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Research Paper

Analysis of the uncertainty among people due to the COVID-19 Pandemic

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ABSTRACT

Background: The COVID-19 Pandemic could have resulted in uncertainty in the society over the economy, employment, finances, relationships, physical and mental health. Aim: To analyze the uncertainty developed among people and relate it with their anxiety due to the pandemic. *Research Design:* Data collected on-line using a questionnaire from 320 people using the snow ball non probability sampling technique. *Tools used:* 16 item Psychological Tool was used to measure uncertainty, which was scored using the Likert equal interval method. The responses to anxiety due to the COVID 19 pandemic and the anxiety experienced during the six months period before the pandemic were elicited through six-point responses ranging from very high to no anxiety. The data was analysed as frequency tables and through statistical techniques, namely, Descriptive statistics, t test, Quarter Method and Random Forest Technique. *Results:* Majority of the respondents either agree or strongly agree to twelve out of the 16 items / statements included in the questionnaire, when expressed as "I am sure". 70.3 % of respondents have Uncertainty Score equal to 62.5 % to 78.1 % of the maximum possible score, indicating less uncertainty. Majority of the respondents reporting no anxiety, very less/ less anxiety and moderate anxiety due to the pandemic agree to the items depicting certainty, while no one reporting very high anxiety agrees to the items. There exists statistically significant difference between the proportion having certainty under different anxiety levels. Six items, which highly influence the creation of certainty (or reduction of uncertainty) of the respondents indicate their positive outlook about not getting worried, not feeling sick, ability to decide on what should be done under the pandemic, mental state not becoming worse, ability to recover from a negative mental state and overcome difficulties created by the pandemic. The belief of the respondents in / sufficiency of / correctness of, and existence of multiple meanings in the information available from Govt. and other sources about COVID 19 have not contributed significantly to uncertainty. The anxiety of respondents has gone up after the COVID 19 pandemic, when compared to the six months period before it. *Conclusion:* Majority of the respondents have only low to medium uncertainty due to the COVID 19 pandemic. Even though the anxiety of the respondents has increased after the COVID 19 pandemic, when compared to the pre-

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pandemic stage, majority of them report only low to moderate pandemic induced anxiety. The items, which highly influence the reduction of uncertainty (or creation of certainty) of the respondents are found to be those which depict their positive outlook with respect to various aspects related to the pandemic. They respondents do not have much negative perceptions on the measures adopted by Govt. and other establishments to contain the pandemic. However, if the pandemic continues longer and increases in its severity, the future might throw up unforeseen situations, which people may not be prepared to face, making them more uncertain, anxious and mentally /physically affected.

Keywords: COVID-19 Pandemic, Uncertainty

Uncertainty refers to a condition, where you are not sure about the future outcomes. Because uncertainty is not an overt, physical object or situation, we can't literally run away from it like we can from a dog or a social situation. According to Bryan Robinson (2020), when certainty is questioned, your stress response goes haywire, instantly arousing your fight-or-flight reaction, kicking you in the pants in an attempt to spur you to action and get you to safety. Studies show that people are calmer anticipating pain than anticipating uncertainty, because pain is certain. Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure.

The current COVID-19 pandemic could have resulted in uncertainty over the economy, employment, finances, relationships, physical and mental health. According to Indian Express July 3, 2020 e-paper, experts are of the opinion that uncertainty over COVID 19 lockdown is increasing. The World Health Organisation has warned of a "massive increase in mental health conditions" arising from the pandemic in the coming months. Results of a study indicate that there was a mediating role of intolerance of uncertainty, depression, anxiety, and stress in the relationship observed between the fear of COVID-19 and positivity (Fuad Bakioglu et al, 2020).

This study was carried out by Water and Environment Development Organization (WEDO), an NGO based at Kozhikode District in Kerala State of India, which is also involved in undertaking studies on socio-psychological aspects of various programmes / issues.

Objective
To study the uncertainty, which has developed among people due to COVID-19 and analyze it with respect to their anxiety due to the Pandemic

METHODOLOGY
Sample
Data for the study was collected on-line using a questionnaire from a sample of 320 people using the snow ball non probability sampling technique.

Procedure
The questionnaire consisted of a 16 item Psychological Tool to quantify uncertainty with responses –Strongly Disagree/Disagree/Agree/Strongly Agree, the level of anxiety of the respondent, husband/wife and children due to the COVID 19 pandemic, and the level of anxiety experienced by the respondent during a period of six months before the pandemic. The responses to anxiety were elicited as: Very High / High / Moderate / Less /Very less / No anxiety. The uncertainty responses were scored using the Likert equal interval method. The sum of scores of the 16 items was the Total Uncertainty Score (TUC Score) of the respondent.

Statistical analysis
The data was analysed as frequency tables and through statistical techniques, namely, Descriptive statistics, t test and Random Forest Technique. Forest is one of the important feature selection techniques based on explanatory variables' contribution to an outcome (Best *et al*, 2020). Node purity value of random forest is the indicator of the measure of importance of the variables /items to the dependent variable. The Quarter Method was used to categorize the respondents into three groups (low, medium & high) based on the TUC Scores. TUC scores less than the first quarter belongs to the low group, between the first quarter to the third quarter is the medium group and more than the third quarter is the high group. Random.

RESULTS
Table 1 shows the pattern of responses by the sample of 320 people to twelve out of sixteen items in the uncertainty tool.

Table1. Responses to majority*of **the** *items*

Reponses to majority of the items**	Respondents (range in %)
Strongly Agree and Agree	58.6 - 96.0
Strongly Disagree and Disagree	3.9 - 47.6

* 12 out of 16 items
** When expressed as "I am sure"

Table 2 shows the responses of people with different levels of anxiety to majority of the items.

Table 2. Responses of people with different levels of anxiety to majority of the items

Level of anxiety reported by the respondents	Respondents (range in %) agreeing to majority of the items*
Nil	55 to 100
Very less and Less	66 to 93
Moderate	55 to 95
Very high	Nil

* When expressed as "I am sure"

Table 3 shows the statistical significance of the proportion of respondents having certainty under different levels of anxiety.

Table 3. Test of significance of the proportion of respondents having certainty under different levels of anxiety

Details	Respondents (%) having certainty* under different anxiety levels induced by the COVID 19 pandemic	
	Moderate anxiety group	Less anxiety group**
Mean % of respondents	73.0	81.7
t	-1.790. Significant *p < 0.10*	
Details	Respondents (%) having certainty under different anxiety levels induced by the COVID 19 pandemic	
	Moderate anxiety group	Very high anxiety group
Mean % of respondents	73.0	37.5
t	2.73. Significant *p< 0.01*	
Details	Respondents (%) having certainty under different anxiety levels induced by the COVID 19 pandemic	
	Very high anxiety group	Less anxiety group
Mean % of respondents	37.5	81.7
t	-3.41. Significant *p< 0.01*	
Details	Respondents (%) having certainty under different anxiety levels induced by the COVID 19 pandemic	
	Very high anxiety group	No anxiety group
Mean % of respondents	37.5	67.4
t	-2.15. Significant *p< 0.05*	
Details	Respondents (%) having certainty under different anxiety levels induced by the COVID 19 pandemic	
	Less anxiety group	No anxiety group
Mean % of respondents	81.7	67.4
t	-2.06. Significant *p< 0.05*	

*Indicates respondents reporting Strongly Agree and Agree to the items when expressed as "I am sure"
**Includes Very Less and Less anxiety respondents

The range of Total Uncertainty (TUC) Score of the respondents is given in Table 4.

Table 4. Range of Total Uncertainty (TUC) Score of the respondents

Range of TUC Score	Respondents (%)	Mean TUC Score	Mode	Minimum TUC Score	Maximum TUC Score
35-40	12.5	46.03	43	35	64
40-50	70.3				
50-60	15.6				
64	1.6				
Total	100				

The Total Uncertainty (TUC) Scores of the respondents were divided into three categories, namely, Low, Medium and High, indicating High, Medium and Low uncertainty respectively using the Quarter Method (Table 5).

Table 5. Categorization of the Total Uncertainty Score of the respondents

Total Uncertainty Score Category	Level of uncertainty	Respondents (%)
High	Low	21
Medium	Medium	61
Low	High	18
Total		100

The Random Forest Statistical Model sorts items based on the importance of their scores to the TUC Score using the INC Node Purity values. The Random Forest Algorithm of R Software was used to develop the model using the Random Forest Function. Higher value of INC Node Purity indicates more importance of the item score to the TOC Score. Only those items with Inc Node Purity values more than the mean value (equal to 120) of the 16 uncertainty items in this study have been considered for analysis (Table 6).

Table 6. Inc Node Purity values of items exerting more influence on TUC Score

Item/Statement	Inc-Node Purity value
I am sure that I should not worry about my mental state arising out of the COVID 19 problem	311.94
I am sure that I have the ability to use the resources / information to make decisions regarding what all should be done to avoid COVID 19 infection / problem	276.05
I am sure that my mental state due to the COVID 19 scenario /problem will not become worse	164.51
I am sure that I have the ability to recover in the future from my mental state, which has arisen out of the existing COVID 19 problem	136.83
I am sure that I can overcome the difficulties that may come up if I have a COVID 19 infection / problem	136.46
I am sure that I am not sick, considering the medical problems / conditions occurring in COVID 19 infected people	133.58

DISCUSSION

It can be made out from Table 1 that majority of the respondents either agree or strongly agree to twelve out of the 16 items, which are expressed as "I am sure". Table 2 shows that while 55 to 100 % of respondents reporting no anxiety due to the pandemic agree to majority of the items expressed as "I am sure", the proportion is 66 to 93 % for respondents with very less and less anxiety, and 55 to 95 % in the case of moderate anxiety respondents. However, none of the respondents reporting very high anxiety due to the pandemic agree to the items depicting certainty (Table 2).

Table 3 shows that, while 81.7 % respondents having less anxiety report certainty with respect to the items, the figure for moderate anxiety respondents reduces to 73 %, with statistically significant difference between these two anxiety groups. There also exists statistically significant difference between 37.5 % of very high anxiety respondents and 73% of moderate anxiety respondents reporting certainty. Similarly, there is statistically significant difference in the proportion reporting certainty between the very high and less anxiety groups, very high and no anxiety groups, as well as between the less anxiety and no anxiety groups (Table 3).

The maximum possible (attainable) Total Uncertainty (TUC) Score in this study is 64. The minimum score of the respondents is 35 and the maximum is 64, with a mean score of 46.03 (Table 4), which is equivalent to a high value of 71.9 % of the maximum possible (attainable) TUC Score. A high mean score indicates that, by and large, the uncertainty of the respondents in this study due to the COVID 19 pandemic is not much. Table 4 also shows that 70.3 % of respondents have TUC Score in the range of 40 to 50, which is also equivalent to high values of 62.5 % to 78.1 % of the maximum possible TUC Score respectively. Once again, this confirms that the uncertainty of the respondents due to COVID 19 is not very high.

When the history of uncertainty is studied, it emerges that people are primed to deal with it. Once we have identified a challenge, many of us step up, adapt and survive at least to some extent. This may be a mechanism, which the people in this study might have adapted to some extent to reduce the uncertainty and anxiety due to the pandemic. The pro-active and timely measures taken up by the establishments at the State as well as Central Govt. level to contain /reduce the pandemic and its negative outcomes through lock down, provision of adequate information, medical facilities, economic benefits, transportation facilities etc. could have also contributed to this.

Based on the categorization od TUC Scores using the Quarter Method, 21 % respondents are found to have low uncertainty, 61 % have medium and 18 % respondents have high uncertainty (Table 5). The mean TUC Score of men is 46.03, while that of women is 45.5, with no statistically significant difference between the scores. This implies that the level of uncertainty is more or less same for the two sexes.

Based on the Inc-Node Purity values (Table 6), the following items are found to highly influence the creation of certainty (reduction in uncertainty) of the respondents:

    a. *I am sure that I should not worry about my mental state arising out of the COVID 19 problem* **-** 69.9 % respondents express their certainty by agreeing to it

    b. *I am sure that I have the ability to use the resources / information to make decisions regarding what all should be done to avoid COVID 19 infection / problem* - 53.8 % respondents express their certainty by agreeing to it

    c. *I am sure that my mental state due to the COVID 19 scenario/problem will not become worse* - 64.3 % respondents express their certainty by agreeing to it

    d. *I am sure that I have the ability to recover in the future from my mental state, which has arisen out of the existing COVID 19 problem* - 96.1 % respondents express their certainty by agreeing to it

    e. *I am sure that I can overcome the difficulties that may come up if I have a COVID 19 infection / problem* - 52.4 % respondents express their certainty by agreeing to it

    f. *I am sure that I am not sick, considering the medical problems / conditions occurring in COVID 19 infected people* - 81.2 % respondents express their certainty by agreeing to it

Considering the above mentioned items which influence the creation of certainty (or reduction of uncertainty) of the respondents very much, it can be inferred that they depict their outlook with respect to positive thoughts such as not getting worried due to the COVID 19 pandemic, not feeling sick, ability to make use of resources to decide on what should be done under the pandemic, mental state not becoming worse due to the pandemic, the ability to recover from a negative mental state and the ability to overcome difficulties created by the COVID 19 pandemic. The results of the Random Forest Model also indicate that the

items used to analyse the uncertainty of respondents such as belief in / sufficiency of / correctness of, and existence of multiple meanings in the information available from Govt. and other sources about COVID 19 have not contributed significantly to whatever uncertainty that has developed in the respondents. This implies that, they do not have much negative perceptions with respect to the measures adopted by Govt. and other establishments to contain the pandemic and its consequences, which is a positive trend. In short, the positively oriented perceptions of the respondents have helped in reducing their level of uncertainty due to the pandemic.

The data reveals that anxiety has gone up after the pandemic, when compared to the six months period before it. There is an increase of about 120 % in the proportion reporting moderate anxiety from 16.1 % pre-pandemic to 35.4 % post-pandemic and a reduction in the proportion of respondents reporting very low and low anxiety from 64.5 % before the pandemic to 46.8 % post pandemic. Similarly, only 14.6 % are reporting no anxiety after the pandemic, when compared to 19.4 % before the COVID 19 pandemic. Based on a study carried out in India, Deblina Roy *et al* (2020) have reported high anxiety levels in people due to the COVID 19 Pandemic. However, a total of 61.4 % of respondents in the present study report either no anxiety or very low / low anxiety induced by the COVID 19 pandemic, which is a favourable trend. This could be probably because the respondents do not have much of uncertainty due to the pandemic. Uncertainty about a possible future threat disrupts our ability to avoid it or mitigate its negative impact and diminishes how efficiently and effectively we can prepare for the future, thus contributing to anxiety (Dan and Jack, 2013). Being very intolerant of uncertainty can cause problems, since it causes stress and anxiety and is the major fuel for worry. On the other hand, people with anxiety may have trouble tolerating uncertainty. Hence, even though the present study does not indicate high uncertainty or anxiety of the respondents, if the pandemic continues for long, spreads significantly and increases in its severity, people could become very much prone to undesirable mental consequences, affecting them individually, socially and economically.

CONCLUSION

Majority of the respondents in this study have only low to medium level of uncertainty due to the COVID 19 pandemic, while the proportion having high uncertainty is less. Even though the anxiety of the respondents has increased after the COVID 19 pandemic, when compared to the pre-pandemic stage, majority of them report only low to moderate pandemic induced anxiety. This could be probably attributed to less of uncertainty due to the pandemic. The items, which highly influence the reduction of uncertainty (or creation of certainty) of the respondents are found to be those which depict their positive outlook with respect to aspects such as not getting worried due to the COVID 19 pandemic, not feeling sick, ability to make use of resources to decide on what to be done under the pandemic, their mental state not becoming worse due to the pandemic, ability to recover from a negative mental state and overcome difficulties created by the COVID 19 pandemic. However, belief in / sufficiency of / correctness of, and existence of multiple meanings in the information available from Govt. and other sources about COVID 19 have not contributed significantly to the level of uncertainty that has developed in the respondents. This implies that they do not have much of negative perceptions with respect to the measures adopted by Govt. and other establishments to contain the pandemic and its consequences, which is a positive trend. However, if the pandemic continues longer and increases in its severity, the future might throw up unforeseen situations, which people may not be prepared to face /accept, making them more uncertain, anxious and mentally as well as physically affected.

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