



Scanning the VIRUS: A study of dimensions of stress and coping with COVID-19

Kanika K. Ahuja¹

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Abstract

The current research examines the psychosocial stressors that Indians are facing as a result of the COVID-19 pandemic, using a self-constructed COVID-19 Stress Scale (CSS). It also assesses the coping strategies being used currently. The sample comprised of 1009 Indians ranging between 17 and 83 years. The items of the CSS were constructed based on a review of existing scales, expert evaluations, and participant interviews. The factor structure of COVID-19 Stress Scale (CSS) was examined through the use of an exploratory factor analysis. Several psychometric tests were conducted to ascertain its reliability and validity properties. Results suggest a five-factor structure: Vexation with Others, Immediate Concerns, Routine Disruption, Uncertainty about the Future, and Systemic stressors (abbreviated as VIRUS) explaining 55.269% of the total variance in COVID-19 stress. Coefficient alphas for the entire scale (0.90) and for each of the five factors, ranging from 0.69–0.85, indicate satisfactory internal consistency. One-way analysis of variance was done to assess the differences among emotion-focused, problem-solving, and seeking social support coping strategy. Correlations were calculated between various coping strategies and COVID-19 Stress. Results suggested that seeking social support was the most used coping strategy. No significant correlation was found between the use of any coping strategy and COVID-19 stress. The proposed VIRUS model adequately captures the stressful experience of COVID-19. COVID-19 Stress Scale (CSS), a 21-item scale has robust psychometric properties.

Keywords COVID-19 stressor scale (CSS) · Stress · Coping · India · VIRUS model

COVID-19, a “public health emergency of International Concern”, as declared by the WHO, has affected nearly every country irreversibly, sparking global panic. Beyond the obvious medical concerns, this pandemic has resulted in huge global psychosocial and politico-economic effects. Pandemics are not just about a potent infectious virus affecting people, but also about how people behave and think in such times. The mental health of people is at stake and their mindset in this crisis is critical. Consequences of safety measures such as lockdowns, social isolation, home confinement etc. lead to fear, panic, loneliness, boredom, and anger, all of which are risk factors for psychiatric disorders. This pervasive fear also results in health anxiety, xenophobia (Ahuja, Banerjee, Chaudhary, & Gidwani, 2020), unnecessary hoarding of medical equipment, self-medication and mass hysteria, all of which have adverse health consequences. For instance,

according to Rajkumar (2020), symptoms of anxiety and depression (16–28%) and self-reported stress (8%) are common psychological reactions to the COVID-19 pandemic in India. Anxiety levels were found to be even higher by Roy et al. (2020) with more than 80% of the sample preoccupied with thoughts of coronavirus. According to another report (Wang et al., 2020), in the early stages of the COVID-19 outbreak in China, the mental health status of more than half of the respondents was very seriously affected. Elmer, Mepham, and Stadtfeld (2020) found COVID-19 specific worries, physical isolation, isolation in social networks, and lack of emotional support to be associated with negative mental health trajectories. Chen et al. (2020), similarly highlighted that 50.95% of public interviewed reported a need for psychological counseling. It is clear that we have never faced a situation like this previously, hence health institutions and government organizations are constantly taking steps to inform the citizens about measures to protect against the advance of the virus. Current treatment on COVID-19 worldwide has mainly focused on infection control, effective vaccine, and treatment cure (Dong, Hu, & Gao, 2020). The psychosocial aspect has yet to be thoroughly considered. One reason for this could be

✉ Kanika K. Ahuja
kanikakahuja@gmail.com

¹ Department of Psychology, Lady Shri Ram College for Women, University of Delhi, Lajpat Nagar-IV, New Delhi 110024, India

lack of a theoretical model to explain what type of stressors individuals are experiencing as a result of the COVID-19 pandemic. Lazarus (1993) defined stress as a relationship between the person and the environment that is appraised as personally significant and as taxing or exceeding resources for coping. Stress experienced due to COVID-19 is both personally significant as it has impacted every living individual directly or indirectly, and seems to exceed the resources for coping. A recent global survey (ILO, 2020) using over 12,000 responses from 112 countries found a deep and systematic impact of the pandemic on employment, education, and mental well-being of young people. After all, this stress is unprecedented in its magnitude, severity and its uncertainty.

While several scales exist for measuring stress, they are inadequate in capturing the various dimensions of stress that individuals are facing in the context of such a pandemic. For instance, the Perceived Stress Scale (PSS), developed by Cohen, Kamarck, and Mermelstein (1983), measures how unpredictable, uncontrollable and overloaded respondents find their lives to be; Dimensions of Stress Scale (Vitaliano, Russo, Weber, & Celum, 1993) assesses appraisals of personal relevance, control, stressor properties, and self-attributions; and Holmes and Rahe Stress Scale, devised by psychiatrists Holmes and Rahe (1967) measures the stress load one carries. While Ahorsu et al. (2020) recently developed the Fear of COVID-19 Scale, this too only captures an individual's fear of COVID-19, and does not assess the underlying dimensions of stress experienced due to COVID-19.

Exploring the various dimensions of stress that individuals are experiencing as a result of COVID-19 is therefore both timely and imperative. Only when we understand the exact stressors that people are encountering, perhaps for the first times in their lives, can healthcare providers design suitable interventions and programs. Therefore, this study develops a model to capture the domains of various stress experience during COVID-19 and proposes a scale - the COVID-19 Stress Scale (CSS) to assess the same (see Appendix section) using exploratory factor analysis. Stress experienced due to COVID-19 can be operationally defined as individuals' feelings and thoughts about the various stressors they are experiencing currently due to the pandemic. It incorporates feelings about the uncertainty of the event, role of other people, the changes in one's life as well as one's confidence in his/her ability to deal with the crisis (for instance, Phillips, 2013).

Further, we were interested in examining the different types of coping strategies that people are using to deal with this pandemic, and to see which were helpful in the present context. Coping is influenced by a person's coping resources including psychological, spiritual, social, environmental, and material resources, and by the nature of the situation, especially whether its outcome is controllable or has to be accepted. Folkman and Lazarus (1988) suggested that there

are two types of coping responses emotion-focused and problem-focused. Problem-focused coping is the kind of coping aimed at resolving the stressful situation or event or altering the source of the stress. Emotion-focused coping, on the other hand, is aimed at managing the emotions associated with the situation, rather than changing the situation itself. A third type of coping, seeking social support, becomes particularly relevant in the collectivistic Indian culture. Previous research has amply documented the role of social support as a buffer against stressors in India in varied samples, such as nurses (Rathi et al., 2019), police personnel (Singh, Gupta, Sharma, & Mishra, 2019), and students (Bukhari & Afzal, 2017).

Current Study

Despite the various measures available to assess stress, we know of no measures that simultaneously examines the various stressor dimensions experienced due to a pandemic like COVID-19. In response to this need, we offer the COVID-19 Stress Scale (CSS). The CSS assesses self-reported beliefs associated with appraisals of which specific stressor properties (such as uncertainty, change) and appraisal of events happening around (such as State response) are contributing to the stress resulting from COVID-19. It is noteworthy that the stress experienced in the current pandemic is twofold, one, stress directly related to the virus and two, stress experienced due to the consequences associated with the virus, e.g. economic uncertainty, job losses, schooling, family dynamics, etc. The present scale explores both these dimensions. The purpose of this article, therefore, is to explore the domains of various stress experience during COVID-19, to develop a tool (the COVID-19 Stress Scale) to assess the same, and to assess the coping strategies currently being used by individuals. It is hoped that the results of the current study will contribute to our knowledge of what underlies the stress of dealing with a pandemic. It will also increase our knowledge on which coping strategies are more successful when applied to an unprecedented crisis like the COVID-19 pandemic, where there are no available roadmaps.

Method

Participants

A total of 1009 respondents (637 women and 372 men) were selected for inclusion in the sample using a convenience non-probability sampling technique. The mean age of the participants was 38.02 years (SD = 15.80), ranging from 18 to 83 years. The sample was drawn from all parts of India. Inclusion criteria were (i) an Indian currently residing in India, (ii) aged 18 years or older, and (iii) able to understand

English. The final sample covered 21 States/Union Territories including Delhi, Uttar Pradesh, Haryana, Punjab, Rajasthan, Bihar, Karnataka, Kerala, Karnataka, Tamil Nadu, Andhra Pradesh Madhya Pradesh, Assam, Meghalaya, Arunachal Pradesh, West Bengal, Odisha, Ladakh, Jammu & Kashmir, Gujarat and Maharashtra. 30.22% of the sample was students, 12.5% homemakers, 7.1% retired, and the remaining 50.18% employed in various fields like education, finance, health services, law, real estate, business, start ups, etc. The sample comprised of middle/upper class income strata, where 9.8% of the sample's monthly family income was below Rs. 50,000; for 41%, the monthly family income was between Rs. 50,000 and Rs. 2,00,000; 25.1% fell under the monthly income bracket of Rs. 2,00,000-Rs. 5,00,000 and 22.2% of the sample's family income was over Rs. 5,00,000. 42.7% respondents were unmarried, 54.5% married and 2.8% others (live-in/separated/widows/ widowers). Since a nation-wide lockdown was imposed at the time of data collection, participants were asked about their living arrangements. A huge majority (93.4%) was living with someone, while only 6.5% of the sample reported to be living alone.

Measures

COVID-19 Stress Scale

Several steps were taken to develop the COVID-19 Stress Scale (CSS). First of all, a literature review was conducted to examine established measures of stress, such as Perceived Stress Scale (PSS; Cohen et al., 1983), Dimensions of Stress Scale (Vitaliano et al., 1993); Holmes and Rahe Stress Scale (Holmes & Rahe, 1967), Perceived Stress Questionnaire (PSQ, Levenstein et al., 1993), Standard Stress Scale (SSS, Gross & Seeba, 2016), and Perceived Stress Reactivity Scale (PSRS; Schlotz, Yim, Zoccola, Jansen, & Schulz, 2011). Certain statements that were found relevant were rewritten or modified slightly to suit the present pandemic context. Second, a semi-structured interview schedule was created to understand the major stressors resulting from COVID-19. Two research associates (undergraduate students of psychology trained in interviewing, especially recruited for the study) conducted 15 detailed interviews over telephone with participants from different age brackets: 5 in the 20-21 age bracket, 5 from the middle age bracket (30–50 years) and 5 participants from the above 60 years age group. Thematic analyses of the interviews revealed broad themes, such as fear, worry, frustration, distress with regard to the uncertainty, finances, other people, health of family members, boredom, panic buying, etc. A total of 35 items were written based on the previous two steps. Each item was subjected to a systematic development process that included initial development, review, revision, and pretesting (Hambleton, 1980). An expert panel comprising of a clinical psychologist, social psychologist, and a

general physician was asked to evaluate these items. After removing those items with similar content or expressions, 27 items were retained for further evaluation. Appointment of content experts to select items has been recommended by previous researchers (e.g., LaDuca, Downing, & Henzel, 1995). As previous guidelines suggest that “about one-half to two-thirds of the items written will ultimately survive all content and editorial reviews and pretesting” (LaDuca et al., 1995, p. 131), eight items were deleted from the pool of 35 items.

The next step in scale development was to pilot test it. These 27 items were now given to five respondents: two undergraduate students of psychology, a businessman, a homemaker and a retired Army officer. A discussion with them helped to ensure face validity of this first version. Based on their feedback and agreement among the participants with regard to items that were felt to be weak or erroneous (those with double meanings, uncertain, inadequate, too common, or too rare), some items were reworded and some were deleted. Some examples of items removed were: “I fear that the lockdown will become permanent” and “I am irritated at having to wear masks all the time”. Some items were also reworded. One example is “I miss my friends and family” was changed to “I miss my friends/family whom I am unable to meet” as the first one was unclear in those cases where someone was already living with family.

After the pilot study, 22 items were selected for the scale administration. A Likert scale ranging from 1 (almost never), 2 (sometimes), 3 (fairly often), 4 (very often), and 5 (all the time) was used to assess how often the participant felt or thought about the stressor mentioned. Higher scores indicate higher COVID-19 stress. The psychometric properties of the COVID-19 Stress Scale are described in the results section.

Coping with Pandemic Scale

This scale was adapted from Ways of Coping Scale (Folkman & Lazarus, 1988). While the original scale measures two types of coping, problem-focused (information seeking) and emotion-focused (wishful thinking), we also included seeking social support. Since the original scale is very long with 66 items and is used to assess coping of people when they encounter stressful situations of everyday life, it was adapted to suit the present pandemic context. A 15 item scale assessing three coping domains: emotion-focused coping, problem-focused coping and the seeking of social support (Felton, Revenson, & Hinrichsen, 1984) was used. Five items each were presented under each of the coping strategy: Problem-focused coping, the kind of coping aimed at resolving the stressful situation or event or altering the source of the stress, for instance, ‘making a plan of action for the next 3 months-1 year’; emotion-focused coping, aimed at managing the emotions associated with the situation, rather than changing the

situation itself, for instance, ‘meditation/chanting/praying’; and seeking social support, for instance, ‘talking to someone about how I am feeling’.

A Likert scale ranging from 1 (almost never), 2 (sometimes), 3 (fairly often), 4 (very often), and 5 (all the time) was used to measure how frequently the participant was using the strategy mentioned. Since there were 5 items each for three domains, scores were obtained on the use of Emotion-focused, Problem-Solving focused, Social-support seeking focused coping strategy. A total score on the use of various coping strategies was also calculated after adding all the three dimensions.

Procedure

A Google form was created for online administration. Participants were recruited through convenience sampling. Messages requesting for participation were posted on various WhatsApp groups (like Senior Citizens, Alumni Associations of various institutions all over the country, Resident Welfare Associations of several localities, Student Groups, Professional Groups of various occupations, such as lawyers, media, teachers, etc.) and several posts on Facebook. Data was collected when the entire country was under a total lockdown. Care was taken to accommodate responses from all parts of India. Participants were told that the purpose of the study was to understand the anxiety and stress that they were experiencing as a result of these extraordinary times of lockdown necessitated due to COVID-19. After ensuring confidentiality of responses, the CSS and the Coping with Pandemic Scale were administered. Questions related to demographic information about their gender, age, family income, occupation, nature of work, city, relationship status, and living arrangement were also asked.

Participation was voluntary, and no monetary compensation was given. Participants were informed of their rights, confidentiality was assured. Informed consent was taken electronically before data was collected from the participants.

Data Analysis

Analyses on psychometric properties included factor analysis, item-total correlation, and cronbach alpha. The factor structure of COVID-19 Stress Scale (CSS) was examined through the use of an exploratory factor analysis, using the maximum likelihood estimation method with varimax rotation with Kaiser Normalization, and the criterion of eigen value greater than 1.00 (Kaiser, 1960). Descriptive statistics were used to calculate means and standard deviations of various stressors and coping strategies. One-way analysis of variance for independent samples was used to compare the different dimensions of stressors across different age groups and income groups. t test for independent samples was used to compare the types of stressors faced by men and women. Correlations were calculated to measure the relationship between 3 types of coping strategies and overall stress. All the analyses were conducted using IBM SPSS 22.0.

Results

Table 1 shows the descriptive statistics of the study variables. The value obtained for skewness indicates a symmetric distribution for all the variables, while that for kurtosis implies a distribution that is neither too peaked nor too flat.

The exploratory factor analysis produced a 5-factor solution, $\chi^2 (231, N= 1009) = 7888.69, p < .001$. This factor solution explained 55.269% of the total variance. Because the purpose of the exploratory factor analysis was to establish meaningful factors underlying the CSS, the following two criteria to identify the preliminary factor structure was used: (a) retain items with a factor loading of .30 or above, and (b) retain factors that have a minimum of 3 items loaded on it. The results indicated 21 items with a factor loading equal to or greater than .30, corresponding to five factors, each with 3 or more items. One item was dropped as it was not loaded onto the factor structure. Item-total correlations of the selected

Table 1 Descriptive Statistics of Study Variables

	Min	Max	Range	Mean	SD	Skewness	Kurtosis
Vexation with others (V)	4	20	16	13.43	3.48	-.123 (.077)	-.620 (.154)
Immediate Concerns (I)	6	30	24	14.51	4.77	.553 (.077)	-.118 (.154)
Routine Disruption (R)	5	25	20	14.44	4.30	.177 (.077)	-.562 (.154)
Uncertainty about future (U)	3	15	12	8.89	3.31	.063 (.077)	-.944 (.154)
Systemic Concerns (S)	3	15	12	9.59	2.74	-.002 (.077)	-.628 (.154)
Stress (Overall VIRUS)	23	110	87	63.84	14.89	.039 (.077)	-.406 (.154)
Emotion-focused Coping	5	25	24	14.51	4.77	.553 (.077)	-.118 (.154)
Problem-solving Coping	5	25	20	14.93	3.11	.234 (.077)	.118 (.154)
Seeking social support Coping	5	25	20	15.11	3.46	.100 (.077)	-.209 (.154)

items ranged from 0.44–0.69 (Refer Table 2). Using these results, the following five factor labels were established, providing evidence of face validity for CSS: Vexation with Others, Immediate Concerns, Routine Disruption, Uncertainty about the Future, and Systemic stressors (abbreviated as VIRUS). These factors accounted for 8.365%, 12.304%, 12.307%, 12.554%, and 9.739% of the total variance, respectively, explaining 55.269% of the total variance in COVID-19 stress (Refer Table 2).

Coefficient alphas were also computed to determine the internal consistencies of the 21-item CSS and for each of the five factors. The results indicated a coefficient alpha of 0.90.

The coefficient alphas for the five factors were as follows: 0.692 for Vexation with Others, 0.786 for Immediate Concerns, 0.736 for Routine Disruption, 0.847 for Uncertainty about the Future, and 0.69 for Systemic stressors.

A VIRUS model for COVID-19 stress is thus proposed, comprising of the following five dimensions:

Dimension 1: Vexation with Others

This stress emanates from annoyance caused due to other people, either because they are overzealous and create panic by sending messages on social media or news channels that

Table 2 CSS Items, Means, Standard Deviations, Item-Total Correlations, and Standardized Factor Loadings of Exploratory Factor Analysis

Item	Item total correlation	Explanatory factor analysis		
		M	SD	Loading
Dimension 1: Vexation with others				
I am irritated on reading/seeing repetitive messages on social media.	0.53	3.10	1.28	.638
I am frustrated as other people are not following restrictions and social distancing.	0.56	3.47	1.18	.576
I am concerned about the scale, speed and intensity at which the Corona virus is spreading.	0.65	3.56	1.09	.499
I am disturbed at the panic and hype created by the news channels.	0.51	3.28	1.24	.701
Dimension 2: Immediate concerns				
I am worried that I will run out of food/other supplies	0.53	1.92	0.97	.602
I am bothered about the health of my family members (elders, children, etc.)	0.60	3.28	1.20	.454
I might get infected with Corona myself.	0.50	2.05	0.94	.770
I might not get proper treatment if I get infected with Corona.	0.57	2.16	1.18	.748
I am anxious that we will face shortage of medical supplies.	0.65	2.57	1.21	.597
I worry about financial issues (losing job, pay cut, other losses).	0.60	2.51	1.29	.377
Dimension 3: Routine Disruptions				
My normal routine has got disrupted.	0.44	3.33	1.26	.571
I miss going out in the open (for example; parks, malls, movie theatres, restaurants etc).	0.51	2.96	1.23	.768
I miss my friends/family whom I am unable to meet.	0.55	3.18	1.23	.686
I am bored as I don't have much to do.	0.48	2.07	1.14	.654
I am concerned about returning back to my normal routine.	0.61	2.89	1.28	.505
Dimension 4: Uncertainty of future				
I am uncertain about what the future holds for me.	0.67	2.72	1.30	.616
I am uncertain about what the future holds for our country.	0.69	3.10	1.20	.813
I am uncertain about what the future holds for humankind.	0.67	3.06	1.26	.809
Dimension 5: Systemic stressors				
The efforts of the Government are not adequate.	0.53	2.44	1.26	.789
I am worried that the economy might face a recession.	0.62	3.56	1.18	.593
I feel distressed thinking about the less privileged (e.g., migrants, daily wagers, etc.).	0.52	3.57	1.09	.509
Item that did not load onto the factor structure				
I have to do household chores myself	0.27	2.57	1.21	—

keep reiterating negative news, or people on the other extreme, who are apathetic and do not follow social distancing (popularly christened ‘Covidiot’), putting lives of others in dangers and contributing to high transmission levels of COVID-19. This dimension contains 4 items, such as ‘I am disturbed at the panic and hype created by the news channels’, ‘I am irritated on reading/seeing repetitive messages on social media’, and ‘I am frustrated as other people are not following restrictions and social distancing’.

Dimension 2: Immediate Concerns

These are stressors in the immediate future, such as worries about contracting COVID-19, lack of medical help, possible pay cut, incurring losses for businessmen, possible shortage of medical supplies, groceries, and other essentials. This dimension contains 6 items, such as ‘I might get infected with Corona myself’, ‘I might not get proper treatment if I get infected with Corona’ and ‘I am worried that I will run out of food/other supplies’.

Dimension 3: Routine Disruption

This stress comes from not being able to follow a structured routine that one is used to, or going out, or meeting friends and family or even worrying about what will happen when one has to get back to the original routine. This dimension contains 5 items, such as ‘I miss going out in the open (for example; parks, malls, movie theatres, restaurants etc.)’, ‘I miss my friends/family whom I am unable to meet’ and ‘I am bored as I don’t have much to do’.

Dimension 4: Uncertainty about the Future

This stressor underlines the ambiguities that that are associated with a pandemic that no one has faced before. Uncertainties about one’s own future, the country and humankind in general come under this dimension. This dimension includes 3 items, viz. ‘I am uncertain about what the future holds for our country’, ‘I am uncertain about what the future holds for humankind’, and ‘I am uncertain about what the future holds for me’.

Dimension 5: Systemic Stressors

These are stressors that are systemic in nature. The plight of those less privileged due to India’s hierarchical socio-economic system, the fear of recession stemming from the economic system, and the efforts of the Government that are a part of the governance system, fall under this dimension. This dimension also includes three items, i.e., ‘I feel distressed thinking about the less privileged (e.g., migrants, daily wagers, etc.)’, ‘The efforts

of the Government are not adequate’, and ‘I am worried that the economy might face a recession’.

A one way analysis of variance showed that the difference among these five stressors experienced was significant, $F(4,5040) = 131.79, p < .001$ (Refer Table 3). Of all the stressors, vexation with others emerged as the highest stressor, followed by systemic stressors, uncertainty about the future, routine disruption, and lastly immediate concerns. Post hoc analysis using Tukey HSD showed that there were significant differences among all dimensions except between routine disruption and uncertainty of future.

The first case of the COVID-19 in India was reported on 30 January. In the month of March strict advisories were issued and a complete nation-wide lockdown was announced on 22 March, when only 236 cases were confirmed. As COVID-19 spread in India, social distancing guidelines were issued by the union and state governments. It has been contended that since the concept of personal space is narrow in India, social distancing is culturally alien (Mishra & Majumdar, 2020). This could have led to many people not following social distancing norms, resulting in frustration among those adhering to such norms. On the other hand, repetitive messages on social media and news channels also led to panic. India is the biggest market of WhatsApp, with more 400 million users. While it is a cheap means of instant communication, it also contributes to spreading of fake news, especially in the crucial time of coronavirus outbreak. Several memes and jokes on COVID-19 were read daily by people, leading to irritation. News channels running stories on increase in numbers of COVID-19 also contributed to anxiety. In fact, Roy et al. (2020) found that 36.4% of their sample in India reported distress related to social media.

The stress caused due to thoughts about the plight of the underprivileged emerged to be the highest among respondents. One respondent in a telephonic interview remarked, “*What distresses me the most is when I see Instagram pictures of culinary delights put up by my friends on one side, and see images of poor, tired migrants walking back to their villages on the other...I feel guilty about my position of privilege.*” It may be prudent to mention here that the gap between the ‘haves’ and the ‘have-nots’ is very large in India. Due to the sudden lockdown, the daily wage workers were suddenly out of a job and money, resulting in mass exodus from cities to villages, often on foot since public transport was shut. It is

Table 3 One Way ANOVA comparison of different dimensions of stress

Source	SS	Df	MS	F value	P value
Between groups	432.11	4	108.02	131.79	0
Within groups	4131.18	5040	0.81		

equally noteworthy that at least for this middle/upper class stratum of society, immediate worries like worry about falling short of essentials did not lead to much stress. Interestingly, the fear that they might get infected with COVID-19 or that they may not receive proper treatment if infected was not as high as the anxiety of economic recession.

No significant difference was found on any of the COVID-19 stress dimensions across various income groups. No significant difference was also found across various age groups on any of the COVID-19 stress dimensions. Significant differences were, however, found between men and women on most of the dimensions of COVID-19 stress. Women faced significantly higher stress than men due to vexation with others ($t[1007] = -3.45, p < .001$, Cohen's $d = 0.21$); immediate concerns ($t[1007] = -3.866, p < .001$, Cohen's $d = 0.26$); routine disruption ($t[1007] = -3.631, p < .001$, Cohen's $d = 0.25$); and systemic stressors ($t[1007] = -4.350, p < .001$, Cohen's $d = 0.30$). No significant difference emerged between men and women on stress due to uncertainty about the future. It is important to bear in mind that the observed differences could be due to differences in sample size, as the sample comprised of 63.1% women and 36.9% men.

With regard to the use of different coping strategies to deal with COVID-19 stress, a significant difference was found using one way analysis of variance, $F(4,3024) = 6.34, p = .0017$ (Refer Table 4). Seeking social support ($M=15.11, SD=3.46$) was the most common coping strategy used, followed by problem solving coping strategy ($M=14.93, SD=3.11$) and lastly emotion focused coping strategy ($M=14.60, SD=3.18$). Post hoc analyses using Tukey HSD showed that seeking social support coping strategy was used significantly more than emotion-focused coping strategy. No significant difference was found between men and women on types of coping strategies used. Significant difference was also not found on the use of different coping strategies across different age groups. Further, rather surprisingly, no significant relationship was found between any type of coping strategy used and stress experienced. This suggests that none of the coping strategies- emotion-focused, problem-solving focused, and seeking social support is significantly related to COVID-19 stress.

General Discussion

Findings demonstrated that the stress experienced due to COVID-19 encompasses five dimensions: Vexation with

Table 4 One Way ANOVA comparing types of coping strategies used

Source	SS	df	MS	F value	P value
Between groups	134.89	2	67.44	6.36	0.0017
Within groups	32,050.47	3024	10.59		

Others, Immediate Concerns, Routine Disruption, Uncertainty about the Future, and Systemic stressors (abbreviated as VIRUS). CSS, an instrument designed to assess stress experienced due to COVID-19 has robust psychometric properties. Moreover, the overall score of the summed-up items of CSS reflects the severity of stress experienced due to COVID-19.

Also, while age and income appeared not to affect the response pattern of stress on the CSS, gender did. Higher stress experienced by women in comparison to men is consistent with previous literature on stress. For instance, higher stress for women on Perceived Stress Scale has been reported by Xu et al., 2015; Vallejo, Vallejo-Slocker, Fernández-Abascal, & Mañanes, 2018, among others. Women from the United Kingdom, the United States, and Germany have been found to score higher than men on most of the subscales of the Perceived Stress Reactivity Scale (Schlotz et al., 2011). A study by Wang et al. (2020) even found women to report greater psychological impact of the outbreak and higher levels of stress, anxiety, and depression than men during the initial stage of the COVID-19 in China. While previous research has found a close relationship between stress and low income and also age-wise differences (for e.g., Vallejo et al., 2018), no such differences were found in the present study. It may be argued that the present stress experienced due to COVID-19 is so high that it overlays other variables, such as age and income. This suggests that the CSS can be relied upon to assess and deal with the psychosocial stressors emanating from COVID-19 among males and females as well as individuals of all ages.

There is no doubt that infectious epidemic crises affect mental health and well-being of individuals. For instance, Coughlin (2012) found important linkages between anxiety and depression and viral diseases such as influenza A (H1N1). Depressive symptoms with rates ranging from 3.0% to 73.1% were observed in two studies on the Ebola epidemic (Matua & Wal, 2015; Rabelo et al., 2016). A review (Brooks et al., 2020) reported negative psychological effects of quarantine including post-traumatic stress symptoms, confusion, and anger due to stressors such as infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma. The CSS could specifically help understand the various types of stressors that the public is experiencing both as a result of COVID-19 and the ensuing lockdown. It can subsequently help in focusing the efforts of the Government and other service providers towards those stressors that are most urgent.

The results also found that seeking social support was the highest used coping strategy. Previous research has pointed towards the beneficial role of receiving social support. For instance, Krause, Pargament, and Ironson (2020) found a three-way interaction between stress, spiritual support, and extraversion on anxiety. They suggested that extraverts are

more likely to benefit from receiving spiritual support because they are more likely to seek out and receive spiritual support than introverts. This may be further understood in the context of collectivism in the Indian culture (for e.g., Verma & Triandis, 1999). In the previous outbreak of Ebola, Kim, Sherman, and Updegraff (2016) found that higher collectivism was associated with a greater perceived vulnerability to Ebola. They suggested that the set of practices and rituals associated with collectivistic cultures may serve as psychological protection against the threat of disease. Similarly, survivors' accounts from the 2004 Asian tsunami emphasised the importance of extended social supportive networks, religious faith and practices, and cultural traditions in facilitating recovery and sustaining emotional well-being. Social support, indeed, seems to be the most widely used coping strategy in times of natural adversity (Ekanayake, Prince, Sumathipala, Siribaddana, & Morgan, 2013).

The relationship between stress and coping was assessed to examine which coping strategy is more helpful in dealing with the pandemic stress. Unexpectedly, none of the three types of coping strategies, seeking social support, emotion-focused and problem-focused helped in reducing stress. It appears that these merely offer momentary diversion from the stress and not provide long-term relief.

Lazarus (1993) has suggested that the adaptational value of a particular type of coping may be a function of the characteristics of the stressful encounter being considered, including how much control we feel over the situation, how predictable and intense the stressor is, and our individual perspective. While problem-focused coping is aimed at doing something to alter the source of the stress, emotion-focused coping aims to manage the emotional distress that is associated with the situation. In the context of COVID-19, many aspects of the situation are outside of our control, including how long the pandemic will last, how other people are behaving, and what is going to happen in our communities. Trying to find answers by searching the Internet, a problem-solving focused strategy, for example, is proving to be futile as these questions have unknowable answers. Seeking social support beyond what respondents already have is also not helping in reducing stress. There is some evidence that there may be a minimum threshold of social contract required for coping, with little improvement in health outcomes for levels of support above the threshold (Baquatayan, 2015). In India, unique collectivistic measures like “*Thaali Bajao*”, cheering as a community together for the “corona warriors” or the frontline workers on 22 March, 2020 or “*diya jalao*” on 6 April 2020, lighting lamps and candles to express unity in fight against COVID-19 served the psychological objective of unifying India by expressing support to each other (Ahuja, 2020). Hence seeking more social support did not have greater adaptive value in dealing with stress.

It might also be useful to conceptualize COVID-19 as a traumatic event rather than a stressor. After all, emotional and psychological trauma is the result of extraordinarily

stressful events that shatter one's sense of security- something that COVID-19 has done. In a previous study, Van Bortel (2016) found that those affected by Ebola were likely to experience psychological effects due to the traumatic course of the infection, fear of death and experience of witnessing others dying. While the relationship between active coping strategies and dealing with trauma has been validated by previous literature (e.g., Alim et al., 2008; Gil, 2005), some research (Amirkhan & Marckwordt, 2017) found non avoidant coping strategies like seeking social support and problem-solving to be ineffective. In fact, one study (Sandler, Tein, & West, 1994) examining younger children and a non-fatal event found seeking support to exacerbate symptoms. Clearly, more research is required to understand the effectiveness of different types of coping strategies used in this pandemic. It is premature to draw conclusions between use of particular coping strategies to deal with the stress experienced due to COVID-19.

Limitations and Future Directions

The data was collected from the middle-upper middle strata of the Indian society; no claims are made about generalizability of the same to other income groups. Convenience sampling further weakens the generalizability of the findings in the present study. It is also possible that the respondents' responses could have been influenced by social desirability factors or choice of semantics. For example, in the 5-point Likert scale used, 5 refers to ‘all the time’, which is meant in a metaphorical sense for greater emphasis. It cannot literally mean all the time, as practically nobody would be able to do something ‘all the time’. Concurrent validity of the CSS has not been studied. No attempt was made to relate the scores of CSS with other scales of depression, anxiety or mood disorders. Further Confirmatory Factor Analysis is required to determine if the proposed factor structure is reliable, and this could be taken in subsequent researches to test the robustness of the CSS. In developing the CSS, an Indian sample was used. Although it may be hoped that the CSS is an adequate tool to measure stress experienced due to COVID-19 in other nations as well, one must be cautious, and future research is required. In the present study since only 6.5% of the sample reported to be living alone, loneliness did not feature as a stressor. Future studies could include this as a possible stressor, particularly in populations that are living alone especially during lockdown periods.

Conclusion

The proposed VIRUS model adequately captures the stress experienced due to COVID-19. COVID-19 Stress Scale (CSS), a 21-item scale has robust psychometric properties

supporting its use. CSS will be useful in examining the stressful experience of individuals when faced with crisis situations such as a pandemic. Research in other cultures is required to see if the scale is valid cross-culturally. Since seeking social support was the most common coping strategy used, drawing upon one's families as social support might prove beneficial. Further measures can be devised to strategize adaptable coping strategies to inculcate in these difficult times.

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Compliance with Ethical Standards

Conflict of Interest The author declares that she has no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of Lady Shri Ram College for Women and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Appendix

COVID-19 Stress Scale

1. My normal routine has got disrupted.
2. I miss going out in the open (for e.g., parks, malls, movie theaters, restaurants, etc.).
3. I miss my friends / family whom I am unable to meet.
4. I am uncertain about what the future hold for me.
5. I am uncertain about what the future holds for our Country.
6. I am uncertain about what the future holds for humankind.
7. I am worried that I will run out of food/other supplies.
8. I am bothered about the health of my family members (elders, children, weak, etc.).
9. I am bored as I don't have much to do.
10. I am irritated with reading/seeing repetitive messages on social media.
11. I might get infected with Corona myself.
12. I might not get proper treatment if I get infected with Corona.
13. I am anxious that we will face shortage of medical supplies.
14. I am frustrated as other people are not following restrictions and social distancing.

15. The efforts of the Government are not adequate.
16. I am worried that the economy might face a recession.
17. I worry about financial issues (losing job, pay cut, other losses).
18. I feel distressed thinking about the less privileged (eg., migrants, daily wagers, etc.)
19. I am concerned about returning back to my normal routine.
20. I am concerned about the scale, speed and intensity at which the Corona virus is spreading.
21. I am disturbed at the panic and hype created by all the news channels.

The participants indicate how often they felt or thought about the stressor mentioned using a five-item Likert type scale. Answers included 1 (almost never), 2 (sometimes), 3 (fairly often), 4 (very often), and 5 (all the time). The minimum score possible for each question is 1, and the maximum is 5. A total score is calculated by adding up each item score (ranging from 1 to 105). The higher the score, the greater stress experienced due to COVID-19. Further, dimension-wise stressor score can also be obtained. For 'Vexation with others' (V), scores obtained on items 10, 14, 20 and 21 should be added. For 'Immediate Concerns' (I), scores obtained on items 7, 8, 11, 12, 13, and 17 should be added. For 'Routine Disruption' (R), scores obtained on items 1, 2, 3, 9, and 19 should be added. For 'Uncertainty about the Future' (U), scores obtained on items 4, 5 and 6 should be added. For 'Systemic Stressors' (S), scores obtained on items 16, 16 and 18 should be added. In order to compare the dimensions, totals obtained on each dimension should be divided by the number of items, i.e. 4 for V, 6 for I, 5 for R, 3 for U and 3 for S.

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