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**Original Research Article**

# Depressive Symptoms among COVID-19 patients: A cross-sectional study in the fieldpractice area of District Mental Health Programme Unit, Ganjam

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**Abstract**:

**Introduction**: COVID-19 patients are at increased risk of mental illness. The holistic concept of care needs constant monitoring of mental health issues among patients. **The objectives** were to find out the proportion of depressive symptoms among COVID-19 patients under treatment and to determine the factors associated with depressive symptoms. **Materials & methods**: A cross-sectional study was conducted among 480 COVID-19 patients selected through random sampling method and were telephonically interviewed by using questionnaire (developed with reference to PHQ-9) about the presence and severity of depressive symptoms. Exploratory data analysis was used to measure and visualise depressive symptoms and factors associated with it. **Results**: Out of all 480 study participants,180 (38%) had minimal, 36 (8%) had mild symptoms, 72 (15%) had moderate, 24(5%) had moderately severe and 12(2%) had severe depressive symptoms based on the final score of the interview. The proportion of patients who reported presence of any depressive symptoms (minimal, mild, moderate, moderately severe) was found to be 67.5%. Variables like " Age", "Place of treatment" & " COVID-19-clinical stage" were significantly associated with depression. Logistic regression analysis found that place of treatment at hospital (DCH plus CCC) had large { OR = 5.018, 95% CI : 2.937 - 8.572,P <0.001}, whereas moderate to severe COVID-19 clinical stage had small to medium{ OR = 3.299, 95% CI : 1.555 -

7.000,P <0.001} and age >39 years) had small { OR = 1.579, 95% CI : 2.478- .047,P <0.001} effect size on depressive symptoms in COVID-19 patients. Recommendations: 1)Monitoring of mental health status: Sensitization of caregivers of COVID-19 patients on symptoms of depression and suicidal ideation.2)Routine use of MSE tool for early diagnosis and prompt management of depression.3) Special focus on older age group and moderate to severe cases during psychological counselling of patients.

**Key words:** Depressive symptoms, COVID-19 patients, PHQ-9

Abbreviations: DMHP: District Mental Health Programme,PHQ-9 : Patient Health Questionnaire, DCH: Dedicated Covid Hospital, CCC: Covid Care Corner, MSE: Mental Status Examination.

## Introduction:

The COVID-19 pandemic has altered the dynamics of human interaction in community. The treatment protocol had subjected COVID-19 patients into isolation, from their family and friends. Evidences from research conducted on different population had suggested increased risk of mental illness among COVID-19 patients[1,2]. Depression, anxiety, distress & insomnia were some of the most common mental health issues in COVID -19 pandemic[3].In the year 2021, the DMHP unit of Ganjam district was involved in screening and providing psychological counselling to the patients suffering from COVID-19. A dedicated team of experts had telephonically interviewed, 15041 patients to identify mental illness and provided counselling to them.

Quality in service delivery is a continuous process and it consists of 4 components viz; Plan, Do, Study, Act (W. Edward Deming)[4]. To improve the quality of care to COVID-19 patients registered under district administration of Ganjam, it was essential to study the burden of depression and factors associated with it. This research had scope to generate evidences, for designing specific patient management strategies.

**Objectives of the study:**

1. To find out the proportion of depressive symptoms among COVID-19 patients under treatment.
2. To determine the factors associated with depressive symptoms.

**Materials & methods:**

The research was conducted by using analytical cross sectional study design from 1st Jan 2021 to 31st July 2021 at the District Mental Health Programme Unit of Ganjam district, Berhampur, Odisha after ethical clearance from IEC committee and administrative clearance from superintendent of M.K.C.G Medical College & Hospital, Berhampur, Ganjam, Odisha.

Sampling: Sample size was calculated by using the formula[5] as mentioned below:

Sample size (n) = $(Z_{1-\alpha/2})^2$ P * Q/ E $^2$

Where:

$Z_{1-\alpha/2}$ at 95% CI = 1.96

P = prevalence of depressive symptoms 50% *

E = absolute precision 5%

Nonresponse = 25%

* To achieve maximum sample size, prevalence of depressive symptoms among COVID-19 patients was assumed to be: 50%

During the data collection phase, 480 patients were selected out of the total 15041 registered in the database of DMHP unit by using random number sequence method and unique IDs were assigned to each of them.

Inclusion & exclusion criteria: All the COVID-19 patients above 18yrs of age, registered at DMHP unit of Ganjam for screening of mental illness and capable of giving valid consent were included in the study. Critically ill patients i.e. acute respiratory distress syndrome (ARDS) and sepsis cases were excluded from the study after taking opinion from treating physician.

Study instrument: A structured questionnaire was designed with reference to Patient Health Questionnaire (PHQ-9)[6] in both English & Odia language. The outcome was depressive symptoms experienced over last two weeks

and was described by nine attributes viz: 1) Lack of interest 2) Feeling depressed 3) Sleep abnormality 4) Lack of energy 5) Lack of concentration 6) feeling of guilt 7) Moving or speaking slowly 8) self-harm ideation 9) disturbances in appetite. The questionnaire recorded responses in a Likert scale on the basis of no of days patients had experienced the symptoms with scores: 0: no symptom in last 14 days, 1: symptom for 1-7 days, 2: symptom for >7days to <14 days. 3: symptoms in all 14 days. Study instrument was pretested in the Department of Psychiatry of M.K.C.G Medical College Hospital and was validated by experts.

Data Collection: The research team had telephonically contacted sampled participants and informed consent was recorded. The interviewer recorded the responses in a excel spreadsheet. At the end of the interview the recorded responses were debriefed to the study participant for internal validation. The interviews were recorded and saved in cloud storage and password protected.

Data analysis: Data was analyzed by exploratory data analysis (EDA) method in Microsoft Excel version 16.62 and SPSS version-17. COVID-19 patients were classified as per the clinical management protocol for COVID-19 (in adults)[8]. Score on "Depressive symptoms" was calculated by adding up all the scores in nine attributes. Depressive symptom was graded into six categories viz: No depressive symptom(score:0), Minimal depression symptom (score:1-4), Mild depression symptom (score:5-9), Moderate depression symptom (score:10-14), Moderately severe depression symptom (15-19), Severe depression symptom (20-27). The probability value <0.05 was the criteria for statistical significance. The association between two categorical variable was measured by using chi square test. The variations in the symptoms of depression due to place of the treatment was explained in a binary logistic regression model. Effect size of association was measured by odds Ratio[8] and categorised as small (OR = 1.68) medium (OR = 3.479) and large (OR = 6.7).

**Results**: In the sampled patients 288 (60%) were male & 192(40%) were female. The mean and median of age in year were 42.15 (SD:13.3) and 39 respectively. Dedicated covid hospital was the most common place of the treatment {count: 204, proportion: 42%}, followed by home {count: 168, proportion: 35%} and covid care corner {count: 108, proportion: 23%}. As per the data on clinical severity and assessment parameter, 312 patients were in mild clinical stage and 168 were in moderate to severe clinical stage of COVID-19. Out of all 480 study participants,180 (37.5%) reported minimal, 36 (7.5%) had mild symptoms, 72 (15%) had moderate, 24(5%) had moderately severe and 12(2.5%) had severe depressive symptoms based on the final score of the interview. The proportion of patients who reported presence of any depressive symptoms (minimal, mild, moderate, moderately severe) was found to be 67.5% (count:324).

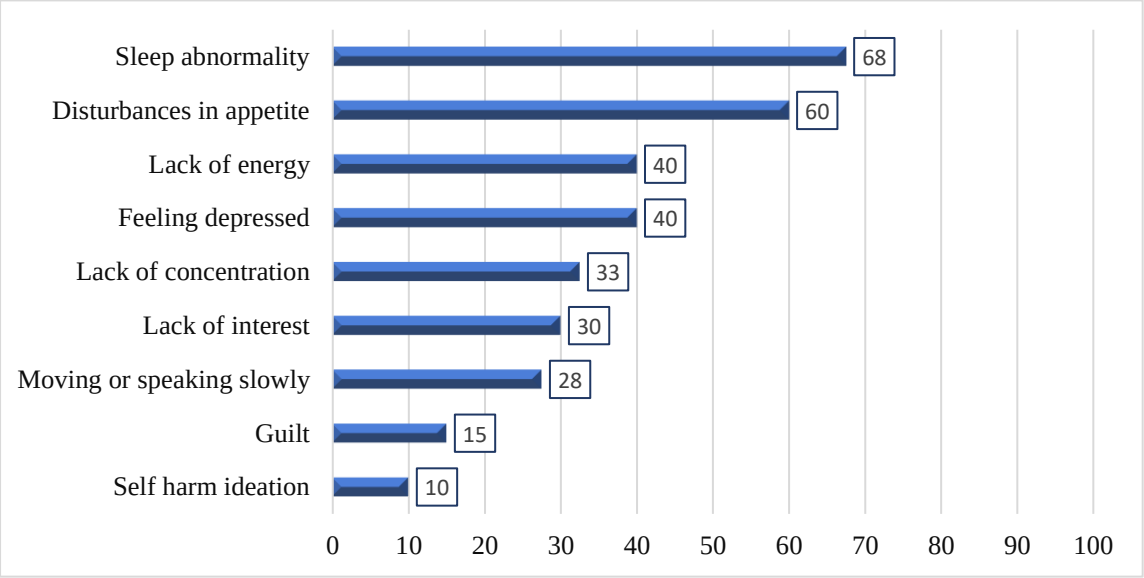


**Fig_1_Proportion of different categories of depressive symptoms among sampled population.**

Fig_1 describes the proportion of different categories of depressive symptoms among sampled population. Sleep abnormality was the most common symptom {count: 324, proportion:68%} followed by disturbances in appetite {Count:288, proportion:60%} and lack of energy {count:192, proportion:40%} and feeling depressed {count:192, proportion:40%} as perceived by patients. Self-harm ideation was perceived in 48 (10%) patients.

**Table_1_Association of "Gender"," Age group", "Place of treatment" & " COVID-19-clinical stage" with depression.**

| Name of the categorical variables | Depression Present Number (Proportion) | Depression absent Number (Proportion) | Pearson Chi-Square test value P value & Probability of association |
|---|---|---|---|
| **Gender**: | | | |
| Female | 120 (62.5%) | 72 (37.5%) | $\chi^2$= 3.646 P = 0.056 94.4% |
| Male | 204 (70.8%) | 84 (29.2%) | |
| **Age group** (Median value of age in year: 39) | | | |
| <39 Year | 132 (57.9%) | 96 (42.1%) | $\chi^2$ =18.264 P =0.001 >99.9% |
| >39 Year | 192 (76.2%) | 60 (23.8%) | |
| **Place of treatment** | | | |
| Home | 84 (41.2%) | 120 (58.8%) | $\chi^2$ =112.063 P =0.001 >99.9% |
| Hospital (DCH plus CCC) | 240 (87%) | 36 (13%) | |
| Home | 84 (41.2%) | 120 (58.8%) | $\chi^2$ =112.063 P =0.001 >99.9% |
| Hospital (DCH plus CCC) | 240 (87%) | 36 (13%) | |
| **COVID-19-clinical stage** | | | |
| Mild | 168 (53.8%) | 144(46.2%) | $\chi^2$ =75.754 P =0.001 >99.9% |
| Moderate to severe | 156(92.9%) | 12(7.1%) | |

Table_1 describes Association of "Gender"," Age group", "Place of treatment" & " COVID-19-clinical stage" with depression. Depressive symptoms were more among male {count:204, proportion: (70.8%)} and age group above the median value of 39 years {count:132, proportion: (57.9%)}, symptomatic patients {count:156, proportion:(92.9%)} and patients treated at Hospital i.e., dedicated covid hospital and covid care corner {240 (87%)}. The differences were found to be statistically significant among age groups, symptomatic status and place of treatment. The difference among male and female was not significant though there was high probability of association (94.4%) between gender and depression.

**Table_2_ Effect size of the association of place of the treatment, age and symptom status with depressive symptoms**

| Predictor Variables | B | SE | OR Exp(B) | 95% C. I. for EXP(B) | | P value |
|---|---|---|---|---|---|---|
| | | | | Lower | Upper | |
| Treatment place (Hospital) | 1.613 | 0.273 | 5.018 | 2.937 | 8.572 | <.001 |
| Age (>39 Year) | 0.457 | 0.230 | 1.579 | 1.006 | 2.478 | .047 |
| Moderate to severe Symptoms | 1.194 | 0.384 | 3.299 | 1.555 | 7.000 | .002 |

*B: Beta coefficients, SE: Standard error, OR : odds ratio, CI: confidence interval in logistic regression analysis*

Table _2_ describes the effect size of the association of place of the treatment, age and symptom status with depressive symptoms in a logistic regression model. The Omnibus Test of Model Coefficients showed that the model was significant, ($\chi$2 = 132.016, $P < 0.001$) and could explain the variation in depression symptoms due to the predictor variables ranging from 24% to 33.6%. (Cox snell R Square =0.240, Nagelkerke R Square = 0.336) with sensitivity 74.6% and specificity 76.9%. The place of treatment at hospital (DCH plus CCC) had

large { OR = 5.018, 95% CI : 2.937 - 8.572,P <0.001}, whereas moderate to severe COVID-19 clinical stage had small to medium{ OR = 3.299, 95% CI : 1.555 - 7.000,P <0.001} and age >39 years) had small { OR = 1.579, 95% CI : 2.478- .047,P <0.001} effect size on depressive symptoms in COVID-19 patients.

## Discussion:

In this study the proportion of patients who reported presence of any depressive symptoms (minimal, mild, moderate, moderately severe) was found to be 67.5%. Similar findings was reported in the epidemiological surveillance (Department of Mental Health in Eucador by Clara Paz et al.)[9], by using PHQ-9, where the overall prevalence of depression was 60.5%. Study conducted on COVID-19 patients in India by Prakash J, Dangi A. et al. through online survey using DASS21 questionnaire found one third (33.33%) patients suffered from depression[10]. In our study 27.5% of patients had depression score between 5 to 19 (i.e mild, moderate, moderately severe depression).The pooled prevalence of depression among COVID-19 patients was 45% and 31.4% respectively(meta-analysis conducted by Deng J et al & Wu T et .al.)[11].In south India, 9.7% COVID-9 patients had clinically significant depression; whereas 7.8% had mild, 1.3% had moderate, and 0.6% had severe depression as per the study by using PHQ-9 (N.A. Uvais et al )[12].In the study the most common symptom reported by COVID-19 patients was sleep abnormality (68%) followed by disturbances in appetite. The pooled estimated prevalence of sleep disorder among Covid-19 was 57% and 63 % as per the meta-analysis by Alimoradi Z. et al.)[13] and Elena Dragioti and Han Li eta al[14]. respectively. Suicidal ideation was reported by 48 patients (10%) of sampled patients. A study conducted by Ju-Wan et al,. found that suicidal ideation was 11.7 % among hospitalised COVID-19 patients of south Korea[15].

The place of treatment and presence depressive symptoms were found to be significantly associated with each other. Hospitalization had large effect size on presence of depressive symptoms among COVID-19 patients. In our study 57.5% of patients were treated at hospital (DCH +CCC). The isolation from family and friends considering the COVID-19 treatment guideline along with the perceived severity of disease might be a reason for high proportion of depression 67.5% in our sampled population. As per the study conducted by Saidi I et al. it was reported that depression was significantly higher among COVID-19 patients with female gender, age >50 years, >20 days of hospital stay, lower oxygen saturation (≤ 95%). In our study where COVID-19 clinical stage (moderate to severe) had small to medium effect size and age >39 years had small effect size. Age(>35year) & COVID-19 complication was independently associated with depression among COVID-19 patients in the study by Ngasa SN et al[16]. Gender was not found to be statistically significant in our study though it had the probability of association with depressive symptoms was 94.4%. In the study by by Prakash J, Dangi A et al[10]. found that there were no significant differences in proportion of depression between male and female patients. But in both gender the proportion of depressive symptom was higher among hospitalised patients.

## Conclusion:

This was a hospital based cross sectional study in which the data about depressive symptoms were collected by telephonic interview by using a structured questionnaire with reference to PHQ-9. Hospitalization, age >39 years and moderate to severe COVID-19 clinical stages were significantly associated with presence of depressive symptom. This study also suggests presence of self-harm ideation in COVID-19 of patients. The evidences from this study further highlights the practice monitoring of mental health status among COVID-19 patients.

**Recommendation**:

1. Sensitization of caregivers of COVID-19 patients on symptoms of depression and suicidal ideation.
2. Routine use of MSE (Mental Status Examination) tool for early diagnosis and prompt management of depression.
3. Special focus on older age group and moderate to severe cases during psychological counselling of patients.

**Strength**: The study instrument was designed with reference to patient health questionnaire (PHQ-9) which has high reliability and it is a valid screening tool to measure depression. This study captured the burden of depressive symptoms among COVID-19 patients of Southern Odisha. The result not only found the factors significantly associated with depression but also measured the effect size of those associations.

**Limitation of the study:** Considering the feasibility of study depressive symptoms were measured through telephonic interview thereby limiting the scope to diagnose depression. Our study could not draw inference on prevalence of depression among COVID-patients as it was conducted only among patients registered under DMHP, hence only proportion of patients having depressive symptoms was reported.

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**Conflicts of interest**: Nil

**IEC Certificate:** IEC no :803 / IEC Committee, M.K.C.G Medical College, Berhampur

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