

# PATTERN OF SUICIDE: A RETROSPECTIVE REVIEW

Chaudhary B L<sup>1</sup> (MD), Kataria Dinesh<sup>2</sup> (MD), Dr. Sandeep Kumar Mittan

<sup>1</sup>Associate Professor, Department of Forensic Medicine & Toxicology, Lady Hardinge Medical College, New Delhi.

<sup>2</sup>Associate Professor, Department of Psychiatry, Lady Hardinge Medical College, New Delhi

<sup>3</sup>Dept. of Genetic Medicine Sir Ganga Ram Hospital, New Delhi

## ABSTRACT

**Introduction:** Accurate information about preferred suicide methods is important for devising strategies and programmes for suicide prevention. Globally, an estimated 815,000 people killed themselves in 2000, making suicide the 13<sup>th</sup> leading cause of death.

**Objective:** The aim of this study is to provide the comprehensive overview of epidemiology, magnitude and patterns of suicide methods.

**Methods:** This is a 5 years (1<sup>st</sup> Jan. 2006 to 31<sup>st</sup> Dec. 2010) retrospective review of autopsies conducted in the Department of Forensic Medicine & Toxicology, Lady Hardinge Medical College (LHMC), New Delhi. The selected cases were studied in detail as to the age, sex, method employed for committing suicide etc.

**Results:** Total 2273 autopsies were conducted during these five year period. Out of total, 315 (11.35%) deaths were of suicide i.e 10.89 suicide/100000 per year. The preferred methods of suicide were poisoning and hanging 43.17% and 40.95% respectively. Self-immolation stands third (11.42%) commonest method of suicide. The majority (n=192, 60.95%) were in the reproductive age group 20-40 yr in both gender. Poisoning by pesticide was common. Male and female ratio of suicide deaths was 2.66:1.

**Conclusion:** Suicide as a social pathology, our study reveals 11.35% suicidal cases of total medico-legal deaths which is quite important figure in the society and requires preventive measures in the social context.

**Key words:** Suicide, Hanging, poisoning, burn, death, autopsy.

## INTRODUCTION

Globally, an estimated 815,000 people killed themselves in 2000, making suicide the 13<sup>th</sup> leading cause of death<sup>1</sup>. During the last 45 years, suicide rates have increased by 60% worldwide. Suicide is now among the 3 leading causes of death of those aged 15–44 years. The World Health Organization (WHO)<sup>2</sup> has estimated that each year over 1.6 million people lose their lives to violence. On the average, 2233 people commit suicide daily, roughly 1 person every 40 seconds. According to WHO report India stands on 41<sup>th</sup> position in suicide ranking. The National Crime Record Bureau of India<sup>3</sup> report 2011 reveals the facts of suicides; 16 people commit suicide every hour in India. In 2011 total 135585 people committed suicide by various means. As per the report West Bengal, Maharashtra, Tamil Nadu, Andhra Pradesh and Karnataka accounted 56.2% of the total suicides in the country while West Bengal recorded the highest number of suicide victims. Restricting access to the means of suicide and better knowledge of national, regional and local suicide patterns are vital components of comprehensive strategies for suicide prevention. Studies on

suicide indicate that suicidal behaviour and the preferred suicide method, varies between countries and different culture. Some patterns are well known, such as the high percentage of firearm suicides in the United States of America<sup>4</sup>. In addition, the role of pesticide suicide in Asian countries became apparent in the 1990s.<sup>5,6</sup> and hanging in different part of the world including India. The emergence of a new method, charcoal burning suicide, in Hong Kong, China and urban Taiwan<sup>7,8</sup>, has been a surprise. International or intercultural comparisons of suicide methods help increase understanding of the interplay between these two factors and provide a basis for preventive strategies.

## MATERIAL AND METHOD

This is a five years (from 1<sup>st</sup> January 2006 to 31<sup>st</sup> December 2010) retrospective review of all autopsies that were conducted at the Department of Forensic Medicine & Toxicology, Lady Harding Medical College (LHMC), New Delhi. The cases consisted of medico-legal deaths that occurred at the Central District of Delhi and deaths occurred in associated hospital of LHMC; Smt. Suchitra Kriplani Hospital, Kalawati Saran Hospital and Dr. Ram Monahar Lohia Hospital. The records of 2773 autopsies were reviewed during this period. Out of these, 315 (11.35%) cases were of suicidal deaths of various methods and these cases further looked at in greater detail as to the age, sex, method employed for committing suicide and any possible underlying causes such as distressing life situations and psychiatric illnesses. The information was provided by the police and history from relatives, scene visits and autopsy findings along with toxicological and other relevant investigations.

## RESULTS

This is a retrospective review study of all autopsies that were conducted at the Department of Forensic Medicine & Toxicology, Lady Harding Medical College (LHMC), New Delhi over the five-year period from 1st Jan. 2006 to Dec. 2010. The records of 2773 autopsies were reviewed during this period. Out of these, 315 (11.35%) cases were of suicidal deaths of various methods. Table No. 1 & 2 show the results of the study according to age and sex and method of suicide used. The preferred methods of suicide were poisoning in 136 (43.17%) cases followed by hanging 129 (40.95%) cases. Self-immolation stands third commonest method of suicide; contributed 36 (11.42%). The majority (n=192, 60.95%) were in the reproductive age group 20-40 yr in both gender. Further, the age group 21-30 years was most vulnerable which constituted 123 (39.04%) of all suicide deaths. Male and female ratio of was 2.66:1.

Poisoning by pesticide was common whereas deaths of poisoning were based on history given by family members, relatives or friends. Data of toxicology analysis of all poisoning deaths were not available. Hanging contributes substantial in suicide deaths; maximum suicide by hanging reported in morning hours between 6 am to 10 am (n=37 cases, 28.68%). Ligature material mostly duppta and nylon rope were in-situ in 78 cases (60.46%). Dribbling of saliva over angle of mouth was seen in 25.58% cases. Discharge of semen over glans penis seen in 7.75% cases and fracture of hyoid bone was reported in 4.65% cases. Most common site of knot of ligature was seen over the back of the neck in 42.62% cases. Protrusion of tongue was seen 43.41% cases while eyes were opened in almost 51.93% cases. Self immolation deaths were almost in female i.e. 33 (91.66%) deaths, out of

total 36 burn deaths. Male committed suicide by self immolation only in 3 cases. In all cases of self immolation showed the smell of kerosene in either in cloths or in tuft of hair or body surface. In burn deaths, septicaemia was the cause of death in 20 (55.55%) cases and primary shock in 16 (44.44%) cases. Firearm suicide deaths contributed 11 (3.49%) cases of all suicide deaths and all were males only. Only a single case of committing suicide by cutting wrist vessels was reported.

## DISCUSSION

This paper reports the comprehensive compilation of methods of suicide based on mortality data from mortuary in the Department of Forensic Medicine and Toxicology, Lady Hardinge Medical College, New Delhi, of autopsies conducted during period between 1<sup>st</sup> January, 2006 and 31<sup>st</sup> December, 2010. According to our study, we reported 10.89 suicide deaths/ 100000 per year. It is currently the ninth leading cause of death in the United States<sup>9</sup>. About 400,000 people commit suicide every year throughout the world. Suicide is among the ten leading causes of death for all ages in most of the countries<sup>9</sup>. In some countries, it is among the top three causes of death for people between 15 to 34 years. Rates per year are as high as 1 suicide per 1000 population (e.g. Falkland Islands) and 1 suicide per 1500 population (e.g. Hungary) are reported<sup>9</sup>. According to the National Crime Records Bureau (NCRB) of India<sup>3</sup>, suicide is among the top ten causes of death in India. Suicide is also among the top 3 causes of death in India between 16 and 35 years. Further, NCRB reveals that in 2011 at least 16 people committed suicide every hour and total figure was about 135000. Suicide due to divorce and illegitimate pregnancy was a rise of 54% and 20% respectively while underlying the economic angle to suicide, the report said 38% of victims were self employed whereas the share of those with permanent jobs (government) committing suicide was negligible at 1.2%. The number of suicides in the country has risen from 40,000 in 1968 to 1.1 lakh in 1999 which means an increase of 175 percent in three decades. The national incidence rate stands at 11 per 1 lakh per year according to a study conducted by NIMHANS, Bangalore<sup>10</sup> similar to our study where 10.89 suicide deaths/ 100000 per year are reported. Methods of suicide employed generally reflect the availability of methods in the community. Pattern of suicide in a region depends upon variety of factors, ranging from availability and access of the method, to the socio-economic status of the individual and also not to forget the prevailing cultural and religious influences. In sum, the differences in the suicide methods used in different countries are remarkable. In our study, three methods of suicide – Poisoning, hanging and burn (self immolation) dominate suicide patterns. The firearm suicide was standing fourth common method of suicide whereas in United States firearm stands on the top of suicide methods<sup>4</sup>. Other methods of suicide occasionally appear as important alternative methods like slicing of vessels. The analysis indicates that hanging is the main suicide method when no other major method is available. Pesticide suicide has been recognized as a major public health problem in developing Asian countries<sup>7,8,11</sup>. It has been known for some time that firearm suicide predominates in several countries in the Americas and also in some European countries where firearms are common in private households<sup>9,12</sup>. In general, underlying suicide patterns tell us more about the availability and acceptability of suicide methods. In European countries, the women suicide by poisoning (mainly poisoning by drugs) has replaced firearm suicide. Analysis of different countries provides evidence for a polarization

between suicide methods by pesticide and firearm, while hanging is in an intermediate position. In fact, this reversal was observed when firearm availability was restricted in Australia<sup>13</sup> and Canada<sup>14</sup> at the same time, the proportion of suicides due to hanging increased. Readily available poisons and firearms facilitate unplanned impulsive suicide acts<sup>15,16</sup>. It is generally assumed that the use of hanging and other traditional suicide methods is largely governed by their acceptability and by socio-cultural norms. Hanging is a violent method, needs some preparation and needs some degree of courage and determination<sup>17</sup>. The emergence of a new method, charcoal burning suicide, in Hong Kong, China and urban Taiwan, China has been a surprise, but serves as a warning that research and prevention efforts should be reinforced<sup>5</sup>.

In a study conducted in Manipal, India, it was observed that 64% survived the attempt of suicide and 36% succumbed to it. Women have outnumbered men in non-fatal unsuccessful attempts<sup>18</sup>. According to the study of Bhatia et al<sup>19</sup> and Agarwal et.al<sup>20</sup> the common methods used are poisoning, hanging, drowning and burning. Chao et al<sup>21</sup>, in their study on changing trends of suicide by poisons in Singapore, points out that until the early sixties, corrosive acids and alkali, inorganic chemicals, heavy metals and plant alkaloids were the mainstay of poisons principally used. The seventies and eighties witnessed a swing towards pharmaceutical products. The early nineties saw a peak of alcohol, insecticides such as malathion, paraquat and household items such as detergents, antiseptics<sup>21</sup>. Dode and Mohanty<sup>22</sup>, in their study of suicide in women, reported that menstruation related psyche could be held responsible for committing suicide. The people who commit suicide by physical self destruction like hanging, burning, drowning, jumping from height, shooting, stabbing documented mental disorders in 38% of cases and only 20% of cases had a significant physical disease<sup>23</sup>. Benett and Collins<sup>24</sup> in their study had pointed out that even though there are approximately 30,000 suicides each year in the United States, and one suicide every twenty minutes, the suicide rate in the United States is at the mid-point of the national rates reported to the United Nations by the industrialized countries. A psychological autopsy study among suicides always provides vital information regarding the prevalent psychosocial and psychiatric risk factors associated with suicide with respect to the place and time. These interviews aim at revealing the prior mental disorder, personality disorder, physical disorder, family history, presumptive stressful life events and socio-demographic data. Interviews are usually conducted with key informants of suicides like a family member, a friend, a relative, a colleague or a neighbour<sup>25</sup>. David A Jobes & Berman<sup>26</sup> notes that the autopsy surgeon's responsibility for certifying the manner of death has important medical, legal, social, economical and research implications for the determination of criminal liability, payment of insurance benefits and establishment of public health records. It has been emphasized that psychological autopsies are similar to physical autopsies in that they investigate the antecedents of death and reveals the decedents contribution to their own demise<sup>26</sup>. Hence for the Forensic investigator, to accurately assign the cause and manner of death in alleged suicides, must be aware of the common methods of suicide, common histories, scenarios, risk factors, socio-demographic factors, cultural aspects and other established aetiologies in relation to the practicing area. Differentiation between suicide, homicide, accident and other self inflicted injuries merits paramount importance from medico legal standpoint. The opinion and decision of the autopsy surgeon about the manner of death may be crucial in initiating or aborting a homicide investigation.

## CONCLUSIONS

There are substantial differences in the pattern of suicide methods in different culture and nations. These reflect the interplay of different determinants of suicidal behaviour and primarily the availability of suicidal means. The present findings indicate that suicide is a social pathology; study reveals 11.35% suicidal cases of total medico-legal deaths which is quite important figure in the society and requires preventive measures in the social context.

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Table no.1: Profile of suicide; Total 2773 autopsies were conducted during 5 year period from 2006 to 2010.

Mode of Suicide	Male						Female						Grand Total	%
	11-20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	>50 yrs	Total	11-20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	>50 yrs	Total		
Poisoning	11	39	27	22	18	117	3	7	3	4	2	19	136	43.17
Hanging	12	40	24	15	5	96	12	15	2	2	2	33	129	40.95
Gun shot	1	2	4	3	1	11	0	0	0	0	0	0	11	3.49
Train	0	2	0	0	0	2	0	0	0	0	0	0	2	0.63
Wrist Cut	0	0	0	0	0	0	0	1	0	0	0	1	1	0.31
Burn	0	0	2	1	0	3	6	17	7	2	1	33	36	11.42
Total	24	83	57	41	24	229 (72.69%)	21	40	12	8	5	86 (27.30%)	315	100

Table No.2: Distribution of suicide according to gender, age group and mode

Mode of suicide	Age group					Total	%
	11-20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	>50 yrs		
Poisoning	14	46	30	26	20	136	43.17
Hanging	24	55	26	17	7	129	40.95
Gun shot	1	2	4	3	1	11	3.49
Train	0	2	0	0	0	2	0.63
Wrist Cut	0	1	0	0	0	1	0.31
Burn	6	17	9	3	1	36	11.42
Total	45 (14.28%)	123 (39.04%)	69 (21.90%)	49 (15.55%)	29 (9.20%)	315 (100%)	100

Table no.3: Gender wise distribution suicidal deaths

Mode of suicide	Male	Female	Total	percentage
Poisoning	117	19	136	43.17
Hanging	96	33	129	40.95
Gun shot	11	0	11	3.49
Train	2	0	2	0.63
Wrist Cut	0	1	1	0.31
Burn	3	33	36	11.42
Total	229 (72.69%)	86 (27.30%)	315	100



Table No.4: Findings in hanging suicidal deaths

Total No. of hanging	Discharge e/ dribbling of saliva	Discharge of semen on glans	Fracture of Hyoid Bone	Fracture of thyroid cartilage	Eyes opened	Protrusion of tongue	Ligature material along with dead body
129	33 (25.58%)	10 (7.75%)	6 (4.65%)	1 (0.7%)	67 (51.93%)	56 (43.41%)	78 (60.46%)

Table No.4 A: Findings in hanging suicidal deaths according to site of knot

Site of Knot				Total
Right	Left	Front	Back	
24 (18.60%)	39 (30.23%)	11 (8.52%)	55 (42.63%)	129 (100%)

Table No.4 B: Suicidal hanging deaths Distribution according to months

Month	Total No. Of suicide by hanging	percentage
January	11	8.52
February	11	8.52
March	9	6.79
April	8	6.20
May	5	3.87
June	13	10.07
July	17	13.17
August	16	12.40
September	13	10.07
October	10	7.75
November	9	6.79
December	7	5.42
Total	129	100

Table No. 4C: Suicidal deaths according to time of incidence

Time	No. of suicide	Percentage
6 – 10 am	37	28.68
10 am – 12	17	13.17
12 noon -2 pm	21	16.27
2 – 6 pm	16	12.40
6 – 10 pm	22	17.05
10 pm – 12 mid-night	11	8.52
12 – 6 pm	5	3.87
Total	129	100

Table No.5: Showing cause of death and Presence of kerosene (Inflammable) in self-immolation cases

Shock	Septicaemia	Total	Kerosene smell
16 (44.44%)	20 55.55%)	36 (100%)	35