

A Survey-based Study of Psychological Impact of Lock Down Due to COVID 19 Pandemic on Indian Working Class Using Statistical Design

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Abstract

The novel coronavirus (COVID-19), identified within the Wuhan, Hubei Province of China in November 2019, needs distinct attention because of its fatal nature. The spreading of any infectious diseases is generally prevented by quarantine and containment or locking down of the populations in danger. Countries suffering from COVID-19 are declaring the country lockdown and restricting public movement. India also has declared full lockdown and restricted public movement to a large extent. Such drastic steps have a severe psychological impact on populations. Being locked up for weeks in a very confined space with the same group of individuals being depressed, nervous, and tired, which is further aggravating various domestic and interpersonal issues. A web-based survey was formed which supported a cross-sectional sampling method and collected data across different working-class population groups in India. The responders had a beginner level of knowledge about the COVID-19 infection and adequate knowledge about its preventive aspects was unknown. Results indicate that 13% of the respondents experienced severe anxiety, 11% moderate anxiety, and 28% are mildly anxious. The results suggest that governments should find effective ways to disseminate unbiased COVID-19 knowledge to reduce population insecurity and provide the best mental equipment to cope with the pandemic.

Key-words: COVID-19, Novel Corona Virus, Data Analysis, Anxiety, Working Class.

1. Introduction

A shutdown of everyday activities normally imposed the outbreak of infectious diseases to reduce the risk of reproduction. The goal is to maintain the reproductive rate or spreading factor, or

"R," below one ($R < 1$) i.e., in each case an average infection of less than one person. According to (Ferguson N et al., 2020) the global effect of COVID-19 is important, indicating that the threat to public health is the most serious in a respiratory virus since the 1918 H1N1 influenza pandemic. In the absence of a COVID-19 vaccine, the latent function of a number of public health initiatives, so-called non-pharmaceutical interventions (NPIs), has meant reducing contact rates among the population and thus reducing the transmission of viruses. By principle, lockout, quarantine, and isolation have the same function of protecting against infection; however, such words have distinct positions in practice. The object of isolation is to separate the infected population from the uninfected population while quarantine takes a different approach by separating and restricting the movement of persons who have been exposed to an infectious disease to monitor whether they have acquired the disease over time. But lockdown helps to limit the movement of non-infected individuals to prevent the disease from spreading (Ferguson N et al., 2020) (CDC, 2020). The enormous scale of the infections, the public health hazard, has enforced enormous stress on the Indian government, the country's medical system and health workers as well as the general public. This tremendous level of medical emergencies has created vast infrastructures to combat the pandemic at pan India level (Krishnakumar, B et al., 2020). The Pandemic not only created the risk of death from virus infection; the psychological pressure on ordinary people in India and around the world is unsustainable (Bao, Y et al., 2020) (Xiac C et al., 2020) (Bao, Y et al.,) and (Jungmann, S. M et al., 2020). The continued spread of the virus caused the lock-up to be extended for three months, with the majority of livelihood activities halting operations in nearly all sectors in India (Kaushik, S et al., 2020). This effort to curb the spread of infection had brought enormous stress to India's working class as the entire work culture scenario changed, lots of people, lost their earning bread and most office workers are encouraged to work from home. Nevertheless, no comprehensive research has yet been carried out on the pandemic's mental health status. Our study assessed the degree of anxiety and the factors affecting the workforce in India.

The Generalized Anxiety Disorder Scale is a scale with seven components (GAD-7), which is one of the most commonly used tools for diagnosing which screening anxiety symptoms. This is a section of the "Patient Safety Questionnaire" (Spitzer, R. L et al., 2006). Completing the GAD-7 test takes less than 3 minutes, and score is very quick (Budikayanti, A et al., 2019). Today, the GAD-7 is commonly used in clinical practice and research to assess anxiety rates. This scale has proven track record of diagnostic reliability, efficacy and accuracy (Johnson, S. U et al., 2020). The results of the GAD-7 scale can be applied very easily to diagnose and evaluate the severity of anxiety disorders and

post-traumatic stress disorders (PTSD) for different phobias and panic disorders (Moreno, E et al., 2019).

During the situation of public health crisis, governments, corporates and employers from different sectors are required to effectively guide their employees and the common people to regulate their emotions. The unstable psychological condition can lead to a variety of critical issues such as increasing suicidal tendency, increasing obsessive compulsive disorder (OCD), etc. So our focus is to create a data-driven investigation to analyse the mental health status of working class people in India during the lockdown imposed for the following purposes due to the pandemic: (a) To assess the mental health of people of the common working class during a pandemic; (b) to establish an abstract groundwork for psychological intervention with working class population; and (c) to offer a foundation for the endorsement of policies to be adhered by the employer during and after the pandemic.

We tried to present in this paper a detailed survey and statistical analysis of the impact on the mental health among the various working class groups in India. The paper is structured as follows. Section 2 elaborates the description of the issue and the analytical methods. The findings and the review are respectively presented in Sections 3 and 4, and the paper is concluded in Section 5.

2. Problem Statement and Method

2.1. Collection of the Population Data and Processing of the Data

India's working class consists of specific group / division according to the National Occupational Classification (Agrawal, S et al., 2014). Our examination of people's mental health during the lock down due to COVID-19 outbreak via a structured questionnaire. The survey was designed to ensure the data was anonymous, confidential and accurate. A total of 5070 respondents completed the questionnaires from which 4870 responses were considered in the final study (96.1% of the response). Some of the responses are discarded due to large number of missing columns. The data has been collected via an online survey form and social media; peer to peer collection method had been leveraged to collect the data from the participants. The group of respondent based on the National classification of occupation had been divided into five sub groups as shown in table 1.

Table 1 - Group Wise Division of Working Class

Group-1	<i>Government Officials, Bankers, Managers, Defence Personnel, Secretary, Politicians</i>
Group-2	Teachers, Engineers, Doctors, Information Technology Professionals, Formal Employment Sectors
Group-3	Business man, Entrepreneur, Consultants, Service Sectors, Hospitality, industrialist
Group-4	Sales, Marketing, Craft Trader, Garment Traders, SME, MSME, Fishery, Agricultural etc.
Group-5	Informal sectors not mentioned above, Online traders, Fresh graduates, Social workers etc.

2.2. Assessment Mechanisms

The investigation system comprises an organized survey parcel that questioned the segment information including gender, locale, profession and age among others. They were likewise asked about their present wellbeing on a numeric scale, understandings and prudent practices with respect to COVID-19 and the accessibility of social and moral help. The members also provided an explanation for the Scale of 7-thing Generalized Anxiety Disorder (GAD-7). The GAD-7 consists of seven items that are based on seven key symptoms and concerns about the recurrence of these indications over the past 10 days (Toussaint, A et al., 2020). The GAD-7 is an all-round, archived and accepted screening tool, which is proved to be splendid on the grounds of the inner consistency of anxiety manifestations (Xin Tong et al., 2015); and its indicators have been reported by a 4-dimensional Likert scale ranged between 0 (not in any situation) and 3 (almost every day), with a final target of the total scale ranging from 0 to 21 (Wang, C et al.,).

2.3. Methods Used for Data Analysis

The data collected have been tested on the open source framework "R" (Version 4.02). In order to demonstrate the participants' demographic and other characteristics, a detailed statistical survey has been conducted. In order to establish the important correlation between test values and the anxiety level, Univariate analysis (non-parametric study) is used (Abdellatif W et al., 2020). We assessed the similarity between COVID-19 stressors (including stressors for financial purposes and daily life) as well as stressors related to monetary delays, homework, family problems and fear levels

through the Spearman correlation coefficient 'r'. A two tailed probability test with significance level $P < 0.05$ is considered to be statistically important parameters for further analysis.

3. Method of Analysis and Results

The collected data in raw form cannot be processed directly. So to mitigate that issue the data are cleaned in the initial stage and the anxiety levels are decided based on the GAD-7 scale of anxiety disorder. Then considering those levels of anxiety as our target (dependent) variable all our analysis has been carried out.

3.1. Levels of Anxiety between the Working Class during the Pandemic

The psychological wellness of the working class was influenced to fluctuating degrees during the novel corona infection episode is shown in Table 2. Out of 4870 respondent from different occupational group, 48% of the populace had no symptoms of anxiety, so it's named as normal, though the extents of the working class with mild, moderate, and severe anxiety were 28%, 11%, and 13%, respectively. The Table 2 is demonstrating level of individuals with their degree of anxiety.

Table 2 - Number of People with different Anxiety Levels (n=4870)

<i>Level of anxiety</i>	<i>Number of People</i>	<i>Percentage of the population</i>
Normal	2338	48%
Mild	1364	28%
Moderate	536	11%
Severe	632	13%

3.2. Factors Influencing Anxiety of Working Class during the Pandemic

3.2.1. Univariate Analysis

The data has been analysed based on different statistics using Univariate Analysis. Based on the analysis, relationship between different variables and level of anxiety has been established. Table 3 detailed these relationships. It has been found out that gender plays a major role in the psychic state. It's also been found out that the occupation has a major impact on the anxiety ($P < 0.05$), whereas place of residence and age has no effect on the level of anxiety ($P > 0.05$). As the target variable is

ordinal categorical data so non parametric chi-square (χ^2) test (Franke, T. M et al., 2012) was used to find out the significant parameters and their relationship with the level of anxiety. The Pearson's test is used for the binary levels independent factors and Kruskal Wallis test is used for the independent variable having more than two levels. Expressions for these tests are shown in (1) and (2).

Pearson's Test Statistics

$$\chi^2 = \sum_{k=1}^m \frac{(O_k - E_k)^2}{E_k} = M \sum_{k=1}^n \frac{(O_k/M - p_k)^2}{p_k} \quad (1)$$

Where

χ^2 is Pearson's cumulative test statistic.

O_k is the number of observations of type k .

M is the total number of observations

$E_k = Np_k$ is the expected (theoretical) tally of type k , stated by the null hypothesis that the fraction of type k in the population is p_k

m is the number of cells in the table.

Kruskal–Wallis Test by Ranks

$$H = (N - 1) \frac{\sum_{k=1}^g n_k (\bar{r}_k - \bar{r})^2}{\sum_{k=1}^g \sum_{j=1}^{n_k} (r_{kj} - \bar{r})^2} \quad (2)$$

Where

H is the Kruskal–Wallis test statistic

n_k is the number of observation in group k

r_{kj} is the rank (among all observations) of observation j from group k

N is the total number of observations across all groups

\bar{r}_k is the average rank across all observation group k

\bar{r} is the average of all the r_{kj}

Table 3 - Univariate Analysis

		<i>Total Population Ratio</i>	<i>Level of anxiety</i>				<i>Statistics</i>	<i>P-value</i>
			Normal	Mild	Moderate	Severe		
Gender	Female	1266 (26%)	494 (39%)	347 (27.4%)	158 (12.5%)	267 (21.1%)	12.409 ^a	0.006
	Male	3603 (74%)	1554 (50.7%)	871 (28.4%)	337 (11.1%)	301 (9.8%)		
Place of Residence	Rural	341 (7%)	191 (55.9%)	70 (20.6%)	30 (8.82%)	50 (14.7%)	1.6 ^a	0.65
	Urban	4529 (93%)	2129 (47%)	1300 (28.7%)	529 (11.7%)	571 (12.6%)		
Occupational Divisions	Group-1	194 (4%)	149 (77%)	33 (17%)	0 (0%)	12 (6%)	10.258 ^b	0.0165
	Group-2	1364 (28%)	696 (51%)	396 (29%)	177 (13%)	95 (7%)		
	Group-3	243 (5 %)	134 (55%)	75 (31%)	12 (5%)	22 (9%)		
	Group-4	50 (1%)	25 (50%)	0 (0%)	12 (25%)	13 (25%)		
	Group-5	3019 (62%)	1328 (44%)	876 (29%)	332 (11%)	483 (16%)		

^aPearson's Chi square test ^bKruskal wallis test

The results indicate that working class females are more prone to anxiety compared to working class male. Though they are 26% of the population but female working class has shown a 21.1% severe anxiety compared to 9.8% in male working class. Similarly the anxiety level among the informal sector (Group-5) and the people who work in technology and health care sector (Group-2) are quite high compared to other occupational groups. Whereas the place of residence shown not much difference among classes hence the hypothesis got rejected ($P > 0.05$). The results are also shown figuratively in Figure.1 and Figure. 2.

The consequences of the correlation investigation between different stress causing factors (stressors) are delineated in Table 4 and the results are also shown figuratively in Figure.3 and Figure.4. The change in working scenario and the change in economy, frustration due to lockdown, social media and media hype, apprehension about government and others are found to be certainly correlated to the level of anxiety. The fear of sudden lock down ($r=0.302$, $P<0.001$), economic impact and uncertainty in future ($r=0.245$, $P<0.001$) have the most effect on the working class as well as other factors whereas stress due to knowledge of preventive measure has shown a minimal correlation hence it is evident that knowledge about preventive measures can be a reassurance factor and can actually help in reducing the anxiety.

Figure 1 - Amount of People with different Level of Anxiety Distributed Across Genders

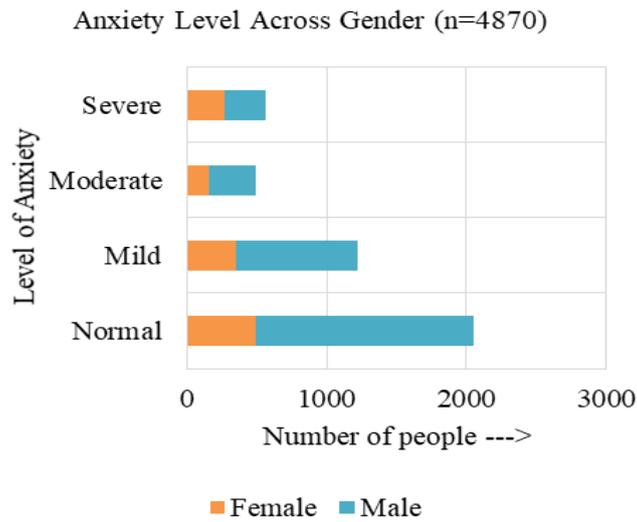


Figure 2 - Anxiety Level of People Across different Occupational Group

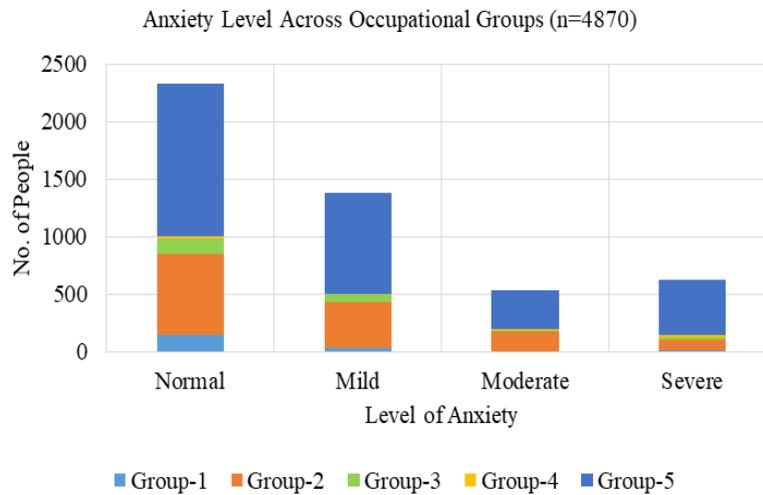


Table 4 - The Correlation between Stress Factors during Lockout and Anxiety Rates in the Epidemic

<i>Stressors</i>	<i>P –value</i>	<i>Spearman's rho (r) of anxiety levels</i>
Unhappiness Caused due to Lockdown	<.001	0.150
Nervousness created due to sudden lockdown	<.001	0.302
Worried because of family	<.001	0.240
Worried due to social media influence	0.01	0.116
Worried because of economic impact	<.001	0.245
Worried because of uncertainty in future	<.001	0.246
Worried about prevention measures are not enough to stop the spread	0.05	0.089
Worried because of loneliness	<.001	0.228
Thought of government is not clear about the course of action	<.001	0.205
Thought of media hype (Print and Visual)	0.002	0.142

Figure 3 - Correlation between Stress Factors Related to COVID-19 as Surveyed

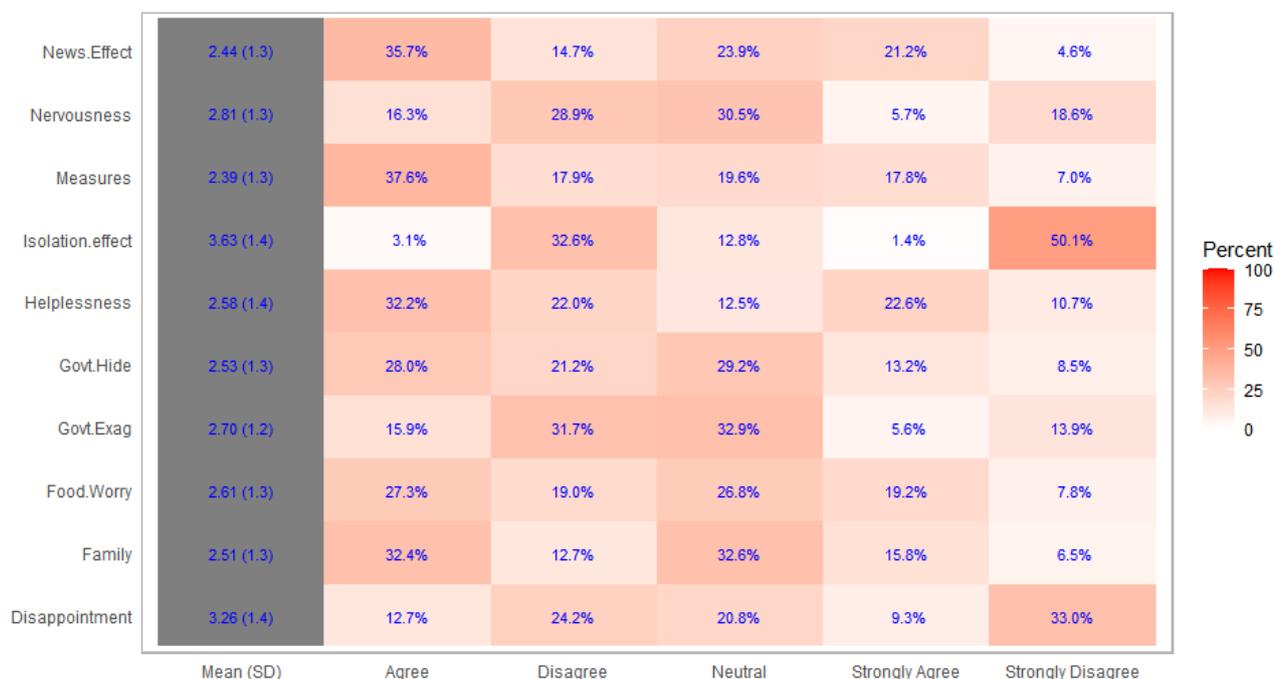
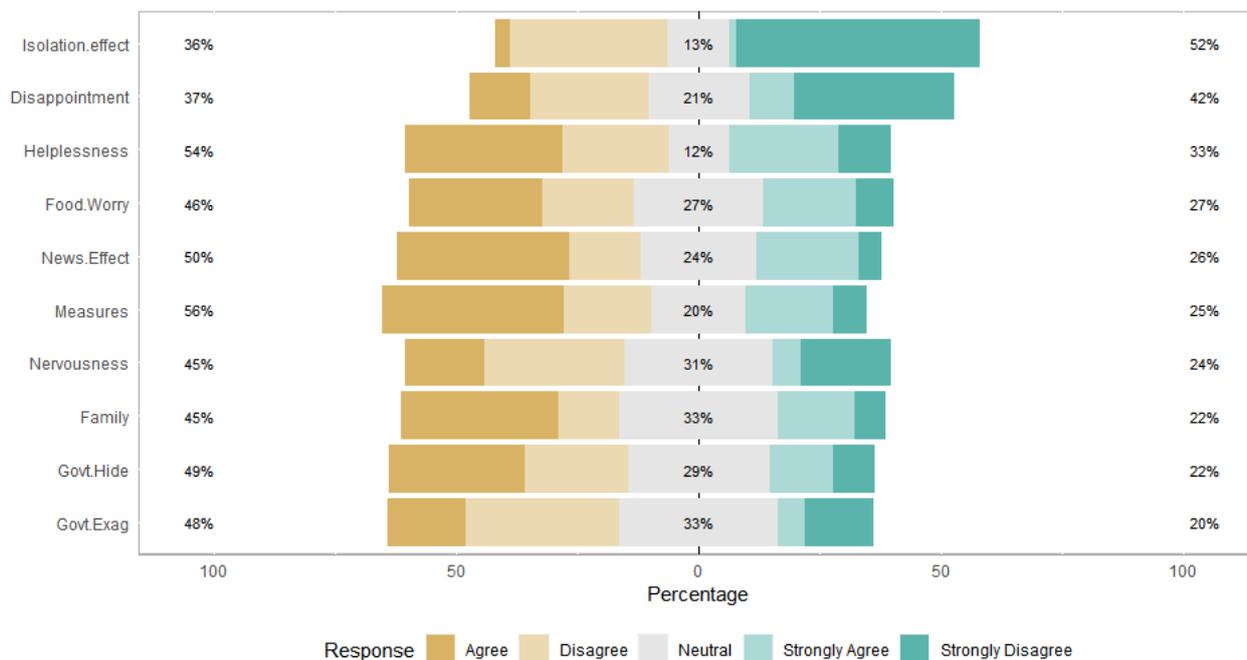


Figure 4 - Percentage of population and the stress factors related to COVID



4. Discussion of the Result

Numerous studies have suggested that public health emergencies and measures to stop those emergencies have very drastic effect on the psychic of the people (Cao, W et al., 2020), (Forstein et

al., 1988), (Ostinelli, E.G et al., 2020). The main aim of our research is to evaluate the psychological impact of lockdown imposed due to the pandemic COVID-19 on the common working class in India and explore factors which are causing them. This research suggested that 52% of the total working class is somehow anxious. Out of these, 13% experienced severe anxiety, 11% experienced moderate anxiety and 28% experienced mild anxiety.

The anxiety among India's average workers due to COVID-19 may have been identified with the impact on their work of forced lock-down measures (Roy, D et al., 2020) and the eventual fate of their business or work (Doshi, D et al., 2020). Moreover, as a result of the lockdown and isolation, the distress may have been caused by the growing separation of individuals. It is understood that the problem of nervousness arises and intensifies without association (Xiao C, 2020). Then again, the considerable shortage of masks, disinfectants, hospital facilities and ventilators as well as the dramatic and sensational news features and incorrect news reports just as rumours in social media have also added to the tension and dread to life (Doshi, D et al., 2020) which our outcomes also recommended. The results of this examination showed that the working class is nervous about the gender-related pandemic, the kind of work they do and other diverse pressure factors as discussed earlier, which is different from past findings (Cao, W et al., 2020). However no significant difference in anxiety level is observed due to place of residence or age, which concur partially to the findings observed in (Moreno, E et al., 2019). This difference indicates that people working in urban as well as rural experience similar kind of anxiety and negative emotions as a consequence of pandemic.

According to our hypothesized hypothesis, the COVID-19 lockdown and the distress caused, which included monetary stressors, day-to-day impacts, the impact of constant media advertisements, and the impact of living alone a long way away from family trapped in the workplace, are unequivocally connected to unpleasant indications in India 's daily workforce. The pandemic would have significant economic consequences apart from the emergency health situation, as seen in previous studies (Roy, D et al., 2020). In India, the government acted, including travel alerts and bans, prolonged lock-downs, and slowly relieved the working class as much as possible, persuading the staff to work from the home to curb the outbreak, ultimately disrupting everyday life (Tang, B et al., 2020), (Nishanthini, V et al., 2021) and causing anxiety. In India, all primary and secondary schools have been shut down, and higher education colleges and universities either delay classes until their status improves or started their activities by means of distant / remote learning via internet. Similarly most of the government sectors and private sectors have instructed their employees to work from home (Doshi, D et al., 2020) (Choudhury, Prithwiraj et al., 2020). Lots of factories and local manufacturing units have been running on minimal labor. These measures without a doubt

specifically affect the economy and work culture and morals of individuals across various occupations. Finally the knowledge of the preventive measure seems to have a very neutral effect on anxiety that means awareness and proper information can sooth people during distress. This result suggests that effective and robust awareness, also assurance from employer on the job security is necessary during public health emergencies.

5. Conclusion

Approximately 52 per cent of the Indian working class is anxious about the prolonged lockdown imposed to stop the pandemic spread. Public doubts and apprehensions about acquiring the COVID-19 infection are increasing daily. The female working class is more depressed than India's male working class, which is pretty obvious since they have to look after the family as well as work from home and maintain their careers. Similarly, the people employed in the informal sector and those employed as teachers, engineers, physicians or other similar professions are more depressed than other occupational classes. There is a need to raise awareness campaign during this COVID-19 pandemic, and tackle people's mental health issues. Employers from different sectors should work together to identify this issue so that high quality and suitable psychological support services are offered to their workforce. Likewise, it is an ethical duty of the legislatures to give moral lift in order to gain the trust of common working class, thus diminishing the tension among them. It is also imperative to investigate the impacts of psychological wellbeing in various populations (overall cultures, individuals affected by COVID-19, close associations with COVID-19, healthcare workers, Courier service providers, people from hospitality sectors and students) and organize persuasive intervention mechanisms for them.

Declarations

Conflicts of Interest

The authors state that they have no conflicting interests that may be seen as improperly affecting the depiction or interpretation of this study's research findings.

Author Contributions

The contributions of our research paper are as follows:

- Conceptualization: Sambit Prasad Kar
- Methodology: Sambit Prasad Kar & Nirmal Kumar Rout
- Software: Sambit Prasad Kar & Jonathan Joshi
- Validation: Sambit Prasad Kar & Jonathan Joshi
- Formal analysis: Sambit Prasad Kar
- Resources: Sambit Prasad Kar
- Writing - original draft preparation: Sambit Prasad Kar
- Writing - review and editing: Sambit Prasad Kar & Nirmal Kumar Rout
- Supervision: Nirmal Kumar Rout & Jonathan Joshi

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