

## Impact of the First Wave of COVID-19 on Individuals Behavioural, Psychological and General Health Conditions

Venu Prasad H D and Naveena K

Centre for Water Resources Development and Management, Kozhikode

To assess the impact of COVID-19 on individual behaviour, psychological and health conditions, we surveyed 848 individuals by snowball sampling method. The study found that an increase in the behavioural pattern of individuals were observed after COVID-19 i.e., wearing masks (97.6%), limited physical contact (95.4%), etc. Respondent's monthly income, age and education were showing higher influence towards health, psychology and behavioural characteristics. The middle (odds value 1.27) aged respondents showing high behavioural adoption practices than young and old. In terms of psychological condition, old-aged respondents were psychologically disturbed (2.48) compared to others. Hence, the study recommends that the Government must ensure to design and develop psychological programmes directed towards old age people and to solace them from the fear of the disease.

**Keywords:** Behavioural changes, Impact of COVID-19, Health conditions, Psychological conditions.

The emergence of new pandemic in terms of COVID-19 (Coronavirus Disease 2019) (Vellingiri et al., 2020) generates a fear among the public and a great concern for global public health. The disease was first identified in China in December 2019 (Kumar et al., 2020; Balkhi et al., 2020) and later spread to different parts of the World and even the WHO (World Health Organisation) declared the disease as Pandemic on March 11th 2020 (Khan et al., 2020). The first case of COVID-19 reported in India was on 30th January 2020 (Annamuthu et al., 2020; David, 2020) and this new pandemic spread through respiratory droplets, person to person contact (Khan et al., 2020, Naddeo et al., 2020) and also through aerosols (Jayaweera et al., 2020). The infected person shows symptoms ranging from severe cough, mild to high fever, respiratory problems and the worst scenario, death of a person (Vellingiri et al., 2020).

The older people were considered more prone to COVID-19 owing to their weak immune system (Mikaberidze, 2020). As the transmission mode is by several means, the disease severity is more, and too many casualties generate more fear among the general public. There was a

significant difference of fear of COVID-19 with respect to gender was reported in a cross-country study showing females were more fearful to COVID-19 than their male counterparts (Khan et al., 2020). But the fear among individuals, their psychological status, behavioural changes owing to the emergence of new pandemic has been a new area of research that needs a thorough investigation. In this backdrop the present study was designed to look into the impact of COVID-19 on behavioural modifications among the individuals, their psychological status and general health conditions.

### Method

To study the psychological, behavioural, and general health conditions of the respondents, a questionnaire was framed in English and sent to Whatsapp/email ids of the respondents through a link generated using 'Google Forms'. The Google Forms consists of an inventory of questions related to psychological, behavioural, and general health conditions of the respondents. The study employed a snowball sampling method to collect information from the respondents. The survey started on 4th June 2020 and ends on 7th July 2020. After removing the incomplete

and random responses, a total of 848 valid responses were selected for analysis, thus the valid response rate is almost 95 per cent.

#### **Measurement:**

##### **Behavioural impact**

A total of 12 items were included to measure the behavioural changes among the respondents due to COVID-19 using dichotomous response pattern like 'yes or no'. The behavioural changes include "carrying a hand sanitizers most of the time, wearing a mask, stopped visiting crowded places, stopped taking food from outside, limited physical contact with people, reduced visiting healthcare facilities (hospitals/public health care centres), recently cancelled plans i.e. family reunions, social gatherings, travelling, or meetings, bought drugs that are good for treating COVID-19, taking herbal/Ayurveda supplements, eating garlic, ginger, lemon; avoiding to watch, read or listen to news because it made me anxious".

##### **Psychological impact**

The highly reliable and validated PTSD Checklist-Civilian Version (PCL-C) (Conybeare et al., 2012) with five-point Likert scale of response ranging from not at all (0) to extremely (4) were used to measure the psychological impact of respondents due to COVID-19. The value of Cronbach alpha for the psychological instrument was 0.93.

##### **General health impact**

Health impact of individuals were measured using the General Health Questionnaire (GHQ-12) (Qin et al., 2018). The questionnaire consists of 12 items with response range from less than usual (0) to much more than usual (3) were considered to measure the general health conditions of the respondents due to COVID-19. Overall score ranges from 0 to 36 with higher score representing higher degrees of health deterioration among the respondents. The value of Cronbach alpha for the GHQ instrument was 0.85.

#### **Data Analyses:**

All statistical analyses were performed using R studio software. Five per cent level of statistical significance is considered for the

analysis. Mann-Whitney U test and Kruskal-Wallis test were used to assess the significant difference within demographic characteristics concerning psychological, behavioural, and general health conditions. Spearman's rank correlation and Correspondence analysis were used to assess the association between psychological, behavioural, general health scores. Odds ratio and Random Forest were also used to assess the association between psychological, behavioural, general health scores with demographic variables.

### **Results and Discussion**

#### **Demographic profile of the respondents:**

The analysis of the demographic information revealed that 62.97 per cent of the respondents constitute males and the remaining were females (36.91 %). The majority of the respondents belong to the age group of up to 45 years (88.68%) and in education, as much as 98.23 per cent had a minimum graduation level. More than half of the respondents in the sample constitute bachelors (54.36%). Similarly, more than half of the respondents (69.2%) had a monthly average income of Rs. less than 50 thousand.

The first section of our questionnaire which explored the behavioural impact of the ongoing pandemic, underlined some interesting results, as outlined in Table 1. It can be seen from the table that a remarkable increase in the behavioural pattern of individuals were observed after COVID-19 i.e., 97.64 percent were indulged in wearing masks, 95.4 percent limited their physical contact with people, 93.99 percent cancelled their visits/appointments, 93.87 percent maintained physical distance outside the home and so on.

**Table 1: Behavioural impact of COVID 19**

Behavioural attributes	No	Yes
Carry a hand sanitizer most of the time	235.00 (27.71)	613.00 (72.29)
Started wearing a mask because of COVID-19	20.00 (2.36)	828.00 (97.64)
Fear visiting crowded places i.e. markets & departmental stores	97.00 (11.44)	751.00 (88.56)

Maintain Physical distancing outside household	52.00 (6.13)	796.00 (93.87)
Wash my hands more frequently	70.00 (8.25)	778.00 (91.75)
Avoided taking food from outside due to COVID-19	60.00 (7.07)	788.00 (92.93)
Limited my physical contact with people	39.00 (4.60)	809.00 (95.40)
Avoided/ reduced using healthcare facilities (hospitals/ public health care centres	144.00 (16.98)	704.00 (83.02)
Recently cancelled my plans i.e., family reunions, social gatherings, travelling, or meetings	51.00 (6.01)	797.00 (93.99)
Bought drugs that are good for treating COVID-19	683.00 (80.54)	165.00 (19.46)
Taking Herbal/Ayurveda supplements	549.00 (64.74)	299.00 (35.26)
Started eating garlic, ginger, lemon	243.00 (28.66)	605.00 (71.34)
Recently started to avoid watching, reading or listening to news because it made me anxious	475.00 (56.01)	373.00 (43.99)

It was found that there was a significant change in the behavioural pattern among the individuals due to COVID-19 Pandemic. Recent studies carried out revealed similar kind of results on COVID-19 (Bae et al., 2021, Roy et al., 2020), which indicates public were more concerned about COVID-19 and try to avoid the transfer of viral infection through changing their behavioural pattern.

With respect to psychological impact indicators, individuals experience not much changes in their psychological behaviour after COVID-19. Whereas, feeling distant (30%), future hopes/plans will be cut short (24%), overly alert (23%) & loss of interest in things (21%) were affected moderate to extreme level. It was observed in this study that there was no major psychological impact among individuals due to COVID-19. Whereas, a study conducted in April 2020 reported moderate level of stress among 74 % of the participants and 71% reported poor well-being (Grover et al., 2020). Compared to the pre-pandemic stage in India, majority of the respondents reported only low to moderate pandemic induced anxiety (Chandran et al., 2020).

**Table 2: Psychological impact of COVID-19**

Psychological attributes	Not at all	A little bit	Quite a bit	Moderately	Extremely
Having upsetting thought or images about COVID-19 that come into your head when you did not want them to	282.00 (33.25)	358.00 (42.22)	58.00 (6.84)	123.00 (14.50)	27.00 (3.18)
Having bad dreams or nightmares about COVID-19	654.00 (77.12)	106.00 (12.50)	22.00 (2.59)	50.00 (5.90)	16.00 (1.89)
Reliving the COVID-19 event acting as if it were happening again	503.00 (59.32)	203.00 (23.94)	34.00 (4.01)	90.00 (10.61)	18.00 (2.12)
Feeling emotionally upset when you are reminded of COVID-19	381.00 (44.93)	261.00 (30.78)	48.00 (5.66)	122.00 (14.39)	36.00 (4.25)
Experiencing physical reactions when reminded of COVID-19 (sweating, increased heart rate	591.00 (69.69)	147.00 (17.33)	28.00 (3.30)	69.00 (8.14)	13.00 (1.53)
Trying not to think or talk about COVID-19	416.00 (49.06)	222.00 (26.18)	37.00 (4.36)	136.00 (16.04)	37.00 (4.36)
Trying to avoid activities or people that remind you of the COVID-19 event	415.00 (48.94)	235.00 (27.71)	43.00 (5.07)	114.00 (13.44)	41.00 (4.83)
Trouble remembering important parts of a stressful experience from the past	493.00 (58.14)	193.00 (22.76)	36.00 (4.25)	102.00 (12.03)	24.00 (2.83)

Loss of interest in things that you used to enjoy	425.00 (50.12)	211.00 (24.88)	36.00 (4.25)	134.00 (15.80)	42.00 (4.95)
Feeling distant or cut off from the people around you	267.00 (31.49)	259.00 (30.54)	65.00 (7.67)	200.00 (23.58)	57.00 (6.72)
Feeling emotionally numb unable to cry or have loving feelings	504.00 (59.43)	177.00 (20.87)	35.00 (4.13)	101.00 (11.91)	31.00 (3.66)
Feeling as if your future hopes or plans will somehow be cut short	306.00 (36.08)	268.00 (31.60)	67.00 (7.90)	143.00 (16.86)	64.00 (7.55)
Having trouble falling or staying asleep	503.00 (59.32)	197.00 (23.23)	37.00 (4.36)	81.00 (9.55)	30.00 (3.54)
Feeling irritable or having angry outbursts	472.00 (55.66)	199.00 (23.47)	38.00 (4.48)	112.00 (13.21)	27.00 (3.18)
Having trouble concentrating	458.00 (54.01)	198.00 (23.35)	42.00 (4.95)	113.00 (13.33)	37.00 (4.36)
Being overly alert	313.00 (36.91)	286.00 (33.73)	49.00 (5.78)	165.00 (19.46)	35.00 (4.13)
Being jumpy or easily startled	479.00 (56.49)	213.00 (25.12)	36.00 (4.25)	103.00 (12.15)	17.00 (2.00)

**Table 3: Impact of COVID-19 on health of individuals**

Health attributes	less than usual	Usual	More than usual	Much more than usual
Have you recently been able to concentrate on whatever you are doing	265.00 (31.25)	378.00 (44.55)	165.00 (19.46)	40.00 (4.72)
Have you recently lost much sleep due to COVID-19	313.00 (36.91)	427.00 (4.46)	76.00 (8.96)	32.00 (3.77)
Have you recently felt constantly under strain	307.00 (36.20)	328.00 (46.67)	125.00 (14.74)	20.00 (2.36)
Have you recently felt that you could not overcome your difficulties	305.00 (35.97)	392.00 (46.22)	117.00 (13.80)	34.00 (4.01)
Have you recently been feeling unhappy and depressed	291.00 (34.32)	373.00 (43.98)	140.00 (16.51)	44.00 (5.19)
Have you recently been losing confidence in yourself	324.00 (38.21)	395.00 (46.58)	101.00 (11.91)	28.00 (3.30)
Have you recently been thinking of yourself as a worthless person	359.00 (42.33)	368.00 (43.39)	94.00 (11.08)	27.00 (3.18)
Have you recently felt that you are playing a useful role in life	233.00 (27.48)	368.00 (43.40)	182.00 (21.46)	65.00 (7.67)
Have you recently felt capable of making decisions about things	207.00 (24.41)	383.00 (35.16)	191.00 (22.52)	67.00 (7.90)
Have you recently been able to enjoy your normal day-to-day activities	290.00 (34.20)	370.00 (43.63)	130.00 (15.33)	58.00 (6.84)
have you been able to face up to your problems	220.00 (25.94)	399.00 (47.06)	174.00 (20.52)	55.00 (6.49)
Have you recently been feeling reasonably happy, all things considered	255.00 (30.07)	406.00 (47.87)	125.00 (14.74)	62.00 (7.31)

In terms of health, majority of them were not much worried about their health status due to COVID-19. Whereas, decision making ability (30%), playing a useful role (29%), able to face the problems (27%) & able to concentrate (24%) were affected to more than and much more than usual level among the respondents (table 3).

Table 4 shows that statistically significant differences were observed among the demographic characters of the respondents with respect to health, psychological and behavioural scores. Education, gender and family size were showing significant differences with respect to behavioural score. Such that among the different level of education, respondents having education up to secondary level shown higher behavioural score (11) compared to others and male respondents (10) shown more score than females (9).

Age, education and marital status were showing statistically significant w.r.t psychological condition of the respondents. In that, those who were less than 26 years, had education up to higher secondary level and unmarried individuals were showing higher levels of psychological disturbance due to COVID-19. The lower educated people were affected psychologically may be due to the lack of awareness about COVID-19. In a similar set of studies, age (Varshney et al., 2020), gender, education (Liu et al., 2020), and marital status (Ramasubramanian et al., 2020) were showing significant differences with respect to Posttraumatic Stress Disorders.

With respect to health, none of the parameters under study showing statistical difference at 5 % level of significance. This indicates that the demographic characteristics of the individuals were not showing any difference w.r.t General Health parameters due to COVID-19.

**Table 4: Test of significance of the Average Health, Psychology and Behaviour score of respondents about Demographic characters.**

Kruskal-Wallis chi-squared							
	Class	Behaviour	P-value	Psychology	P-value	Health	P-value
Age	<26	9.81 (10)	0.19	19.34 (16)	<0.01	11.43 (12)	<0.60
	26-35	9.72 (10)		13.62 (11)		10.86 (12)	
	36-45	9.96 (10)		13.70 (10)		11.26 (12)	
	46-55	9.78 (10)		10.86 (8)		11.10 (11)	
	56-65	9.15 (9)		10.67 (7)		11.85 (12)	
	>66	9.20 (9)		15.20 (10)		8.40 (11)	
Education	High school or less	10.00 (10)	0.014	18.00 (11)	0.04	12.66 (11)	0.133
	Higher secondary	10.42 (11)		15.33 (14.5)		11.50 (12)	
	Graduation	10.04 (10)		14.64 (12)		10.36 (12)	
	Post-graduation	9.58 (10)		16.36 (12)		11.65 (12)	
	PhD	9.67 (10)		15.78 (13)		11.56 (12)	
Child in family	0	9.75 (10)	0.77	15.85 (13)	0.23	11.36 (12)	0.32
	1	9.80 (10)		14.42 (11)		11.13 (12)	
	2	9.79 (10)		14.73 (11)		10.25 (11)	
	3	9.79 (10)		15.29 (11)		9.85 (10.5)	
	>3	10.50 (10)		26.71(11.5)		13.71(12.5)	

Elder in family	0	9.75(10)	0.97	15.85 (11)	0.64	11.33 (12)	0.31
	1	9.80 (10)		14.42 (12.5)		11.13 (12)	
	2	9.79 (10)		14.73 (13)		10.25 (11)	
	3	9.79 (10)		15.29 (14)		9.85 (10.5)	
	>3	10.50 (10)		26.71 (11)		35.86 (12.5)	
Family size	Upto 4	9.64 (10)	0.04	16.38 (13)	0.12	11.30(12)	0.39
	5-8	9.97 (10)		14.41 (10.5)		11.08 (12)	
	> 8	9.95 (10)		14.95 (10)		10.60 (11)	
Monthly income	Upto 25000	9.86 (10)	0.15	15.19 (11)	0.95	11.33 (12)	0.89
	25001-50000	10.01 (10)		15.91 (12.5)		10.86 (12)	
	50001-75000	9.70 (10)		15.31 (13)		10.80 (12)	
	75001-100000	9.73 (10)		15.56 (14)		11.35 (12)	
	Above 1 Lakh	9.37 (9.5)		16.41 (11)		11.57 (12)	
Mann Whitney u test							
Gender	Female	9.64 (10)	0.029	15.54 (12.5)	0.60	11.08 (12)	0.46
	Male	10.01 (10)		15.73 (12)		11.37 (12)	
Marital Status	Single	9.79 (10)	0.85	18.18 (15)	<0.01	11.52 (12)	<0.12
	Married	9.75 (10)		12.55 (9)		10.79 (12)	

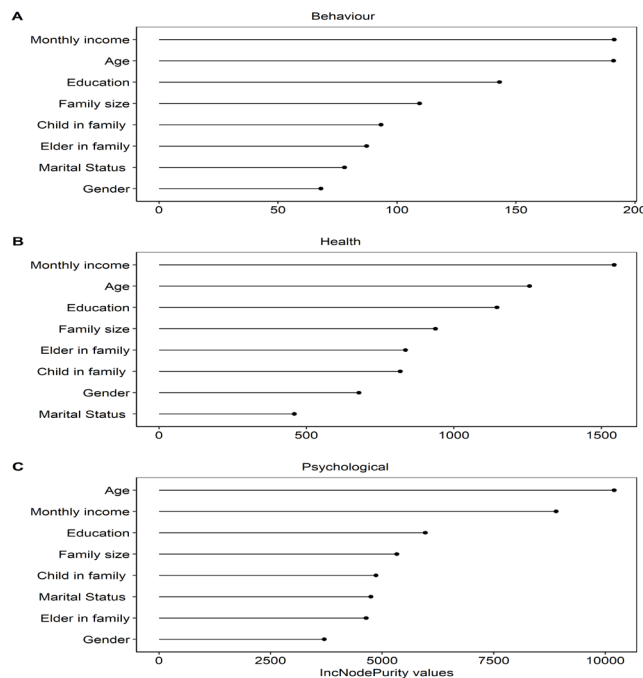


Figure 1: Influence of demographic variables on Behaviour, Health and Psychological conditions of individuals using Random Forest model.



**Table 5: Odds ratios of personal characters about high Behaviour, Health and Psychological score.**

Character	Class	Behaviour	Psychology	Health
Age	Young (18 to 35 years)	0.93 (0.62 to 1.24)	0.56 (0.26 to 0.87)	1.12 (0.75 to 1.50)
	Middle age (36 to 55 years)	1.27 (1.27 to 1.61)	1.54 (1.22 to 1.87)	0.78 (0.37 to 1.19)
	Old (> 55 years)	0.53 (0.12 to 1.19)	2.48 (1.76 to 3.19)	1.51 (0.79 to 2.23)
Education	Higher Education (PG to PhD)*	1.13 (1.41 to 0.83)	0.81 (0.53 to 1.09)	1.22 (0.88 to 1.56)
	Lower Education (X to UG)**	0.87 (0.60 to 1.18)	1.23 (0.95 to 1.51)	0.82 (0.48 to 1.15)
Monthly Income	Up to 25000	1.03 (0.77 to 1.37)	0.83 (0.62 to 1.10)	1.06 (0.80 to 1.41)
	25001-50000	1.30 (0.92 to 8.22)	1.07 (0.77 to 1.50)	0.84 (0.61 to 1.16)
	50001-75000	1.11 (0.75 to 1.62)	1.33 (0.90 to 1.94)	1.01 (0.69 to 1.47)
	75001-100000	1.03 (0.66 to 1.59)	1.20 (0.78 to 1.85)	1.07 (0.69 to 1.64)
	Above 1 Lakh	0.62 (0.43 to 0.90)	0.85 (0.59 to 1.23)	1.06 (0.74 to 1.53)

\* PG- Post-Graduation, PhD- Doctor of Philosophy

\*\* X- 10th Standard, UG- Under Graduate

To identify the most influencing factors, among demographic variables with respect to behaviour, psychology and general health, we used a Random Forest technique based on IncNode purity values (fig 1). Respondent's monthly income, age and education were showing high

influence towards psychological conditions (Varshney et al., 2020; Liu et al., 2020; Ramasubramanian et al., 2020; Arora, T., & Grey, I. 2020) health, and behavioural characteristics.

As these three variables (monthly income, age and education) were showing higher influence, we performed odds ratio to analyse the categorical performance of these three variables towards high behaviour, psychological and health conditions.

Results from odds ratio (table 6) indicates that the middle (odds value 1.27) aged respondents showing more connection towards high behavioural adoption practices than young and

old. In terms of psychological condition, old-aged respondents were psychological disturbances (2.48) compared to others. Similarly, for health the old aged respondents were showing high health deterioration conditions compared to others. Higher educated respondents showing more concern towards high behavioural (1.13) and health (1.22) scores.

Whereas, lower educated individuals were showing more concern in their psychological behaviour, this may be due to lack of awareness and knowledge about mode of transmission and control measures of COVID-19.

### Conclusion

As the disease is highly contagious, there was a shift in behavioural pattern among the individuals were observed i.e., use of face masks, avoiding public gathering, limited physical contact etc. This change in behavioural pattern might have significant impact on reduction in number of positive cases. Hence, it is advised

that the public need to practice these changes to limit an individual from exposure to the virus till complete vaccination.

Most of the respondents were not much concerned about the health and psychological conditions but their behaviour towards preventing the spread of COVID-19 was visible. This may be the reason for obtaining weak relationship between health and psychological parameters of the respondents. As the study was undertaken at a later stage i.e., after 5-6 months of emergence of COVID-19, the individuals might have shown fearlessness about the Pandemic. Hence, the responses were not in favour of increase in PTSD and deteriorating health conditions among individuals. Moreover, as the recovery rate is quite high in India, the general public were not showing much fearsome to COVID-19 at the time of data collection. On the contrary, if the study was undertaken in the initial stages of the pandemic, the fear among the public were high (Roy et al., 2020, Pakpour et al., 2020) and got a positive association with psychological conditions of the respondents (Dsouza et al., 2020, Sakib et al., 2020). This throws a light on the 'fear factor' associated with pandemic i.e., as the pandemic is at the initial stages and the death rate due to pandemic increases the fear among the public will be more and vice versa.

Age, education and income were showing significant association towards behavioural, psychological and health conditions. Whereas, higher education was showing more concern towards behavioural and health conditions. Old-aged respondents were psychologically more disturbed compared to others and their general health conditions were also affected. Hence, Government must ensure to develop psychological programmes directed towards old age people during pandemic situations to solace them from the fear of the disease.

### References

- Annamuthu, P., Shenbagavadivu, T., & Arthi, S. (2020). A study on the perception and precautionary measures taken by the general public amidst COVID-19. *Int J Modern Trends Sci Technol*, 6, 169-74.
- Arora, T., & Grey, I. (2020). Health behaviour changes during COVID-19 and the potential consequences: A mini-review. *Journal of Health Psychology*, 25(9), 1155-1163.
- Bae, S. Y., & Chang, P. J. (2021). The effect of coronavirus disease-19 (COVID-19) risk perception on behavioural intention towards 'untact'tourism in South Korea during the first wave of the pandemic (March 2020). *Current Issues in Tourism*, 24(7), 1017-1035.
- Balkhi, F., Nasir, A., Zehra, A., & Riaz, R. (2020). Psychological and behavioral response to the coronavirus (COVID-19) pandemic. *Cureus*, 12(5).
- Chandran, K. M., Valsan, T., Naveena, K., & Krishnakumar, K. (2020). Analysis of the uncertainty among people due to the COVID-19 Pandemic. *The International Journal of Indian Psychology*, 8(3). DOI: 10.25215/0803.196
- Conybeare, D., Behar, E., Solomon, A., Newman, M. G., & Borkovec, T. D. (2012). The PTSD Checklist—Civilian Version: Reliability, validity, and factor structure in a nonclinical sample. *Journal of clinical psychology*, 68(6), 699-713.
- David, M. (2020). Covid-19 (coronavirus): A global emergency outbreak and its implications in India. <https://zenodo.org/api/files/56392ea7-5354-426e-a18d-9a12828c8c5b/5.%20IJZAB%20ID%20No.%20506.pdf>.
- Dsouza, D. D., Quadros, S., Hyderabadwala, Z. J., & Mamun, M. A. (2020). Aggregated COVID-19 suicide incidences in India: Fear of COVID-19 infection is the prominent causative factor. *Psychiatry research*, 290, 113-145.
- Grover, S., Sahoo, S., Mehra, A., Avasthi, A., Tripathi, A., Subramanyan, A., ... & Reddy, Y. J. (2020). Psychological impact of COVID-19 lockdown: An online survey from India. *Indian Journal of Psychiatry*, 62(4), 354.
- Jayaweera, M., Perera, H., Gunawardana, B., & Manatunge, J. (2020). Transmission of COVID-19 virus by droplets and aerosols: A critical review on the unresolved dichotomy. *Environmental research*, 109819.
- Khan, M. H. A., Gupta, S. D., Hasan, T., Chowdhury, D. R., & Hasan, M. M. (2020). COVID-19: A threat to human existence. *IOSR J Human Soc Sci*, 25(5), 53-57.
- Kumar, S. U., Kumar, D. T., Christopher, B. P., & Doss, C. (2020). The rise and impact of COVID-19 in India. *Frontiers in medicine*, 7, 250.
- Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., ... & Liu, W. (2020). Prevalence and



- predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry research*, 287, 112921.
- Mikaberidze, A. (2020). Letter To The Editor: "Letter to the Editor." *International Journal of Phytoremediation*. 20(1), 135–136.
- Naddeo, V., & Liu, H. (2020). Editorial Perspectives: 2019 novel coronavirus (SARS-CoV-2): what is its fate in urban water cycle and how can the water research community respond?. *Environmental Science: Water Research & Technology*, 6(5), 1213-1216.
- Pakpour, A. H., Hossain, M. A., Jahid, M., Kabir, I., Hossain, K. A., Walton, L. M.,... & Hossain, Z. (2020). Knowledge, attitudes, and fear of COVID-19 during the Rapid Rise Period in Bangladesh. *PLoS ONE*, 15(9).
- Qin, M., Vlachantoni, A., Evandrou, M., & Falkingham, J. (2018). General Health Questionnaire-12 reliability, factor structure, and external validity among older adults in India. *Indian journal of psychiatry*, 60(1), 56.
- Ramasubramanian, V., Mohandoss, A. A., Rajendhiran, G., Pandian, P. R. S., & Ramasubramanian, C. (2020). Statewide survey of psychological distress among people of Tamil Nadu in the COVID-19 pandemic. *Indian journal of psychological medicine*, 42(4), 368-373.
- Roy, A., Singh, A. K., Mishra, S., Chinnadurai, A., Mitra, A., & Bakshi, O. (2020). Mental health implications of COVID-19 pandemic and its response in India. *International Journal of Social Psychiatry*, 0020764020950769.
- Roy, D., Tripathy, S., Kar, S. K., Sharma, N., Verma, S. K., & Kaushal, V. (2020). Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian journal of psychiatry*, 51, 102083.
- Sakib, N., Bhuiyan, A. I., Hossain, S., Al Mamun, F., Hosen, I., Abdullah, A. H., ... & Mamun, M. A. (2020). Psychometric validation of the Bangla Fear of COVID-19 Scale: Confirmatory factor analysis and Rasch analysis. *International Journal of Mental Health and Addiction*, 1-12.
- Varshney, M., Parel, J. T., Raizada, N., & Sarin, S. K. (2020). Initial psychological impact of COVID-19 and its correlates in Indian Community: An online (FEEL-COVID) survey. *PLoS one*, 15(5), e0233874.
- Vellingiri, B., Jayaramayya, K., Iyer, M., Narayanasamy, A., Govindasamy, V., Giridharan, B., ... & Subramaniam, M. D. (2020). COVID-19: A promising cure for the global panic. *Science of the total environment*, 725, 138277.

**Venu Prasad H D**, Scientist, Training and Outreach Research Group, Centre for Water Resources Development and Management, Kozhikode, 673571, India. e-mail: venu@cwrmdm.org (Correspondence author)

**Naveena K**, Scientist, Land and Water Management Research Group, Centre for Water Resources Development and Management, Kozhikode, 673571, India.