM may have emerged to be a good model to explain preventive health behaviors and panic buying behaviors, yet it may not be sufficient to explain these behaviors completely (see, Chua et al., 2021). Therefore, the present study incorporates Social Identity Theory (SIT, Tajfel & Turner, 1979, 1986) to elucidate on the concepts at the social level. Although SIT has originally been developed in the context of inter-group relations (Brown, 2000; Tajfel & Turner, 1979, 1986), it has also been expanded in many disciplines including health and wellbeing (e.g., Jetten et al., 2012). Recently, SIT has also been presented as a possible framework to explore behavior during the current pandemic (Bavel et al., 2020). In the present research, the inclusion of a social identity framework would help in understanding preventive health behaviors as well as panic buying behaviors from a multi-level perspective, wherein individual level factors can be understood within the backdrop of HBM, and social level factors can be understood within the context of SIT. The relevance of understanding the role of groups and the strength of social identities in critical times of the pandemic can be seen from the work of Alcover et al. (2020), Cruwys et al. (2020), and Bavel et al. (2020). Alcover et al. (2020) have successfully shed light on the significance of group membership and high-quality social relationships in impacting the health and wellbeing of individuals. Belonging to social groups not only provides individuals with a definition of the group (i.e., a social identity), but also a description and prescription of what is involved in being a group member (i.e., the group's norms). Neville et al. (2021) have revealed how social groups prove to be a guiding force for people in terms of helping them to act during uncertain times in the current pandemic. The authors demonstrated, how the strength of social norms is directly tied to social identities, which in turn has an impact on the development of normative compliance as it would define what is approved and what is done by the group members. Drawing upon this argument, the authors provide an example of a Scottish man, adhering to the 'norm' of wearing a face mask, mainly due to the salience given to his Scottish identity; which innately includes a certain sense

of responsibility towards protecting the community members (Neville et al., 2021). However, shared social identity is not always a guarantee of safe or preventive behavior. Cruwys et al. (2020) found consistent evidence for a direct causal link between shared group membership and risk perception which eventually resulted in risky health behaviors across eight different studies. To the best of our knowledge, no empirical study has assessed panic buying behavior from the SIT lens so far, but there have been media reporting from India that some influential leaders (movie stars, political leaders etc.) have hoarded essential medicines such as Fabiflu and Remdesivir to help their people (Times Now Digital, 2021).

Furthermore, the researchers have also highlighted the role of SIT in having a significant impact on not just the social identities of an individual, but also towards forming the roots of his/her personal identity (Baray et al., 2009; Postmes et al., 2006). These researchers have highlighted the capability of group memberships in providing a sense of control, self-efficacy, development of a sense of agency and power towards having a positive impact on health and wellbeing. In addition, Bavel et al. (2020) has shown how leaders can contribute to the development of a shared sense of identity and can help in coordinating efforts to manage threats by fostering in-group commitment and promoting adherence to norms. Similarly, the role of the family as a collective unit has been given importance due to the heightened level of proximity brought by the restrictions of staying inside homes (Bavel et al., 2020) which in turn enhances the strength of emotional connections between the family members. Drawing from the importance of in-groups such as one's nationality and family as an intimate group, the present study undertakes identification with nation and identification with family as two of the important social identifications. Further, the present study also incorporates identification with religious groups as another contributing social identity since findings given by Postmes et al. (2006), successfully describe the crucial role of an individual's religious identity in determining the right course of action in any given social context.

Amidst the changing face of the crisis, India witnessed a devastating second wave during April-May, 2021 that resulted in the deaths of a large number of people (Priyamvatha, 2021). The main reasons behind this sudden surge was attributed to the lack of adherence to COVID-19 protocols such as wearing face masks, maintaining social distancing as well as a more transmissible mutation of the virus (Priyamvatha, 2021; Schumaker, 2021). The trajectory of the disease during its second wave observed a falling health care system which was evident in the form of a shortage of medical oxygen and essential drugs such as Remdesivir and other antibiotics (ANI I, 2021; Barnagarwala, 2021; "Crisis over shortage of Remdesivir, Fabiflu to end by next fortnight - ET HealthWorld", 2021),

and one painful aftermath of the second wave was the large scale of panic buying behaviors. The extent of panic amongst people all over India could be seen from the long queues in which people waited outside medical supply shops, to procure ‘Remdesivir injections’ (“Coronavirus | Long queues to buy Remdesivir”, 2021). There were also some reports of hoarding and black-marketing of medical oxygen and essential medicines (“Covid-19 update: Two arrested for Remdesivir black marketing in Mumbai”, 2021; “COVID-19: 2 arrested for black marketing, hoarding oxygen concentrators, oximeters in Delhi”, 2021).

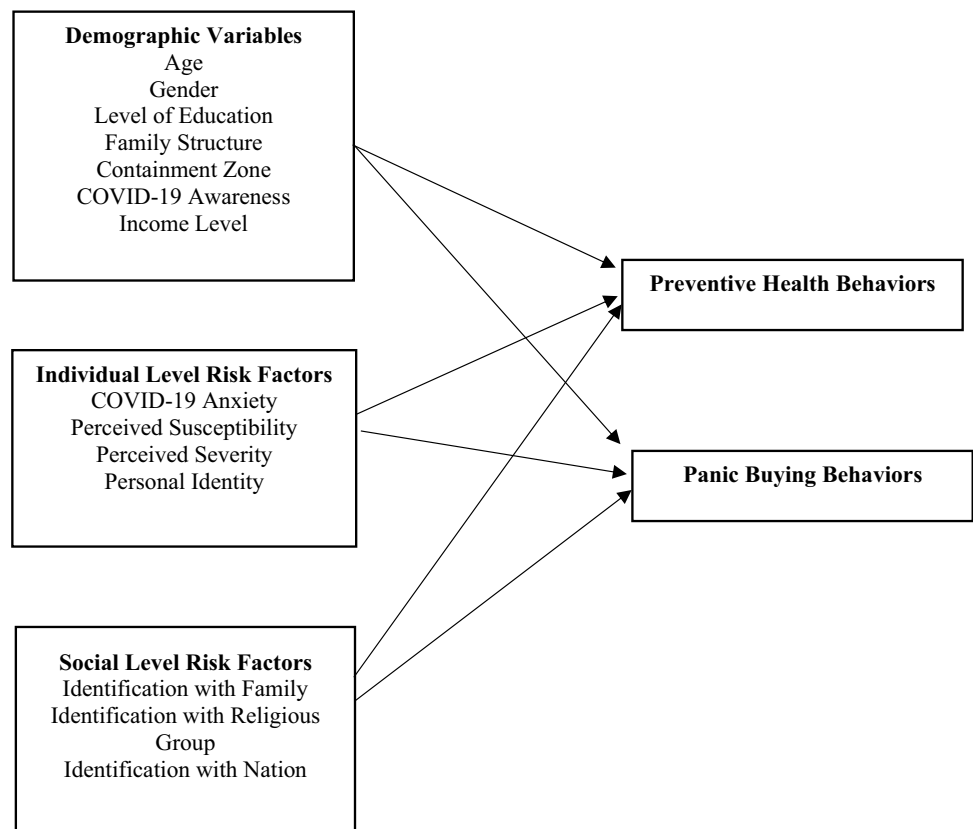
There is apprehension that India will experience the third wave of COVID-19 by the end of this year which can be more catastrophic (“Third Covid Wave: When Will It Arrive, What the Govt. Said & Are Kids in Danger | Explained”, 2021), therefore preventive health and panic buying behaviors need to be thoroughly examined from a multi-theory perspective (e.g., Chua et al., 2021). Hence, the present study aims to capture both preventive health behaviors and panic buying behaviors sharing the same premises as potential causes having roots in HBM and SIT. To the best of our knowledge, both individual-level and social level factors stemming from these two theories have not been examined together to explain preventive health behavior as well as panic buying behaviors in general, as well as in the context of pandemics. Thus, the results of

the present study would aid in delving into the reasons as to why people are engaging or not engaging in preventive health and panic buying behaviors during pandemic situations like COVID-19 (Fig. 1).

Preventive Health and Panic Buying Behaviors: The Role of Demographic Factors

COVID-19 has affected people of all ages (some more, as compared to others), of all genders, and income groups (some more vulnerable than others). The effect of COVID-19 is also likely to be influenced by one’s current location (containment versus non-containment zones), people’s awareness about COVID-19 symptoms and manifestations (some will be more aware as compared to others), and their illness histories. Therefore, it is pertinent to include the relevant demographic variables in any comprehensive analysis of preventive health as well as panic buying behavior. Previous research has also shown the impact of both demographic variables (such as differences caused by age, gender, education, awareness about COVID-19 etc.) and psychological variables (such as perceived susceptibility and perceived severity of the disease, COVID-19 anxiety) to have a significant impact on engagement with protective behaviors (Betsch, 2020; Bish & Michie, 2010; Yildirim et al., 2020) as well

Fig. 1 Conceptual framework of the variables of the present study



as on panic buying behaviors (Bhushan, 2020). Moreover, assessing the role of demographic variables would allow us to evaluate the predictive power of psychological variables over and above demographic variables on the criteria variables (Kline, 2011). Thus, the present study aimed to explore the role of certain demographic factors, individual and group level risk factors in explaining preventive health as well as panic buying behaviors during pandemics (Table 1).

Definitions of Variables Used in the Current Study

The definition of COVID-19 anxiety is based on the studies undertaken on COVID-19 anxiety and its related factors (Fardin, 2020; Limcaoco et al., 2020). Perceived susceptibility and perceived severity have been defined in the work of Champion and Skinner (2008). Barry et al. (2009) definition of personal identity has been used in the present research. The definitions of all three social identifications, i.e., identification with family, identification with religious group and identification with the nation, are based on the construct of ‘group identification,’ which broadly signifies identification with one’s in-group (Jetten et al., 2005; Branscombe et al., 1999). Further, the definition for preventive health behaviors is adapted from the seminal studies of Kasl and Cobb (1966a, 1966b) (also see, Glanz et al., 2008), whereas the definition of panic buying behaviors has been built upon the core definitions of ‘panic buying’ proposed by Billore and Anisimova (2021) and Arafat et al. (2020c).

Hypotheses

H₁: Demographic variables such as age, gender, educational level, family structure, containment zone, COVID-19 awareness, and income level will influence preventive health behaviors.

H₂: Individual-level variables such as COVID-19 anxiety, perceived susceptibility, perceived severity, and personal identity will predict preventive health behaviors.

H₃: Social factors (social identities) comprising identification with family, religious group and nation will significantly predict preventive health behaviors.

H₄: Demographic variables such as age, gender, educational level, family structure, containment zone, COVID-19 awareness, income level will influence panic buying behaviors.

H₅: Individual-level variables such as COVID-19 anxiety, perceived susceptibility and perceived severity, including personal identity will predict panic buying behaviors.

H₆: Social factors (social identities) comprising identification with family, religious group and nation will predict panic buying behaviors.

Method

Sample

The sample of the present study comprised 305 Indian respondents residing in different states of India. Convenience sampling technique was used to collect data electronically

Table 1 Definitions of variables used in the current study

Individual Level Risk Factors

COVID-19 Anxiety: Anxiety arising out of the threat posed by COVID-19.

Perceived Susceptibility: Beliefs about the chances of experiencing the risk or getting a disease (such as COVID-19)

Perceived Severity: Beliefs about the short and long term influence of a condition/illness (such as COVID-19) on different facets of one’s life such as health, career and finance.

Personal Identity: The definition of self in terms of personal attributes, moral values and one’s roles and responsibilities in life.

Social Level Risk Factors

Identification with Family: The extent to which an individual identifies oneself with the family members, feels strong ties with the family members, feel a sense of solidarity and value one’s membership to the family.

Identification with Religious Group: The extent to which an individual identifies oneself with the members of one’s religious groups, feels strong ties with them, feel a sense of solidarity and value one’s membership to the group.

Identification with Nation: The extent to which an individual identifies oneself being an Indian, feels strongly about being an Indian, feel a sense of solidarity with other Indians and value being an Indian.

Preventive Health and Panic Buying Behaviors

Preventive Health Behaviors: Any activity is undertaken by an individual who believes himself (or herself) to be healthy, to prevent or detect illness in an asymptomatic state. It may include behaviors such as wearing a mask, washing/sanitizing hands, maintaining a safe distance, staying home, avoiding public transport and gatherings of people.

Panic Buying Behaviors: Behaviors undertaken to stock/hoard essential items amidst the fear of future scarcity. It may include stockpiling of sanitizers, toilet papers, food items, and essential medicines.

Table 2 Sample Characteristics (N = 305)

Variable	Level	Frequency	Percentage
Age	18 – 78 years (Mean = 31.81; SD = 11.31)	–	–
Gender	Male	112	36.7
	Female	193	63.3
Level of Education	Up to Graduation (15 years of formal education)	100	32.7
	Above Graduation (More than 15 years of formal education)	205	67.3
Family Structure	Nuclear family	221	72.5
	Joint family	84	27.5
Resided during Lockdown	Containment Zone	96	31.5
	Non- Containment Areas	209	68.5
COVID-19 Awareness	Fully Aware	279	91.5
	Partially Aware	18	5.9
	Not at all Aware	8	2.6
Income level (per month)	Below \$334	32	10.5
	Between \$334 to \$668	52	17
	Between \$668 to \$ 1000	66	21.6
	Above \$ 1000	155	53.1
Religion followed	Hinduism	162	53.1
	Islam	90	29.5
	Christianity	15	4.9
	Sikhism	08	2.6
	Jainism	06	2
	Other religions	03	1
	None	21	6.9

with the help of Google forms in English. The sample characteristics are presented in Table 2.

Estimating a-priori Sample Size

An a priori power analysis using the G*Power version 3.1.9.4 software (Faul, 2019) was used to estimate the sample size to detect a medium effect, $f^2 = .15$ with 80% power while using a hierarchical multiple regression (fixed model & R^2 change) at an alpha of .05. The estimated sample size was found to be 119 and therefore the actual sample size (N = 305) is adequate to test the hypotheses of the study.

Measures

Family Structure

To understand the distribution of family structure, participants were asked to self-report the type of family they belonged to. Following the distinction of Indian family structure highlighted by Chadda and Deb (2013), the participants were asked whether they belonged to a 'Nuclear family', or they belonged to a 'Joint Family'. As observed from Table 2, 221 (72.5%) participants belonged

to a nuclear family and 84 (27.5%) participants belonged to a joint family.

COVID-19 Awareness

A single-item measure was used to assess participants' awareness of COVID-19 symptoms. The item stated as; 'Are you completely aware of COVID-19 symptoms?' The responses were recorded in three categories 'Yes,' 'No' and 'Maybe.' Table 2 shows most participants i.e., 279 (91.5%) being 'fully aware' of COVID-19 symptoms, followed by 18 (5.9%) being 'partially aware' and 8 (2.6%) being 'not at all' aware. The participants who were 'fully aware' of the symptoms answered in 'yes,' those who were 'partially aware' answered in 'may be' and those who were 'not at all' aware, answered in 'no.'

COVID-19 Anxiety

COVID-19 anxiety was assessed through six items of 'New Coronavirus Anxiety Scale (Rehman et al., 2021a, b). Although the original scale has 12 items, we have used six items having the highest factor loadings. The scale had a 5-point response mode, ranging from never (0) to always

(4). The sample items included, ‘Lack of clear-cut policies/coordination among various Government agencies related to COVID-19 makes me stressful’ and ‘I feel tense when I watch/hear COVID-19 related news/stories.’ The minimum value in this measure is 0 and the maximum is 24. Cronbach’s alpha coefficient on the present sample was reported to be 0.87.

Perceived Susceptibility

Perceived susceptibility is assessed through four items (Kharshiing et al., 2020). Each one of the items can be scored on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The minimum value in this measure is 4 and the maximum is 20. Sample items included, ‘I feel that my chances of getting COVID-19 in the future are good’ and ‘There is a good possibility that I will get COVID-19.’ Cronbach’s alpha coefficient for perceived susceptibility is 0.82 on the current sample.

Perceived Severity

Perceived severity has been assessed through six items (Kharshiing et al., 2020) with the response mode ranging from strongly disagree (1) to strongly agree (5). For this measure, the minimum value in this measure is 6 and the maximum is 30. Sample items for perceived severity are, ‘If I had COVID-19 my career would be endangered’ and ‘My financial security would be endangered if I got COVID-19.’ Cronbach’s alpha coefficient for perceived severity was found to be 0.78.

Personal Identity Strength

For the present study, personal identity has been measured using a 5-item scale of personal identity strength devised by Baray et al. (2009). The items of this scale can be measured on a 5-point scale where (1) indicates ‘do not agree at all’ and (5) indicates ‘agree completely’. The scale entails the following items: ‘I know what I like and what I don’t like,’ ‘I know what my morals are,’ ‘I have strong beliefs,’ ‘I know what I want from life,’ and ‘I am aware of the roles and responsibilities I have in my life.’ On this measure, the minimum value is 5 and the maximum is 25. Cronbach’s alpha on the study sample for this measure is 0.83.

Identification With Family

The identification with family measure has been adapted from the 5-item ‘Group Identification’ scale (Jetten et al., 2005). Response mode for this tool ranges from (1) stands for ‘not at all’ to (7) stands for ‘very much’. The minimum value on this tool is 5 and the maximum is 35. The items

used to measure identification with my family are as follows: ‘I identify with my family members,’ ‘Being a part of my family is an important part of who I am’, ‘I feel strong ties with my family members’, ‘I feel a strong sense of solidarity with my family members’, and ‘I value being a part of my family.’ Cronbach’s alpha coefficient was found to be 0.89.

Identification With Religious Group

The measure for identification with religious group has also been adapted from the 5-item ‘Group Identification’ scale (Jetten et al., 2005) with a seven-point response mode ranging from (1) stands for ‘not at all’ to (7) which stands for ‘very much’. The minimum value on this tool is 5 and the maximum is 35. The items used for measuring identification with the religious group are: ‘I identify with the members of my religious group’, ‘Being a part of my religious group is an important part of who I am’, ‘I feel strong ties with other members of my religious group’, ‘I feel a strong sense of solidarity with other members of my religious group’, and ‘I value being a part of my religious group.’ Cronbach’s alpha for this measure was 0.95 on the current sample.

Identification With Nation

Group Identification scale (Jetten et al., 2005) was also utilised to assess identification with the nation. It has 5 items. The response mode of the scale ranges from (1) ‘not at all’ to (7) ‘very much’. On this measure, the minimum value is 5 and the maximum is 35. The Cronbach’s alpha of the original scale is .87. Following on the lines of identification with a family and religious group, the items used for measuring identification with nation are: ‘I identify as an Indian’, ‘Being an Indian is an important part of who I am’, ‘I feel strong ties with other Indians’, ‘I feel a strong sense of solidarity with other Indians’, and ‘I value being an Indian.’ Cronbach’s alpha for this measure was found to be 0.94 on the current sample.

Preventive Health Behavior

The preventive health behavior measure of 9 items has been developed by the researchers for the present study following the guidelines issued by the Ministry of Health and Family Welfare (MoHFW), Government of India (2020). The 9 items are as follows: ‘Frequent hand washing/ hand sanitising’; ‘Social/physical distancing of 1 meter from other people’; ‘Wearing a face mask outdoors’; ‘Avoiding touching of eyes, nose and mouth’; ‘Using tissue/bent elbow when coughing or sneezing and throwing the used tissue immediately in closed bins’; ‘Seeking immediate medical help in case of fever, breathing difficulty or cough’; ‘Cleaning/disinfecting surfaces’; ‘Avoiding spitting in public

places, and ‘Avoiding public/crowded gatherings’. A 4-point scale ranging from 1 (It has not changed at all) to 4 (It has changed significantly), has been used to score the items. On this tool, the minimum value is 9 and the maximum is 36. Cronbach’s alpha value of the measure was found to be 0.85.

Panic Buying Behavior

Panic buying behaviors have been measured by 3 items (Harper et al., 2020). A 4-point scale ranging from 1 (it has not changed at all) to 4 (it has changed significantly) has been used to score the items. The minimum value is 3 and the maximum is 12. The sample items included ‘Stockpiling protective supplies (e.g., gloves, masks) during COVID-19’. Cronbach’s alpha for panic buying behaviors on the current sample was found to be 0.87.

Analytical Plan

Obtained data were analysed in IBM-SPSS Version 22. Descriptive statistics such as Means, Standard deviations, Pearson Product Moment Correlation were obtained. Moreover, a three-step hierarchical multiple regression model has been used to test the stated hypotheses. As presented in the conceptual model, demographic variables (age, gender, level of education, family structure, containment zone, COVID-19 awareness, and income level) were regressed first (model 1). Individual-level risk factors (based on HBM) were entered in the second model, and finally, group-level risk factors (based on SIT) were entered in the third model to assess the step by step increments in criteria variables (preventive health and panic buying behaviors). The entering of demographic variables first in the hierarchical regression model is based on both theoretical considerations as well as on the practical utility of the results, while the entering of psychological variables in Models 2 and 3 was based on theoretical consideration. According to Kline (2011), “sometimes demographic variables are entered at the first step and then entered at the second step is a psychological variable of interest. This order not only controls for the demographic variables but also permits evaluation of the predictive power of the psychological variable, over and beyond that of simple demographic variables” (p, 27).

Results

Table 3 showed results for descriptive analysis.

The participants reported being more likely to engage in preventive health behavior (Mean = 30.76). Similarly, the mean score of 8.37 for panic buying behaviors also shows participants’ high willingness to engage in it.

Table 3 Descriptive statistics (N = 305)

Variables	Mean Score	Standard Deviation
COVID-19 anxiety	12.03	4.88
Perceived susceptibility	10.40	3.04
Perceived severity	16.63	4.72
Personal identity	21.78	3.06
Identification with family	30.25	5.71
Identification with religious group	22.14	9.12
Identification with nation	30.53	6.18
Preventive health behavior	30.76	5.03
Panic buying behavior	8.37	2.56

COVID-19 anxiety, perceived susceptibility, perceived severity, and identification with one’s religion were found to be in the average category. Lastly, the mean scores indicated that participants of the present study reported a high level of personal identity. Moreover, participants also showed a high level of identification with their family as well as with their nation.

It is evident from Table 4 that personal risk factors of anxiety, severity and susceptibility were closely related to each other as the *r*-values ranged from 0.15 to 0.56 ($p < .01$). However, personal identity (the other personal level risk factor) was not found to be related to these three personal risk factors significantly. Interestingly, all the identities including personal identity were significantly correlated with each other (correlation coefficients ranged from 0.12 to 0.36). Moreover, only identity-based variables (personal, family, religious and nation) were significantly correlated to preventive health behaviors. Panic buying behavior was found to be significantly correlated to all identity-based measures, besides perceived severity. Preventive health and panic buying behaviors were also found to be significantly correlated to each other.

Table 5 shows that demographic variables (Model 1) did not influence preventive health behaviors ($F = .64$, $p = .72$). On the other hand, personal identity ($\beta = .31$, $p < .001$) emerged as a significant predictor amongst individual-level factors of preventive health behaviors (Model 2). Concerning social identities (Model 3), only identification with the nation ($\beta = .25$, $p < .001$) proved to be a significant predictor of preventive health behaviors. The effect size of Model 2 over Model 1 was found to be 0.11 and from Model 3 over Model 2 was found to be 0.11 again. Both these effect sizes indicated moderate to small effect as per Cohen’s guidelines (1988).

Table 6 revealed that only the containment zone amongst the demographic variables (Model 1) could significantly influence panic buying behaviors ($\beta = .18$, $p = .002$). Amongst the individual-level variables (Model

Table 4 Correlations of variables

Variables	1	2	3	4	5	6	7	8	9
COVID-19 anxiety	1	.30**	.56**	-.05	-.05	-.007	-.06	.06	.03
Perceived susceptibility		1	.15**	-.07	-.03	-.15*	-.07	-.04	-.11
Perceived severity			1	-.003	-.09	.09	.004	.04	.14*
Personal identity				1	.36**	.28**	.28**	.31**	.12*
Identification with family					1	.29**	.33**	.28**	.13*
Identification with religious group						1	.24**	.21**	.15**
Identification with nation							1	.36**	.16**
Preventive health behavior								1	.18**
Panic buying behavior									1

** . $p < 0.01$

* . $p < 0.05$

Absolute r-value is the effect size (Cohen, 1992)

Table 5 Hierarchical multiple regression analysis for variables predicting preventive health behaviors

Model	Variables	B	SE	β	t	P	R	R ²	ΔR^2	
1		F (7,297) = .64 (p = .72)					.121	.015	.015	
	Age	.02	.03	.04	.60	.55				
	Gender	.11	.63	.01	.17	.86				
	Level of education	-.08	.39	-.01	-.22	.83				
	Family structure	.86	.66	.07	1.28	.19				
	Containment zone	.98	.63	.09	1.56	.12				
	COVID-19 Awareness	.16	.59	.02	.27	.79				
	Income level	.11	.29	.02	.38	.70				
2		F (11,293) = 3.452 (p < .001)					.34	.11	.10	
	Covid-19 anxiety	.10	.07	.10	1.38	.16				
	Perceived susceptibility	-.06	.09	-.03	-.60	.55				
	Perceived severity	-.01	.07	-.01	-.15	.88				
	Personal identity	.51	.09	.31	5.54	<.001				
							*Effect size = .11 (Model 1–2)			
3		F (14,290) = 5.38 (p < .001)					.45	.21	.09	
	Identification with family	.09	.05	.104	1.710	.09				
	Identification with religious group	.04	.03	.07	1.27	.20				
	Identification with nation	.21	.04	.25	4.36	<.001				
							*Effect size = .11 (Model 2–3)			

* B = unstandardized regression coefficient; SE = Standard error of estimate, β = standardized regression coefficient; t = student's t test, p = obtained probability; R = Multiple correlation, R² = Coefficient of determination; ΔR^2 = R square change

2), perceived severity ($\beta = .18, p = .007$) and personal identity ($\beta = .12, p = .035$) emerged as significant predictors of panic buying behaviors. None of the social identities (identification with family, religious group, nation) could significantly predict hoarding behaviors ($F = 2.651, p = .001$). The effect size of Model 2 over Model 1 was found to be 0.05 and from Model 3 over Model 2 was found to be 0.02. Both these effect sizes indicated small effects as per Cohen's guidelines (1988).

Discussion

The present research aimed at exploring factors leading to preventive health and panic buying behaviors following HBM and SIT during the current pandemic. Findings in this study indicate that participants engaged in preventive health and panic buying behaviors. People have adhered to adopting preventive health behaviors in the present COVID-19 pandemic e.g., (Consolo et al., 2020; Jimenez

Table 6 Hierarchical multiple regression analysis for variables predicting panic buying behaviors

Model	Variables	B	SE	β	t	P	R	R ²	ΔR^2	
1		F (7,297) = 1.932 (p = .064)						.209	.044	.044
	Age	-.02	.01	-.08	-1.39	.16				
	Gender	.12	.32	.02	.39	.69				
	Level of education	.22	.20	.06	1.11	.27				
	Family structure	.28	.33	.05	.84	.40				
	Containment zone	1.00	.32	.18	3.16	.002				
	COVID-19 Awareness	.31	.29	.06	1.04	.30				
	Income level	-.02	.14	-.008	-.13	.89				
2		F (11,293) = 2.669 (p = .003)						.302	.091	.047
	Covid-19 anxiety	-.04	.04	-.07	-.92	.36				
	Perceived susceptibility	-.09	.05	-.10	-1.76	.08				
	Perceived severity	.10	.04	.18	2.69	.007				
	Personal identity	.10	.05	.12	2.11	.035				
									*Effect size = .05 (Model 1–2)	
3		F (14,290) = 2.651 (p = .001)						.337	.113	.022
	Identification with family	.03	.03	.07	1.06	.29				
	Identification with religious group	.02	.02	.070	1.13	.26				
	Identification with nation	.04	.02	.09	1.49	.13				
									*Effect size = .02 (Model 2–3)	

* B = unstandardized regression coefficient; SE = Standard error of estimate, β = standardized regression coefficient; t = student's t test, p = obtained probability; R = Multiple correlation, R² = Coefficient of determination; ΔR^2 = R square change

et al., 2020) as well as in the past pandemics too (e.g., Bish & Michie, 2010). However, many people do not follow preventive health measures (Hills & Eraso, 2021). It can be surmised that the deadly second surge of the pandemic in India in April-May 2021 resulting in the loss of lives and increase in infections was attributed to the lack of adherence to preventive health measures, besides the transmissible mutating nature of the virus (Priyamvatha, 2021).

Results in this study demonstrated that adoption of preventive health behaviors is not associated with demographic variables as they are deemed necessary for individuals of all age groups, gender and income levels, thereby *invalidating Hypothesis 1 of the present research*. Indeed, these findings are in line with those of Irogoyen-Camacho et al. (2020) who found no association between sociodemographic variables of age and gender on COVID-19 preventive behaviors. On the contrary, the results refute the conclusions drawn by Sutin et al. (2020) who found that among US adults, higher education level was associated with greater concerns regarding the consequences of COVID-19. Greater engagement and interest in health information that was associated with higher education (Saha, 2006) is not evident in the present research.

Further, the evidence in the study also revealed that perceived severity, susceptibility, and COVID-19 anxiety did not show any significant correlations with preventive

health behavior. Moreover, they failed to predict preventive health behavior which is contrary to previous research (e.g., Dryhust et al., 2020; Yildirim et al., 2020; Fragaki et al., 2021). It can also be said that the present research evidence is in line with that of Mirzaei et al. (2021) who found that perceived severity and perceived susceptibility did not influence preventive health behavior. Similar kind of results have also been reported from India in which cognitive and affective risk factors did not explain social distancing behavior (Rehman et al., 2021a, b). Pertinently, perceived severity, susceptibility, and Covid-19 anxiety have been moderately reported by participants in the present study which perhaps can be attributed to lack of fear of the disease and pandemic fatigue resulting in Covid-inappropriate behavior (Thadani, 2021), which may have culminated in the second wave of the outbreak in the country. Perhaps, similar to what was observed in the United States where people rapidly adapted psychologically to the pandemic (Daly & Robinson, 2021), people in India too experienced the same and hence anxiety of, perceived severity and susceptibility to COVID-19 was moderate and not heightened. Indeed, with the progression of the pandemic, the salience of the risk factors for the virus has reduced (Irogoyen-Camacho et al., 2020; Daly et al., 2020; Rehman et al., 2022) and this could also explain the moderate findings of anxiety, perceived severity, and susceptibility to COVID-19 in the

present study that was undertaken in June 2020 (six months after the detection of the first COVID-19 case in India).

It is important to highlight that personal identity has emerged as a significant predictor of preventive health behavior. Self-efficacy is a strong predictor of individual-level adherence decisions and measures in public health outbreaks (e.g., Herrera-Diestra & Meyers, 2019), and personal identity share a substantial content domain of self-efficacy (Baray et al., 2009), and therefore personal identity too influenced preventive behavior in the present research. Furthermore, personal identity enables individuals to be certain and view their own functioning vis-à-vis personal risks and vulnerability (Reicher & Haslam, 2006) that prod people to adopt preventive health behaviors (Oh et al., 2020). Evidence from Alcover et al. (2020) demonstrated that personal identity acts as a resource that is related to resilience and better outcomes of mental health during the COVID-19 pandemic. Perhaps, a similar experience by participants in this study enabled them to look to their personal identity as a coping resource in the adoption of crucial preventive health measures during the COVID-19 outbreak. Unlike the present study that examined the relation of individual-level factors on preventive health behaviors, Kharshiing et al. (2020) focused on the same individual risk factors such as COVID-19 anxiety, perceived severity, susceptibility and personal identity on a positive outcome such as quality of life. These researchers revealed that only COVID-19 anxiety and personal identity significantly predicted quality of life. Moreover, the role of some personality and cognitive factors must also be taken into account while explaining the relationship between individual level risk factors and preventive health behaviors. Some of these are presented to better contextualize this relationship.

It could be said that the prolonged nature of the present pandemic may have had implications on people's engagement in preventive health behaviors. Thadani (2021) referred to pandemic fatigue in India that culminated in COVID-19 inappropriate behavior. It is noteworthy that McIntyre et al. (2021) observed that with the progression of the pandemic, adoption of risk mitigation measures decreased consistently over two periods of time (March-April, 2020 and July 2020) in five cities of Sydney, London, Melbourne, Phoenix and New York City, with all cities except for Melbourne (which experienced devastating second wave during the second phase of data) showing preventive fatigue. There is evidence that fatalistic beliefs of respondents in themselves (Khan et al., 2021), and in conjunction with HBM constructs such as perceived barriers, may have been implicated in people's reluctance to follow preventive health behavior (Shahnazi et al., 2020). Moreover, Venema and Pfattheicher (2021) found in their multi-study research that grandiose narcissism predicted lower perceived susceptibility even when the effects of age and gender were controlled. To summarize,

respondents of the present study did follow preventive health behavior, but perceived severity and susceptibility could not predict it as only personal identity emerged as its significant predictor. Perhaps, preventive fatigue, fatalistic beliefs, and some personality traits such as grandiose narcissism are the pathways/boundary conditions that need to be probed to throw better light on the relationship between various individual-level risk factors and preventive health behavior.

What is noteworthy is that within the context of social identities, the present study found an individual's identification with his or her nation to be the only significant predictor of preventive health behaviors. This is in line with the multi-country research by Van Bavel et al. (2022) who found that national identification robustly predicted people's endorsement of and adherence to preventive health measures during the pandemic. This study by Van Bavel et al. (2022) is a significant contribution to the existing body of knowledge as they have combined person-level and country-level analyses across more than 100 countries to establish that National identification (NI) was significantly and positively related to all public health measures. The researchers found that individuals with stronger NI reported stronger support for preventive health measures than individuals with weaker identification. The link between the COVID-19 pandemic and the role of social identities during this critical time is reflected in the invocation of the strength of one's national identity (Mbuguo, 2020; Chakravarty, 2020; Van Bavel et al., 2022) and the superiority of one's nation over other nations by the leaders (Jetten et al., 2020). Therefore, salience to national identity led to adherence to social norms such as wearing face masks to protect community members (Neville et al., 2021). It would also be interesting to report that the two other social identities (family and religious group) were significantly correlated to preventive health behavior. Identification with family (Marinthe et al., 2022), and religious group (Chu et al., 2021) have also been found to be related to preventive health behavior. However, a bi-variate correlation may give misleading results because of overlapping conceptual boundaries among predictors (Aron et al., 2007), therefore, correlation results need to be interpreted carefully. There is also evidence that social affinity or membership may result in risky health behaviors (Cruwys et al., 2020a, b). For example, in the context of smaller in-groups (such as family, religious groups, and college groups), in-group members may be considered 'safe' that may lead to the engagement of risky behaviors (e.g., Cruwys et al., 2020; Tarrant, Hagger, & Farror, 2012). Shared social identity among in-group members culminate in members' attenuating risks associated with infectious diseases (such as COVID-19) that make them more trusting of in-group members (Cruwys et al., 2020). Essentially, such an in-group attenuation effect is evident in the congregation of religious groups and gatherings amid the pandemic in India (Krishnan, 2021).

Hence membership in social groups may not in itself result in preventive health behaviors, as people would engage in health behaviour only when it is congruent with the norms of their social identities (e.g., Oyserman et al., 2007). There is evidence that when higher identities such as national identities (e.g., Van Bavel et al., 2022; Tarrant et al., 2012) or all humanity identity (Barragan et al., 2021) are made salient, people would engage in healthy behaviors as these would appear to be relevant to all of them.

Results in this study reiterate the importance of personal and social identities working in conjunction with each other (Baray et al., 2009) in the adoption of preventive health behaviors. It is imperative, therefore, that an appraisal and strengthening of both personal and national identities may provide exclusive inputs in planning interventions to better manage the ongoing as well as future pandemics. This could be possibly achieved by increasing the personal efficacy of individuals by providing authentic information and social support so that they would feel more empowered (Sharour et al., 2021) to follow preventive health behaviours. This can also be done in terms of national identity by strengthening the national voice, be it through the actions of national leaders or governmental policies in framing appropriate intervention programmes for developing behavior change habits among people. Identification with nation can also be enhanced by adopting various measures such as positive distinctiveness, creativity, and in-group differentiation by group members as well by leaders (e.g., Lemaire, 1974; Tajfel & Turner, 1986; Jetten et al., 2005). For example, world leaders invoked national identities so many times during the pandemic (Mbuguo, 2020; Chakravarty, 2020), and highlighted the superiority of their nation over other nations (Jetten et al., 2020) to create positive distinctiveness and in-group differentiation of their nations to bolster national identities so that it would result in adherence to preventive health behavior (Neville et al., 2021). Moreover, many creative strategies were adopted by world leaders including Indian leaders such as Prime Minister Narendra Modi who had urged Indians to step out onto their balconies for five minutes and clap for frontline workers on 22nd March 2020, and for the Indian Air Force to shower flower petals Pan India to honour Corona Warriors on 3rd May 2020, etc. Thus, research findings *partially confirm Hypothesis 2 and Hypothesis 3*.

The present research findings allude to the significance of panic buying behaviors in the COVID-19 pandemic. Panic buying, as well as hoarding, have been observed during the current pandemic in many countries such as Singapore, Japan, Australia, Italy, Spain, the UK, and the USA (Sim et al., 2020). Multiple factors are implicated in panic buying and hoarding of essentials such as anxiety, fear, uncertainty, and the negative role played by media (Dholakia, 2020; Wilkens, 2020; Arafat et al., 2020a).

Panic buying behavior is also caused by the fear of not getting essential supplies during COVID-19 especially in the containment areas (Bhushan, 2020) is indicative of complexities involved in delivering essential supplies to residents in general, and especially to people living in the containment zones, hospitals and other places. Following these considerations, the present study strengthens the connection between panic buying behaviors and containment zones, highlighting a significant possibility of similar situations arising in future health crises. Hence, the findings *partially validate Hypothesis 4*.

Participants' perceived severity in this study had a significant bearing on the panic buying of essential items. The perceived threat of COVID-19 triggered stockpiling behavior of toilet paper as an essential household item during the outbreak (Garbe et al., 2020; Leung et al., 2021). In addition, Chua et al. (2021) revealed a direct link between HBM constructs and panic buying behaviors whereby health belief constructs such as perceived susceptibility, outcome expectation, cues to action and self-efficacy significantly influenced consumers' perception of scarcity. It can be said that Indians panicked, hoarded and bought essential items like hand sanitizers and food products during the beginning of the pandemic (Tandon, 2021). In the second wave of the pandemic in the country in 2021, snack items and essential medicines were bought with panic and hoarded ("COVID-19 lockdown leaves...dry", 2021; "Coronavirus | Long queues to buy Remdesivir", 2021). Furthermore, panic buying behaviors were also significantly influenced by personal identity since it refers to an act of doing something providing some sense of control to the individual such as "preventing oneself from experiencing a stock out of essential products by ensuring an available inventory of personal supply" (Chua et al., 2021, p. 3). Many times, buying in panic is a rational behavior (a clear manifestation of one's personal identity) during an emergency, people may buy goods that are anticipated to be needed if the crisis persists for long (Arafat et al., 2020b). Therefore, it can thus be summarized that panic buying behaviour has emanated from fear, uncertainty, and anxiety, but it also provided the individuals to have some kind of situational control during unprecedented times such as the COVID-19 crisis (VanDyke et al., 2020). Hence, *Hypothesis 5 is partially confirmed* from the study findings. At this point, it would be interesting to report that social factors i.e., identification with family, religious group, or nation were correlated significantly (with low effect size) to panic buying behaviors but could not influence them significantly, thereby *invalidating Hypothesis 6*. Although there was some evidence that people hoard medicines and other essentials for their "own" people (Times Now Digital, 2021). This is an interesting area of research that needs to be taken up by future researchers.

Conclusion

COVID-19 is the biggest health emergency of our generation (Jetten et al., 2020; Van Bavel et al. 2022) and is an unquestionable reality that everyone is living with. The findings of the present study reveal how the interplay of different levels of factors works to collectively predict both preventive health behaviors, as well as panic buying behaviors in the context of the COVID-19 pandemic. Concerning preventive health behaviors, the findings of the present study represent an amalgamation of both individual-level factors through personal identity and social factors through identification with the nation. This reflects the potential of both the individual's agency and the strength of his or her national identity, in bringing forth greater adherence to the adoption of preventive health behaviors. On the other hand, an enhanced role of the individual factors can be seen to have an impact on panic buying, wherein along with personal identity, perceived susceptibility and perceived severity of the disease can be seen to contribute towards enhancing the tendency to engage in panic buying. Finally, the impact of living in a containment zone on panic buying behaviors might prove to be pertinent to concerned authorities designated with managing supplies in such zones.

Limitations

The present study has certain shortcomings. Firstly, the online or electronic nature of data collection through Google form limits accessibility to a larger population. Secondly, the cross-sectional nature of the research limits the focus on the causal nature of the relationship between constructs under study. Perhaps, longitudinal studies may benefit to track changes in the engagement of preventive health behaviors during the pandemic that is still evolving in terms of its resurgence. Thirdly, although, the sample size was statistically adequate, a bigger sample size would have been more meaningful given the diversity of India. Moreover, some other sample characteristics such as more female respondents as compared to their male counterparts; more respondents with higher educational levels, living in non-containment areas, and coming from more nuclear rather than joint family structures may limit the findings in terms of their being generalized to the general population. COVID-19 awareness is a complex construct and therefore, measuring it with a single item is another limitation of the present research. Lastly, in the current research, a direct relationship between three sets of predictors and two sets of criteria variables have been assessed. However, these relationships are likely to be mediated/moderated by pandemic fatigue, fatalism, trust, etc., which further limits the scope of the present research.

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Data Availability Data is available on OFSHOME.

<https://mfr.osf.io/render?url=https%3A%2F%2Fosf.io%2F7my95%2Fdownload>

Declarations

Ethical Statement The research was approved by the Institutional Ethics Committee, Faculty of Social Sciences, Jamia Millia Islamia, New Delhi, India. The procedures followed in the study adhere to the ethical standards of the Helsinki Declaration of 1975 and its later addenda.

Conflict of Interest All the authors declare that they have no conflict of interest.

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all participants for inclusion in the study.

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