

RESEARCH ARTICLE

A comparative study of suicidal deaths during the pre-COVID and COVID periods

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ABSTRACT

The present study was undertaken to observe the change in the pattern of unnatural deaths, particularly suicidal deaths between non-pandemic periods, i.e., Pre-COVID and a pandemic period, i.e., COVID period at a tertiary care hospital of New Delhi, India. The data was collected from post-mortem reports of autopsies done at Dr. Ram Manohar Lohia Hospital, New Delhi, between 1st April 2019 to 30th September 2019 (pre-COVID period) and 1st April 2020 to 30th September 2020 (COVID period). The data collected were subjected to statistical analysis and presented as numbers, proportions, age, gender, and suicide methods.

Findings suggests a notable change in the pattern of unnatural deaths, apart from an increase in natural deaths, particularly suicidal deaths in the population of New Delhi, India, due to the impact of COVID and nationwide lockdown following the first wave of the COVID pandemic. There was a significant decrease in accidental and homicidal deaths, whereas an 18% increase was observed in suicidal deaths during the COVID period compared to the pre-COVID period. The difference in the number of suicidal deaths out of total unnatural deaths during the pre-COVID and COVID period was found to be significant (P-value <0.0001). As the duration of the lockdown period was being extended, suicidal deaths kept on increasing, with a peak seen during the last months of the COVID period. Both the males and females showed a significant rise in suicidal deaths, and the percentage increase was found to be more among males than females, i.e., 19.1% and 15.8%, respectively. Variations in suicidal death rates were observed in different age groups. In both genders increase in the suicidal deaths was observed in the age group of 30-40 years, while it decreased in 40-50 years of age group.

Keywords: COVID-19; mental health; pandemic; suicide; unnatural deaths

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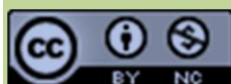
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INTRODUCTION

Two waves of the COVID-19 pandemic devastated the world in 2020-21, and the third wave in 2022¹. The devastation was caused within a short period leading to the death of about six million people worldwide till the end of 2021². Various countries across the world adopted different methods to tackle the rapidly spreading COVID-19 pandemic. Countries closed their borders, restricted international flights, and imposed nationwide lockdowns to tackle this situation³. In India, the first case of COVID-19 was reported from the state of Kerala on 30th January 2020⁴.

Within the next few months, there were 18 deaths and a 260% weekly increase in the number of cases reported as on 23rd March 2020⁵. Hence, India imposed a sudden strict nationwide lockdown and stopped national and international flights. Railways and roadways were closed significantly from 25th March onwards except for transport services for food, health, and economic matters.

The sudden lockdown resulted in a feeling of confinement and isolation which was further aggravated by the loss of loved ones, and social stigma due to COVID-19. Lockdown also caused loss of jobs, financial insecurity, and an uncertain future for the country's young population. Toddler's and college-going students could not attend schools and colleges, making them anxious and isolated. Females became more vulnerable to domestic violence due to the loss of their jobs or the job of their life partners, which forced them to stay longer at home with no involvement in other activities resulting in more conflicts^{6,7}. Older individuals were neglected by the younger generation who showed signs and symptoms of depression due to isolation and confinement in the houses away from friends and society⁸. All this led to a negative psychological impact on the people in the form of mental stress, hopelessness, and panic, which eventually led to fatal outcomes.

Evidence has suggested that previous epidemics such as Influenza (2019) and SARS (2003) were also associated with a rise in deaths by suicide⁹⁻¹¹. Findings of this study will also be useful in creating awareness among health professionals and public in general about the impact of pandemic and lockdown on suicides.

OBJECTIVE

To compare the pattern of suicidal deaths, (incidence, rate, numbers, percentage, age, gender, methods) in the pandemic (COVID period) and non-pandemic periods (pre-COVID period), at a tertiary care hospital in New Delhi, India.

METHODS

This was an observational comparative study done in the Department of Forensic Medicine, Atal Bihari Vajpayee Institute of Medical Sciences & Dr. Ram Manohar Lohia Hospital, New Delhi, with the objective of understanding the impact of COVID on suicidal deaths in terms of rate, proportions and methods adopted for suicide. The data was collected from the records of post-mortem reports of

autopsies done between 1st April 2019 to 30th September 2019 (pre-COVID period) and 1st April 2020 to 30th September 2020 (COVID period). The same period of each year was taken to avoid any bias due to seasonal factors. The cause of death was taken as per the post-mortem reports. All post mortem examinations done during the study period were included while cases in which the cause of death was not ascertained were excluded.

Data was collected from the post mortem reports of autopsies conducted during the study periods using a checklist of variables and analysed using the Excel statistical package. The data is presented in tables, histograms, percentages along with appropriate statistical analysis. A comparison of unnatural deaths between pre-COVID period and COVID period was made using chi-square test. The incidence rate ratio (IRR), i.e., the ratio of incidence of suicidal deaths, was calculated from the ratio of incidence of suicide out of total deaths during the COVID period and the pre-COVID period.

RESULTS

Suicidal deaths vs. total deaths

During the pre-COVID period, 415 deaths were reported, of which 115 (27.71 %) were natural and 300 (72.29 %) were unnatural. During the COVID period, 305 deaths were reported of which 119 (39.02 %) were natural and 186 (60.98 %) were unnatural.

A chi-square test of independence showed that there is a significant association between manner of death during pre-COVID and COVID periods (Table 1).

Table 1: Manner of death during COVID and pre-COVID periods

Manner of death	Pre-COVID period	COVID period	Total	P-value
Natural	115 (27.7 %)	119 (39 %)	234	0.0014*
Unnatural	300 (72.3 %)	186 (61 %)	486	
Total	415 (100 %)	305 (100 %)	720	

*P-value obtained by using Pearson's chi-square test

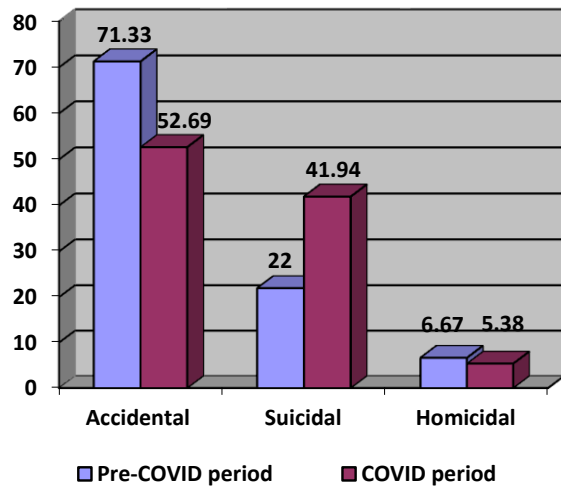


Fig. 1: Unnatural deaths during pre-COVID period and COVID period.

Of the 300 unnatural cases in pre-COVID period, 66 (22%) were suicidal deaths and 234 (78%) were other forms of unnatural deaths (accidental deaths and homicidal deaths). Of the 186 unnatural deaths in the COVID period, 78 (42%) were suicidal deaths, 108 (58%) were other forms of unnatural deaths (accidental deaths and homicidal deaths). A chi-square test of independence showed that there is a significant difference between types of unnatural deaths during pre-COVID and COVID periods (Table 2).

Table 2: Comparison of suicidal deaths with other forms of unnatural deaths during COVID and pre-COVID periods

Types of unnatural deaths	Pre-COVID period	COVID period	Total	P-value
Suicidal deaths	66 (22 %)	78 (41.9 %)	144	0.0001*
Other unnatural deaths	234 (78%)	108 (58.1 %)	342	
Total	300 (100 %)	186 (100 %)	486	

*P-value obtained by using Pearson’s chi-square test

Monthly variation in suicides

A monthly variation in suicides was also noted during the COVID period. As the lockdown period went on, the number of Suicidal deaths increased, with the highest number of deaths during August and September (Figure 2).

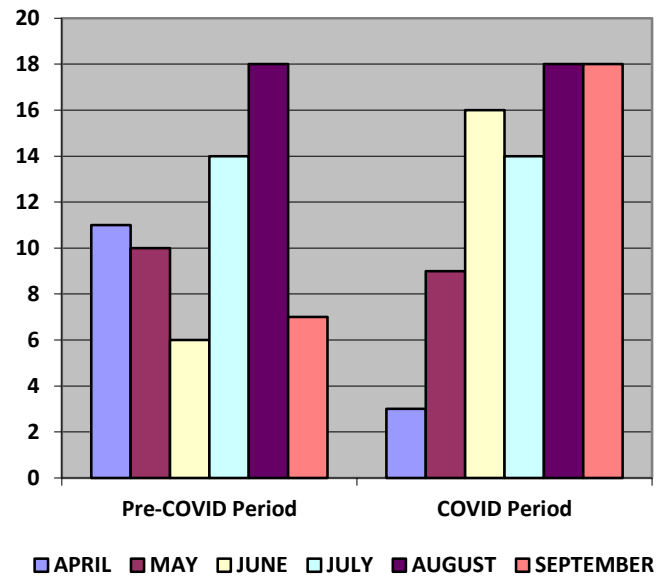


Fig. 2: Distribution of Suicidal deaths month-wise during pre-COVID and COVID periods.

Gender Variation

During the pre-COVID period, there were 66 suicidal deaths, out of which 47 were male, and 19 female, whereas, for the COVID period, there were 78 suicidal deaths out of which 56 were males, and 22 were females. An increase in percentage of suicidal deaths was observed in both the genders with male preponderance.

Male

For the pre-COVID period, Suicidal deaths among males as a percentage of total unnatural deaths (300) were 15.67% and as a percentage of total deaths (415) was 11.32%, whereas for the COVID period, Suicidal deaths among males as a percentage of total unnatural deaths (186) was 30.11%, and as a percentage of total deaths (305) was 18.36%.

Female

For the pre-COVID period, Suicidal deaths among females as a percentage of total unnatural deaths (300) is 6.33%, and as a percentage of total deaths (415) is 4.58%, whereas for the COVID period, Suicidal deaths among females as a percentage of total unnatural deaths (186) was 11.83% and as a percentage of total deaths (305) was 7.21%.

Age Distribution

It was observed that there is a general increase in Suicidal deaths in the COVID period among all age groups except for the age group of 40-50 years (Table 3). When age distribution was tabulated according to sex, it was observed that different age groups were affected differently. There was an increase in suicidal deaths in individuals less than 20 years old, among both the genders, with the earliest suicide reported at age of 16 for males and 13 years for females. In the age group of 20-30 years, there was a decrease in suicidal deaths among males while there was an increase among females. In the age group of 30-40 years, suicidal deaths increased in both the genders. In the age group of 40-50 years, suicidal deaths decreased among both males and females. Above 50 years, suicidal deaths increased among males (Table 3).

Table 3: Suicide during pre-COVID and COVID periods - Age distribution

Age group	Pre-COVID period			COVID period		
	Male	Female	Total	Male	Female	Total
<20 years	3 (6%)	3 (16%)	6 (9%)	4 (7%)	4 (19%)	8 (10%)
20-30 years	18 (38%)	8 (42%)	26 (39%)	17 (30%)	10 (45%)	27 (35%)
30-40 years	7 (15%)	3 (16%)	10 (15%)	12 (21%)	4 (18%)	16 (21%)
40-50 years	13 (28%)	4 (21%)	17 (26%)	11 (20%)	3 (14%)	14 (18%)
50-60 years	4 (9%)	1 (5%)	5 (8%)	9 (16%)	0	9 (12%)
>60 years	2 (4%)	0 (0%)	2 (3%)	3 (5%)	1 (5%)	4 (5%)
Total	47	19	66	56	22	78

Methods of committing suicide

During the pre-COVID period, out of 66 Suicides, 50 (75.76%) were due to hanging, 11 (16.67%) were due to poisoning, 4 (6.06%) were due to thermal deaths, 1 (1.52%) was due to a firearm injury. No deaths were reported due to fall from heights. During the COVID period, of a total of 78 suicidal deaths, 62 (79.49%) were due to hanging, 11 (14.10%) were due to poisoning, 3 (3.85%) were due to fall from heights, 1 (1.28%) was a thermal death, and 1 (1.28%) was due to firearm (Table 4).

Table 4: Methods of committing suicide*

Method of Suicide	Pre-COVID period	COVID period
Hanging	50 (75.8 %)	62 (79.5 %)
Fall from height	0 (0 %)	3 (3.8 %)
Poisoning	11 (16.7 %)	11 (14.1 %)
Thermal Deaths	4 (6.1 %)	1 (1.3 %)
Firearm	1 (1.5 %)	1 (1.3 %)
Total Suicidal deaths	66 (100 %)	78 (100 %)

* Use of statistics on table 4 is difficult as the numbers are too small

DISCUSSION

Various studies have been done to assess the impact of COVID on suicidal deaths throughout the world^{6-7, 12-14}.

Most of the studies suggested that pandemics not only caused a direct impact on the life of the person, but many indirect impacts keep harming human life for a very long period even after the passing of the pandemic.

In a study done by Calderon-Anyosa et al.¹², it was revealed how lockdown policy impacts unnatural deaths among the Peruvian population. They observed that all the types of unnatural deaths showed an immediate decline, particularly accidental deaths with a reduction of up to 12.22 and 3.55 deaths per million population for males and females, respectively. Suicidal deaths also showed a marginal drop in their study. Similar results were observed in the present study, with total unnatural deaths decreasing by 38%, although in the present study total number of suicidal deaths showed an increase of 18%.

Proportion of suicidal deaths out of total deaths in pre-COVID period is 15.9% and during COVID period is 25.6%. This increase in the proportion of suicidal deaths can be attributed to absolute increase in the number of suicidal deaths along with fall in number of accidental and homicidal deaths. As Peru have a GDP per capita more than 3 times that of India, it would have better managed the impacts of pandemic, particularly financial impact. In comparison, India is a developing nation with high income inequality and a large chunk of the

population dependent on daily wages. So, the impact of COVID pandemic was more pronounced in a developing country like India than in any other part of the world.

A study by Sengupta et al.¹³ to assess change in the pattern of suicidal deaths during the first month of lockdown (April) in India. As per their findings, suicidal deaths increased by about 34% and 43% during the first month of lockdown compared to the previous two months before lockdown. In contrast, in the present study there is an initial decline followed by subsequent increase in suicidal deaths (Figure 2). Results similar to present study were also observed by Tanaka T et al in their study done in Japan.⁷ The possible explanation for different observations in different studies, especially for suicidal deaths, could be that every study has unique population groups with different social and economic statuses. Also, measures taken by the government to handle the pandemic had a significant impact on the stress and depression level in the different populations and age groups. Suicide is a complex phenomenon with multiple factors involved and responsible for the person to commit suicide. Many review studies have been done to assess the psychological and social impact of COVID-19¹⁵⁻³².

Almost all the literature describes the occurrence of depression following financial insecurity, unemployment, loneliness, different types of fear (Fear of contagion, isolation, the burden for the family, etc.), and various kinds of other stresses. Committing suicide after getting tested positive of COVID were noted by various authors. Suicide committed by celebrities and role models also promoted suicidal tendencies, particularly in young persons³³. Some literature has provided evidence of involvement of the nervous system in case of infection with the novel coronavirus (CoV) leading to neuropsychiatric manifestations³⁴⁻³⁵. Few studies have pointed out the involvement of the Liver and kidney due to COVID-19 infection, which can result in prolonged morbidity and hence financial and physical burden resulting in suicidal tendencies³⁶.

The monthly study by Ueda et al.⁶ in Japan observed a decline in suicidal deaths at the initial months of pandemic followed by exceptionally increased deaths in the later months, particularly among females (IRR-1.695), i.e., approximately 70% increase in suicidal deaths. Similar findings were observed by Tanaka T et al.⁷ The present study also observed higher number of Suicidal deaths in the last two months of the COVID period. Although multiple factors could be involved, one of the

possible reasons could be the stress levels that kept increasing as time passed. A study done by Hai-Xin Bo et al.³⁷ studied the pattern of post-traumatic stress symptoms in clinically stable COVID-19 patients. They found the presence of post-traumatic stress symptoms among more than 96% of the COVID-19 patients before discharge. These findings suggest the negative psychological impact due to COVID, affecting the quality of life and an inclination towards suicidal tendencies.

Most studies supported the findings of an increase in suicide in both the sex with higher suicide observed in females compared to males¹⁵. However, the present study is consistent with an increase in overall suicidal deaths, but there is slightly more increase in suicidal deaths among males compared to females (Table 3), which is consistent with the study done by Sengupta et al.¹³ In every critical situation like COVID pandemic, vulnerable populations like elderly, females and children are at increased risk of getting affected. It has been observed that females suffered from adverse economic conditions and domestic violence due to job loss and financial stress of their male partner due to lockdown.

Ueda et al.⁶ found that young females of less than 40 years showed a maximum increase in suicidal deaths in all age groups. Our study noted similar findings with females from 13 years to 40 years showed increased incidences of suicidal deaths in the present study population. Also, males less than 20 years showed a marginal increase in suicidal deaths. As per the periodic labour force survey (PLFS) the unemployment rate among 15 years and above increased to 20.8% for April-June 2020 and 13.2% for July-September 2020 in the urban population.³⁸ Industrial production declined up to 28% in the initial few months of the pandemic worldwide, with about a 40-60% decrease reported from India³⁹. This resulted in a loss of livelihood and financial distress leading to increased suicidal ideation.

The least affected age groups were 40-50 years of age as they were most stable financially and did not face much impact of job loss due to savings and stable family structure. Older age individuals are affected both due to social isolation and disease conditions, leading to increased suicidal deaths in this age group. Most studies supported these findings and suggested measures to curb this issue in older individuals by a selective approach^{8,15,40-42}.

Hanging was suggested to be the most typical method of suicide¹³ which was also found in the

present study. It can be easily understood that hanging is the easily accessible and commonest painless form of death. Falling from height for a similar reason is also an easily accessible method for suicide. Poisoning, thermal deaths, and firearm deaths showed negative association most likely due to painful nature and prolonged hospitalization.

The negative psychological impact of the pandemic as a result of loss of life of loved ones, unemployment, financial distress, fear mongering by media etc. has led to an increase in suicidal deaths. Although our government took a series of steps like Food grain scheme, direct cash transfer, movement restrictions, setting up of infrastructure for diagnosis and management of COVID, etc, we need to do more in improving mental health and enhanced social connectedness for long term mitigation. For this we need to increase the awareness and decrease the taboo regarding mental health issues among general population. This can be achieved by traditional and social media campaigns to promote mental health. Importantly the slogan for COVID prevention should be physical distancing, not social distancing, along with other universal, selective, and indicated measures for suicidal prevention⁴³⁻⁴⁶.

CONCLUSION

COVID-19 was a dual pandemic causing death due to both infection and suicide. The present study provides quantitative data on the increase in suicidal deaths in both genders in different age groups.

RECOMMENDATIONS

1. Develop scientifically sound preventive strategies to mitigate morbidity and mortality associated with suicides.
2. Integrate functions of government bodies, media, social organizations, health care providers, and the public
3. Increase budgetary allocation for health, especially the mental health.
4. Develop further studies to better understand the impact of COVID on suicides in different regions.
5. Include more people under Job Guarantee schemes like MGNREGA which will lead to decreased suicide rate in times of high unemployment.
6. Promote online learning portals like SWAYAM, ATAL ACADEMY, etc to be better prepared for future job requirements.

7. Promote financial literacy in order to take effective and informed financial management decisions.

CONFLICTS OF INTEREST

There are no conflicts of interest.

ETHICAL ISSUES

None. Ethical clearance obtained from Institutional Ethical Committee of Atal Bihari Vajpayee Institute of Medical Sciences and Dr. Ram Manohar Lohia Hospital, New Delhi, India (File No. 494 (30/2021)/IEC/ABVIMS/RMLH/529)

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AUTHOR CONTRIBUTIONS

YT: Project proposal and data collection; **MSM:** Data collection and analysis; **JK:** Drafting project report; **SM:** Data collection and compilation; **RKS:** Writing final project report and proofreading.

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