ISSN No:-2456-2165

# Burden of Suicidal and Accidental Mortality in India

Akif Mustafa
Research fellow
International Institute for population sciences, Mumbai, India

**Abstract**

- ***Objective***

Self-harm or suicide and accident are one of the leading cause of mortality in India. So the objective of the present study is to find out the burden of accidental deaths and suicidal deaths in India in previous years on the national and state level.

- ***Methods***

The data was taken from 'Accidental Deaths & Suicides in India from 1967 to 2015', which is published by National Crime Records Bureau, Government of India. To show the burden of mortality due to accidents and suicide, years of potential life lost (YPLL) were calculated on the national and state level. YPLL is a summary measure of premature mortality, it is used for estimating the potential life lost due to premature death

- ***Results***

Total potential years of life lost due to accidents and suicide in 2015 were 98804274. In the span of 5 years from 2010 to 2015 India lost 9.8 crore potential years of life due to accidents and suicides in which 7.3 crore were contributed by accidents and 2.5 crore by suicides. The burden was very high in some states like Maharashtra, Chhattisgarh, Tamil Nadu, etc. The major cause of accidental death was road traffic accident (42.9%), and the major cause of suicide was 'family problem' (27.6 percent).

- ***Conclusion***

The burden of suicidal and accidental mortality is high in the country and in the past years, no significant decline has been observed in the burden. So a proficient policy is needed for the problem. Also there is a huge variation in the rate of accidental and suicidal mortality among the states, so state with high rate must give attention to the problem.

***Keywords:-*** *Suicide, Accidental Death, Burden, YPLL.*

## I. INTRODUCTION

For a country its somewhat less complex to deal with disease-related mortality and morbidity than dealing with unpredictable morbidity and mortality related to accident and suicide. A disease has some root cause and risk factors, and study of these factors helps in tackling the problems related to that disease, but suicide and accident both are the results of some complex phenomenon, which makes it complicated to handle the issue.

Self-harm or suicide and accident are one of the leading cause of mortality in India. Data recorded by the National Crime Records Bureau (NCRB) shows that the incidence of suicide has increased by 17.3%, from 1,13,914 in 2005 to 1,33,623 in 2015 (Sharma Sanchita, n.ds.). The data is also depicting that accidental death in India increased by 40.5% from 2005 to 2015, every week 2650 people are being killed and 9000 people are getting injured due to traffic accidents ("National Crime Records Bureau," n.d.).

In the present era people are passing tensioned or struggled life. The mental balance of many people is at shivering state due to many reasons like unemployment, family problems, cut throat competition in the market, failure in exams or business, etc. In this situation the risk of self harm becomes very high. Suicide is a serious public health problem; worldwide it is the second leading cause of death among people of age group 15-29 years (Pitman, Krysinska, Osborn, & King, 2012) and 1.4% of all global deaths are contributed by suicidal mortality (Bachmann, 2018). According to a WHO report, there is a 60% increase in suicide mortality during the previous 45 years. In India the condition is distressful. One-third of the world's annual female suicides and around one-fourth of the male suicides are contributed by India. According to the global burden of disease, study suicide was the leading cause of death for both the sexes of age group 15-39. The suicide rates in India are significantly higher than the global averages (Rukmini S., 2018). A lot of risk factors of suicide or suicidal thoughts have been recognized, like depression, anxiety disorder, personality disorder etc., apart from these mental health conditions there many other factors which increase the risk of suicide, like poverty, unemployment, childhood abuse or trauma, bullying or harassment, love failure, family history of suicide etc. (Gorton, Webb, Kapur, & Ashcroft, 2016). In this era all these risk factors are significantly prevalent in society.

ISSN No:-2456-2165

The accident is an unplanned event that results in various kinds of losses like death, injury, property loss, etc. accidental causes comprise deaths caused by various kinds of factors like traffic accidents, air crash, drowning, electrocution, accidental fire, natural causes (earthquake, flood, lightning, etc.), etc. NCRB data shows that the rate of accidental deaths during 2005 to 2015 was 22.8% while the rate of population growth during the same period was 14.2% (Suicides in India: What data shows, n.d.). Traffic accidents are a major contributor in overall accidental deaths in India. Every hour in India 15 people die and 53 people get injured due to road accidents. India overtook China to top the world in fatalities due to road accident. The research shows that if proper interventions not made than deaths due to traffic accidents would increase by 100% between 2013 to 2017 (Singh, 2017). 2.5% of all accidental deaths are contributed by natural causes, this may be seeming a small number but it can be reduced with proper interventions. In 2015, 114 deaths were due to exposure to cold, lightning-caused 2641 deaths and 1908 deaths were attributed to heat/sunstroke. Un-natural accidental deaths always had a major percentage of all accidental deaths, in 2015 it was 75.8%. Major un-natural causes were drowning (29822 deaths), traffic accident (177423 deaths), accidental fire (17700 deaths), and falls (16759 deaths). Apart from these, there are some other accidental causes like poisoning (26173 deaths), sudden deaths (35023 deaths), etc (Suicides in India: What data shows, n.d.).

The aim of the present study is to find out the burden of accidental deaths and suicidal deaths in India in previous years on the national and state level.

## II. METHODOLOGY

The data used for the present study was taken from 'Accidental Deaths & Suicides in India from 1967 to 2015', which is published by National Crime Records Bureau, Ministry of Home Affairs, Government of India, New Delhi. The data for the report is collected by State Crime Records Bureaux (SCRBx), SCRBx collected data from District Crime Record Bureaux (DCRBx). The report provides information on mortality due to accidents and suicides. The report provides data age group-wise and sex-wise. National, state and city-level data is provided in the report.

To show the burden of mortality due to accidents and suicide, years of potential life lost (YPLL) are calculated on the national and state level. YPLL is a summary measure of premature mortality, it is used for estimating the potential life lost due to premature death. YPLL is calculated using the age at death, greater weights are given to deaths at a younger age and lower weights for deaths at an older age. An upper bound of age is considered for the calculation, usually, life expectancy at birth is taken as the upper limit of age. Suppose 'n' persons died at age 'x', and the life expectancy of the population is 'e', then years of potential life lost at age x are

$$YPLL = (n * x) - e$$

So for all ages

$$\text{Total YPLL} = \sum_{i=1}^{x_i} \sum_{j=1}^{n_j} \{(n_{j^*} x_i) - e\}$$

The data was divided into age groups, so for each age group mid-point of the age group was taken for the calculation of YPLL in that age group. YPLL is calculated at the national and state level. To show the trend of the burden of accidental and suicidal deaths trend of YPLL is shown at the national level.

The calculation was done using MS Excel 2016, charts and graphs were also prepared using MS Excel 2016.

## III. RESULTS

Table-1 is showing the demographic and socioeconomic characteristics of suicide victims in India in 2015. From the table, it is clear that there is inequality in committing suicide among various stratum of the population. Men are prone to suicide than women and among all suicides, most were married. Among all suicide victims, 70% were from low socioeconomic status.

ISSN No:-2456-2165

| | Total Suicide | Percentage Share |
|---|---|---|
| **sex** | | |
| Male | 91528 | 68.5 |
| Female | 42088 | 31.5 |
| **marital status** | | |
| Married | 92878 | 69.5 |
| Unmarried | 28179 | 21.1 |
| Others(widowed, divorced, separated, etc.) | 12566 | 9.4 |
| **economic status** | | |
| low | 93586 | 70 |
| low-middle | 33413 | 25 |
| middle-high | 4743 | 3.5 |
| high | 1881 | 1.4 |
| **education** | | |
| No Education | 18497 | 13.8 |
| Primary | 26290 | 19.7 |
| Middle | 28275 | 21.2 |
| Secondary | 28996 | 21.7 |
| Hr. Secondary(up to class 12) | 15842 | 11.9 |
| post-secondary | 5839 | 4.4 |
| status not known | 9884 | 7.4 |

Table 1:- Socioeconomic Characteristics of Suicide Victims

Fig-1 is showing the cause of suicide (in percentage) in India in 2015, the biggest reasons for suicide were family problems , illness, and marriage related issues. 27.6 percent of the suicides were due to family problem, 15.8 percent were due to illness and 4.8 percent of suicides were related to marriage related issues. the causes like love affairs (3.3 percent), bankruptcy and indebtness(3.3 percent) and failure in examination (2 percent) were also causing significant numbers of suicides.

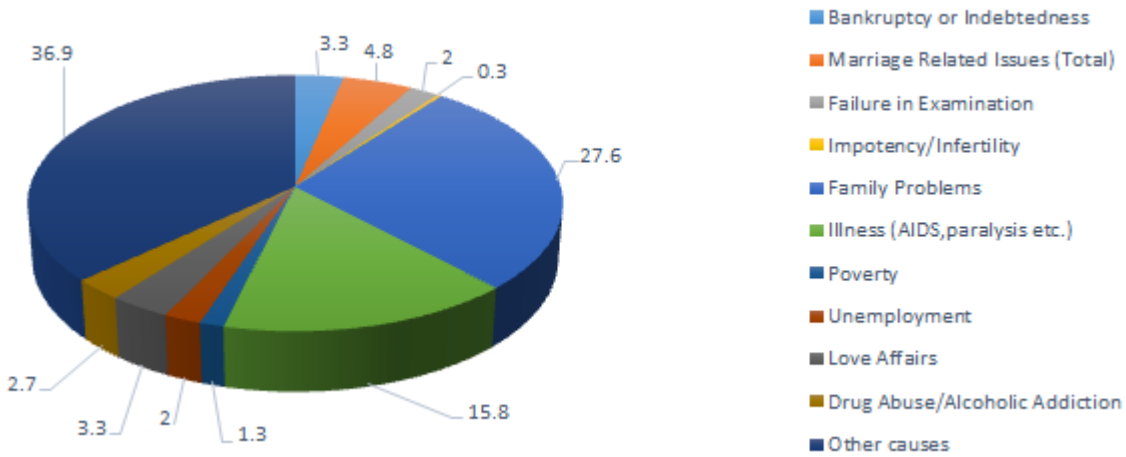


Fig 1:- Percentage Wise Cause of Sucide in India in 2015

Fig-2 is showing years of life lost due to suicide at the national level from 2010 to 2015. From the graph, we can see easily that with time the PYLL due to suicide has increased, except 2012 every year the PYLL are more than the previous year. In 2010 the PYLL were 4045739 and in 2015 it was 4310834.

ISSN No:-2456-2165


Fig 2:- Person Years of Life Lost Due to Suicides from 2010 to 2015 in India.

Table-2 is showing the rate of suicide per 100000 people among Indian states in 2015. Puducherry tops the list in the highest suicide rate with the rate 43.2. The rate is also very high in Sikkim (37.5), Andaman & Niko-bar Islands (28.9), Telangana (27.7), Chhattisgarh (27.7) and Kerala (21.6). The rate was low in states like Bihar (0.5), Nagaland (0.9), Manipur (1.4), Uttar Pradesh (1.8), etc. Out of 36 states/Union-territories 21 were having the rate equal or more than 10 per 100000 persons.

| states/Uts | Rate of suicide (per 100000 persons) | states/Uts | Rate of suicide (per 100000 persons) |
|---|---|---|---|
| Andhra Pradesh | 12.1 | Nagaland | 0.9 |
| Arunachal Pradesh | 10.4 | Odisha | 9.7 |
| Assam | 10 | Punjab | 3.6 |
| Bihar | 0.5 | Rajasthan | 4.8 |
| Chhattisgarh | 27.7 | Sikkim | 37.5 |
| Goa | 15.4 | Tamil Nadu | 22.8 |
| Gujarat | 11.6 | Telangana | 27.7 |
| Haryana | 13 | Tripura | 19.6 |
| Himachal Pradesh | 7.7 | Uttar Pradesh | 1.8 |
| Jammu & Kashmir | 3 | Uttarakhand | 4.5 |
| Jharkhand | 2.5 | West Bengal | 15.7 |
| Karnataka | 17.4 | A. & N.Islands | 28.9 |
| Kerala | 21.6 | Chandigarh | 6.9 |
| Madhya Pradesh | 13.3 | D. & N. Haveli | 25.4 |
| Maharashtra | 14.2 | Daman & Diu | 11.8 |
| Manipur | 1.4 | Delhi | 8.8 |
| Meghalaya | 6.2 | Lakshadweep | 6.3 |
| Mizoram | 11.7 | Puducherry | 43.2 |

Table 2:- Suicide Rate Per 100000 Persons Among the States of India in 2015.

Fig-3 is showing state wise PYLL in 2015. We can see that the highest value of PYLL is for Maharashtra (2681260), though the population of Maharashtra is much lesser than UP, but the YPLL is much higher in Maharashtra than in UP. Similarly, the value of YPLL is very high in West Bengal (2307116), Tamil Nadu (2492766) and Karnataka (1704188). The rate was lowest in Bihar (0.5). Nagaland (0.9), Manipur (1.4), Uttar Pradesh (1.8), Jharkhand (2.5), Jammu and Kashmir (3), etc. are also having a very low suicide rate.

ISSN No:-2456-2165

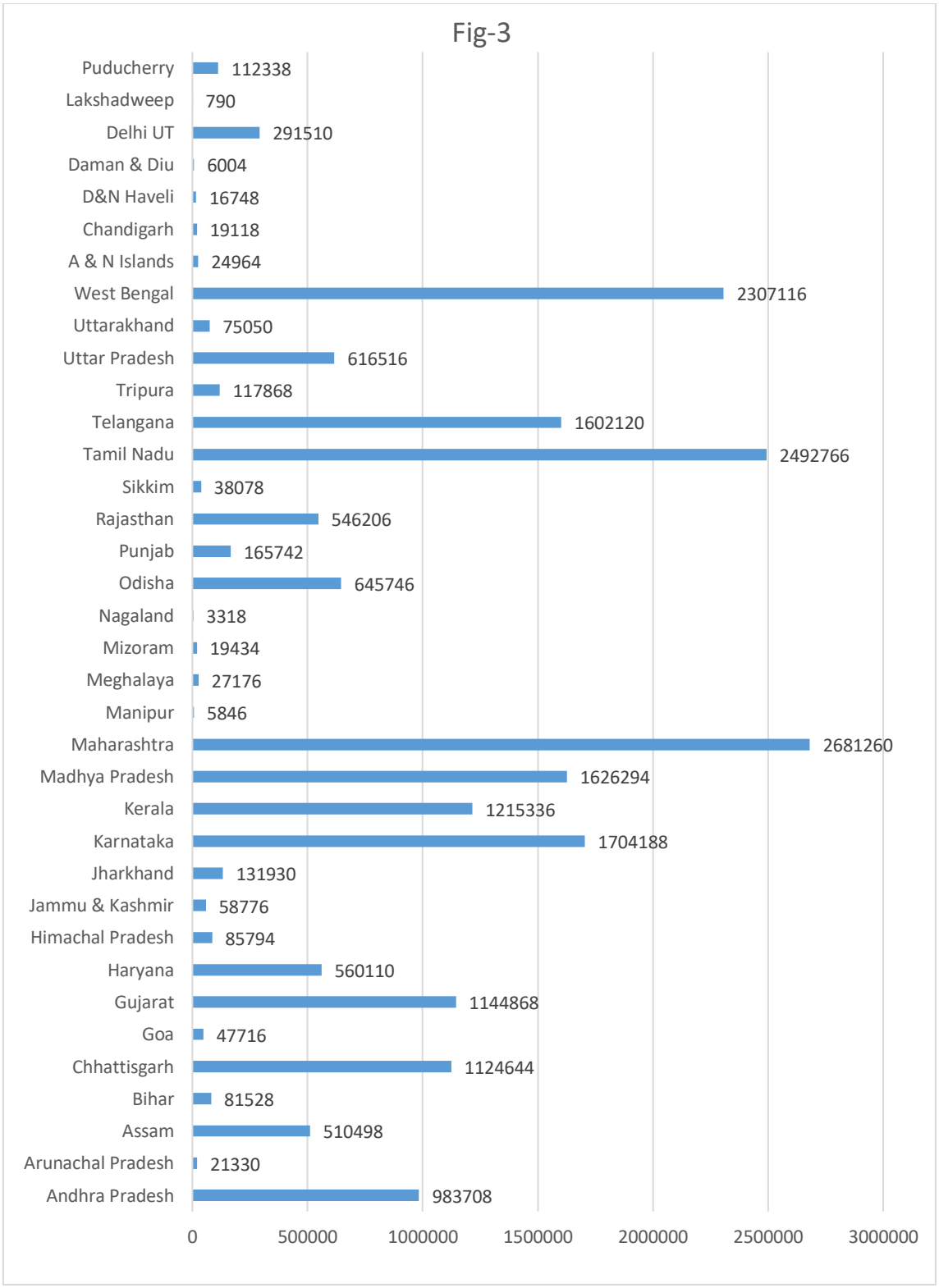


Fig 3:- Person Years of Life Lost Due to Suicides among Indian States in 2015.

Coming to the accident part, Fig-4 is showing the cause of accidental death in 2015. Major cause of accidental death was road traffic accident (42.9%), apart from that sudden death (8.43%) and poisoning (6.27%) were also a common cause of accidental deaths in 2015. A similar pattern was found for years past 2015. 2.58 percent of accidental deaths were due to due to a natural cause.

ISSN No:-2456-2165

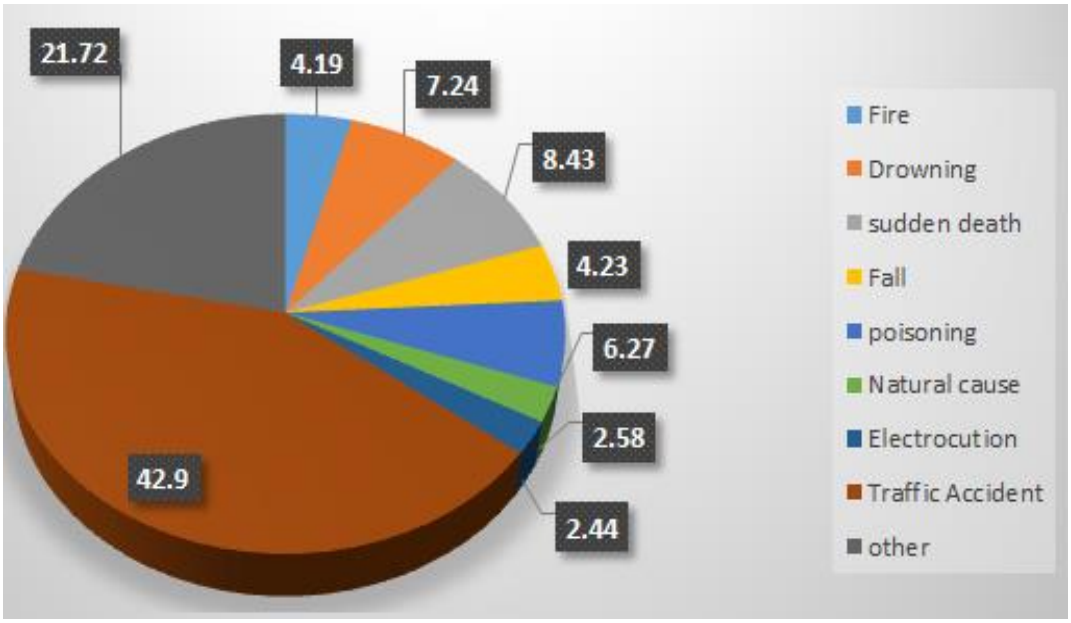


Fig 4:- Percentage Share of Cause of Accidental Deaths in 2015 in India

Fig-5 is showing potential years of life lost due to accidental deaths in India from 2010 to 2015. From the graph, we can see that from 2010 PYLL was on increasing mode toll 2014. In 2015 the value of PYLL decreased significantly but still was much higher than the 2010 value. Overall we see that there is no drastic change in the value of PYLL during five years.

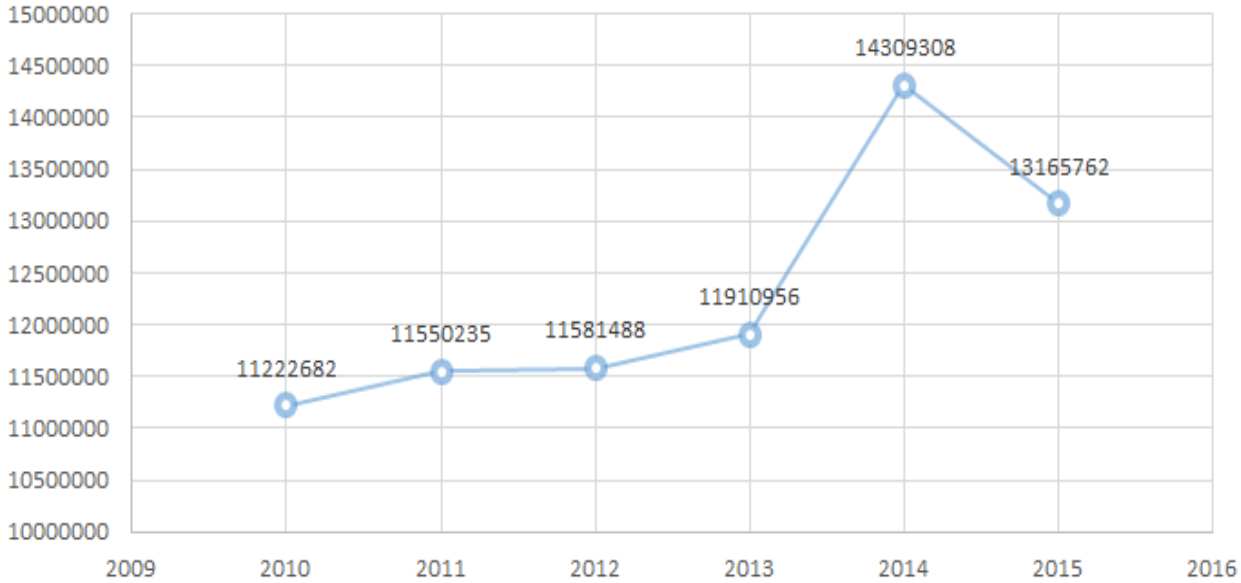


Fig 5:- Potential Years of Life Lost due to Accidental Deaths in India.

Table-3 is showing the rate of accidental mortalities in 2015. Chhattisgarh was having the highest rate of 75.1 accidental deaths per 100000 people. Puducherry was second highest in the list with the rate of 73.4, Maharashtra (54.2), Madhya Pradesh (52.7) Tamil Nadu (48.7), etc. were also having a very high rate of accidental deaths. The rate was lowest in Nagaland (3.7), apart from this rate was also low in Lakshadweep (8.8), Manipur (11.1) and Bihar (10.1). 19 out of 36 states/Union-territories were having the rate of accidental mortality more than 30 per 100000 persons.

| State: | Rate (2015) | State: | Rate (2015) |
|---|---|---|---|
| Andhra Pradesh | 33.9 | Nagaland | 3.7 |
| Arunachal Pradesh | 28.3 | Odisha | 29.8 |
| Assam | 13.5 | Punjab | 36 |
| Bihar | 10.1 | Rajasthan | 39.2 |
| Chhattisgarh | 75.1 | Sikkim | 32.7 |
| Goa | 40.7 | Tamil Nadu | 48.7 |
| Gujarat | 45.7 | Telangana | 40 |
| Haryana | 48.8 | Tripura | 14.5 |
| Himachal Pradesh | 47.8 | Uttar Pradesh | 17.1 |
| Jammu & Kashmir | 15.5 | Uttarakhand | 26.1 |
| Jharkhand | 17.2 | West Bengal | 16.3 |
| Karnataka | 42.6 | A. & N.Islands | 34.2 |
| Kerala | 32.3 | Chandigarh | 15.3 |
| Madhya Pradesh | 52.7 | D. & N. Haveli | 29.7 |
| Maharashtra | 54.2 | Daman & Diu | 45.2 |
| Manipur | 11.1 | Delhi | 33.1 |
| Meghalaya | 15.3 | Lakshadweep | 8.8 |
| Mizoram | 17.3 | Puduchery | 73.4 |

Table 3:- Rate of Accidental Mortality per 100000 Persons among Indian States in 2015.

Fig-6 is showing person-years of life lost in states of India due to accidents in 2015. Highest years of life lost were in Maharashtra, 1898513 years of life were lost due to accidents in Maharashtra in 2015. PYLL were also high in Madhya Pradesh (1420203), Uttar Pradesh (1257434), Tamil Nadu (988587.5) and Rajasthan (964131.9).

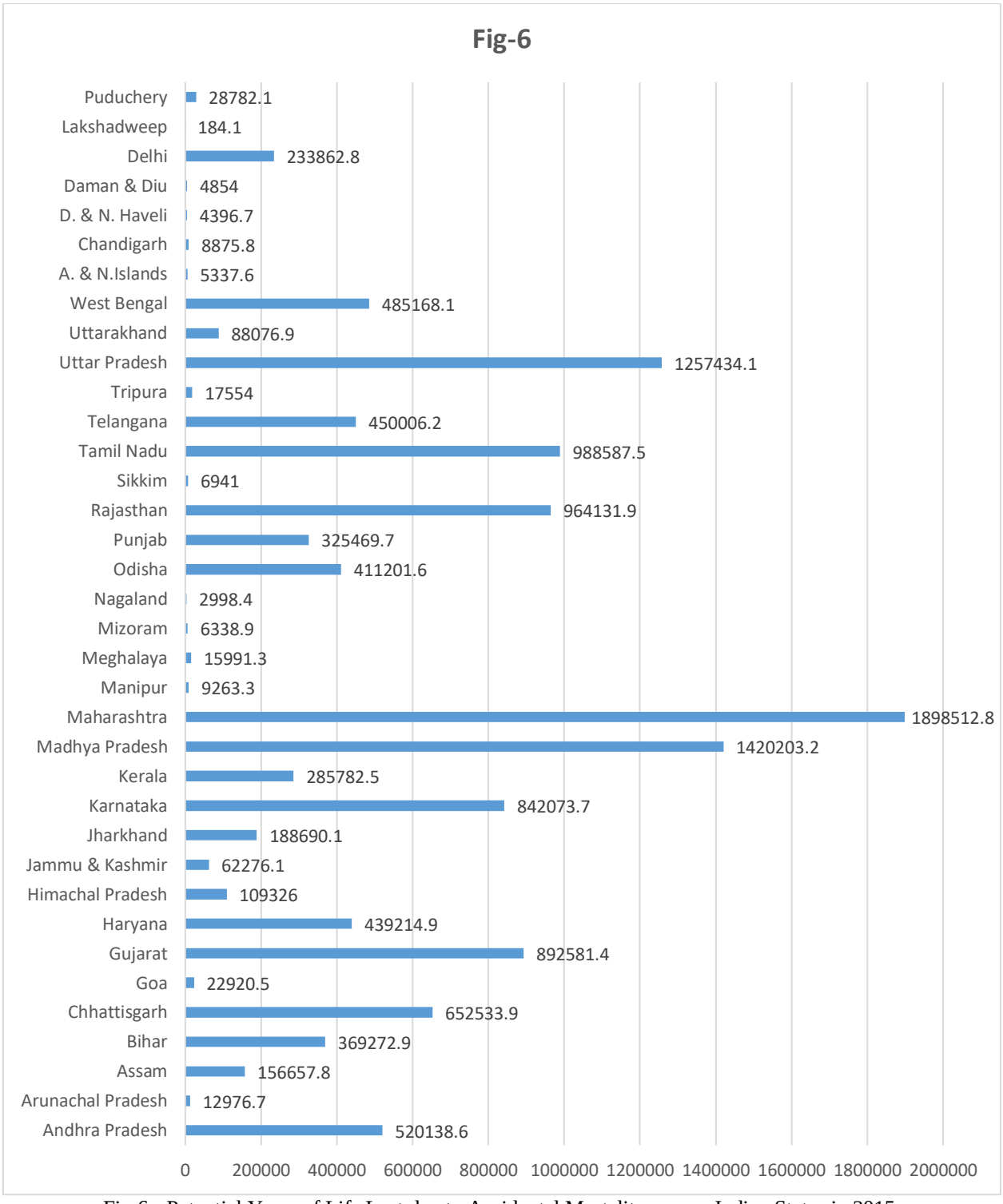


Fig 6:- Potential Years of Life Lost due to Accidental Mortality among Indian States in 2015.

Overall if we see total potential years of life lost due to accidents and suicide in 2015 were 98804274. In the span of 5 years from 2010 to 2015 India lost 9.8 crore potential years of life due to accidents and suicides.

## IV. DISCUSSION AND COCLUSION

That's true that accident and suicide are a bit complex phenomena, but most of the time up to a significant extent these are preventable. Premature death is always damage to the nation. Suppose a person dies at the age of 25 due to accident/suicide, till that age government has invested a lot of money on that person in the form of medical facilities, education etc. and after that government and the nation expects some return in terms of service, innovation etc. but

when the person died prematurely the whole money spent on that person ended in smoke, so it's the loss of the nation, and in India this loss is significant.

In 2015, 547080 people died prematurely due to accidents and suicides in India which costed loss of around 2.5 crore of potential years of life. The matter of concern is that each year the loss is increasing, which implies that no significant action is being taken by the authorities.

There are some group which are at more risk of suicide, like rate suicide twice among males than females and the rate was higher among poor, so keeping high-risk groups in mind there should be some awareness scheme that can alleviate the situation. Suicide among farmers has been a hot potato in the past few years. In Maharashtra alone, more than 60000 farmers committed suicide in 2018("Maharashtra crosses 60,000 farm suicides," n.d.), and the reason was the inability to repay loans. There are some states/UTs where the rate of suicide is very high like Puducherry, Sikkim, and Telangana, state government these states must take action about the problem. Suicides due to failure in examination, unemployment, social reputation, property dispute, unemployment, poverty, love affairs, physical abuse etc. are preventable. So India needs a nationwide suicide prevention program that will spread awareness and make suicide prevention a significant plan in nation-building.

Psychiatric diseases like depression, substance use, psychosis, anxiety, personality disorder, etc. are found to be a potential risk factor of suicide (Bachmann, 2018). The overwhelming majority of suicides near about 90% are psychiatrically ill who are committing suicide (Black and Winokur, 1990). Mental health act came in 1987 which included a lot of objectives regarding the upliftment of mentally ill persons. The act aimed at providing custody to mentally ill persons, those who are dangerous to themselves, the act also aimed at protecting the rights of mentally ill persons ("The Mental Health Act, 1987," n.d.). The Mental health act 1987 was superseded *Mental Healthcare Act 2017*, the act completely decriminalized suicide attempt which was earlier punishable under section 309 of the Indian Penal Code. The act attempts to empower persons suffering from mental illness (*National Mental Healthcare Act*, 2017). Whether the act or mental health policies are effective significantly or not? Further research on the effectiveness of the act and current mental health policies is required.

Accidental deaths are also a major concern in India. There are many causes of accidental deaths e.g. drowning, poisoning, traffic accident, electrocution, fall, drought, tsunami, etc. In all accidental deaths, traffic accidents have the biggest share, among all accidental deaths in 2015 42.9 percent were due to a traffic accident. Mortalities due to traffic accidents are preventable up to a great extent, so roa-d safety interventions and policies are required to curtail the current level of burden. In India mostly the nature of road traffic is mixed i.e. pedestrian, bicycles, taxi vans, buses, trucks, motorcycles, trucks and many other types of vehicles share the same road and space, this mixed nature of road traffic inflates the rate of road accidents (Singh, 2017). To reduce the risk there should be a separation between light and heavy vehicles on Indian roads on a wide scale. The government had taken some initiation for road safety, like 'Motor Vehicle Act, 1988', Justice Radhakrishnan Committee, Justice Agrawal Committee, 'The Road Transport and Safety Bill, 2014', etc. After the death of union cabinet minister Gopinath Munde in a road accident *Road Transport and Safety Bill, 2014* came into force which envisaged of saving two lakh lives in first five years by reducing road traffic accident through strict implementation of the law. We can not make any conclusion on whether the law had any significant impact on the problem or not because of the unavailability of data. Further research on the effectiveness of India's policies to curb the road accident is required. Many countries have curbed the rate of a road accident (especially developed countries), we should learn from their approach and policies.

India has been regularly vulnerable to natural disaster due to its unique geo-climatic conditions. Natural calamities like floods, earthquakes, cyclones, drought, landslides, etc. have recurrently harmed the nation. With the help of technology and proper vigilance and surveillance system, the fatalities and mortalities due to natural accidents can be preventable. In this context the *Disaster Management Act, 2005* came into force which envisaged of mitigating the risk of any disaster and severity or consequences of any disaster. National Disaster Management Authority (NDMA) was formed in 2005 for management, policy planning and mitigation of natural and man-made disasters and for capacity building in disaster resiliency. The present data is showing the picture unsatisfactory efforts of the authorities, from 2010 to 2015 there was no significant decline in the rate of mortalities due to accidental deaths except 2015. In some cases, the government showed a meritorious attempt, for example in 1999 cyclone in Odisha caused a lot of damage, around 15000 died in that natural accident. But after that decent precautions were taken by the government during *Hudhud* and *Fani* cyclone in Odisha and a lot of fatalities were prevented. Similar kind of attempts are required in all kind of accidental situations.

The current study has some limitations like the age groups were broad and the calculations were done by taking the mid-point of the interval, which gives a crude estimate of the PYLL, but still, it is portraying the picture of the burden of suicidal and accidental mortality. Another limitation is that the data was only available for up to 2015 so the present situation could not be described in the paper.

- *Conflict of Interest*
  The author have no conflict of interest

- *Ethical Approval*
  Since the data is available on public domain and open for research by the National Crime Records Bureaue, so no ethical concern is there regarding the study.

## REFERENCES

[1]. Bachmann, S. (2018). Epidemiology of Suicide and the Psychiatric Perspective. International Journal of Environmental Research and Public Health, 15(7), 1425. https://doi.org/10.3390/ijerph15071425
[2]. Black, D. W., & Winokur, G. (1990). Suicide and Psychiatric Diagnosis. In S. J. Blumenthal and D. J. Kupfer (Eds.), Suicide over the life cycle: Risk factors, assessment, and treatment of suicidal patients (Pp.135-153). Washington, DC: American Psychiatric Press.
[3]. Gorton, H. C., Webb, R. T., Kapur, N., & Ashcroft, D. M. (2016). Non-psychotropic medication and risk of suicide or attempted suicide: a systematic review. BMJ Open, 6(1), e009074. https://doi.org/10.1136/bmjopen-2015-009074
[4]. Maharashtra crosses 60,000 farm suicides. (n.d.). Retrieved July 29, 2019, from https://ruralindiaonline.org/articles/maharashtra-crosses-60000-farm-suicides/
[5]. National Crime Records Bureau. (n.d.). Retrieved July 21, 2019, from http://ncrb.gov.in/
[6]. National Mental Healthcare Act. (2017). Retrieved from http://www.prsindia.org/uploads/media/Mental Health/Mental Healthcare Act, 2017.pdf
[7]. Pitman, A., Krysinska, K., Osborn, D., & King, M. (2012). Suicide in young men. The Lancet, 379(9834), 2383–2392. https://doi.org/10.1016/S0140-6736(12)60731-4
[8]. psk. (n.d.). CHAPTER-1 ACCIDENTS IN INDIA. Retrieved from http://ncrb.gov.in/StatPublications/ADSI/ADSI2015/chapter-1 accidents.pdf
[9]. Rukmini S. (2018). Suicides in India: What data shows. Retrieved July 24, 2019, from https://www.livemint.com/Politics/YCw8vC0qZUzAYkWSEVXS9N/Suicides-in-India-What-data-shows.html
[10]. Sharma Sanchita. (n.d.). The top 10 causes of death in India | health | Hindustan Times. Retrieved July 21, 2019, from https://www.hindustantimes.com/health/the-top-10-causes-of-death-in-india/story-lFLxCFVHmF7svw2RKCl70K.html
[11]. Singh, S. K. (2017). Road Traffic Accidents in India: Issues and Challenges. Transportation Research Procedia, 25, 4708–4719. https://doi.org/10.1016/J.TRPRO.2017.05.484
[12]. The Mental Health Act, 1987. (n.d.). Retrieved August 18, 2019, from http://www.tnhealth.org/mha.htm