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Long COVID as a Possible Contributor to Rising Suicide Mortality in Bharat (India): An Analysis of Suicide Trends Since the Emergence of COVID-19

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Abstract: Mortality due to suicide is amongst the largest public health concerns across the world today in Bharat (India). There have been concerns that the COVID-19 pandemic has contributed to worsening mental health outcomes across the world, including in Bharat. Furthermore, long COVID has been proposed to be a major consequence of COVID-19, which can also worsen mental health outcomes. Therefore, our objective in this study was to analyse trends in suicide mortality across Bharat and to compare these trends to changes prior to the COVID-19 pandemic; in addition, we aimed to analyse if long COVID had any role in these changes. It was found that, at a national level, the average annual increase in the suicide rate between 2019 and 2022 was 0.7 per 100,000 people (a 6.41% increase). There was also an average annual rise in suicide rates across 27 states/union territories (out of the 33 that were analysed). States/UTs with the highest annual increases since the start of the COVID-19, despite a decrease from 2018 to 2019, were Tamil Nadu (increased by 2.7; a 15.17% increase) and Telangana (increased by 1.9; a 9.22% increase). Multi-linear regression showed that the annual suicide rate changes were not associated with COVID-19 deaths per 10,000 people (standardized beta coefficient = 0.077; $p = 0.605$) but were associated with COVID-19 cases per 100 people (standardized beta coefficient = 0.578; $p < 0.001$). It has been shown that suicide mortality has worsened, and long COVID may have a potential role in this in Bharat.

Keywords: Bharat; COVID-19; long COVID; suicide; mortality

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1. Introduction

Suicide, which involves the intentional act of taking one's own life, is a major public concern across the world. Each year, over 700,000 people die by suicide globally, with more than 77% of these deaths occurring in low- and middle-income countries [1]. Suicidal mortality is often attributed to many causes and may occur at a result of an exacerbation of major mental health problems; prior to death by suicide, one may have issues of suicidal behaviour, which encompass suicidal ideation, threats or plans of suicide, suicide attempts, and completed suicides [2,3]. There is a wide array of potential risk factors for suicide, and these include affective disorders, addiction, antisocial behaviours, physical illness, being elderly, and a history of suicide attempts [4–6].

Bharat (India) is a nation in which suicidality is a major concern. Bharat has the highest number of deaths by suicide compared to any other nation, and suicide has been shown to be the leading cause of death in those who are aged 15–39 [7]. It has been demonstrated previously that factors associated with suicide mortality differ greatly from European and American nations, with marriage having previously been shown not to be a protective factor in Bharat, and the female-to-male ratio being higher in this country [8]. Other risk factor previously noted in the country include traumatic/difficult family problems, academic stress, exposure to violence, and economic distress [9].

In 2020, the coronavirus disease of 2019 (COVID-19) pandemic had begun. The pandemic has resulted in significant morbidity and mortality across the globe. It has been estimated that there have been more than seven million deaths attributed to COVID-19 worldwide [10]. Along with the direct impacts of the virus, the pandemic has led to a challenging life circumstance for many, with the psychological impact of COVID-19 being adverse. Quarantine restrictions and lockdowns increased the risk of suicide by causing fear and panic, frustration, scarcity of basic supplies, a lack of reliable information, perceived stigma, financial distress, and a lack of physical exercise [11]. Strict spatial distancing measures and social isolation tend to elevate anxiety levels, profoundly affecting vulnerable groups such as the elderly, individuals with preexisting medical conditions like respiratory issues, and those with preexisting mental health conditions such as depression and anxiety. These factors can significantly increase the risk of suicidality. Additionally, loneliness associated with lockdowns can lead to depression, which, if untreated, can drive individuals toward suicidal behaviour [12,13]. As a result of all of this, in terms of mental health impacts, there have been significant rises in depression, with approximately 53 million more cases of depression and 76 million more cases of anxiety disorders [14]. In Bharat, similar patterns have been seen, with 23% out of 2640 adult respondents in a survey reporting major anxiety, and 26% reporting major depression [15].

Although the COVID-19 pandemic has been declared over, concerns have been expressed regarding the persisting impacts of long COVID in Bharat, and across the world [16,17]. The WHO defines long COVID (also referred to as post-COVID-19 condition) as an illness in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually three months after the onset of COVID-19, with symptoms lasting at least two months and these symptoms being unable to be attributed to another diagnosis [17]. Some research has shown that psychiatric consequences of COVID-19 are widespread and can persist beyond six months [18]. Studies in Hong Kong and Colombia found that long COVID can worsen mental health, increasing depression and other psychiatric disorders [19]. In Haryana, India, long COVID significantly impacted mental health, with participants reporting persistent anxiety, depression, and stress [20]. A study in Eastern India found that 4% of long COVID patients post-Omicron wave self-reported depression [21].

Despite the rising evidence of the potential impacts of long COVID, much is not known about this syndrome and its resultant impacts. In particular, the evidence regarding its impacts on suicidal behaviour and suicide mortality among survivors of COVID-19 globally and in Bharat remains limited. Therefore, our objectives for this study were twofold: to assess the longer-term impacts of the COVID-19 on suicide mortality in Bharat at the state and national level and to determine if long COVID may be a contributor to changes in suicide mortality rates across the nation.

2. Methods

For this work, we intended to analyse and compare trends in suicide across Bharat both before and after the start of the COVID-19 pandemic. We carried this out by first evaluating the total numbers of suicide and suicide rates (per 100,000 individuals) annually with national level data. More precisely, this entailed analysing trends in each of these parameters between the years of 2012 to 2022. These trends were visually depicted in figures. To analyse trends in further detail, we also evaluated annual increases/decreases between the years 2018 to 2019 with the average annual change from the years 2019 to 2022. Absolute increases/decreases and percent changes across these time periods were evaluated.

After providing a comparison of national level trends, trends at the state and union territory (UT) levels were next analysed. With the exception of Jammu and Kashmir, Ladakh, Dadra and Nagar Haveli, Daman and Diu, all states and UTs were included in our analyses. These states and UTs were excluded from this study due to issues with inconsistencies in the reporting of data across years for these regions. Once again, data on total number of suicides and suicide rates (per 100,000 individuals) from 2018 to 2022 are

provided and shown in tabular format. Annual absolute increases/decreases and percent changes were calculated for state/UT, and comparisons were made for 2018 to 2019 and the average annual change from 2019 to 2022. The most notable increases and decreases are thereafter described.

Data for suicide mortality across Bharat were retrieved from the annual reports known as the Accidental Deaths and Suicides in India (ADSI) by the National Crime Records Bureau of the Ministry of Home from each of the years between (and including) 2018 and 2022 [22–26]. These reports contain publicly available data that are published annually by the Government of Bharat and contain detailed data on factors relating to suicide mortality, but also on mortality relating to accidental causes [22–26].

Next, to assess for the role of the COVID-19 pandemic, and the potential role of long COVID, we aimed to analyse the relationship between COVID-19 incidence and mortality to suicide mortality. To carry this out, we conducted bivariable linear regression analysis between COVID-19 cases per 100 individuals and annual change in suicide rate from 2019 to 2022 at the state/UT level, and again between COVID-19 deaths per 10,000 individuals and annual change in suicide rates from 2019 to 2022 at the state/UT level. Thereafter, multivariable linear regression was conducted with annual change in suicide rates from 2019 to 2022 to the two aforementioned COVID-19 variables. COVID-19 data were acquired from publicly available datasets by the Government of Bharat [27]. Statistical analysis was completed using SPSS Version 28 [28].

As this study did not involve human participants and instead involved analysing data from publicly available sources, ethics board approval was not required.

3. Results

3.1. National Suicide Trends

Long-term trends demonstrate that there was a net decrease in total suicides between 2012 and 2017, from 135,445 annual deaths to 129,887. From 2017 onwards, the total number of suicides has increased at the national level, with the highest number of deaths occurring in 2022 at 170,924. However, the annual total number of suicide deaths has risen since the start of the COVID-19 pandemic in 2020. Between 2018 and 2019, there was an annual increase of 4607 deaths (percent increase of 3.42%). In comparison, the average annual increase in deaths since 2020 was 10,600.33 (percent increase of 7.62%). A depiction of long-term annual suicide deaths is shown in Figure 1.

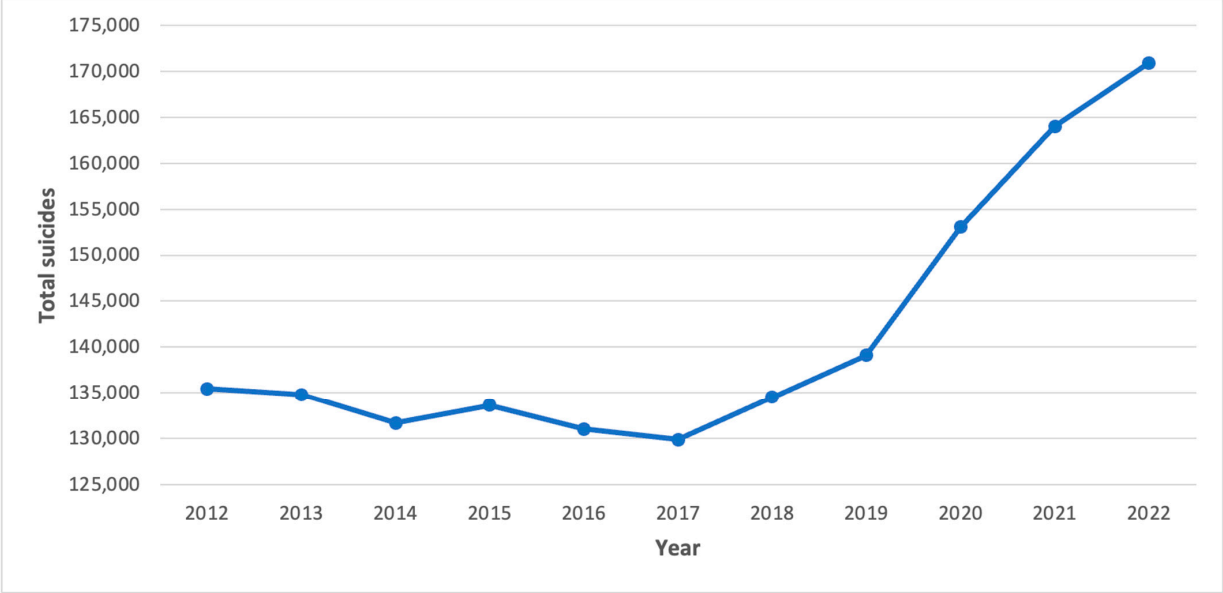

Figure 1. Long-term trends in number of suicides per year in Bharat.

Similar trends have been shown for suicide rates at a national level. There were continual declines in suicide rate across Bharat from 2012 to 2017, decreasing from 11.2 suicides per 100,000 people to 9.9. However, after 2017, there were annual rises in the suicide rate across the country. Furthermore, the rise in suicide rates has accelerated since the start of the COVID-19 pandemic. Between 2018 and 2019, the suicide rates rose by 0.2 per 100,000 people (percent increase of 1.96%), whereas the average annual increase between 2019 and 2022 was 0.7 per 100,000 people (percent increase of 6.41%). Long-term annual trends in suicide rates at the national level are shown in Figure 2.

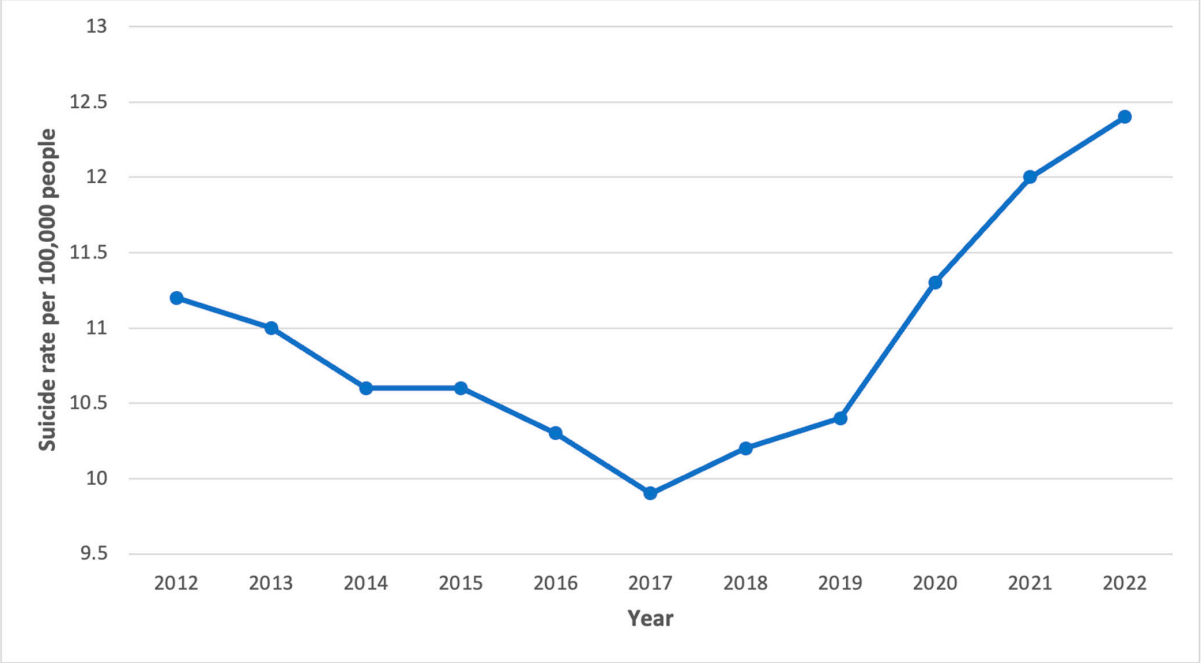

Figure 2. Long-term trends in suicides per 100,000 by year in Bharat.

3.2. State Level Trends—Total Suicides

Trends across states and UTs in Bharat of total number of suicides are shown in Table 1. Across the 33 states and UTs that were analysed, the majority had an overall increase in total suicides prior to the COVID-19 pandemic. Between 2018 to 2019, 20 states and UTs had an increase in suicide rates, compared to 13 that had an overall decrease. The largest decreases in this period were in West Bengal (decreased by 590; 4.45% decrease), Tamil Nadu (decreased by 403; 2.90% decrease), Karnataka (decreased by 273; 2.36%), Telangana (decease by 170; 2.17% decrease), and Himachal Pradesh (decreased by 156; 21.08% decrease). In contrast, the largest increases occurred in Andhra Pradesh (increased by 1146; 21.55% increase), Maharashtra (increased by 944; 5.25% increase), Madhya Pradesh (increased by 682; 5.79% increase), Punjab (increased by 643; 37.51% increase), and Uttar Pradesh (increased by 615; 12.68% increase).

Table 1. Total number of suicides and changes in total suicides across Bharat.

State/Union Territory	Number of Suicides					Absolute Increase/Decrease		Percent Increase/Decrease	
	2018	2019	2020	2021	2022	2018–2019	2019–2022 (Average Annual Change)	2018–2019	2019–2022 (Average Annual Change)
Andhra Pradesh	5319	6465	7043	8067	8908	1146	814.33	21.55	12.60
Arunachal Pradesh	132	112	160	160	149	−20	12.33	−15.15	11.01

Table 1. *Cont.*

State/Union Territory	Number of Suicides					Absolute Increase/Decrease		Percent Increase/Decrease	
	2018	2019	2020	2021	2022	2018–2019	2019–2022 (Average Annual Change)	2018–2019	2019–2022 (Average Annual Change)
Assam	2379	2370	3243	3262	3320	−9	316.67	−0.38	13.36
Bihar	443	641	809	827	702	198	20.33	44.70	3.17
Chhattisgarh	7046	7629	7710	7828	8446	583	272.33	8.27	3.57
Goa	256	259	308	321	302	3	14.33	1.17	5.53
Gujarat	7793	7655	8050	8789	9002	−138	449.00	−1.77	5.87
Haryana	3547	4191	4001	3692	3783	644	−136.00	18.16	−3.25
Himachal Pradesh	740	584	857	889	644	−156	20.00	−21.08	3.42
Jharkhand	1317	1646	2145	1825	2181	329	178.33	24.98	10.83
Karnataka	11,561	11,288	12,259	13,056	13,606	−273	772.67	−2.36	6.85
Kerala	8237	8556	8500	9549	10,162	319	535.33	3.87	6.26
Madhya Pradesh	11,775	12,457	14,578	14,965	15,386	682	976.33	5.79	7.84
Maharashtra	17,972	18,916	19,909	22,207	22,746	944	1276.67	5.25	6.75
Manipur	52	58	44	49	26	6	−10.67	11.54	−18.39
Meghalaya	189	198	224	226	213	9	5.00	4.76	2.53
Mizoram	79	70	108	99	153	−9	27.67	−11.39	39.52
Nagaland	36	41	48	43	49	5	2.67	13.89	6.50
Odisha	4592	4582	5546	5651	6140	−10	519.33	−0.22	11.33
Punjab	1714	2357	2616	2600	2441	643	28.00	37.51	1.19
Rajasthan	4333	4531	5658	5593	5343	198	270.67	4.57	5.97
Sikkim	199	220	285	266	293	21	24.33	10.55	11.06
Tamil Nadu	13,896	13,493	16,883	18,925	19,834	−403	2113.67	−2.90	15.66
Telangana	7845	7675	8058	10,711	9980	−170	768.33	−2.17	10.01
Tripura	720	728	845	771	713	8	−5.00	1.11	−0.69
Uttar Pradesh	4849	5464	4804	5932	8176	615	904.00	12.68	16.54
Uttarakhand	421	516	943	717	814	95	99.33	22.57	19.25
West Bengal	13,255	12,665	13,103	13,500	12,669	−590	1.33	−4.45	0.01
A&N Islands	164	181	180	159	171	17	−3.33	10.37	−1.84
Chandigarh	160	131	128	120	131	−29	0.00	−18.13	0.00
Delhi (UT)	2526	2526	3142	2840	3417	0	297.00	0.00	11.76
Lakshadweep	3	0	2	1	2	−3	0.67	−100.00	N/A
Puducherry	500	493	408	504	481	−7	−4.00	−1.40	−0.81
Bharat (total)	134,516	139,123	153,052	164,033	170,924	4607	10,600.33	3.42	7.62

Overall, the highest number of suicides in 2022 occurred in Maharashtra (22,746 deaths), followed by Tamil Nadu (19,834), and Madhya Pradesh (15,386). After the start of the pandemic, there was an increase in total suicides across 28 states and UTs, with a decrease in five (Haryana, Manipur, Tripura, Andaman and Nicobar Islands and Puducherry). Haryana had the largest decrease, with an annual decline of suicide deaths of 136 per year (3.25% annual decrease). Overall, there was also a higher increase in total suicides annually from 2019 to 2022 compared to 2018 to 2019. States with the highest annual increases, despite an annual decrease from 2018 to 2019, were Tamil Nadu (2113.67 annual increase; 15.66% increase), Karnataka (772.67 annual increase; 6.85% increase), Telangana (768.33 annual increase; 10.01% increase), and Odisha (519.33 annual

increase; 11.33% increase). Other states with the highest increase in total annual suicides after the start of the COVID-19 pandemic were Maharashtra (1276.67 annual increase; 6.75% increase), Madhya Pradesh (976.33 annual increase; 7.84% increase), Andhra Pradesh (814.33 annual increase; 12.60%), and Kerala (535.33 annual increase; 6.26% increase).

3.3. State Level Trends—Suicide Rates

Trends in suicide rates (per 100,000 people) across the states and UTs are shown in Table 2. Across the 33 states and UTs, suicide rates increased in 20 states and decreased in 13 from 2018 to 2019. The largest decreases in suicide rates occurred in Meghalaya (decreased by 9.9; a 61.88% decrease) and Lakshadweep (decreased by 4.3; a 100% decrease), followed by Chandigarh (decreased by 2.6; a 18.98% decrease) and Himachal Pradesh (decreased by 2.2; a 21.57% decrease). In contrast, the largest increases in suicide rates occurred in Andaman and Nicobar Islands (increased by 4.5; a 10.98% increase), Mizoram (increased by 3.4; a 136.00% increase), Sikkim (increased by 2.9; a 9.60% increase), and Andhra Pradesh (increased by 2.2; a 21.57% increase). The change in the suicide rate across states and UTs from 2018 to 2019 was a decrease of 0.05.

Table 2. Rates of suicide (per 100,000) and changes in suicide rates across Bharat.

State/Union Territory	Rate of Suicide (Per 100,000)					Absolute Increase/Decrease		Percent Increase/Decrease	
	2018	2019	2020	2021	2022	2018–2019	2019–2022 (Average Annual Change)	2018–2019	2019–2022 (Average Annual Change)
Andhra Pradesh	10.2	12.4	13.4	15.3	16.8	2.2	1.5	21.57	11.83
Arunachal Pradesh	8.9	7.4	10.5	10.4	9.6	−1.5	0.7	−16.85	9.91
Assam	7	6.9	9.3	9.3	9.4	−0.1	0.8	−1.43	12.08
Bihar	0.4	0.5	0.7	0.7	0.6	0.1	0.0	25.00	6.67
Chhattisgarh	24.7	26.4	26.4	26.4	28.2	1.7	0.6	6.88	2.27
Goa	16.7	16.8	19.9	20.6	19.2	0.1	0.8	0.60	4.76
Gujarat	11.6	11.2	11.6	12.5	12.7	−0.4	0.5	−3.45	4.46
Haryana	12.5	14.5	13.7	12.5	12.6	2	−0.6	16.00	−4.37
Himachal Pradesh	10.2	8	11.6	12	8.7	−2.2	0.2	−21.57	2.92
Jharkhand	3.6	4.4	5.6	4.7	5.6	0.8	0.4	22.22	9.09
Karnataka	17.7	17.1	18.4	19.5	20.2	−0.6	1.0	−3.39	6.04
Kerala	23.5	24.3	24	26.9	28.5	0.8	1.4	3.40	5.76
Madhya Pradesh	14.5	15.1	17.4	17.6	17.9	0.6	0.9	4.14	6.18
Maharashtra	14.8	15.4	16.1	17.8	18.1	0.6	0.9	4.05	5.84
Manipur	1.7	1.9	1.4	1.5	0.8	0.2	−0.4	11.76	−19.30
Meghalaya	16	6.1	6.9	6.9	6.4	−9.9	0.1	−61.88	1.64
Mizoram	2.5	5.9	8.9	8.1	12.4	3.4	2.2	136.00	36.72
Nagaland	1.7	1.9	2.2	2	2.2	0.2	0.1	11.76	5.26
Odisha	10.5	10.5	12.2	12.3	13.3	0	0.9	0.00	8.89
Punjab	5.8	7.9	8.7	8.6	8	2.1	0.0	36.21	0.42
Rajasthan	5.7	5.8	7.2	7	6.6	0.1	0.3	1.75	4.60
Sikkim	30.2	33.1	42.5	39.2	43.1	2.9	3.3	9.60	10.07
Tamil Nadu	18.4	17.8	22.2	24.7	25.9	−0.6	2.7	−3.26	15.17
Telangana	21.2	20.6	21.5	26.9	26.3	−0.6	1.9	−2.83	9.22

Table 2. *Cont.*

State/Union Territory	Rate of Suicide (Per 100,000)					Absolute Increase/Decrease		Percent Increase/Decrease	
	2018	2019	2020	2021	2022	2018–2019	2019–2022 (Average Annual Change)	2018–2019	2019–2022 (Average Annual Change)
Tripura	18.2	18.2	20.9	18.9	17.3	0	−0.3	0.00	−1.65
Uttar Pradesh	2.2	2.4	2.1	2.6	3.5	0.2	0.4	9.09	15.28
Uttarakhand	3.8	4.6	8.3	6.3	7	0.8	0.8	21.05	17.39
West Bengal	13.7	13	13.4	13.7	12.8	−0.7	−0.1	−5.11	−0.51
A&N Islands	41	45.5	45	39.7	42.8	4.5	−0.9	10.98	−1.98
Chandigarh	13.7	11.1	10.7	9.9	10.7	−2.6	−0.1	−18.98	−1.20
Delhi (UT)	12.9	12.7	15.5	13.7	16.2	−0.2	1.2	−1.55	9.19
Lakshadweep	4.3	0	2.9	1.5	2.9	−4.3	1.0	−100.00	N/A
Puducherry	33.8	32.5	26.3	31.8	29.7	−1.3	−0.9	−3.85	−2.87
Bharat (total)	10.2	10.4	26.3	12	12.4	0.2	0.7	1.96	6.41

After the occurrence of the COVID-19, in 2022 the highest suicide rates per 100,000 people were in Sikkim (43.1), Andaman and Nicobar Islands (42.8), Puducherry (29.7), Kerala (28.5) and Chhattisgarh (28.2). After the start of the pandemic, there was an average annual rise in suicide rates across 27 states/UTs and a decrease in seven states/UTs (Haryana, Manipur, Tripura, West Bengal, Andaman and Nicobar Islands, Chandigarh, and Puducherry). The largest decreases were in the Andaman and Nicobar Islands (decreased by 0.9; a 1.98% decrease) and Haryana (decreased by 0.6; a 4.37% decrease). While there was a decrease in the suicide rate from 2018 to 2019, the average annual change in suicide rates across states and UTs from 2019 to 2022 was an increase of 0.65. The states/UTs with the highest annual increases since the start of the COVID-19, despite a decrease from 2018 to 2019, were Tamil Nadu (increased by 2.7; a 15.17% increase), Telangana (increased by 1.9; a 9.22% increase), Delhi (increased by 1.2; a 9.19% increase), Karnataka (increased by 1.0; a 6.04% increase) and Assam (increased by 0.8; a 12.08% increase). The other states with the highest annual increase in suicide rates were Sikkim (increased by 3.3; a 10.07% increase), Mizoram (increased by 2.2; a 36.72% increase), Andhra Pradesh (increased by 1.5; a 11.83% increase), Kerala (increased by 1.4; 5.76% increase) and Odisha (increased by 0.9; a 8.89% increase).

3.4. Associations with COVID-19 Caseload and Deaths

For bivariable regression conducted between COVID-19 cases per 100 people and average annual change in suicide rates by state/UT from 2019 to 2022, there was a statistical correlation (Pearson correlation coefficient = 0.581; $p < 0.001$; 95% CI: 0.297, 0.771). For bivariable regression, there was no statistical correlation between COVID-19 deaths per 10,000 people and the average annual change in suicide rates (Pearson correlation coefficient = 0.101; $p = 0.577$; 95% CI: −0.251, 0.429). Multi-linear regression was next conducted, and it was shown that the annual changes in suicide rate were not associated with COVID-19 deaths per 10,000 people (standardized beta coefficient = 0.077; $t = 0.523$; $p = 0.605$) but were associated with COVID-19 cases per 100 people (standardized beta coefficient = 0.578; $t = 3.904$; $p < 0.001$).

4. Discussion

In this study, it has been demonstrated that there has been a major rise in suicide mortality across Bharat since the emergence of COVID-19. While the rise in total suicide deaths and suicide rates was occurring prior to the start of the pandemic, our analysis has demonstrated that these rises have accelerated since the start of the COVID-19 pandemic.

These trends regarding disease control differ from those for major conditions in Bharat, such as HIV and tuberculosis [29,30]. Overall, these findings demonstrate that there is a clear need for more research to be conducted in order to understand the many factors that have contributed to these rises in suicide mortality. Of note, in a number of states, the rate of suicide has instead decreased since the start of the COVID-19 pandemic. For example, in both Andaman and Nicobar Islands and Haryana, there was a notable decrease in suicide rates between the years 2019 and 2022. More research should be conducted in these contexts to aim to understand the factors that led to these decreases. Such findings may offer utility in efforts to reduce suicide rates throughout Bharat.

The trends of rising suicide in Bharat also demonstrate a larger need to focus on upstream factors that contribute to poor mental health outcomes and mental health conditions such as depression and anxiety in Bharat. During the pandemic, aside from those pertaining to suicide, it has been shown that mental health outcomes have worsened across Bharat [15]. There is hence a need for more research to determine how mental health morbidities can be improved across the country. Connected to this point, these findings indicate a clear need for more allocation of funding towards mental health care as part of government initiatives. Access to more psychiatrists in the nation is clearly needed, as the country currently only has approximately 0.30 psychiatrists per 100,000 population [31]. Increased funding for mental health supports should also involve a focus on improving access to counselling while also working to improve traditional approaches and fostering protective factors. For example, it has been shown that traditional healers have a valuable role in providing mental health support in certain regions, and there may be notable benefits in improving integration of such healers into health and medical systems [32].

An additional crucial finding from our analyses has been that pertaining to the link between the COVID-19 caseload in certain geographic regions with changes in suicide rates after the emergence of COVID-19. Importantly, it was found that COVID-19 deaths in the population were not associated with these rises in suicide rates—this may indicate that it is specifically those who survive from COVID-19 who are at a higher risk of suicide. These findings may demonstrate a possible role of long COVID leading to higher suicide rates in the country. While there are potentially confounding factors to this, these findings regarding long COVID may have important implications in explaining the extent of the long-term impacts of the COVID-19 pandemic. There is a need for further research on the biological basis for long COVID causing all forms of mental health impacts, but especially suicide. Further research should also work towards focusing on providing tools for diagnosing long COVID, providing a prognosis, and determining factors that increase risk of occurrence of this condition. Furthermore, there is a clear need to better understand the condition so that treatment regimens can be developed.

There are a number of limitations to this study that need to be considered. First of all, this was a study at the level of the nation and the state; while these findings may provide important insights regarding trends on a large scale, they do not provide thorough insights regarding the realities in local settings. Furthermore, they do not provide explanation regarding the geographic and health factors across these regions that may provide explanations regarding the differences in rates. An additional limitation is that, while this study does provide important insights regarding the potential role of long COVID in exacerbating suicide risk, the study does not provide answers as to the ways in which or reasons why they occur; of note, there also may be an array of other confounding factors, such as impacts of quarantining measures and the loss of social connection during the pandemic, which may have had a role on suicide rates but were not able to be considered in our analysis. Regardless of these limitations, our study has provided important insights regarding the mental health impacts of the COVID-19 pandemic, and in potentially demonstrating the role that long COVID may have had in the rising rates of suicide across Bharat.

5. Conclusions

In our study, we have demonstrated that, with the COVID-19 pandemic, there have been major rises in suicide deaths and suicide at both a state and national level in Bharat. A particularly worrying aspect of these trends has been that this rise in suicide mortality has occurred at a rate that is faster than that prior to the COVID-19 pandemic. Our study has also demonstrated that, as the COVID-19 caseload has been associated with these changes in suicide mortality rates, there is potential for long COVID to have had an important role in contributing to overall suicidality across Bharat. These findings indicate an urgent need for improved mental health care and access across the country, whether this be with psychiatrists, counsellors, or traditional healers. Additionally, there is a clear need for more research on the causes, risks, outcomes, and treatments of long COVID.

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