

**How to Cite:**

Navab, R., Anil, R., Priyadarisini, N. J., & Janakiraman, P. (2022). A comparative study on suicides due to poisoning during pre-pandemic & pandemic period in a rural tertiary care center. *International Journal of Health Sciences*, 6(S1), 9649–9656. <https://doi.org/10.53730/ijhs.v6nS1.7254>

## **A comparative study on suicides due to poisoning during pre-pandemic & pandemic period in a rural tertiary care center**

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**Abstract**---Background: Suicide or self-harm is an important public health issue; it may be due to multi-factorial life events affecting the lives that may trigger individuals to end their life. Mental health was severely affected by the COVID-19 pandemic leading to suicides. Poison consumption is one of the most common modes of suicide. In the present study, our objectives were to compare the number of reported poisoning cases before & during the COVID-19 pandemic and to describe the clinical profile & outcome of reported poisoning cases. Objectives: The objectives were to compare the number of poisoning cases reported before & during the COVID-19 pandemic, and also to describe the clinical profile and outcome of reported cases. Methodology: This is a retrospective observational and comparative study of poisoning cases reported to Emergency Medicine Department in PES institute of medical sciences and research, Andhra Pradesh, India, during the pre-pandemic & pandemic phases. A total of 122 cases were reported. Google forms were used to collect the data from the medical records section. Data was compiled & analyzed using the SPSS 20 version. Results: Out of 122 cases included in the study, 62

cases were during the pre-pandemic phase and 60 cases were during the pandemic phase. In both, the phases age group of 18-40 years was most commonly affected (61.2% vs 61.6%). More number of married individuals were involved in the pre-pandemic phase (53.2%), whereas an equal number of married and unmarried individuals were reported in during the pandemic phase (50% each). Organophosphate (OP) compound poisoning (40.3%) and insecticide poisoning (41.6%) was the commonest mode of suicide in both the phases respectively. The average time duration to reach ED was about 2-5hours (58% vs 40%) in both the phases. The associations between the liver profile, blood profile & time to reach the hospital, and the phases of the pandemic were found to be statistically significant ( $p < 0.05$ ). Conclusion: There were no major differences found among the cases between the pre-pandemic & pandemic phases. It was noted that two incidents of suicides in the age group of more than 60 years, unmarried males & married females were more affected, insecticide poisoning was more common, and one-third of the cases reached the emergency department after 5 hours during the pandemic period. There was not much significant association found between the demographic factors / clinical profile & two phases of a pandemic.

**Keywords**---Suicide, COVID-19, poisoning, mental health, rural, pre-pandemic.

## Introduction

COVID-19 is a devastating crisis the whole world has ever met. As India has the second-largest population, it is fighting severely with the pandemic. According to Union health ministry data, the number of cases and deaths reported in India by January 2022 was 4.13 crore and 4,95,050, respectively <sup>[1]</sup>. Suicides in India are an important public health issue. In addition to being a medical phenomenon, a pandemic disrupts individuals and society and causes stress, anxiety, stigma, and xenophobia <sup>[2]</sup>. This could be due to financial loss, uncertainty caused, unemployment, and loss of loved ones at an early age. World Health Organisation (WHO) predicts that 20% of Indians may suffer from mental health issues due to COVID-19 <sup>[3]</sup>. This could lead to suicidal tendencies among the people. About 20% of suicides globally are due to pesticide self-poisoning, which is most common in rural areas and in countries with low- and middle-income. Hanging and firearms are also other common methods of suicide <sup>[4]</sup>. According to WHO estimates, in India, every year more than 170,000 people die committing suicide, out of the 900,000 people who die from suicides globally <sup>[5]</sup>. Therefore, it becomes an important issue whether the Indian population is affected by the pandemic in terms of suicidal rate.

Therefore, this study would like to compare the number of poisoning cases reported before & during the COVID-19 pandemic, and also to describe the clinical profile and outcome of reported cases.

## Methods

This is a hospital-based retrospective observational study conducted under the department of preventive medicine at the people's education society institute of medical sciences and research, Kuppam, Andhra Pradesh. This study was conducted for a period of 6 months from August 2021 to January 2022. Patients who arrived at the emergency department with an alleged history of consumption of poison and were admitted for in-patient care for further treatment at our institute were included in the study. Certain cases which required a higher level of care and due to lack of beds were referred out from the emergency department were not included in the study. Likewise, cases that had accidental exposure to poison were also excluded. All the medical records of these patients were stored in the medical records department section of our institution. All the necessary permissions were taken from the institution authorities to collect this data for carrying out this study. All the cases that were reported between June 2019 to November 2019 and February 2021 to July 2021 were considered for the pre-pandemic & pandemic period respectively.

A total of 122 patient records were accessed, of which 62 were during the pre-pandemic and 60 were during the pandemic period. All the data like age group, marital status, type of poisoning, time is taken to reach the emergency department (ED), consciousness at the time of admission, stomach wash, ICU stay, intubation, clinical profile, duration of hospital stay, and outcome were collected using a google form which was pre-prepared. The excel sheet was downloaded from the google forms. Data were cleaned and analysed using SPSS 20 version. Descriptive statistics were used for categorical data in the form of percentages. The Chi-square test and 'Z' test were used for analysing statistical associations. A P value of less than 0.05 was considered statistically significant. The ethical clearance for this study was approved by the institutional ethical committee at the people's education society institute of medical sciences and research, Kuppam, Andhra Pradesh

## Results

### A) Before the Pandemic phase:

Out of 122 cases included in the study, 62 were reported during this phase. There was an equal number of cases among males and females. The majority of them belonged to the age group of 18-40 years (61.2%). About 53.23% of them were married. OP compound poisoning was the most common cause (40.3%) of suicides whereas drug overdose was the least (3.2%). More than half of the people (58%) reported to emergency medicine within 2-5hours of consumption of poisoning. The majority of people (83.8%) were conscious at the time of admission. A stomach wash was performed in 80.65% of the cases. About 85.48% of the cases required intensive care for further management. Only about 8% of the cases required intubation. Renal profile, liver profile, blood profile & coagulation profile was deranged in about 33.8%,14.5%,77.4% & 6.4% of the cases respectively. Duration of hospital stay was in between 2-7days in the majority of cases (74.7%). Only one death was reported in this phase. (Table 1).

### **B) During Pandemic Phase:**

During the pandemic, about 60 cases were reported. Males and females were about 55% & 45% respectively. The majority (61.6%) of them belonged to the age group of 18-40 years and about 3.3% of cases were in the age group of greater than 60 years. The majority (60.6%) of males were un-married and most (62.9%) of the females were married. The most common cause was insecticide poisoning (41.6%) and the least was by fuel poisoning (3.3%). Only about 40% reported to the emergency medicine department within 2-5hours of consumption of poisoning and about 33.33% of cases took more than 5hours to reach the emergency department. About 88.33% of the cases were conscious at the time of admission and a stomach wash was performed in 73.33% of cases. Most of the cases (80%) required intensive care for further management. Intubation was required in 20% of the cases. Renal profile, liver profile, blood profile & coagulation profile was deranged in about 20%, 1.6%, 46.6%, and 3.3% of the cases respectively. Duration of hospital stay was in between 2-7days in majority of the cases (66.67%) reported. Only one death was reported in this phase. (Table 2).

The males were more (55%) affected during the pandemic whereas both males and females were equally affected before the pandemic. The age group of less than 40 years was the most affected in both the phases (85% vs 86.6%) Almost the same number of married & unmarried individuals were affected in both the phases. About 33.3% of individuals took more than 5 hours to reach the emergency department compared to the non-pandemic phase. There was a significant association between the time taken to reach the hospital and the phases of the pandemic ( $P<0.05$ ). About 21.6% of the subjects had a hospital stay of more than 7 days during a pandemic, whereas only 12.9% before the pandemic, but no significant association was seen. There was no significant difference between loss of consciousness, stomach wash, ICU stay, intubation, and renal profile and in the two phases except for liver profile (0.0096) & blood profile (0.0004) (Table 3).

### **Discussion**

COVID-19 is a highly contagious disease caused by severe acute respiratory syndrome (SARS-CoV-2). COVID-19 is an ongoing pandemic in India. As a result of COVID-19, not only the physical health and well-being are impacted, but also the mental health, which can have a disastrous impact on the health system [6]. In India, Suicide is more common among young people, which involves hanging and pesticide consumption, and is mainly influenced by social and economic factors [7]. There were 3548 suicides in India in 2020 due to unemployment when the first wave of COVID-19 hit [8]. With regard to the COVID-19 outbreak (since late January 2020 in India), the first Indian suicide (which occurred on February 12<sup>th</sup>) was attributed to fear of being infected with COVID-19, followed by two more cases [9]. This proves that COVID-19 is not just a physical disease but it also affects mental health. Various factors leading to suicide during a pandemic includes financial loss, depression, emotional-break up, anxiety adding to these stress, loss of employment, mental health, loneliness, unavailability of alcohol, and social stigma. The current study is to compare the number of reported poisoning cases and their clinical profile before & during the COVID-19 pandemic in a tertiary care center.

During pandemic & before the pandemic about 60 & 62 cases respectively, were reported. The number is almost equal in our study. It was reported that COVID-19 lockdown was associated with 369 suicides and attempted suicides, compared to 220 reports in 2019 <sup>[10]</sup>. This could be due to referrals, not reporting in the emergency department, transport, financial reasons & locking of state borders. During pre-pandemic, when the state borders were open, patients from Tamilnadu & Karnataka were also admitted. But during the lockdown, most of the cases were only from the surrounding area. One of the studies on suicide revealed that the financial crisis, loneliness, social boycott, the pressure to be quarantined, a COVID-19 positive report, stress at work, and the inability to come to home towns during lockdown were the causative factors <sup>[9]</sup>. In a recent study, it was revealed that the lockdown, travel restrictions, and social distancing likely contributed to a significant reduction in the use of private transport for the transfer of patients to the ED <sup>[11]</sup>. Therefore, the number of suicide cases reaching the emergency department could have been reduced as seen in this study. The most common age group which was affected during (61.2%) & before the (61.6%) pandemic was the 18-40 years age group. Suicides among 15-29-year-olds were the fourth leading cause of death globally in 2019 <sup>[4]</sup>. So the age group that is affected the most in our study is justifiable. But there were notably 2 cases of more than 60 years involved in suicides during the pandemic in this study. Compared to 2019, older age groups (30 vs 50 years,  $p < 0.05$ ) reported significantly more suicides during lockdown <sup>[10]</sup>. During the COVID-19 pandemic, lockdown Restrictions increased social isolation and the feeling of loneliness among older adults <sup>[12]</sup>, especially in rural areas. Because in rural areas joint families are more & social mobility of older people is more. In our study during the pandemic phase, males attempted more suicide and in the before pandemic phase, an equal number of males & females attempted suicide. There is an abundance of evidence linking male suicidal behavior to triggers such as joblessness, unemployment, failure at work, relationship strains, depression, hopelessness, and substance use disorders across the sociopsychological literature <sup>[13]</sup>. And all these triggers were present during the pandemic, especially among unmarried men. Factors like sex & age make individuals vulnerable to ending their lives <sup>[14]</sup>.

In our study more suicides (41.67%) were due to insecticide poisoning during pandemic & Op compound (40.3%) poisoning during pre-pandemic, whereas another study on poisoning cases in tertiary care hospitals revealed that the most common poison used was aluminum phosphide (34.4%) followed by organophosphorus (22.4%) <sup>[15]</sup>. In another study conducted in 2019, it was revealed that around 42.31% of suicides involved op compound poisoning in Kerala <sup>[16]</sup>. A recent study conducted in Rajasthan revealed that suicides due to OP compound poisoning were 4.5% and 1.4% during lockdown & pre-lockdown periods respectively <sup>[17]</sup>. The high load of poisoning due to OP compound & insecticide is because this is a rural setting where agriculture is the predominant occupation. Therefore because of their easy availability, poisoning due to them is common. Other reasons could be low literacy and unawareness regarding mental health. The majority of the cases reached the emergency department within 2-5 hours in our study, while it was 58% before the pandemic phase & 40% during the pandemic phase. This drop of 18% could be due to various factors like lockdown, unavailability of transport facilities, away from family members, state

borders closed, social distancing, etc. The mean time duration to reach the emergency department is about 3.3 hours in a study conducted by Rakesh Sharma et al <sup>[18]</sup>. And it was found that there was a statistically significant association between the time duration to reach the emergency department & the two phases ( $P<0.05$ ).

When the clinical profile was compared between the two phases, loss of consciousness (16.1% VS 11.6%), stomach wash (60.6% VS 73.3%), ICU stay (85.4% VS 80%), Renal profile deranged (33.8% VS 20%), liver profile deranged (14.5% VS 1.6%) and blood test deranged (77.4% VS 46.6%) were more before the pandemic than compared to the pandemic phase except for endotracheal intubation (8% VS 20%). But there was no statistically significant difference noted between these clinical profile factors except for liver profile ( $P<0.05$ ) & blood test ( $P<0.05$ ). This could be due to 40.3% of Op compound poisoning before the pandemic compared with only 13.3% during the pandemic phase. One death each was seen in both the phases. This could be due to a higher number of cases being referred out because of a lack of beds during the pandemic phase and intense treatment during the non-pandemic phase. In the state of Andhra Pradesh, the greatest number of suicides are due to poisoning according to national crime records bureau data 2019, where 42 % of victims ended their lives by consuming poisoning and about 37% were by hanging <sup>[19]</sup>. Depression, posttraumatic stress disorder, and particularly suicide risk are mental health issues that should not be neglected by the low-income population <sup>[20]</sup>, especially during the pandemic.

## Conclusion

There was an equal number ( $n=62$  &  $n=60$ ) of poisoning cases reported before & during the pandemic. But the significant result noted during the pandemic phase were, two incidents of suicides in the age group of more than 60 years, unmarried males & married females were more affected, insecticide poisoning was more common, and one-third of the cases reached the emergency department after 5 hours. Time taken to reach the emergency department during the two phases was significantly statistically associated. Longer time taken during a pandemic to reach was due to lockdown, which has led to a greater number of intubation & longer hospital stay. Though there was no statistically significant difference among the clinical profile factors during the two phases, more clinical profile fluctuations were seen in the pre-pandemic phase. Only liver profile & blood test had a significant difference. Awareness regarding self-poisoning and implementation of suicidal preventive campaigns to instill good mental health among the rural communities, especially agriculturists who are in more proximity to the insecticides is the need of the hour.

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