

# Statistical Analysis and Interpretation to Introspect Suicides in India: An Overview of Past Decade

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**Abstract**— India is a vast country with a population of 1.38 Billion. In Total, this population is equivalent to nearly 17.7% of total people alive today [1]. Suicides are an important cause of death in India. According to the Indian government, suicide can be defined as an unnatural death with the intent to die within the person for a particular reason [2]. The major reason for suicide is bankruptcy or indebtedness, depression, illness, marriage related issues, unemployment, etc. [3]. India accounts for 17% of worldwide suicides [4]. In the past two decades from 1987 to 2007, the suicide rate increased from 7.9 to 10.3 per 1 lack people [4]. The highest proportion of suicides were attempted in major states like Tamil Nadu (12.5%), Maharashtra (11.9%), and West Bengal (11%) in 2012 with male to female suicide ratio of 2:1 [4]. The estimation of the number of suicides in India varies from source to source because of such a high volume of population. For example, according to data published in The Lancet estimated 187,000 suicides in 2010 [5], whereas the official data of the government of India claims 134,600 suicides in the same year. According to the World health organization (WHO), suicide by age standard in India is 16.4 per 1 lack for women which is 6<sup>th</sup> highest in the world, and 25.8 for men which is 22<sup>nd</sup> ranking in the world. Analyzing the age group and method of suicide in India we have about 46,000 suicides that occurred in 15-29 and 30-44 age groups dying from poisoning (33%), hanging (26%), and self-immolation (9%). These are the primary methods used to die by suicide in 2012 [4]. India is a very vast and ever-growing country and the quality of information about suicide in India is quite limited, but it is an important and growing public health concern. Compared to suicides in high-income developed countries, suicides in India are more prevalent and complicated to understand & analyze. Therefore, an attempt has been made to study and analyze the suicide in India based on the data-set collected from Kaggle.

**Keywords**—Suicides in India, Analysis, Deaths.

## I. INTRODUCTION

Suicide is the ultimate outcome of a complicated correlation of genetic, biological, physiological, sociological, and environmental factors. The number of suicides in the whole world is estimated at nearly 9000000 people, from which 170,000 are from India [6]. This accounts for nearly 18% of suicide worldwide. There is a valuable reason to understand and study Indian suicide data. It is because of what outcomes and results we get as compared to data from other countries. These findings

display the relationship for the causation of suicide and thus helps to find prevention strategies. Properly examining such data which includes differences in rates & patterns in gender, age group, population over some time may provide the key to understanding the suicidal purpose and therefore plan intervention aimed towards forestalling suicide.

To understand the suicide pattern, we need to understand & broaden the reasons for suicide in India which are:

### A. Family problems

According to data available with the state crime records bureau, in the current scenario family problems have been constantly the elite reason for suicide [7]. Out of the total people who committed suicide in 2018, 37.7% ended their life due to ongoing family problems [8].

### B. Illness

After family problems, prolong terminal illness is the second-highest reason for suicide. According to the NCRB report, nearly 17.7% of total persons committed suicide due to illness in 2018. This figure constitutes one in 5 suicides due to illness in India. The increasing cost of healthcare and the rise in ill health is pushing people to suicides [8].

### C. Poverty

India is the world's second-largest population with one of the fastest-growing economies in 2020, poverty rate is continuously on the decline in the country, but still due to the high population, and more than 800 million people in India are considered poor. Majority of which are farmers and people living in the countryside. With the constant rise of the inflation rate and economic recession, the growth of unemployment and no work forced at least 10 Indians to take the step towards suicide every day in 2018 [9].

### D. Bankruptcy

It can be defined as the incapability of people and entities to repay debts that they are entitled to. In 2014 nearly 2308 people attempted suicide due to financial stress and bankruptcy [9]. Which is equivalent to seven people dying every day due to bankruptcy [9]. Also, according to NCRB 80% of farmers attempted suicides due to incapability of paying bank loans and debts taken from moneylenders and banks in 2015 [10].

**E. Dowry**

Death by dowry disputes contributes 3% of overall suicides from 2001-12. The death by dowry is undertaken by married women due to continuous harassment and torture by the husband or in-laws. According to the data by NCRB reports there were 8331 deaths by dowry in India [11].

**F. Failure in examination**

Considering a diverse country like India with a large majority of the population below the age of 35 the suicide rate of students due to exam pressure and poor performance in the examination is declining steadily over the years. From 1998 to 2018 the suicide rate of students due to failure in exams went down from 41% to 26% [12]. According to data by the Indian government, in 2014 nearly 2403 students attempted suicide due to failure in examination [10].

**II. OBJECTIVE**

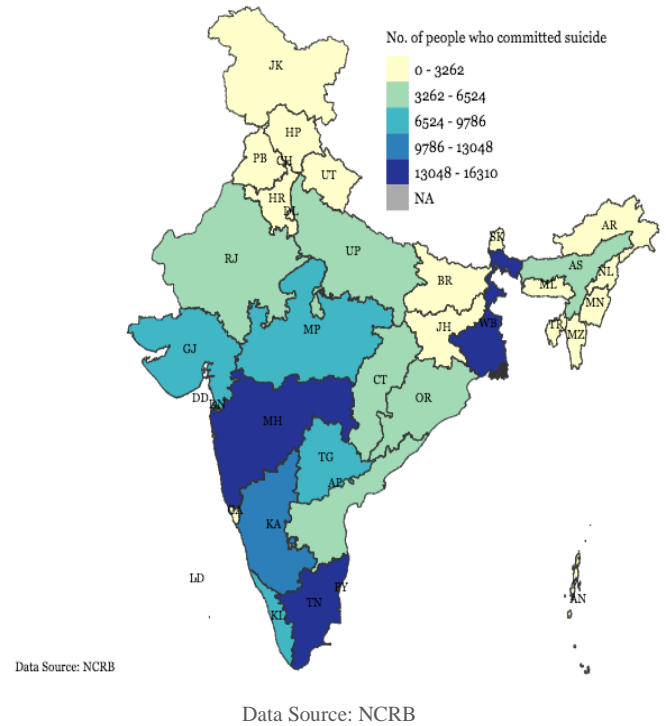
- 1) To study the suicidal rates in India
- 2) Analyzing suicides by categorizing them under various categories and considering various constraints and parameters.

**III. RESEARCH METHODOLOGY**

In this statistical analysis, we used secondary data from the world’s largest data science community Kaggle. In which we took the data set of suicides happening in India in the past decade from 2001 to 2012. Analysis is performed by considering various parameters like States-wise suicides, considering the factor of Age and gender in increasing and decreasing the number of suicides in India. Though reports for the years 2011–14 were available, detailed data in a comparable format were not available for disaggregated analysis as for 2001–12.

We applied a three-stage approach in which we analyzed the complete data set by breaking them down into different prospects, namely 1.Input, 2.Processing, and 3.output.As input we put together our complete data set and further for the next process we divided the suicides prospects into multiple formats, then for processing these formats we worked on defining the problem statement, data cleaning, data analysis, validation, and predicted useful insights. Further, we designed a visual representation to properly understand, compare useful insights and trends. In the end, we complied and integrate all of these data representations, comparisons, and trends to gain the desired output.

**Suicides in India - 2014**



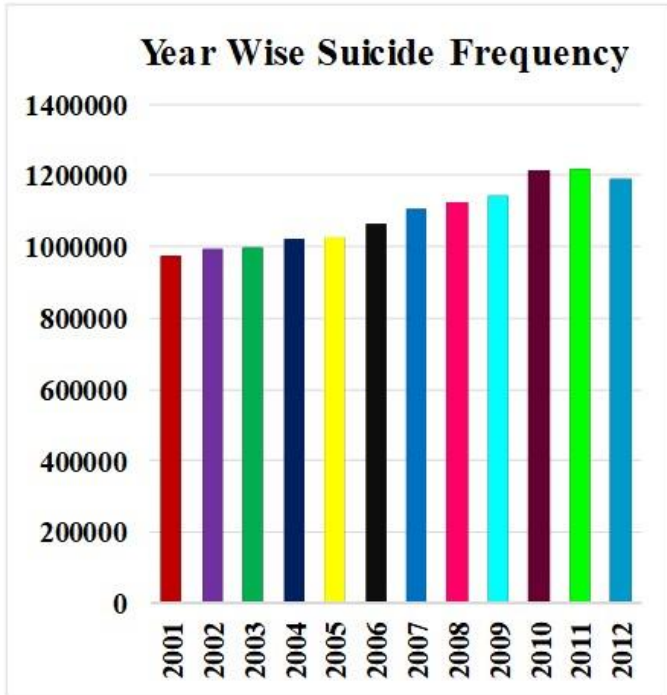
**1. Rate of suicides in the past decade from the 2001-2012 year:**

According to the survey conducted by WHO, there are nearly 900,000 people worldwide committing suicides every year about 200,000 in China, 170,000 in India, and 140000 in high-income countries. Rates which is being recorded for the suicides were about 14.9 and 15.4 suicides per 100,000 population according to the survey conducted in the year 2001 and 2010 respectively [17]. World Suicide Prevention Day theme “Suicide Prevention across the Globe: Strengthening Protective Factors and Instilling Hope” is celebrated on September 12, 201 [18]. The NCRB (National Crime Records Bureau) reported 104720 suicides in the year 2001, increasing to 130653 in the year 2010, and so on [19].

**TABULAR REPRESENTATION:**

Year	Suicidal Cases
2001	108506
2002	110417
2003	110851
2004	113697
2005	113914
2006	118112
2007	122637
2008	125017
2009	127151
2010	134599
2011	135585
2012	135445

GRAPHICAL REPRESENTATION



**Findings from Analysis:**

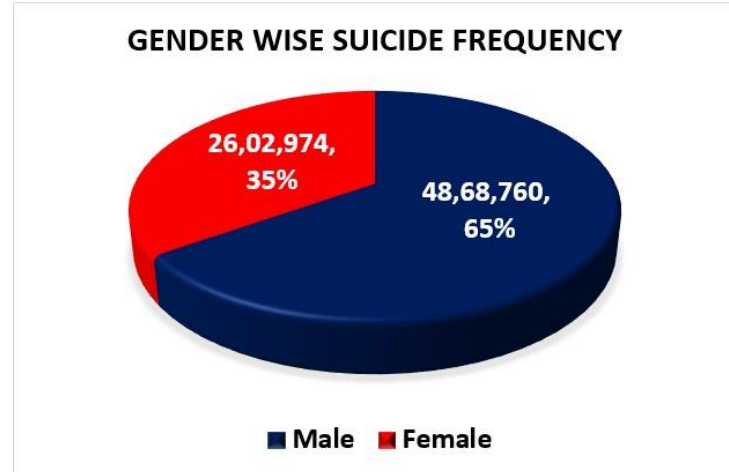
After analyzing the data set, we identified that the rate of suicides has increased dramatically in the past decade. If we precisely analyze our bar graph, we can conclude that the suicides had increased from the year 2001 to 2011 and are somewhat stable from 2011-2012. The highest number of suicides was in the year 2011 having several and the lowest number of suicides is in the year 2001 having stats of 108506 cases. Cases of suicides from 2002 to 2005 is constant around 110000 to 120000. The rate with which suicides in India are increasing is alarming and mandatory steps should be taken to decrease the slope of the graph.

**2. Gender wise Suicides:** Global records of death shows that suicide occurs about 1.8 times more in males as compared to females according to the stats of 2008 and 1.7 times in 2015 [21]. Men usually do suicides in case of any financial and mental failure while women commit suicides because of, mental disturbance, the feeling of helplessness, and the moral burdens of society. From studies it is being identified that men use more violent and lethal modes to attempt suicides like firearms, hanging and by causing injuries to the body whereas women’s more likely use medication, an overdose of drugs, or by consuming poison [5]. From the source of Lancet Public Health 1 of every 3 women who died in suicide was from India in the year 2016. Also, 71.2 % of suicides by women are in the age group of 15-39 years. Women are having twice much depression than men do carry also women are more likely to get treatment for depression rather than men which might become a cause of suicide in long run.

TABULAR REPRESENTATION:

<b>Female</b>	<b>2602974</b>
<b>Male</b>	<b>4868760</b>

GRAPHICAL REPRESENTATION:



**Findings from Analysis:**

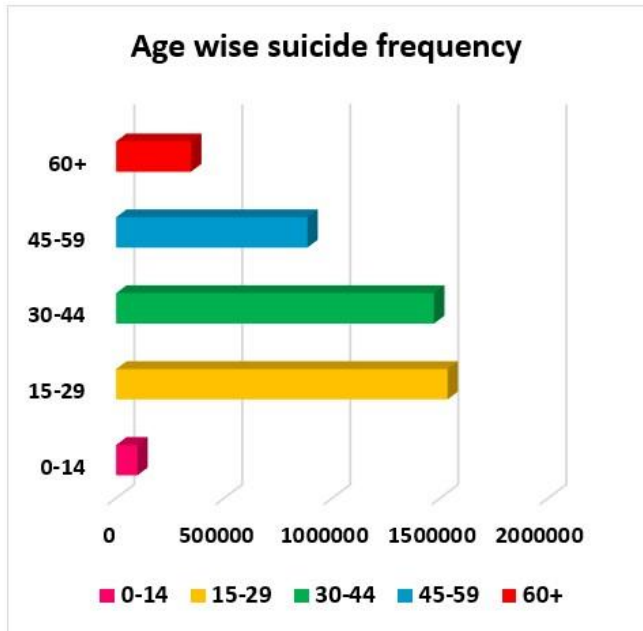
The visualization shows that in the past 12 years from 2001 to 2012, males were more prone to attempt suicides than women. According to our statistical analysis, we found that around 4868760 males attempted suicide while 2602974 females die by suicide from the year 2001-2012 in total, which is almost double for men. This visualization gives us insight that men attempted more suicides than women which gives us a ratio of 2:1 for men is to women.

**3) Age-wise Suicides in India:** Suicide is the most common cause of death in the age groups of 15–29 and 15–39 years [20]. It might be possible that the reason for suicide for the age group of 15-19 is somehow related to the education system, peer pressure, unemployment along with some other external factors. According to the report of Times of India, almost 63% of suicides belong to the age group of 15-39 including both the genders if calculated at a rate of per 100000. The lowest rate of suicides is in the age group of 60+ as many of the senior citizens most probably attempt suicide due to family disputes or health issues [22]. If we precisely note, that the youth of India is facing the highest rate of suicides which is an issue of concern as youth is the foundation for both moral as well as the financial development of the country.

TABULAR REPRESENTATION:

Age Group	Total number of suicides
0-14	98410
15-29	1534037
30-44	1471599
45-59	885177
60+	346925

GRAPHICAL REPRESENTATION:



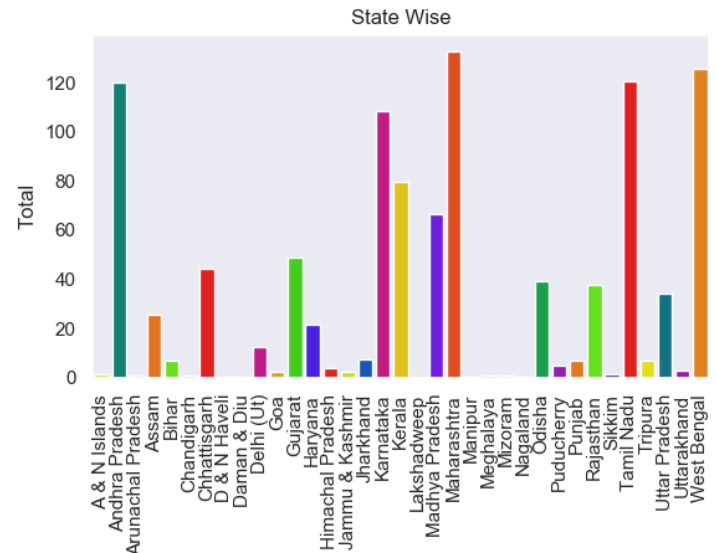
Findings from Analysis:

After analyzing the visualization, we can easily infer that people belonging to the age group of 15-29 is committing the highest number of suicides and the second group is between the age of 30-44 years. The lowest number of suicides is in the age group of 1-14 and the second-lowest is above the age of 60+. This shows that either senior citizens or teens are less prone to attempt suicides according to the data of the past decade. The probability of attempting suicide is average for the age group of 45-59, lowest for the age group of 0-14 as there are only 98410 cases, which is lower as compared to other age groups, the highest probability is for the age group of 15-29 and 30-44 as there were 1534037 and 1471599 suicides committed by these groups in the year 2001-2012.

**4. State-wise Suicides:** India is a very diverse country having a federal union comprising of 28 states and 8 union territories, which in total accounts for 36 entities, of all these 36 entities suicides is a national social issue. Analyzing state-wise suicide is a national social issue. Analyzing state-wise suicide by its parameters we have states like Maharashtra, West-Bengal, Andhra Pradesh, Tamil Nadu, Karnataka with the highest no of suicides. Also, according to the national crime record bureau and

Government of India, states like Puducherry (43.2), Sikkim (37.5), and Andaman & Nicobar Islands (28.9) has seen the highest growth in suicide rate per 1 lakh people in 2015 [13]. Taking the stats from the public health foundation of India we have states like Tamil Nadu, Karnataka, and West Bengal with the worst rate of female suicide in the country. Also, states like Tripura, Karnataka, and Tamil Nadu have the highest age-standardized suicide rates among men [14].

GRAPHICAL REPRESENTATION:



Findings from Analysis:

After analyzing the graph, we can observe that the population is a factor in to Infer suicide rate. States with a higher population like Maharashtra, Tamil Nadu, West Bengal has a higher number of suicides. While states with a lower population like Madhya Pradesh and Goa have a relatively low suicide rate. Also, states like Goa, Jammu & Kashmir, Andaman & Nicobar Islands, and Lakshadweep have a very low rate overall partly because of being a major travel destination in the country.

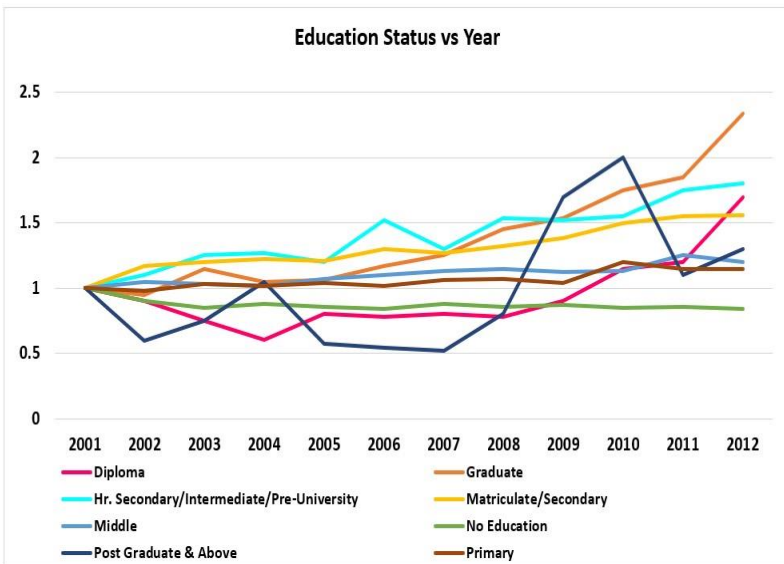
**5. Education Wise:** Education is the most crucial and critical responsibility of society. Education Imparts knowledge and understanding of people. But in recent times education and learning have become a part of the system which is continuously contributing to the growth of mental pressure, depression, and academic pressure. India has a huge student population and has the highest suicide rates among the age of 15 and 29. This is due to academic stress and pressure that many students had to deal with. In India gaining education is more about responsibility than gaining knowledge. With the continuous increase in setting benchmarks and qualifying grades it is not uncommon to see students anxious and under pressure. With the continuous increase in academic & educational competition standards, students are more stressed than ever. Every hour one student commits suicide in India. Alone in 2015, more than 8934 students committed suicide due to educational

and parental pressure [15]. India has the world's highest suicide rates for youth under the age of 30, according to a 2012 lancet report [16], which illustrates the need for necessary measures and interventions for the country.

Tabular Representation:

Year	Diploma	Graduate	Hr. Secondary	Matriculate/ Secondary	Middle	No Education	Post- Graduation & more	Primary
2001	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2002	0.90	0.95	1.10	1.17	1.05	0.90	0.6	0.98
2003	0.75	1.15	1.25	1.20	1.03	0.85	0.75	1.03
2004	0.60	1.05	1.27	1.22	1.02	0.88	1.05	1.02
2005	0.80	1.06	1.20	1.21	1.07	0.86	0.57	1.04
2006	0.78	1.17	1.52	1.30	1.10	0.84	0.54	1.02
2007	0.80	1.25	1.30	1.27	1.13	0.88	0.52	1.06
2008	0.78	1.45	1.54	1.32	1.15	0.86	0.80	1.07
2009	0.90	1.54	1.52	1.38	1.12	0.87	1.70	1.04
2010	1.15	1.75	1.55	1.50	1.13	0.85	2.00	1.20
2011	1.20	1.85	1.75	1.55	1.25	0.86	1.10	1.15
2012	1.70	2.34	1.80	1.56	1.20	0.84	1.30	1.15

GRAPHICAL REPRESENTATION:



**Findings from Analysis:**

It can be observed from the line chart that people with no education have committed lesser suicide than educated people. After analyzing the line chart, we can easily infer that graduation and post-graduation are the worst affected education fields with the most suicide cases. This shows the graduate level students are dealing with much high academic pressure and are more prone to attempt suicide. Also, there has been a rapid increase in the number of suicides from 2006 to 2012. Partly because of high competition and the burden of examination due to an increase in student population.

**IV. CONCLUSION**

In our statistical analysis, we found various outcomes like, the rate at which suicides in India increasing is alarming as it shows considerable growth from the year 2001 to 2012. States having the highest number of suicides include Maharashtra, Tamil Nadu, and West Bengal which are almost highly

populated states. From our findings, we reached the fact that men commit suicides almost twice as compared to women which can be evident by the fact that there are 2602974 women and 4868760 men committed suicides in the past decade. Also, in our analysis, we found that the people under the age group of 5-19 and 30-44 having cases 1534037 and 1471599 respectively are contributing the most to the number of people committing suicides in India. I consider the parameter of education level, then we can infer that people having the educational qualifications of Postgraduation and graduation are more likely to commit suicides as compared to others.

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