A Study on the Impact and Associative Factors of COVID – 19 Outbreak

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***Abstract*---**The COVID-19 epidemic infection are affected in most of the countries. The worldwide public health crisis caused by COVID-19 has lasted longer than several people would have hoped and expected. The outbreak has brought not only the risk of death from infection but also unbearable psychological pressure. All the services are affected due to lockdown and fear of its spread. The first stages of the COVID-19 pandemic were typically related to enlarged levels of distress and depressive and anxiety symptoms within the general population. Therefore, the one want to investigate and analyze the mental health status of public during the epidemic. To study the Psychological Impact such as prevalence of depression, anxiety and stress among people at RMMCH in Annamalai University. To compare a case control study to these levels between 100 COVID affected cases and 100 public those who are not affect in COVID. The respondents in the target population were sampled by cluster sampling. The public responded to a questionnaire that included the 7-item Generalized Anxiety Disorder Scale (GAD-7) and also acquiring the public basic information. The Questionnaire including DASS-21 was conduct to evaluate the depression, anxiety and stress levels of among them. The Decision Tree classification technique has been used to classify the psychological factor and the depression, anxiety and stress Grades were correlated with each other and compared with age both among cases and controls. The grade of depression 68 % among COVID cases has been lesser 75 % than that of controls. Prevalence of Anxiety cases 60 % has slightly higher than controls 58 %. Stress prevalence among cases 42 % and the controls 41 % were same. Depression score mean of control was significantly greater than that of cases. There was no association between psychological factors with age in both cases and controls. There was a significant positive correlation between the psychological factor in both controls and cases.

***Keywords*---**COVID-19, Anxiety, Depression, Stress, Generalized Anxiety Disorder Scale, Mental Health, Decision Tree, psychological factors

I. INTRODUCTION

CORONA virus is a new version of SARS-CoV-2 has presented with epidemic implicit affecting almost 220 countries leading to COVID 19 disease. Utmost people infected with the virus experience from mild to moderate respiratory illness and recover without taking special treatment. However, some become seriously ill and require medical attention. Aged people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. World health Organization (WHO) have been reported in January 2022, over 346 million confirmed cases and over 5.5 million deaths have been reported (https://covid19.who.int/) in worldwide. January 2022, India reported a total of 37,618,271 confirmed cases. In the past 24 hours, 238018 confirmed cases have been reported with 182 daily cases per million populations[1].

The epidemic is still ongoing with new and more contagious variants leading to increased infection rates across the globe, with accordingly more strict restrictions in social interactions and more lockdowns. The pandemic and the accompanying measures have led to changes in people's daily routines, limited social interactions, as well as formed tensions among families in lockdown together, and fear of getting ill or spreading the virus.

The epidemic is continuing, and there's the threat of future outbreaks, it's time to consider its impact on internal health and factors that are linked to resilience against internal illness to guide the ongoing response to it. In view of this, we aim to provide a critical overview of how the epidemic has affected internal health in general, and how mortal stress adaptability has shaped its impact on the shorter and longer- term. The epidemic has affected nearly every individual directly or laterally, either due to (or fear of) COVID-19 infection or because of the goods of far- reaching measures and their profitable and social impact. Accordingly, the impact of the epidemic on internal health issues has been frequently examined in the general population.

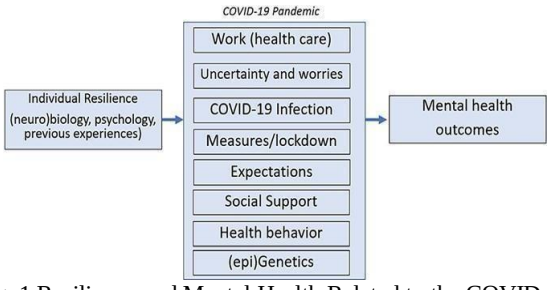

Fig. 1 Resilience and Mental Health Related to the COVID-19 Pandemic.

An astonished level of resilience is evident across populations, although there are groups and individuals that are at increased risk for the stressful effects of the COVID- 19 pandemic shown in Figure 1. Utmost studies on stress adaptability and internal health issues during the epidemic are experimental, cross-sectional, using convenience samples with frequently rather small sample sizes and rather limited assessment of contextual and particular characteristics that are essential to understand stress vulnerability and adaptability.

The rest of the paper is organized as follows. Section 2 presented in study of a related work. Section 3 described the methodology of this study of the Impact and associative Factors of COVID – 19 Outbreak. Section 4 represents analysis of experimental results and Finally Section 5 elaborated conclusion and future scope.

II. LITERATURE REVIEW

The early stages of the COVID-19 pandemic were often associated with increased levels of distress and depressive and anxiety symptoms in the general population. The epidemic brought not only the risk of death from the viral infection but also unbearable psychological pressure to people in China and the rest of the world [2]. In another study among 9565 individuals from 78 countries, during the height of the lock-down (April – June 2020), the pandemic was experienced as at least moderately stressful for most people, and 11% reported the highest levels of stress. Symptoms of depression were also high, including 25% of the sample indicating that the things they did were not reinforcing, 33% re- porting high levels of boredom, and nearly 50% indicating they wasted a lot of time [3]. There have been reports on the psychological impact of the epidemic on the general public, patients, medical staff , children, and older adults [4][5]. Davenport et al. reported a significant increase in self-reported levels of depression and anxiety in pregnant women from before to during the COVID-19 pandemic [6]. A possible reason for this difference may be the cultural and social discrepancies between the study settings. Varshney et al. in his study on Indian general population shows that 33.2% had psychological impact regarding COVID-19 [7]. Wang et al. in china reported 53.8% of respondents suffered a psychological impact from the pandemic [8].

Indeed, a recent quantitative data synthesis, conducted by the Global Bur- den of Disease (GBD) Resource center, has shown that the pandemic has impacted substantially on the risk of major depressive disorder and anxiety disorders, estimating an additional 53.2 million cases of major depressive disorder and an additional 76.2 million cases of anxiety disorders globally due to the COVID-19 pandemic [9]. This indicates that the pandemic may have longer-lasting negative effects on mental health outcomes that might take time to fully emerge. Finally, a survey performed in 1,310 Spanish adults during the first lock-down period (March 2020) showed that regression models containing a series of variables (i.e. being female, having a younger age, having negative self-perceptions about aging, more time being exposed to news about COVID- 19, having more contact with relatives different to those that participants co-reside with) explained 48% and 33% of the variance of distress and loneliness respectively [10].

The 7-item Generalized Anxiety Disorder Scale (GAD-7) is one of the most widely used instruments for the detection and screening of anxiety disorders, and it is a module of the „Patient Health Questionnaire, which is the first self-reported questionnaire developed for primary care, to aid the diagnostic process of specific dis- orders [11]. Today, the GAD- 7 is the most widely used measure of anxiety used in clinical practice and research due to its diagnostic reliability and efficiency [12]. It can be applied for screening, diagnosis, and the assessment of the severity of anxiety disorders, as well as for social phobia, post-traumatic stress disorders, and panic disorders [13]. The prevalence of the disease was low among women during the beginning of the outbreak. This might be due to the less exposure of women with the society or COVID-19 screening facilities. In Republic of Korea, the infection was reported with 62.3% of female's cases, and in China, 51% of COVID-19 positive cases were male [14]. Trajectories of mental distress varied markedly by resilience level during the early months of the COVID- 19 pandemic [15].

III. METHODOLOGY

Methods of guiding the public to effectively and properly regulate their emotions during public health emergencies and avoid losses caused by crisis events. It was administered to assess the levels of depression, anxiety and stress among them. Grades of depression, anxiety and stress were correlated with each other. Nevertheless, it appears that we have proven surprisingly resilient over time, with fast recovery from COVID-19 measures.

A. Decision Tree Induction Algorithm

A decision tree is a structure that includes a root node, branches, and leaf nodes. Each internal node indicates a test on an attribute, each sub node denotes the outcome of a test, and each leaf node holds a class label. The topmost node in the tree is the root node. A decision tree algorithm known as ID3 (Iterative Dichotomiser). Decision Tree is to identification of the attribute for the root node in each level. This process is known as attribute selection. The two popular attribute selection measures Information Gain and Gini Index.

The given data set has to classify the class by using decision tree, the method starts from the root node of the tree. This method is compare the values of root node attribute with the record (real dataset) attribute and, follows the branch and jumps to the next node, based on the comparison. For the next node, the algorithm again compares the attribute value with the other branch and move further. The process has continues until the leaf node of the tree will reaches. The algorithm is given below:

Step-1: Begin the tree with the root node, says S, which contains the complete dataset.
Step-2: Find the best attribute in the dataset using Attribute Selection Measure (ASM).
Step-3: Divide the S into subsets that contains possible values for the best attributes.
Step-4: Generate the decision tree node, which contains the best attribute.
Step-5: Recursively make new decision trees using the subsets of the dataset created in step -3. Continue this process until a stage is reached where you cannot further classify the nodes and called the final node as a leaf node.

B. Data Collection

It was study of the Psychological Impact such as prevalence of depression, anxiety and stress in public. The data on the number of infections of COVID-19 will be obtained from the public of the area in an around chidambaram Taluk, Cuddalore District at RMMCH in Annamalai University. Mental health is a public health concern especially during COVID pandemic and affected due to lockdown and fear of its spread. The respondents in the target population were sampled by cluster sampling. We assessed the impact of mental health of the public during the COVID 19 pandemic period by using the structured questionnaire. The questionnaires are anonymous to ensure the confidentiality and reliability of data. There are 220 respondents that response the questionnaire. Finally 100 COVID affected cases and 100 public those who are not affect in COVID results were randomly selected as cases and controls. Cases were defined as asymptomatic contacts of COVID-19 patients who later tested positive for COVID-19, controls were asymptomatic contacts who never tested positive.

C. Data and Statistical Analysis

The study will be instrument comprised of a structured questionnaire packet that inquired demographic information, including age, gender, place, with Psychological Impact factor using DASS 21 Scale. DASS 21 scale was managed to assess the depression, anxiety and stress. It is a 21-item of self-reported questionnaire scheme to compute a three subscales such as depression, anxiety, and stress. The each scale consist of 7 items. Each item value is scored from 0 (not at all) to 3 (most of the time). Hence, the total score is ranged from 0 to 21. The DASS-21 is short form version of DASS (the long form has 42 items), the final score of each subscale needs to be multiplied by two.

Data were analyzed using WEKA tool to classify the psychological factor and to analysis of descriptive statistics has conducted to define the demographic information and other characteristics of the respondents. Psychological factors were classify into five grades such as Normal, Mild, Moderate, Severe and Extremely Severe. The proportions difference was computed using chi square test with a significant level of $p < 0.05$. Correlation between psychological factor scores and age was verified and estimate the Pearson correlation coefficient.

D. Environment

WEKA - an open source software provides tools for data preprocessing, implementation of several Machine Learning algorithms, and visualization tools for developing the machine learning techniques and apply them to real-world data mining problems. Statistical analysis of descriptive statistics has conducted using SPSS Version 22.0.

IV. Result And Discussions

In this study, the Psychological Impact of the public during the COVID 19 pandemic was assessed by using the structured questionnaire. There are 220 respondents that response the questionnaire. Out of the 220 respondents, the 200 data (Respondents) that contains 100 COVID affected cases and 100 public those who are not affect in COVID results were randomly selected as cases and controls.

The grades for the Psychological Impact factors such as depression, anxiety, and stress of the public during the pandemic shown in Table 1. Among the sample of 100 covid cases the percentage of grades depression 68 % was lesser than that of control 75%. Prevalence of Anxiety cases 60 % has slightly higher than controls 58 %. Stress prevalence among cases 42 % and the controls 41 % has similar.

TABLE 1
NUMBER OF POPULATION WITH GRADES OF PSYCHOLOGICAL FACTORS

Grades		Normal	Mild	Moderate	Severe	Extremely severe
Depression N (%)	***Cases***	32	33	27	08	0
	Control	25	35	30	04	0
Anxiety N (%)	***Cases***	40	23	25	10	2
	Control	42	10	36	8	4
Stress N (%)	***Cases***	58	29	8	3	0
	Control	59	31	8	1	0

The demographic Basic characteristics can be similar between cases and controls which is comparable, so that, to find correction between age with both among cases and controls. The minimum and maximum of the age was 25 and 65 years respectively. The age has grouped into five, which is below 30, 30 - 40, 41 – 50, 51 -60, and above 60. The majority of cases 48 % and control as 53% were in the age group 30 – 40. Table 2 shows the association between the psychological factor Grades with the demographic data age among both the cases and the controls.

TABLE 2
ASSOCIATION OF PSYCHOLOGICAL FACTORS WITH AGE

Age (Demographic characteristic)	Depression N (%)		Anxiety N (%)		Stress N (%)	
	Cases	***Controls***	***Cases***	***Controls***	***Cases***	***Controls***
Below 30	8	7	9	6	4	3
30 – 40	48	53	41	46	35	35
41 - 50	27	21	25	23	38	37
51 - 60	12	15	15	15	18	21
Above 60	5	4	10	10	5	4

In table 2 shows that, prevalence of depression and anxiety were higher in age of 30 -40 than other age group among both cases and controls. The prevalence of stress was higher in age group 41 - 50 than other age group among both cases and controls. Fig. 2 shows the association between Psychological Factors with the age of study population. There is a positive significant correlation between the scores of Psychological Factors both in cases and the controls. Hence, Age had no correlation with depression, anxiety and stress scores both in cases and controls.

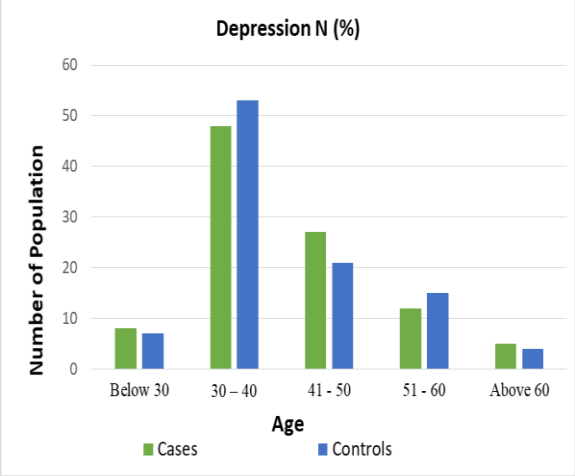

Fig. 2. (a). Association of Depression with Age

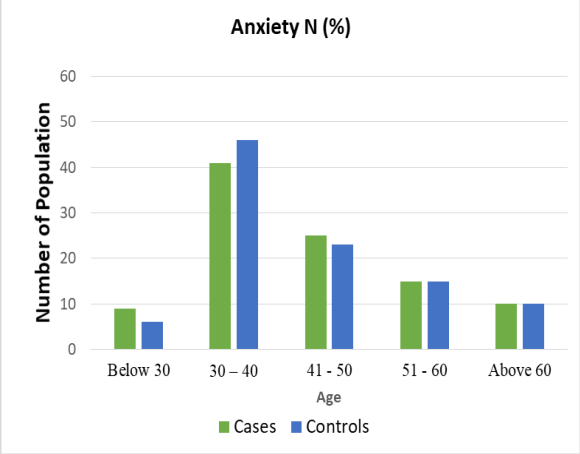

Fig. 2. (b). Association of Anxiety with Age

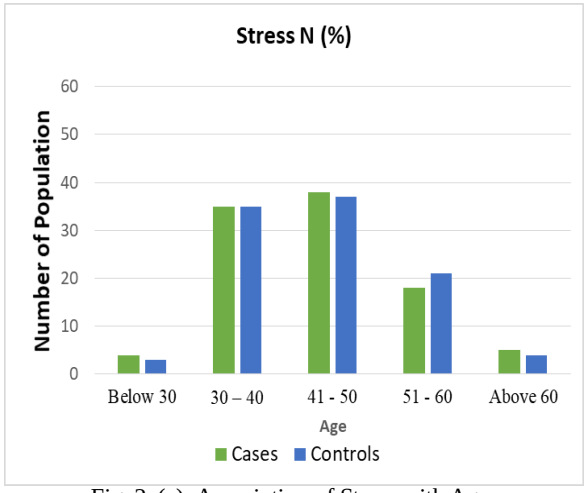

Fig. 2. (c). Association of Stress with Age

Table 3 shows comparison of factors scores among the Population. Mean of depression scores in cases were 20±7.11 which is lesser than control 22 ±13.53, which is significantly fall in the mild depression grade. Mean of anxiety scores among cases were 19 ±5.337 which is more or less similar to that of controls which is 18 ±6.344 that falls in the mild anxiety grade. Mean of stress scores of cases were 20 ±6.431which is similar to that of controls which is 20 ±6.512.

TABLE 3
COMPARISON OF FACTORS SCORES AMONG THE POPULATION

Psychological Factors	Cases	Controls	t value	p value
	Mean and SD	*Mean and SD*		
Depression score	20 ±7.11	22 ±13.53	-2.6	0.021
Anxiety score	19 ±5.337	18 ±6.344	-0.25	0.911
Stress score	20 ±6.431	20 ±6.512	-0.9	0.458

However, it is observed that, there were no statistical significance for difference. There is a significant positive correlation between the scores of depression, anxiety and stress both in cases and controls. Age had no correlation with depression, anxietyand stress scores both in cases and controls.

V. CONCLUSION

In this study, the results have shown high self-reported levels of depression, anxiety, and stress in all the public irrespective of their infective status during the COVID-19 pandemic. This investigation is to carry an essential for enhanced identification and management of public mental health problems. The study emphasizes possible interventions to maintain mental health among the public during the challenging times of the COVID pandemic where access to diagnosis and treatment is difficult. Even though there is several experience-based knowledge and scientific pieces of evidence in many fields from the previous two waves of coronaviruses, the research is still limited, especially in terms of public mental health. It is recommended that the government will be to resolve this issues to provide exclusive, timely crisis-oriented psychological solution to the general public.

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