

Coronavirus Disease (COVID)-19 in Tamil Nadu: Psychological impact and the associated factors concerned with the pandemic among the general population

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Abstract- Background: Fear of the pandemic and the impact of lockdown makes the people emotionally vulnerable during this crisis. This study was aimed to investigate the psychological impact and the associated factors concerned with the pandemic among general population in Tamil Nadu, India. **Methodology:** A structured questionnaire was used to assess the demographic details, physical status, history of contact with COVID-19, awareness, concerns and practice of prevention about COVID-19 and need for additional health information. Psychological Impact was assessed using Impact of Event Scale-Revised (IES-R). **Result:** 985 individuals participated in the study and their mean IES-R score was 22.79. Age was found to be negatively associated ($B=-0.062$; $CI = - 3.10-0.003$) with mean IES-R scores, females (mean IES-R score= 23.84) were associated significantly ($B = 2.412$; $CI = 0.520-4.305$) with higher scores when compared with males. Participants who

rated their current health status as 'very poor' were negatively associated ($B = -5.277$; $CI = -6.786 - -3.767$) with other participants. 50.1% were aware about the transmission of COVID-19. Dissatisfaction about health information available among the participant showed higher IES-R scores (mean IES-R score = 30.8). Linear regression analysis showed a significant relationship ($B = 2.766$; $CI = 1.903- 3.630$) between mean IES-R score and participants opinion about their likelihood of surviving if infected with COVID-19. 57.1% are worried about their family member getting COVID-19. Conclusion: Considering COVID-19 pandemic, health care policymakers should plan and implement strategies for psychological support, both for COVID positive patients as well as the general public.

Keywords: COVID-19, Surveys and Questionnaire., India, Female gender, Impact of Event Scale (IES-R), pandemic

1. INTRODUCTION

Coronavirus disease (COVID-19, also called as 2019-nCoV or SARS-CoV-2) is a viral disease that can spread directly or indirectly from one person to another through respiratory droplets. COVID-19 was declared as a Global health emergency, by the World Health Organization on 30 January 2020.^[1] In India, as on 12 June 2020, 297535 cases have been tested positive for COVID-19, of which 38716 cases are being reported from Tamil Nadu.^[2] This infectious pandemic has imposed an enormous pressure on the Government, medical and all public health care sectors. Fear of the pandemic, concern about family members, the social and financial impact of lockdown makes the general public emotionally vulnerable during this unprecedented crisis. Hence, it is the need of the hour to evaluate and understand the often-neglected psychological impact of COVID 19 in a timely manner.

While there are numerous studies focusing on epidemiology, clinical characteristic, molecular biology and management of COVID 19, there is a relative paucity of studies that focus on the psychological issues.^[3-7] Wang et al^[8] investigated the immediate psychological impact among people in China and recommends the data can be used to plan psychological interventions for the general population during the pandemic in China.

Currently, in India, there is no information available to understand the psychological impact of COVID-19 among the general population. Hence this survey was undertaken with the aim to investigate the psychological impact and associated factors concerned with the pandemic among the general population in Tamil Nadu, India. The data obtained from this survey will in turn assist the policy makers to plan psychological interventions for mental well being of the general population during the pandemic in Tamil Nadu, India.

2. METHODOLOGY

The present study is being reported based on STROBE statement.^[9]

Study design

A cross-sectional online questionnaire survey was conducted among general population in Tamil Nadu, India to assess their psychological impact due to COVID-19.

Participants and setting:

Adult members living in Tamil Nadu, aged 18 years and above, who were willing to participate in the survey, and were able to speak and read English were included in the study. Participants were explained about the study and they were free to withdraw from the study at any time without any obligation to give reasons for their withdrawal. A snowball sampling strategy was utilized to include participants living in north, south, east and west zones of Tamil Nadu. Ethical clearance was obtained from the Institutional Ethics Committee of the Thai Moogambigai Dental College and Hospital, Chennai (Ref No: Dr. MGRDU/TMDCH/EC/2019-20/06041306). The data were collected for three days (9th, 10th, 11th April 2020), one week after the Government declared curfew in India.

Variables:

The structured questionnaire used was based on the survey conducted by Wang, C et al (2020).^[8] The questionnaire consists of 8 parts: (I). Demographic characteristics of the participants including age, gender, occupation, education, district where they reside currently, marital status and number of household members were collected; (ii) assessment of physical status in the past 14 days; (iii) any history of contact with COVID-19 patients in the past 14 days; (iv) Participants awareness about COVID-19; (v) participants concern about COVID-19; (vi) participants practice of precautionary measures against COVID-19; (vii) requirement of additional health information with respect to COVID-19 and (viii) Psychological Impact of COVID-19 using Impact of Event Scale-Revised (IES-R).^[10]

The Impact of Event Scale-Revised (IES-R) is a 22 item closed ended questionnaire comprising of three subscales to measure intrusion, avoidance and hyperarousal. The participants were asked to report how much they have been stressed due to COVID-19 in the past 7 days on a 5-point rating scale ranging from 0 (Not at all) to 4 (extremely). The total IES-R scores were then divided as (i) Normal (IES-R Score = 0-23) ; (ii) mild psychological impact (IES-R score = 24-32); (iii) moderate psychological impact (IES-R score = 33-36), and (iv) severe psychological impact (IES-R score = >37).^[8,10]

Data sources and study size:

The questionnaire was entered in Google forms and the link was forwarded to all participants using Facebook and Whatsapp. All questions were made mandatory to answer, so that the participants will not be able to submit if anyone the question was left unanswered. Since the Government had declared curfew, direct face to face interview was not possible. Tamil Nadu, Southern state in India was divided into four zones: North (Chennai, Chengalpattu, Kanchipuram, Kadaloor, Thiruvannamalai, Vizhuppuram, Veeloar, Thiruvallur, Kallakurichi, Thirupaththoor, Ranipettai) South (Kanniyakumari, Thirunelveli, Thooththukudi, Thenkasi, Theni, Sivagangai, Virudhunagar, Ramanathapuram, Mathurai), East (Thiruchirapalli, Thanjavoor, Pattukkottai, Nagappattinam, Thiruvaaroor, Perambaloor, Puthukkottai, Ariyaloor, Mayiladuthurai) and West (Neelagiri, Koyampuththoor, Thirupoor, Erode, Salem, Namakkal, Karoor, Thindukkal, Tharmapuri, Krishnagiri). 6 investigators (4 investigators were attached to three dental institutions, One Government dental practitioner and one private practitioner) took part in the study. An attempt was taken to include a representative sample of the population of Tamil Nadu aged more than 18 years, covering all the zones.

Quantitative variables and statistical measures:

The data obtained from Google spread sheet was transferred to Statistical Package for the Social Science (SPSS) version 20 software package, IBM, Chicago, Illinois software program for statistical analysis. Descriptive statistics were carried out. The scores of IES-R subscales were expressed as mean and standard deviation. Linear regression analysis was carried out to check the relationship between the mean IES-R score and all the parameters that has been obtained. Level of significance was set at 0.05.

3. RESULTS

Participants and descriptive data:

985 participants filled the online survey form. Of which, 35% filled on the first day, 50% filled in the second day and 15% filled in the third day. 506 participants were from the northern zone of Tamil Nadu, 214 from South zone, 76 from east zone and 184 from west zone. The mean IES-R score of the total participants was 22.79 of which, 586 (59.6%) participants had a 'normal' IES- R score (average), 176 (17.9%) participants had 'mild' IES-R score, 38 (3.9%) had 'moderate' and 184 (18.7%) had 'severe' IES-R score.

Association between participants demographic statistics and IES-R:

Table 1 shows the relationship between mean IES-R and demographic variables. Age was found to be negatively associated ($B=-0.062$; $CI = -3.10-0.003$) with mean IES-R scores, i.e., IES-R decreases with increase in age. Similarly, females (mean IES-R score= 23.84; $SD=15.52$) were associated significantly ($B = 2.412$; $CI = 0.520-4.305$) with higher scores when compared with males (mean IES-R score= 21.41; $SD=18.53$). Participants who had completed high school (mean IES-R score= 26.55; $SD=15.00$) had significantly ($B=1.618$; $CI = .372-2.864$) higher mean IES-R scores than compared with professionals (mean IES-R score= 21.44; $SD=14.44$) and graduates (mean IES-R score= 23.52; $SD=15.82$). Other demographic variables did not show any significant relation.

Association between IES-R and physical status:

From table 2 it is found that majority of the participants, i.e., 873 (88.7%) have not experienced any symptoms in the past 14 days. Of those who experienced, 40 (4.1%) reported headache, 24 (2.4%) had cough, 20 (2%) had a sore throat, 18 (1.8%) had coryza and less than 0.5% reported persistent fever, breathing difficulty and dizziness. There was no significant relation between these symptoms and mean IES-R score. 37 (3.8%) of the participants had undergone consultation with their doctor and 9 (0.9%) were hospitalized in the past 14 days. Linear regression analysis showed that people who had undergone consultation ($B = 11.985$; $CI = 6.957-17.013$) and hospitalization ($B = 20.509$; $CI = 10.432 - 30.586$) had higher significant relation with mean IES-R score. Majority of the participants, 976 (91.4%) did not get tested for COVID-19 and it was found to be statistically significant with mean IES-R score. 85 (8.6%) participants who were asked to quarantine in the past 14 days had significantly ($B = 5.664$; $CI = 2.240 - 9.088$) higher scores (IES-R score = 27.96 , $SD=17.51$), than others who were not asked to quarantine (IES-R score = 22.30 , $SD =15.16$). Participants who rated their current health status as 'very poor' had higher IES-R score (IES-

R score = 52.80, SD=37.08) which was negatively associated (B =-5.277; CI = -6.786 – -3.767) with other participants.

Association between IES-R mean score and contact history:

From table 3 it is observed that less than 1% of study participants reports to have close or indirect contact with confirmed or suspected cases of COVID-19. Participants who felt they have or may have had close or indirect contact with COVID-19 had higher mean IES-R scores (IES-R score = 51.67, SD=26.41; IES-R score = 68.60, SD=17.73, respectively), than those who reported no contact (IES-R score = 21.86, SD=14.60; IES-R score = 21.66, SD=14.54, respectively). Linear regression analysis shows a significant relationship between mean IES-R scores and the history of contact questions.

Association between IES-R mean score and awareness about COVID-19:

Table 4 shows that the majority of the participants, 493(50.1%) were aware that COVID-19 transmitted through droplets, contact through contaminated objects and infected person. 79.1% are aware that the number of individuals recovered from COVID-19 has increased, 93.8% have heard that the number of COVID-19 deaths has increased in India. The main source of information for 20.1% is television, 16.3% is through the internet and others through newspaper, radio and family and friends. Statistical test shows a significant relationship (B = 2.935; CI = 1.744-4.126) between mean IES- R score and satisfaction of the participants with health information available about COVID-19. Dissatisfaction about health information available among the participant showed higher IES-R scores (mean IES-R score = 30.8; SD= 21.6466).

Association between IES-R mean score and concerns about COVID-19:

Table 5 shows that 41.8% participants are somewhat confident with their own doctors' ability to diagnose COVID-19. The impact score was significantly higher (B = 2.749; CI = 1.687- 3.811) for participant who are not at all confident (mean IES-R score = 35.36; SD= 26.22) and not very confident (mean IES-R score = 27.84; SD=15.73) with their own doctors' ability to diagnose COVID-19. 32.2% of them feel they are somewhat likely to contract COVID-19 and 32.6% felt they were 'very likely' to survive if infected with COVID-19. Linear regression analysis showed a significant relationship (B = 2.766; CI = 1.903- 3.630) between mean IES-R score and participants opinion about their likelihood of surviving if infected with COVID-19. 57.1% are worried about their family member getting COVID-19.

4. DISCUSSION

The emergence of COVID-19 has created a rapidly growing confusing situation among the Indian population. Studies conducted during the emergence of such epidemics, such as Severe Acute Respiratory Syndrome (SARS), Influenza A H1N1 virus and Ebola^[11-14] have reported high psychological impact among individuals, community and health care workers. Lack of literature among the Indian population about the psychological impact due to COVID-19 had prompted us to undertake this study. This study is the first large-scale

survey undertaken to study psychological distress due to COVID-19 among the general population in Tamil Nadu, India.

The psychological impact was assessed using the Impact of Event Scale- Revised (IES-R).^[10] Impact of Event Scale (IES) is a self-report measurement scale which is designed and broadly applied to assess subjective distress for any life event or trauma. IES was widely criticised as it measures only (a) intrusion(re-experiencing) symptoms such as intrusive memories, nightmares or flashbacks and (b) avoidance symptoms such as avoiding places or topics, or feeling numb about the event. The hyperarousal symptoms such as difficulty in sleeping or irritability was not measured. Hence IES was revised by including 6 hyperarousal items and one reexperiencing symptom by Weiss DS and Marmar CR(1997).^[15]

The results of our study suggest that 68 days after the first reported case of COVID-19 in India and after 17 days of lock down 40.4% of the study population reported mild to moderate psychological impact. It is found in our study that females have higher impact score than males. The reason can be due to increase responsibility to take care of their family, financial crisis and the risk of illness. 88.7% of the participants did not report any physical symptoms. The impact score was found to be significantly higher for participants who had visited a clinician for consultation, had hospitalized, had undergone testing for COVID-19 and who rated their health status as 'very poor' in the past 14 days. Similarly, participants who reported a positive direct or indirect contact with either confirmed or suspected cases of COVID 19 showed a higher impact score. Health professionals should take into consideration the psychological status of the patients, if any patient visits him with the above symptoms as the psychological effects can be equally,if not more significant as the physical effects. The cognitive behavioural therapies such as psychoeducation, cognitive restructuring and exposure therapy might not be effective as most the participants use television and the internet which reports an increase in the spread of the disease. Hence the policy makers should recommend the treatment providers to spend quality of time with such psychologically impacted people and provide resources for psychological support and interventions.

50.1% are aware about the transmission of COVID-19. Our study also shows that the mean IES-R was significantly higher for participants who reported dissatisfaction with the health care available. 57.1% are very worried about their family members getting COVID-19. It must be noted from this study that the majority of the participants, 58.07% use either television or internet or newspaper or radio to get information on COVID-19. Considering their psychological impact, the health care policy makers can provide proper, timely information and reinforce awareness and precautionary measures through the health informatics media. Increased spread of rumors and fake information lead people to get unnecessarily panicked when the study was carried out. At present, the Indian government has undertaken vigorous action to stop the spread of fake information.

The findings of our study are almost similar to the studies conducted by Wang et al (2020)^[8] in China. Tamil Nadu being one of the worst affected states in India due to COVID-19 pandemic, the results of our study can be generalized for Indian population with certain regional modification and can also be used as a guidance for the policy makers to plan psychological development strategies for the general population in the midst of COVID-19 pandemic.

Our study had several limitations. The questionnaire used for the survey was lengthy and hence there are chances for dropouts. Since we had used virtual snowball sampling technique and made all questions mandatory to answer we were not able to assess the number of dropouts. Due to ethical considerations, participants were given a free chance to withdraw

from the study at any time for any reason without any obligation to give reasons for their withdrawal. Hence, the reason for dropouts cannot be justified. Considering the less numbers among participants with a suspected or confirmed history of COVID-19 the results cannot be generalized for whole population who are suspected or confirmed with COVID-19, but can be considered for the general population.

5. CONCLUSION

Our study attempted to evaluate the psychological impact of COVID-19 pandemic in the state of Tamil Nadu. Within the limitations of our study, we found that female gender, medical consultation, recent hospitalization, possible contact with COVID positive patients and the self-perception of health status are some of the factors that affect the psychological health of the patients. In this unprecedented crisis, dissemination of reliable information about COVID-19 through television, social media etc. would be helpful. The policymakers can plan and devise appropriate strategies for psychological evaluation and intervention, both for COVID positive patients as well as the general public.

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Conflict of Interest: Nil

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Table 1: Association between mean Impact of Event Scale (IES-R) and demographic variables

Variables	N	(%)	IMPACT SCORE				
			F value	p value	R Squared R ²	Adjusted R Squared AR ²	Beta (95% Confidence Interval) B (95% CI)
Age							
< 20 years	67	6.8	3.837	0.05*	0.004	0.003	-0.062 -3.10- 0.003
20 – 40	729	74.1					
41-60	136	13.8					
>60	52	5.3					
Gender							
Male	431	43.8	6.255	0.013*	0.006	0.005	2.412 0.520- 4.305
Female	546	55.5					
Not interested to tell	7	0.7					

Marital status							
Single	408	41.5	0.633	0.427	0.001	0.0001	-0.025 -2.446- 1.035
Married	557	56.6					
Divorced	11	1.1					
Widowed	8	0.8					
Number of house hold members							
>6	117	11.9	0.573	0.449	0.001.	0.0001	644 -1.026- 2.314
03-05	746	75.8					
2	90	9.1					
1	31	3.2					
Occupation							
Self employment/professional	124	12.6	3.265	0.071	0.003	0.002	-0.331 -0.690 0.028
Industrial workers	472	48					
Commercial workers	44	4.5					
Transportation workers	7	0.7					
Personnel service workers	15	1.5					
Protection and security workers	6	0.6					
Unemployment	140	14.2					
Others	167	17					
Education							
Profession degree or Honours	415	42.2	6.492	0.011*	0.007	0.006	1.618 .372- 2.864
Graduate	513	52.1					
High school certificate	51	5.2					
Middle school certificate	3	0.3					
Primary school certificate	2	0.2					

*p value \leq 0.05

Table 2 : Association between mean Impact of Event Scale(IES-R) and Physical status

In the past 14 days did you experience any of the following	N	%	IMPACT SCORE				
			F value	P value	R Squared R ²	Adjusted R Squared AR ²	Beta (95% Confidence Interval) B (95% CI)
None	873	88.7	0.814	0.367	0.001	0.000	0.232 -0.273 -

Persistent fever (>38 °C for at least 1 day)	3	0.3					0.737
Headache	40	4.1					
Cough	24	2.4					
Breathing disability	4	0.4					
Dizziness	2	0.2					
Coryza (stuffy nose, runny nose, sneezing, and post-nasal drip)	18	1.8					
Sore throat	20	2					
Did you consult any doctor in their clinic in the past 14 days?							
No	94	96	21.8	0.001*	0.022	0.021	11.985 - 6.957 - 17.013
Yes	37	3.8					
Do you have any history of recent hospitalization in the past 14 days?							
No	97	99	15.9	0.001*	0.016	0.015	20.509 - 10.432 - 30.586
Yes	9	0.9					
Were you tested for COVID-19 in the past 14 days?							
No	97	99	18.5	0.001*	0.019	0.018	23.401 - 12.732 - 34.070
Yes	8	0.8					
Were you asked to quarantine for past 14 days?							
No	89	91	10.5	0.001*	0.011	0.010	5.664 - 2.240 - 9.088
Yes	85	8.6					
How would like to rate your health status now?							
very poor	5	0.5	47.06	0.001*	0.046	0.045	-5.277 (-6.786) - (-3.767)
Poor	4	0.4					
Average	67	6.8					
Good	60	6.4					
very good	30	3.0					
Do you have history of any illness							

No	84 2	85 .6	0.18 8	0.66 5	0.000	- 0.001	0.608 -2.144 - 3.360
Yes	14 2	14 .4					

*p value ≤ 0.05

Table 3: Association between Impact of Event scale(IES-R) mean score and contact history

Contact history	N	IES-R score		IMPACT SCORE				
		Mean	Std. deviation	F value	P value	R Squared R ²	Adjusted R Squared AR ²	Beta (95% Confidence Interval) B (95% CI)
Did you have any Close contact with an individual with confirmed infection with COVID-19?								
No	92 2	21.86	14.60	44.44	0.001 *	0.043	0.042	6.996 4.937- 9.056
Yes	9	51.67	26.41					
may be	53	34.04	18.48					
Did you have Indirect contact with an individual with confirmed infection with COVID-19?								
No	84 0	21.66	14.54	24.99	0.001 *	0.025	0.024	3.485 2.117- 4.853
Yes	5	68.60	17.73					
may be	13 9	27.98	17.20					
Did you have any Contact with an individual with suspected COVID-19 or infected materials?								
No	85 0	21.66	14.54	24.04	0.001 *	0.024	0.023	3.557 2.133- 4.980
Yes	8	68.60	17.73					
may be	12 6	27.98	17.20					

Table 4: Association between Impact of Event scale (IES-R) and awareness about COVID-19

	N	%	IMPACT SCORE				
Do you think COVID 19 is transmitted through			F value	P value	R Squared R ²	Adjusted R Squared AR ²	Beta (95% Confidence Interval) B(95% CI)

Droplet	102	10.4	2.66 0	0.10 3	0.003	0.002	0.646 -1.131 – 1.424	
Contact through contaminated objects	50	5.1						
Airborne	24	2.4						
Combination of any of the 2 above	30	3						
None of the above	285	29						
All the above	493	50.1						
Have you heard that the number of infected COVID-19 individuals has increased in India?								
No	18	1.8	0.98 5	0.32 1	0.001	0.000	2.556	
Yes	948	96.3					-2.498	–
May be	18	1.8					7.609	
Have you heard that the number of COVID-19 deaths has increased in India?								
No	28	2.8	0.25 5	0.61 4	0.000	-.001	-1.00	
Yes	923	93.8					-4.884	–
May be	33	3.4					2.885	
Have you heard that the number of individuals that have recovered from COVID-19 infection has increased?								
No	61	6.2	.074	0.78 6	0.000	-.001	-0.298	
Yes	778	79.1					-2.45	–
May be	145	14.7					1.853	
What is your main source of health information								
Television	198	20.1	0.25 8	0.61 2	0.001	-.002	-0.317	
Internet	160	16.3					-1.543	–
Newspaper	16	1.6					0.909	
Radio	1	0.1						
Family and friends	38	3.9						
Combination of the above	572	58.0 7						
How satisfied are you with the health information available about COVID-19								
don't know	20	2	23.37 8	0.00 1*	.023	.022	2.935	
Very satisfied	193	19.6					1.744	–
Satisfied	495	50.3					4.126	
Neutral	246	25						
Dis satisfied	30	3						

Table 5: Association between Impact of Event scale (IES-R) mean score and concerns about COVID-19

Concerns about COVID-19	N	%	IMPACT SCORE				
			F value	P value	R Squared R2	Adjusted R Squared AR2	Beta (95% Confidence Interval) B (95% CI)
How confident are you with your own doctors ability to diagnose or recognize COVID -19?							
don't know	126	12.8	25.808	0.001	0.026	0.025	2.749* 1.687- 3.811
Very confident	325	33					
Some what confident	411	41.8					
Not very confident	108	11					
Not at all confident	14	1.4					
What is your opinion about your Likelihood of contracting COVID							
Not at all	209	21.2	3.981	0.046	0.004	0.003	0.771 0.013- 1.530
Very likely	106	10.8					
Somewhat likely	317	32.2					
Not very likely	251	25.5					
Not likely at all	101	10.3					
What is your opinion about your Likelihood of surviving if infected with COVID-19							
Don't know	209	21.2	39.526	0.001	0.039	0.038	2.766* 1.903- 3.630
Very likely	321	32.6					
Somewhat likely	302	30.7					
Not very likely	97	9.9					
Not likely at all	55	5.6					
What is your Concerns about other family members getting COVID							
Very worried	562	57.1	3.791	0.502	0.004	0.003	-1.037 -2.083 – 0.008
Somewhat worried	282	28.7					
Not very worried	82	8.3					
Not worried at all	41	4.2					
Do not have family members	17	1.7					