Research Article

Mental Health and Predictors of Depression During Covid-19 Pandemic in General Population of Odisha: A Cross-Sectional Study

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ABSTRACT

Background: The emergence of the Coronavirus disease (COVID-19) pandemic has caused an unprecedented global catastrophe in the 21st century as a major virus outbreak. The disease as well as the different preventive measures taken to contain the disease especially quarantine and lockdown, loss of income, loss of job and financial insecurity have led to an enormous impact on the mental health of the community and various psychological problems in the form of anxiety, depression and stress.

Objective: This article aims to highlight the extent of the impact of COVID-19 on mental health with a special focus on depression in the general population of Odisha.

Methods: This is a cross-sectional study carried out among the general population of Odisha through an online semi-structured questionnaire the link of which was sent to the participants by way of e-mails, WhatsApp and other social contacts. Data analysis of the received responses was done. Various statistical analyses were adopted using methods like Microsoft Excel, 2013, R version 4.0.2 software, t-test and Chi-square tests. Significant predictor analysis was done using logistic regression.

Results: The incidence of depression to the tune of 43% was found (Mild - 10.28%, Moderate - 16.19%, Severe - 5.56%, Extremely severe – 9.96%). Risk factors associated were the younger age group (21-40 years), unmarried persons (71.5%0, students (51.1%), persons not having symptoms of COVID -19 (78.4%), and persons without jobs (47.8%).

Conclusion: The COVID-19 pandemic is associated with highly significant levels of depression and is the topmost priority concern. It is important to take adequate measures to mitigate the severity of the impact. Early identification of worsening mental health and prompt response to address the problem can prevent further damage.

Key Words: Coronavirus disease, COVID-19, Depression, General population, Mental health, Psychological impact

INTRODUCTION

The coronavirus infection or COVID-19 outbreak is one of the biggest medical challenges to mankind in recent times. The outbreak of the COVID-19 infection started in China. It was declared a public health emergency by the World Health Organization (WHO) on January 30th, 2020. On the 11th of March, WHO declared COVID-19 a pandemic as by then about 114 countries were affected.[1] After the number of COVID-19 cases increased globally, different countries took different measures to prevent its spread. Some of these measures were border control or closure, quarantine and test-

ing of all incoming travellers or returnees, massive reverse-transcription polymerase chain reaction (RT-PCR) testing for case detection, rapid contact tracing and quarantine, frequent hand hygiene, social distancing measures and lockdown.[2]

Lockdown is an emergency protocol. It prevents the movement of the public from one area to the other. During the lockdown, all educational institutions, shopping arcades, factories, offices, local markets, transport vehicles, airports, railways, metros, buses, etc., were completely shut down, except hospitals, police stations, emergency services such as fire station and petrol pumps, and groceries.[3] The Govern-

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ment of India called for a nationwide lockdown from March 25th, 2020 for 21 days.[4] The lockdown was further extended until 31st May in 4 phases with conditional relaxations.[5]

While the lockdown was an effective strategy to prevent the spread of the virus, it had some degree of psychological impact on the citizens. There was a sudden and drastic alteration in the daily routine due to lockdown which hindered the ability to meet regular responsibilities. Many people were stranded in boarding houses and rental apartments, without work and far from home which potentially affected the physical and mental health of individuals.[6] Higher levels of stress, anxiety, depression, and poor quality of life during the COVID-19 crisis have been reported in recent studies among different populations.[7,8] In India, the lockdown period was repeatedly extended that led to longer restrictions on physical mobility and prolonged self-isolation measures due to which people experienced significant mental health problems ranging from boredom, sense of loneliness, sleep disturbance, fear, anger, anxiety, depression, stress etc. These negative psychological outcomes lead to a poorer quality of life not just during the lockdown but also after the crisis.[9]

The impact of lockdown might vary across different vulnerable groups. With longer lockdown periods, financially weaker individuals might have faced more challenges in meeting the basic needs of their families. Similarly, children felt restless as they ran out of options to keep themselves engaged and adults felt burdened with household chores in the absence of housemaids/servants. COVID-19 pandemic provides a unique opportunity to assess the psychological impact of an administrative decision as rare as "lockdown" on the general population. With this background, this study was conducted to assess the mental health of the general population during the COVID 19 pandemic and to evaluate the predictors of depression during COVID 19 pandemic.[10,11]

MATERIALS AND METHODS

This was a cross-sectional study carried out among the general population of Odisha. The study was undertaken from July 2020 to August 2020. The study population consisted of all persons more than 15 years of age and those able to read English. Data were collected by an online semi-structured questionnaire. The link of the questionnaire was sent through e-mails, WhatsApp and other social media to the contacts of the investigators. The link had an informed consent form along with the questionnaire. After accepting to take part in the survey, they filled up the questionnaire. Those who did not provide informed consent were excluded from the study.[12-14]

The questionnaire had three sections. The first section consisted of the socio-demographic profile of study participants; the second section comprised of a set of questions regarding social and economic status during the COVID-19 pandemic: the third section consisted of the psychological impact: Depression, Anxiety, and Stress Scale (DASS)-21. The DASS-21 is based on three subscales of depression, stress and anxiety. Each subscale consists of seven questions. The DASS sub-items i.e. depression, anxiety, and stress can be rated as normal, mild, moderate, severe and extremely severe. Each item is scored on a self-rated Likert scale from 0 (didn't apply to me all) to 3 (much or mostly applied to me) in the past 1 week. The scale does not cover several domains of depression such as sleep, appetite, and sexual functions, so it cannot be used as a diagnostic tool but can be applied as an aid to the diagnostic tool as well as to measure treatment response. Both English and non-English versions have high internal consistency (Cronbach's alpha scores >0.7). The DASS scale has the shorter version and a longer version (comprising 21 and 42 items, respectively). In DASS-21, the final score of each item is multiplied by two to obtain the final score.[10]

Collected data was checked for completeness and consistency. The forms that had a complete response were finally analyzed. Total of 938 responses were received but 24 responses were incomplete. So a total of 914 responses were analysed. Data cleaning was done and then data was extracted in Microsoft Excel, 2013. R version 4.0.2 software was used for statistical analysis. Chi-square test was for categorical variables and t-test was used for continuous variables to compare between the groups, where P < 0.05 as statistical significance. Significant predictors were further analyzed using logistic regression.

RESULTS

938 persons participated in this study out of which data in 24 responses was incomplete. Data analysis of 914 responses was carried out. Statistical significance was determined at P <0.05.

Our study indicates that depression, anxiety and stress are prevalent among the studied population (Table 5). Figure 1 shows that the incidence of depression was 43%, (Mild – 10.28%, Moderate – 16.19%, Severe – 6.56%, extremely severe – 9.96%). Persons in the age group of 21-40 years (26.59% of total depression) suffered most (Figure 2 &3). As per sex variation, the incidence in both male and female was almost equal. Unmarried persons (71.5%) and Students (51.1%) had a higher incidence (Figure 4). The education status of the respondents was not relevant (Tables 1 and 2).

Those who never had symptoms of COVID-19 had a higher degree of depression (78.4). No statistical significance was noted in persons who did the confirmative diagnostic test or who came in contact with COVID -19 positive patients, Also the safety of visiting relatives and friends and place of stay in the lockdown period had no statistical significance. Persons

without jobs (47.8%) and those with no income (58.8%) had more (Figure 4). The majority of participants (95.4%) did not suffer from chronic disease during illness. There was very little disturbance in the sleep pattern. 57.8% had sound sleep and 24.9% had sometimes sound sleep. The majority (96.9%) did not require psychiatrist consultation. The incidence of the use of alcohol and smoking did not increase in the lockdown period (Table 3).

When logistic regression of independent predictors was taken into consideration, the individuals having symptoms of COVID-19 were significantly associated with depression. Similarly, individuals having sound sleep (always and sometimes) were also significantly associated with depression (Table 4).

DISCUSSION

In our study, the prevalence of depression from mild to extremely severe variety was found to be 43% in the general population (Mild 10.28%, Moderate 15.19%, Severe 6.56%, Extremely Severe 9.96%). The prevalence of depressive symptoms ranged between 14.6% and 48.3% in several studies by different researchers. The reported rate in our study is higher than the previously determined one-year prevalence rate (Huang et al 3.6%, Lim et al 7.2%) of depression before the pandemic.[20-24]

We found the prevalence to be almost equal in both males and females. However, in other studies females were found to develop depressive symptoms more in comparison to males.[15,16] The probable reason reported by Gopal et al. is the skewed gendered division of household responsibility in Indian society.[25] Because of the lockdown the school, college and offices were closed and all were forced to remain indoors and the women shouldered most of the responsibilities which in turn affected their mental health.[17,18] Also they were more exposed to domestic violence. But the majority of women in our study group were unmarried leading to statistically insignificant result. Individuals in the age group of 21-40 years in our study had higher levels of depression which is in agreement with the findings of several other researchers.

We did not find any correlation between the personal education level of participants and the prevalence of depression. Different authors found different results. More prevalence was noted by Gao et al. Mazza et al. Olagoke et al. in lower education level i.e. middle school degree whereas Wang et al. reported a higher prevalence in higher professionals. Probably depression has no impact on the educational status but the personal tolerance level of stress in individuals.[16,17,22] Students in our study had a higher prevalence which is in agreement with the findings of other authors.[17,21] This may be due to the closure of schools, uncertainty regarding future study prospects and examination, more fear regarding contracting disease, the prohibition of personal movements, inability to have physical social interaction with friends and above all the low tolerance level of stress.

Another significant finding was the higher incidence in unmarried persons which is similar to the data reported by others.[13,15,17] This may be due to the loneliness in the lockdown period and the extra burden of performing household work in absentia of housemaids. The person having no income were the worst sufferers and had a higher prevalence level (58.8%) due to the financial stress and uncertainty of income in future which agrees with other reports.[15,17] Similarly the unemployed persons reported higher incidence (47.8%) which agrees with the data reported by Mazza et al.[16]

CONCLUSION

Taking into considerations the significant predictors and running the logistic regression, the model was found to fit with Nagelkerke R^2 value of 11.3%. The results revealed that those who had sound sleep during lockdown either sometimes (AOR: 1.79) or always (AOR: 3.37) had higher odds of depression among the study participants. Also, those with symptoms of COVID-19 had a significant association with depression when adjusted for all other factors (AOR: 0.51). It is evident from our study and also from other studies that the COVID-19 did have a significant impact on the mental health of the general population. Many psychological problems and important consequences in terms of mental health including anxiety, stress, depression and many more, emerged during the pandemic. Therefore, early detection and prompt corrective measure to mitigate the problem is the need of the hour as at present this is the topmost public health concern. However, more studies taking a larger population is required to recognize the extent of the problem and to adopt definite problem-oriented corrective policy measures.

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Table 1: Socio-demographic profile of the study participants and its association with depression

	Overall (N=914)	Depression (N=393)	No Depression (N=521)	p value
Age				<0.01*
Mean (SD)	30.7 (13.1)	28.1 (11.9)	32.7 (13.5)	
Sex				0.454
Female	364 (39.8%)	162 (41.2%)	202 (38.8%)	
Male	550 (60.2%)	231 (58.8%)	319 (61.2%)	
Marital status				< 0.001*
Divorced	3 (0.3%)	1 (0.3%)	2 (0.4%)	
Married	350 (38.3%)	111 (28.2%)	239 (45.9%)	
Unmarried	561 (61.4%)	281 (71.5%)	280 (53.7%)	
Occupation				< 0.001*
Business	32 (3.5%)	13 (3.3%)	19 (3.6%)	

Table 1: *(Continued)*

	Overall (N=914)	Depression (N=393)	No Depression (N=521)	p value
Govt. Services	200 (21.9%)	64 (16.3%)	136 (26.1%)	
Private MNCs	226 (24.7%)	85 (21.6%)	141 (27.1%)	
Student	384 (42.0%)	201 (51.1%)	183 (35.1%)	
Unemployed	72 (7.9%)	30 (7.6%)	42 (8.1%)	
Education				0.079
Primary	28 (3.1%)	17 (4.3%)	11 (2.1%)	
Secondary	75 (8.2%)	39 (9.9%)	36 (6.9%)	
Graduate	366 (40.0%)	151 (38.4%)	215 (41.3%)	
Post-Graduation	445 (48.7%)	186 (47.3%)	259 (49.7%)	

Table 2: Depression in different age groups

Age group	Depression (N-393)	Normal (N-521)	Total (N-914)	P value < 0.01
15-20 yrs	95 (10.39%)	80 (8.75%)	175 (19.15%)	
21-40yrs	243 (26.59%)	320 (35.01%)	563 (61.60%)	
41-60 yrs	45 (4.92%)	97 (10.61%)	142 (15.54%)	
61-80 yrs	9 (0.98%)	21 (2.30%)	30 (3.28%)	
>80 yrs	1 (0.11%)	3 (0.33%)	4 (0.44%)	

Table 3: Covid 19 status among the study participants and its association with depression

	Overall (N=914)	Depression (N=393)	No Depression (N=521)	p-value
Have you ever had symptoms of Covid 19?				0.007*
No	752 (82.3%)	308 (78.4%)	444 (85.2%)	
Yes	162 (17.7%)	85 (21.6%)	77 (14.8%)	
Have you got yourself tested for Covid 19?				0.264
No	731 (80.0%)	321 (81.7%)	410 (78.7%)	
Yes	183 (20.0%)	72 (18.3%)	111 (21.3%)	
Have you come in direct contact with a Covid 19 positive patient?				0.688
Don't know	369 (40.4%)	160 (40.7%)	209 (40.1%)	
No	416 (45.5%)	182 (46.3%)	234 (44.9%)	
Yes	129 (14.1%)	51 (13.0%)	78 (15.0%)	
Do you feel safe to visit relatives and friends during the pandemic?				0.873
No	751 (82.2%)	322 (81.9%)	429 (82.3%)	
Yes	163 (17.8%)	71 (18.1%)	92 (17.7%)	
Where were you staying during the lockdown?				0.349
Alone	66 (7.2%)	30 (7.6%)	36 (6.9%)	
hostel(with friends/roommates)	33 (3.6%)	18 (4.6%)	15 (2.9%)	
with family	815 (89.2%)	345 (87.8%)	470 (90.2%)	
How were you working during lockdown?				0.001*
going to office/shop/field visit	164 (17.9%)	57 (14.5%)	107 (20.5%)	

Table 3: *(Continued)*

	Overall (N=914)	Depression (N=393)	No Depression (N=521)	p-value
not working	375 (41.0%)	188 (47.8%)	187 (35.9%)	
work from home	375 (41.0%)	148 (37.7%)	227 (43.6%)	
What was your income status during lockdown?				<0.001*
been paid as previous	300 (32.8%)	95 (24.2%)	205 (39.3%)	
been paid less	149 (16.3%)	67 (17.0%)	82 (15.7%)	
no income	465 (50.9%)	231 (58.8%)	234 (44.9%)	
Were you addicted to alcohol or smoking during lockdown?				0.499
Maybe	22 (2.4%)	10 (2.5%)	12 (2.3%)	
No	864 (94.5%)	368 (93.6%)	496 (95.2%)	
Yes	28 (3.1%)	15 (3.8%)	13 (2.5%)	
Did you develop any chronic illness during a lockdown?				0.035*
No	885 (96.8%)	375 (95.4%)	510 (97.9%)	
Yes	29 (3.2%)	18 (4.6%)	11 (2.1%)	
Did you have a sound sleep during a lockdown?				< 0.001*
No	103 (11.3%)	68 (17.3%)	35 (6.7%)	
Sometimes	185 (20.2%)	98 (24.9%)	87 (16.7%)	
Yes	626 (68.5%)	227 (57.8%)	399 (76.6%)	
Have you consulted to a psychiatrist during lockdown?				0.608
No	889 (97.3%)	381 (96.9%)	508 (97.5%)	
Yes	25 (2.7%)	12 (3.1%)	13 (2.5%)	

Table 4: Logistic regression for independent predictors of depression

Predictors	Adjusted Odds Ratio (AOR)	Confidence Interval (CI)	P-value
(Intercept)	1.90	0.08 – 72.75	0.697
Age	1.01	0.99 – 1.03	0.172
Sex [Male]	1.00	0.72 – 1.39	0.991
Occupation [Govt. service]	1.31	0.54 – 3.10	0.548
Occupation [Private service]	0.91	0.38 – 2.12	0.826
Occupation [Students]	0.87	0.37 – 2.02	0.751
Occupation [Unemployed]	1.22	0.47 – 3.10	0.672
Education [Post-Graduate]	0.98	0.70 – 1.37	0.904
Education [Primary]	0.68	0.28 – 1.63	0.395
Education [Secondary]	0.67	0.38 – 1.17	0.157
Marital status [Married]	0.31	0.01 – 5.12	0.427
Marital status [Unmarried]	0.21	0.01 – 3.47	0.291

Table 4: *(Continued)*

Predictors	Adjusted Odds Ratio (AOR)	Confidence Interval (CI)	P-value
Have you ever had symptoms of Covid 19? [Yes]	0.51	0.34 – 0.77	0.002
Have you got yourself tested for Covid 19? [Yes]	1.45	0.96 – 2.21	0.079
Have you come in direct contact with a Covid.19 positive patient? [No]	1.11	0.81 – 1.53	0.514
Have you come in direct contact with a Covid.19 positive patient? [Yes]	1.06	0.65 – 1.73	0.814
Do you feel safe to visit relatives and friends during the pandemic? [Yes]	0.95	0.65 – 1.39	0.791
Where were you staying during lockdown? [hostel (with friends/roommates)]	0.69	0.28 – 1.72	0.430
Where were you staying during lockdown? [with family]	1.05	0.59 – 1.86	0.860
How were you working during lockdown? [not working]	0.78	0.45 – 1.37	0.389
How were you working during lockdown? [work from home]	1.04	0.65 – 1.66	0.864
What was your income status during a lockdown? [been paid less]	0.65	0.42 – 1.01	0.056
What was your income status during a lockdown? [no income]	0.86	0.53 – 1.41	0.557
Were you addicted to alcohol or smoking during a lockdown? [No]	1.05	0.41 – 2.65	0.915
Were you addicted to alcohol or smoking during a lockdown? [Yes]	0.80	0.23 – 2.70	0.717
Did you develop any chronic illness during a lockdown? [Yes]	0.53	0.22 – 1.23	0.148
Did you have a sound sleep during a lockdown? [sometimes]	1.79	1.06 – 3.06	0.031
Did you have a sound sleep during a lockdown? [Yes]	3.37	2.13 – 5.42	<0.001
Have you consulted a psychiatrist during a lockdown? [Yes]	0.69	0.29 – 1.66	0.401

Table 5: Mean score DAS Scale sub-items

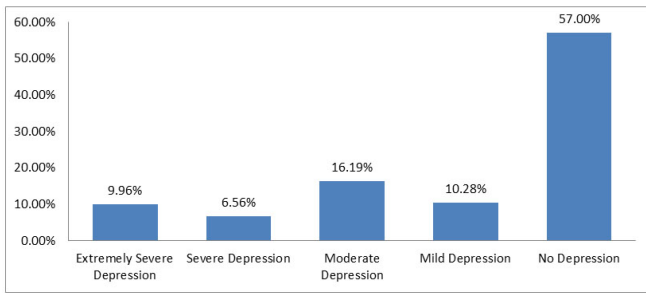| Variable	Mean ± SD
Depression subscale total	10.22 ± 10.57
Anxiety subscale total	7.89 ± 8.82
Stress subscale total	10.12 ± 9.98
DASS score total	28.23 ± 27.58

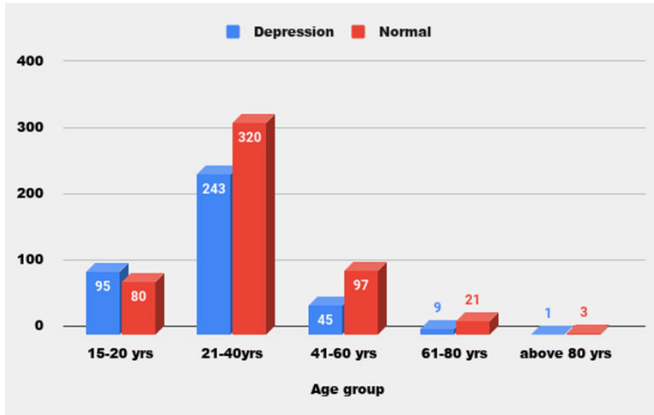**Figure 1:** Depression among the study participants.

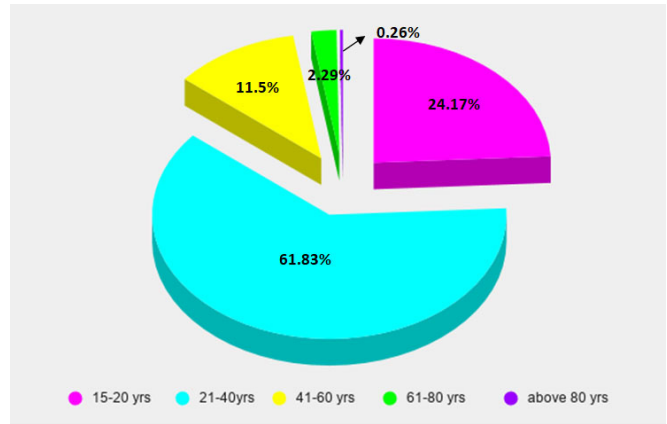**Figure 2:** Graph representing depression and no depression versus Age group.

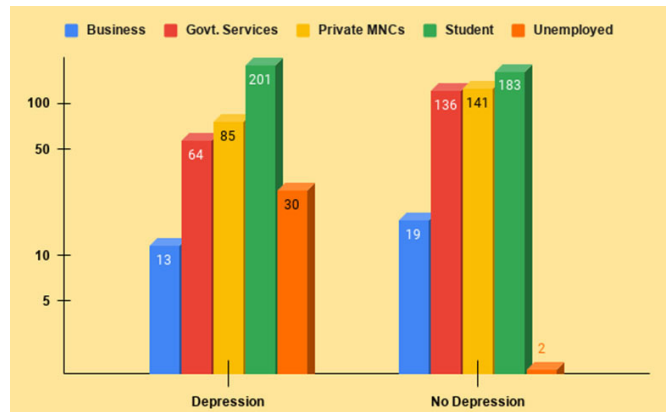**Figure 3:** Pie Chart representing the percentage of depression according to the age group.

Figure 4: Bar graph representing employment sector versus mental status.