

## Suicide in India: Distinct Epidemiological Patterns and Implications

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### ABSTRACT

Suicide is a societal crisis which also deeply impacts the personal and family realms. Indian suicidal data present distinctive epidemiological patterns when we compare it with the global suicide rates and trends. Higher proportions of young individuals are resorting to suicide compared to any other country in the world, and Indian suicide rates, especially South Indian rates, are one of the highest in the world. In this article, we present various historical aspects and theories of Indian suicide and review of available Indian research from various sources such as community, hospitals, schools and forensic settings. We discuss our findings which reveal the distinctiveness of Indian data when we compare these with global data and draw implications for practice and policy.

**Keywords:** *Attempted suicide, epidemiology, India, self-injurious behavior, suicide*

Suicide is a personal, family, and societal crisis. According to the WHO 2012 estimates, 8 lakh people globally die by suicide every year which amounts to a suicide death every 40 s. Suicide attempts are thought to be at least 25 times the suicide death rates. What becomes important in these estimates is that 75% of these deaths happen in the low- and middle-income countries (LMICs), i.e., the developing countries.<sup>[1]</sup>

Earlier research used to rank India lower than some of the Western European and Scandinavian countries. Over the past decade, good-quality community studies with a valid methodology which ensures good reporting have displayed that India is one among the countries with high suicide rates. This is a striking fact. Recent steps toward decriminalization of suicide would also help better estimate the extent of this problem as well as encourage public health interventions. We review the available research on suicide estimates in India and try to draw a few conclusions.

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## HISTORICAL ASPECTS OF SUICIDE

Suicide has been described in the earliest extant literary works and all major civilizations worldwide. In India, suicide has strong sociocultural determinants dating back to the earliest Hindu scriptures. Unlike many other faiths, Hinduism does not accord suicide the status of a sin<sup>[2]</sup> warranting eternal damnation, and it is one among many other negative deeds in the circle of rebirths. Ritualistic suicidal practices (such as “sati” and “jauhar”) specifically for women were common in Ancient Hinduism, and the resultant death was considered a virtuous one.<sup>[3]</sup> Ancient Indian philosophy gave importance to three “gunas” or qualities, akin to modern concepts of personality traits. These were sattva (sacrificial), rajas (greed), and tamas (affecting factor that darkens or clouds judgment). Persons with sattva are said to be less suicide prone, and persons with tamas the most (as tamas is considered the root of all sin).<sup>[3]</sup>

## SEARCH STRATEGY

We systematically searched open -access scientific databases such as PubMed, PLoS, IndMed, Google Scholar, and few journals such as Indian Journal of Psychiatry and Indian Journal of Psychological Medicine. The details of the search are given in Table 1.

We included 33 articles in the final review. The reviewed articles fell into five broad categories. These are community-based verbal autopsies and surveys (11 studies [Table 2]), hospital-based studies (4 studies [Table 3]), school and college surveys (3 studies [Table 4]), medicolegal studies based on police records and postmortem reports (6 studies [Table 5]), and special populations (9 studies [Table 6]). In our appraisal, we found that community- and hospital-based studies had better-quality evidence than the other categories of studies. Although the other categories of studies have compromised the quality of evidence, we included them as they give us information from sources which have not been considered in other reviews on the subject.

### *Community studies*

Most of the community-based studies are from South India but are well performed with good methodology and reporting of data [Table 2]. Many estimated

**Table 1: Search results**

Database	Terms used	Number of hits	Positive results
PubMed	“Suicide, attempted/epidemiology (MeSH)”	811	24
	“Suicide/epidemiology” (MeSH) and “suicide/statistics and numerical data” (MeSH)	3156	
IndMed	Suicide	280	25

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Database	Terms used	Number of hits	Positive results
PLoS	Suicide and India	1870	5
Google Scholar	Allintitle: Suicide India	280	9
Total unsorted articles			63
Total articles, after rejection of abstracts and duplicates			39
Final full-text articles, after rejecting articles without original data			33

deaths by the verified method of verbal autopsy. These studies show high suicide rates. The results form a bimodal or a two-peak curve across the age groups, one at 15–24 years and another after 60–65 years. In the first peak, females exceed the males in the number of suicides. Poongothai et al. (Chennai Urban Rural Epidemiology Study), 2009 also attested to this sex distribution. Patel et al., 2012, which was a national representative study based on million death study, confirm higher South Indian rates compared to rest of India. They also report high rates in rural India. WHO SUicide PREvention-Multisite Intervention Study on Suicidal and CIEMS studies report significantly high rates of ideation and attempts in the community and also suggest that there might be a smooth and continuous evolution from ideation to attempts, both of which need further study.

### *Hospital-based studies*

Hospital data [Table 3] show higher percentages of attempts in the second and third decades of life. More men who attempted suicide are admitted in the hospital compared to women, while more women are referred for psychiatric help compared to men. Elderly are not represented as a significant group when compared to the community sample, which might be due to disparities in the healthcare accessibility and service usage.

### *School and college surveys*

School and college surveys [Table 4] provide important data as they are conducted among the vulnerable group which represents the first peak in the age-specific suicide rates. The studies as depicted in Table 4 report high proportions of people with suicidal ideation. These studies, especially Arun and Chavan, 2009, reported high proportions of psychological problems. The risk factors which correlated with higher percent of ideation and attempts are single parent alive, working mother, role models using substance, and part-time work. The school and college population has to be focused on so that timely help can be provided with preventive strategies and training in life skills modules.

### *Medicolegal studies*

In the medicolegal studies [Table 5], people in their third and fourth decades of life are over-represented which correlates with community and hospital studies; however, again, elderly

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are underrepresented. All the studies found male preponderance, except for Mohanty et al., 2007 where an equal proportion of both sexes was found. These studies shed a new light with regard to the method of suicide. As with other categories, the most common methods were poisoning, hanging, and self-immolation. However, firearms, an often neglected method in Indian suicide research, presents as the third and fourth common methods of suicide in Singh.

**Table 2: Summary of community studies**

Author and date	Studies on suicide deaths	Sex distribution	Suicide rate/100,000 (male; female)
Joseph <i>et al.</i> , 2003 <sup>[4]</sup>	Verbal autopsy	Female > male in 15-24 years; Male > female in others	95.2
Aaron <i>et al.</i> , 2004 <sup>[5]</sup>	Verbal autopsy of 10-19-year olds	Female > male	58; 148
Abraham <i>et al.</i> , 2005 <sup>[6]</sup>	Verbal autopsy of elderly (>55 years)	Male > female	189
Bose <i>et al.</i> , 2006 <sup>[7]</sup>	Verbal autopsy	Male > female	82.2
Prasad <i>et al.</i> , 2006 <sup>[8]</sup>	Verbal autopsy	Male > female	92.1 (112; 72.2)
Gajalakshmi and Peto, 2007 <sup>[9]</sup>	Verbal autopsy	Female > male in 15-24 years; Male > female in others	62 (71; 53)
Soman <i>et al.</i> , 2009 <sup>[10]</sup>	Verbal autopsy (profile)	Male > female	44.7; 26.8
Patel <i>et al.</i> , 2012 <sup>[11]</sup>	National representative mortality survey	Male > female	22 (26.3; 17.5) South India (52.9; 32.2) Rural India (31.5; 20.4)
Poongothai <i>et al.</i> , 2009 <sup>[12]</sup>	Community survey (CURES)	Female > male	Ideation (12.4)
Bertolote <i>et al.</i> , 2005 <sup>[13]</sup>	Community survey (WHO SUPRE-MISS) of ideation and attempts	-	Ideas (2.6), plans (2), attempts (1.6)
Jonas <i>et al.</i> , 2014 <sup>[14]</sup>	Population-based study (CIEMS) of suicidal ideation	Female > male	Ideas (5.1), attempts (4.2)

CURES – Chennai Urban Rural Epidemiology Study; SUPRE-MISS – SUicide PREvention-Multisite Intervention Study on Suicidal; CIEMS – Central India Eye and Medical Study

**Table 3: Summary of hospital based studies**

Author and date	Method	Sex distribution	Age distribution
Rao 1965 <sup>[15]</sup>	Admissions of suicide attempt	Male > female	16-30-year olds constituted 70%
Bagadia <i>et al.</i> , 1971 <sup>[16]</sup>	Admissions of suicide attempt	Male > female	16-35-year olds constituted 78%
Baruah and Baruha, 2007 <sup>[17]</sup>	Study of deaths and attempts	-	15-29-year olds constituted 54.4% and 30-44-year olds 28%
Kumar <i>et al.</i> , 2009 <sup>[18]</sup>	Referrals of suicide attempt	Female > male	20-29-year olds constituted 36.1% and 30-39-year olds 41.6%

**Table 4: Summary of school and college surveys**

Author and date	Age group studied	Sex distribution	Percentage in sample
Sidhartha and Jena, 2006 <sup>[19]</sup>	12-19-year olds	Female > male	Ideas (21.7); attempts (8)
Sharma <i>et al.</i> , 2008 <sup>[20]</sup>	14-19-year olds	Female > male	Ideas (15.8); attempts (5.1)
Arun and Chavan, 2009 <sup>[21]</sup>	12-17-year olds	Male = female	Ideas (6); attempts (0.4)

*et al.*, 2005 and Chaudhary and Dinesh, 2016 studies, respectively.

### **Special populations**

Studies of suicide in special populations are few [Table 6]; however, they provide data which can be studied further in future. About 30% of schizophrenia deaths are due to suicide as shown in Thara, 2012 and Bagewadi *et al.*, 2016 studies. High rates of suicidal ideas and attempts in wives of alcoholics represent the stress and family disturbance due to alcohol use disorders. One would expect high proportions of people suffering from depressive disorders in the people with terminally ill cancer, but Latha and Bhat, 2005 have found only 3.8% with major depressive disorder. People with obsessive-compulsive disorder also reported higher rates of ideation and attempted emphasizing the distress and disability it may cause. Suicidal ideation among prisoners has to be studied further with a view to develop strategies to address it. Bardale and Dixit, 2015 present an interesting perspective from behind bars. They report that a significant minority (8%) of deaths is due to suicide and 78.6% of these are among 21–40-year olds. This has to be further enquired into and addressed.

### PSYCHIATRIC DISORDERS AND SUICIDE

Alcohol use disorders, financial problems, interpersonal problems, and academic or romantic failures form important issues causing psychological distress. Rao 1965, Sharma et al. 1978, Latha and Bhat 2005, and Mohanty et al. 2007 report 13.2% disorders, 25.4% disorders including alcoholism, 3.8% depressive disorders, and 6.2% disorders, respectively. These findings are very different from those reported in Western countries. Impulsive personality trait is also reported as one of the major contributors to suicide in Indian studies.

### MARITAL STATUS AND SUICIDE

Most of the included studies had a significant percentage of married people ranging from 27% to 77%. It is commented by an earlier review<sup>[2]</sup> that marital status did not have a protective effect in Indian suicides.

**Table 5: Summary of medicolegal studies**

Author and date	Method	Sex distribution	Age (% deaths)	Percentage in sample
Sharma and Gopalakrishna 1978 <sup>[22]</sup>	Deaths according to police records	Male > female	10-24 (16), 25-44 (59), ≥45 (25)	-
Singh <i>et al.</i> , 2005 <sup>[23]</sup>	Postmortem examination	Male > female	11-20 (21), 21-30 (37), ≥31 (42)	7
Mohanty <i>et al.</i> , 2007 <sup>[24]</sup>	Postmortem examination	Male = female	11-20 (20), 21-30 (41.5), 31-40 (23), ≥41 (15.5)	28
Murkey <i>et al.</i> , 2009 <sup>[25]</sup>	Postmortem examination among elderly (>50 years)	Male > female	50-59 (47.5), 60-69 (31), 70-79 (15), 80-89 (6)	32
Rathod and Baratwaj, 2015 <sup>[26]</sup>	Postmortem examination	-	20-29 (49), 20-49 (68.2)	43.3
Chaudhary and Dinesh, 2016 <sup>[27]</sup>	Postmortem examination	Male > female	20-40 (61)	11.35

**Table 6: Summary of studies in special populations**

Author and date	Population	Sex distribution	Percentage in sample
Latha and Bhat, 2005 <sup>[28]</sup>	Terminally ill cancer -	-	Ideas (9.2)
Manohar and Kannappan, 2010 <sup>[29]</sup>	Wives of alcoholics -	-	Ideas (78), plans (19), past attempts (22)
Bhogale <i>et al.</i> , 2011 <sup>[30]</sup>	Referrals from ICU -	-	Attempts (33)
Dhyani <i>et al.</i> , 2013 <sup>[31]</sup>	OCD -	-	Ideas (56), attempts (19.2)

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Ramakrishna and Rajni, 2014 <sup>[32]</sup>	Vitiligo	-	Ideas (28.3)
Ayirolimeethal <i>et al.</i> , 2014 <sup>[33]</sup>	Prisoners	Male > female	Ideas (4)
Bardale and Dixit, 2015 <sup>[34]</sup>	Prison deaths	Male > female	8 of all deaths; 78.6 of these were in 21-40 years of age
Rangaswamy, 2012 <sup>[35]</sup>	Schizophrenia	Male = female	32 of all deaths
Bagewadi <i>et al.</i> , 2016 <sup>[36]</sup>	Schizophrenia	-	33.3 of all deaths

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ICU – Intensive Care Unit; OCD – Obsessive-compulsive disorder

### METHOD AND SUICIDE

The most common methods in many studies presented here are poisoning (in almost all cases, pesticides) and hanging. These being easily available with no laws for restriction of access are resorted to by many Indians who attempt suicide. Self-immolation, drowning, and jumping from heights are other significant methods. Women more commonly than men choose self-immolation<sup>[37]</sup> and drowning as methods of suicide. This prevalence of self-immolation among young women probably has deep sociocultural roots in India, with “fire” considered as an agent of purification in Hinduism or as an attempt at escape from hardship or humiliation. These themes were reflected in ancient archaic practices such as “sati” and “jauhar.”<sup>[2]</sup> As India has stricter licensing laws restricting the use of firearms compared to countries such as the United States of America, this method is considered to be less often used. Firearms are not focused on in Indian suicide literature; however, as the medicolegal studies reveal, they can be chosen by a significant proportion of people if accessible.

### DISCUSSION

India has one of the highest suicide rates in the world. Some of the countries with high suicide rates are South Korea (36.8), Guyana (34.8), Lithuania (33.5), Sri Lanka (29.2), Suriname (28.3), Hungary (25.4), Kazakhstan (24.2), and Japan (23.1).<sup>[38]</sup> When we compare the available rates with the above-mentioned WHO 2012 global estimates,<sup>[39]</sup> South Indian suicide rates are definitely the highest in the world and overall Indian suicide rate is among the top ten countries. These high Indian suicide rates also contribute both to the high regional average rate of 17.1 in South East Asia Region and to the 75% of global suicides which happen exclusively in LMICs. Decriminalization of suicide and further community studies would help get a realistic estimate which might increase the rate above the current rate of 22<sup>[11]</sup> or 20.9 (according to the WHO 2012 report).

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The first suicide rate peak among 15–24-year olds is the distinctive feature of Indian suicides compared to age-specific rates of most of the countries. Although Sri Lanka<sup>[40]</sup> and China<sup>[41]</sup> share with us the finding of higher proportion of young (i.e., 15–29 years) female suicides, they do not have the overall increased suicide rate at 15–24 years. Most of the countries, including South Korea, Japan,<sup>[42]</sup> and Sri Lanka, have the peak of suicide rate above 45 or 65 years cutoff. This finding points to the fact that we are losing larger proportions of young people to suicide than any country in the world. It is a somber fact and needs urgent attention as it may impact the national demographic and the country's social and economic future.<sup>[43]</sup>

Regarding the high rates of suicide in the elderly, again, this appears more in the South India than in the rest of the country. Although it follows general features of other countries (in that many of the countries have a peak in the suicide rate around 65 years), the age-specific rates in the elderly age group are very high compared to other countries. This finding indicates a greater need for improving basic healthcare and social security systems for elderly. Elderly in India may be more dependent and socially isolated due to factors such as urbanization, resultant nuclear families, absence of social security, and psychosocial aspects of ageism, compared to any other elderly person in the more developed countries.

Indian studies suggest fewer diagnosable psychiatric disorders and more psychosocial problems compared to the Western countries. This observation may be contested but warrants clarification. There is a subtle problem with the presumption of a mental disorder when someone attempts or dies with suicide. A study done in Chennai<sup>[44]</sup> indicates that though many (about 25%) were diagnosed as suffering from depressive disorders, 60% of them only had mild to moderate depressive disorder, and majority attempted suicide in the first episode. Unlike the West, alcohol use disorders and impulsive personality traits are seen more often than any other specific psychiatric disorder such as major depressive disorder.<sup>[2]</sup> Most studies reviewed here report financial difficulties, interpersonal (termed as family conflicts and domestic quarrels) or marital problems, chronic physical illnesses, and academic or romantic failures as the common reasons for suicide. Many experts in psychiatry believe that psychiatric disorders are “weak natural kinds,”<sup>[45]</sup> i.e., they do not clearly form a group according to the structure of natural world, but their construct can be influenced by how we, humans, conceptualize and use them.<sup>[46]</sup> Kendler notes that psychiatric disorders are a result of multiple etiological processes and these physical, psychological, and social processes have mediational or moderational interactions between the levels.<sup>[47]</sup> This is not to say that people who attempt suicide do not require psychiatric help, it only means that people who have suicidal ideas and attempts go through psychological problems which result from multiple levels of bio-psycho-social factors working together and need help at all these levels. It is our contention that the East-West discrepancy in this issue is more due to the ways of conceptualization rather than any concrete biological or psychosocial differences. However, suicide rates are also not uniform over time; different cultures show differences in rates reflecting the changing historical and sociocultural circumstances. It is possible that the



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current environment in Western Europe is such that several sociocultural causes of suicide currently common in Asian countries are no longer significant, thus making mental illness the major contributor toward suicide in those countries.

There is a need for public health interventions such as the ones tested by the WHO in Tamil Nadu with regard to closed storage facility for pesticides<sup>[48]</sup> and other policy changes for control of alcohol use, as these are predominantly correlated with Indian suicides. Mental health care (MHC) bill 2013<sup>[49]</sup> and the 210th Law Commission Report<sup>[50]</sup> have positively influenced the decriminalization of suicide. This will improve help-seeking and service provision for people in need of psychological care. High rural suicide rates also have to be addressed by improving accessibility to community MHC, which is also enshrined in the MHC Bill 2013.

### CONCLUSION

Distinctive patterns of Indian suicide epidemiology present somber realities which need urgent public health response. India has one of the highest suicide rates in the world, particularly the developed and more educated South India. There are two peaks in the age-specific suicide rates, one at 15–24 years and another around 65 years. Higher proportions of women commit suicide at younger age groups. Elderly need better basic accessible health care and social security systems. Indian suicides are due to complex psychosocial reasons which need a comprehensive health strategy including psychiatric help.

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