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RESEARCH PAPER

A case series on suicide by hanging: a prospective study conducted in Mumbai region

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***Background and aims**: The present scenario of globalisation, urbanisation and industrialization is creating lot of stress on individual in particular as well as on the society in common. Person who are not able to sustain these stressful situations are the major victims of suicidal deaths. **Materials and methods**: Present study is carried out at the department of Forensic Medicine and Toxicology and post mortem centre of a tertiary care hospital and a medical college in Mumbai region. Suicidal hanging cases over the last two years were included for this study. The statistical analysis was carried out using the Microsoft Excell and SPSS software 18. Ethical clearance was obtained from the ethics committee of the institute. **Results**: A total 124 cases of hanging were studied in detail. Out of 124 suicide cases 77 were males (62.10%) and 47 were females that is 37.90%. Fifty-seven victims were of age group between 21 to 30 years (45.97%). Privacy for suicide was maintained by selecting lonely place by 97 cases (78.22%). **Conclusion**: The most commonly affected age group was between 21 to 30 years. In the present study male victims (62.10%) outnumbered the female victims. The lower socioeconomic group was more vulnerable (49.5%) for suicide. Most victims were married and committed suicide due to unemployment and money crisis. The commonest cause of suicide in housewives was marital disharmony and dowry related issues.*

***Keywords**: Suicidal hanging; vulnerable age group; socioeconomic status; privacy for suicide; suicide note.*

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INTRODUCTION

Suicide is a major public health problem: approximately 0.9% of all deaths arethe result of suicide. About 1000 persons are estimated to commit suicide each day worldwide. [1] Suicide may be defined as, "an intentional act causing harm to a person amounting to death and committed by person himself in the absence of contribution from any external agency particularly in the commencement of act. [2] Recently the term suicide has been replaced by "Intentional Self-Harm"(ISH) in the scientific literature due to derogatory nature of the word "Suicide?"[2] Hanging is almost always suicidal or accidental, the former being by far the most common.[3] Most hangings are self-suspensions, this may be carried out by a wide variety of methods, but a typical method of self-suspension is to attach a thin rope to a high point such as a ceiling beam or staircase.[3] Any substance that is available at the time of the impulse has been used by the suicides as a ligature for hanging.[4]

MATERIAL AND METHODS

This study is prospective study carried out at post mortem centre attached to Medical College in Mumbai. Only the alleged suicidal cases or suspected suicidal deaths by hanging are included in this study. The natural deaths, accidental deaths, deaths due to multiple injuries are excluded. The study duration is two years i.e., from 1st October 2012 to 30th September 2014.

Collection of data: The primary data in each case is collected from the police inquest along with the statement of relatives taken by investigating officers. Findings of thorough external examination and internal examination of the corpse studied in detail. Post mortem reports were studied in all cases and suicide notes were investigated. Further toxicological analysis and crime scene visit was done wherever feasible.

Data Analysis: Data were imported from Microsoft Excel into SPSS. The later same software was used to generate figures and to calculate descriptive statistics, including: means, ranges, odds ratios, confidence intervals, and p values. Chi Square test was employed to evaluate the statistical significance of differences between the categorical variable.

RESULTS

Total of 3429 cases were referred for medico-legal post mortem examination. Out of these 1669 cases are natural and 1314(38.3%) cases are unnatural. In 1314 unnatural cases 216 are of suicide (16.43%). Out of total 216 cases of suicide 124 cases (57.4%) are of hanging. Every case of hanging is studied in detail and the following observations are made.

Age: The cases are divided in seven age groups as follows, (0-10) years no case found, (11-20) 9 cases(7.25%), (21-30) 57 cases(45.97%),etc. The minimum age observed among victims is 11 years and maximum age is 85 years (**Table 1**).

Table 1 Age group wise distribution

Age group (years)	Frequency	Per cent
11-20	9	7.25
21-30	57	45.97
31-40	30	24.20
41-50	12	09.68
51-60	7	5.65
> 60	9	7.25
Total	124	100

Gender: Out of 124 suicide cases 77 are males (62.10%) and 47 are females (37.90%). Male to female ratio is 1.6:1. Mean age for male and female is 37(36.79) year and 29(29.12) year respectively.

Marital Status: Out of 124 cases 81 cases are married (65.32%) and 36 cases(29.03%) are unmarried etc. (**Figure 1**).

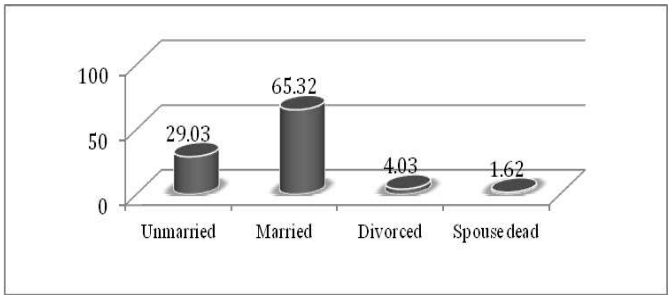

Figure 1 Marital status

Table 2 Mean age

Gender	Marital status	Number	Mean age
Female	Unmarried	13	20 (20.15) years
	Married	32	33 (32.71) years
Male	Unmarried	23	25 (25.43) years
	Married	49	40 (39.79) years

Occupation: Out of 124 22 victims wereLabourers (17.74%), Housewives- 29 cases (23.4%), Students- 2 in

number (1.61%), prisoners- 1 case (0.8%), farmers- 3 cases (2.41%) Those having no job at present are 27 in number (21.78%).

Statistical analysis:

- Null hypothesis: There is no association between the gender and employment in suicide.
- Alternate hypothesis: There is an association between the gender and employment in suicide.

Out of 124 suicidal cases employment was not known in 11 cases so chi square table is prepared for 113 cases and the result is interpreted.

Table 3 Chi-square test

Employment				Total
		Yes	No	
Gender	Female	7	39	46
	Male	24	43	67
Total		31	82	113

Chi square (X^2) value of the above table is 5.81.
Degrees of freedom (d.f.)
= (Column – 1) (Row – 1) = (2 – 1) (2 – 1) = 1
Chi square (X^2) tabulated value of d.f. = 1
is 3.84 at $p<0.05$ i.e. at 95 % level of significance.

As the calculated chi square (X^2) value is higher than the tabulated (X^2) value, we should reject the null hypothesis and accept the alternate hypothesis.Probability of the difference occurring in gender and employment by chance is less than 5 out of 100 cases, i.e. probability of not getting the difference between gender and employment in nature is 95%. So the gender and employment are associated in suicide.

Socioeconomic status: Depending on Kuppuswamy's socioeconomic scale groups are made, upper class - 9 cases (7.25%), middle-upper class- 3 cases (2.42%), middle-lower class- 50 cases (40.33%), and lower class 62 cases (50.0%). Out of 124 cases 100 cases are Hindu (80.64%), 18 cases are Muslim (14.52%) and 6 cases are Christian (4.84%). Time of suicide preferred by 32 victimsis morning -25.80%, afternoon - 44 cases(35.49%), evening- 16 cases(12.90%), night - 21 cases(16.93%) and late night in 11 cases(8.88%).

Privacy for suicide: Privacy for suicide is maintained by selecting lonely place by 97 cases (78.22%) but not so by 27 cases (21.78%). In 98 cases (79.03%) suicide is committed following sudden provocation and in 25 cases (20.17%) suicidal act is planned and pre decided. In 4 cases (3.23%) there is a definite history of previous attempts of suicide. In four cases (3.23%) multiple methods are used for committing the suicide.

Place of suicide: Place of suicide is own residence in 102 cases (82.23%), Work Place- 9 cases (7.27%), (**Figure 2**).

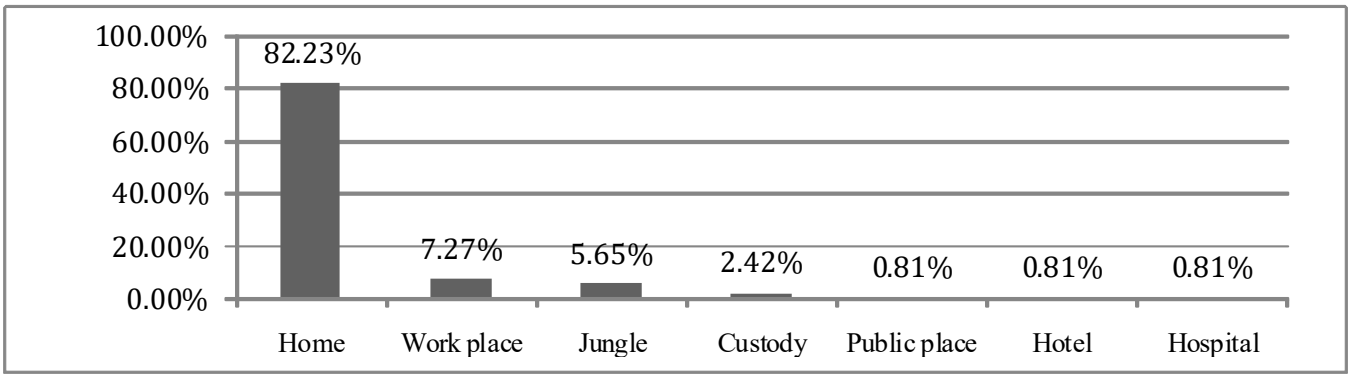

Figure 2 Place of suicide

Behavioural changes: Behavioural changes were noticed by relatives in 107 cases (86.3%), changes like become silent and less talkative, short tempered and violent or rowdy etc. Diagnosed psychiatric illness was found in 8 cases (6.45%). History of acute depression is present in 29 (23.38%) individuals. In 22 cases (17.74%) chronic illness was documented as a reason for suicide. Alcohol addictionpresent in 18 cases (14.52%). Menstrual history was present in 5 cases (10.64%) out of 47 females.

Suicide within seven years after marriage: This parameter was studied because Section 304B of Indian penal code deals with dowry death:1) Where the death of a woman is caused by any burns or bodily injury or occurs otherwise than under normal circumstances within Seven years of her marriage and it is shown that soon before her death she was subjected to cruelty or harassment by her husband or any relative of her husband for, or in connection with, any demand for dowry, such death shall be called "dowry death", and such husband

or relative shall be deemed to have caused her death.[5]

In present study out of 47 females, 32 females (68.08%) were married and out of which 15 females (46.87%) were within the seven years of marriage. Out of 15 cases in 3 cases (20.0%) maternal relatives had allegation about death.

Ligature material used: Commonest ligature materials used for hanging are rope in 46 cases (37.1%) followed by dupatta in 41 cases (33.1%)etc.(**Table 4**).

Table 4 Ligature material used

Material	Frequency	Per cent
Rope	**46**	**37.1**
Dupatta	41	33.1
Sari (Saree)	15	12.1
Shawl	7	5.6
Bedsheet	5	4.0
Cable wire	2	1.6
Shirt	2	1.6
Lungi	2	1.6
Rubber tube	1	0.8
Jeans belt	1	0.8
Packaging tape	1	0.8
Not known	1	0.8
Total	124	100

Commonest suspension points used is ceiling fan 66 cases (53.2%) followed by ceiling (roof) 35 cases (28.2%), Fixed knot was present in 105 cases (84.7%), running noose in 18 cases(14.5%).

Suicide note: Suicide notes found in 10 cases (8.07%) and not found in 114 cases (91.93%). All suicide notes language was in mother tongue. In one case (10.0%) written on left forearm. Electronic device (laptop) is used in one case (10.0%). In all suicide notes reason for suicide was mentioned.

DISCUSSION

In present study ligature mark is present in all 124 cases (100%). Suicide predominantly noted in males, i.e., 62.1% compared to females, i.e., 37.9% consistent with PN suresh kumar[6] (51.9%) and correlates with study of Sachil Kumar et al[7] (56.61%), Bennett and Collins et al.[8] (79.5%) and Kanchan T et al.[9] (73.7%). As per Table 1 most vulnerable age group is between 21 to 30 years (45.97%) consistent with Behera A et al[10] and Ambade VN et al.[11] In this younger age group suicidal tendency is more frequently observed may be due to frustration and acute depression secondary to exam failure, unsuccessful love affair, marital disharmony and unemployment, etc.

According to **figure 1** suicide incidences are more in married (65.32%) correlated with Behera A et al.[10] (72.32%) and Kadu Sandeep et al.[13] (74.68%), but Panarat Sritus et al.[12] observed more in unmarried (46.7%). Maximum victims are Hindu (80.64%) consistent with Kadu Sandeep et al.[13] (87.0%) and Kanchan T et al.[9] The incidence of suicide is noted more in housewives (23.4%) followed by those have no job (21.78%) consistent with PN Suresh Kumar et al.[6] may be due to stress and marital disharmony. Maximum (50.0%) cases are from lower socioeconomic class consistent with Kadu Sandeep et al.[13]

As per **figure 2** place of suicide is own residence in 82.23% individuals consistent with Rodge et al.[14] (65%) and Lisa BE Shields et al.[15] (63.9%). Maximum cases occurred in afternoon, (35.49%) but Panarat Sritus et al.[12] and Kadu Sandeep et al.[13] found in morning (40.30%) and Behera A et al.[10] in night. In afternoon family members are outside from home for job so that female victims get privacy for their suicide act. In present study suicide note is observed in 8.07% cases correlated with Bennett and Collins et al.[8] (22%) and Panarat Sritus et al.[12] (3.70%). Privacy for suicide is maintained by selecting lonely place by 78.22% victims but not so by 21.78%.

In 3.23% cases definite history of previous attempts of suicide noted consistent with Bagadiya et al.[16] (7%). Documented chronic illness is a reason for suicide in 17.74% cases consistent with Behera A et al.[10] (16.4%) and Kadu Sandeep et al.[13] (9.49%). Diagnosed psychiatric illness is found in 6.45% cases consistent with Sachil Kumar et al.[7] (10.9%). In 3.23% cases victims preferred more than one method to commit suicidemay be because of failure of first consistent with Behera A et al.[10] (2.51%). Menstrual history is presentin 10.64% females consistent with Behera A et al.[10] (30%). 46.87% femalescommitted suicide within the seven years of marriage consistent with DS Bhullar et al.[17](44.19%).

According to **table 4** rope (37.1%) is the commonly used ligature material by males followed by dupatta (33.1%) by females, consistent with Ambade VN et al.[18] Unusual ligature materials like cable (TV) wire and packaging tape is used by victims who committed suicide at workplace and where these materials are used by them for their work.Most commonly used suspension point used for hanging is ceiling fan in 53.2% casesclosely related with studies of Patel AP[19] and Meera Th et al.[20] In present study unusual suspension points like door grill, window grill, railing, ladder and swinging chair hook at roof are used by victims and their body found in partial hanging position. The type of knot is fixed noose in 84.7% cases and running noose in 14.5% cases consistent with Ambade VN et al.[15] Complete hanging seen in 79.83% victims followed by partial hanging (20.17%) consistent with Ambade VN et al.[15] Dried saliva stains are found over the angle of mouth in 28.22% cases and absent in remaining 71.78% cases of suicidal hanging dribbling of saliva/salivary

stains not observed, which indicates absence of saliva need not necessarily indicate that the hanging is not ante mortem and not suicidal.

CONCLUSION

Suicide tendency is more in males as compared to females. Younger age group (21 to 30 years) is more vulnerable for suicide. Commonest cause of suicide in housewives is marital disharmony and dowry related issues. Unemployment and money crisis is the commonest cause of suicide. Own residence preferred by maximum (82.23%) victims. Behavioural changes are noticed by relatives in 86.3 percent cases. Preferred language for suicide note is mother tongue of victims. Privacy for suicidal act is maintained by 78.22% victims. Mentally ill persons are highly prone to develop suicidal tendency. In menstrual phase suicidal tendency is more seen in females. Dowry demand is provocative factor for suicidal attempts in newly married females. Dupatta is the most commonly used ligature material for hanging used by females and rope by males. In 72% cases of suicidal hanging dribbling of saliva/salivary stains not observed. More vulnerable victims in suicidal hangings are housewives, labourers, students, farmers.

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Contribution of Authors: BG Chikhalkar and PB Waghmare had examined the cases. PB Waghmare had collected the data. BG Chikhalkar had provided guidance to PB Waghmare and contributed to writing and revising the manuscript. Both authors contributed to the study design and had full approval of the submitted version. Vd. AS Thote did statistical analysis of data.

Ethical clearance: The study work is conducted after the approval of Institute's Ethics Committee for Academic Research Projects, Grant Govt. Medical College Mumbai, India.

REFERENCES

1. Sadock BJ, Sadock VA. Chapter 29.1, Suicide. Kaplan & Sadock's comprehensive textbook of Psychiatry. 7th ed. Philadelphia: Lippincott Williams & Wilkins; 2000. p. 4186, 4200-4201.
2. De Leo, D, Burgis, S, Bertolote, J, Kerkhof, AJFM, & Bille Brahe, U (2006). Definitions of Suicidal Behaviour: Lessons learned from the WHO/EURO Multicentre Study. Crisis. 27(1):4-15. Available from: URL:https://doi.org/10.1027/0227-5910.27.1.4
3. Pekka Saukko, Knight B. Knight's Forensic Pathology. 3rd ed. London: Arnold Publication; 2004. p. 384.
4. Modi JP. In. Mathiharan K, Kannan K editors. A textbook of medical jurisprudence and toxicology. 24th ed. Haryana, India: LexisNexis; 2012. p. 445.
5. Universal's Criminal Manual. New Delhi, India: Universal Law Publishing Co. Pvt. Ltd; 2014. p. 517-8.
6. Suresh Kumar PN. An analysis of suicide attempters versus completers in Kerala. Indian Journal of Psychiatry 2004;46(2):144-149.
7. Kumar Sachil, Verma AK, Bhattacharya Sandeep, Rathore Shiuli. Trends in rates and methods of suicide in India. Egyptian Journal of Forensic Sciences 2013;3(3):75–80.
8. Bennett AT, Collins KA, Suicide: a ten-year retrospective study. Journal of Forensic Sciences 2000;45(6):1256-8.
9. Kanchan Tanuj. Day, week, month of suicide by hanging. J Indian Acad Forensic Med; 30(4):202-206.
10. Behera A, Balabantray JK, Nayak SR. Review of suicidal cases, A retrospective study. JIAFM 2005;(2):100-102.
11. Ambade VN, Godbole HV, Kukde HG. Suicidal and homicidal deaths: a comparative and circumstantial approach. J Forensic Leg Med 2007;14(5):253-60.
12. Panarat Sritus, Montip Tiensuwan, Suda Riengrojpitak. A retrospective study on suicide autopsy cases from Ramathibodi hospital in Bangkok Thailand. 2010: 25-28.
13. Kadu Sandeep, Asawa Rajshrikant, Medico legal evaluation of suicidal deaths in rural area. Journal of Forensic Medicine, Science and Law 2011;20(1):8-11.
14. Rodge Sidsel, Hougen PH, Poulsen K. Suicides in two Scandinavian capitals- a comparative study. Forensic Science International 1996;80:211-219.
15. Shields Lisa BE, Hunsaker DM, Hunsaker JC. Suicide: A ten-year retrospective review of Kentucky medical examiner cases. J Forensic Sci 2005;50(3):1-5.
16. Bagadia VN, Abhyankar RR, Shroff P, Mehta P, Doshi J, Chawla P. Suicidal behaviour: a clinical study. Indian J Psychiatry 1979;21:370-375.
17. Bhullar DS. Profile of unnatural female deaths between 18-30 years of age. JFMT 1997;8(3):5-8.
18. Ambade VN, Tumram Nilesh, Meshram Satin, Borkar Jaydeo. Ligature material in hanging deaths: The neglected area in forensic examination. Egyptian Journal of Forensic Sciences 2015;5(3):109-113.
19. Patel AP, Bansal A, Shah JV, Shah KA. Study of hanging cases in Ahmedabad region. JIAFM 2012;34(4):343-345.
20. Meera Th, M Bipin Kumar Singh. Pattern of neck findings in suicidal hanging- a study in Manipur. JIAFM 2011;33(4):352-354.