

Profile of Suicidal Death: An Autopsy-Based Observational Study at a Tertiary Care Centre in Rajasthan During the Year 2024–25

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ABSTRACT

Background: Suicide is a major public health and medicolegal problem, contributing substantially to preventable mortality worldwide. Autopsy-based studies provide valuable information regarding the demographic profile, methods of suicide, precipitating factors, and causes of death, thereby assisting in understanding the epidemiology of suicidal deaths and formulating preventive strategies. **Methods:** A cross-sectional descriptive autopsy-based observational study was conducted in the Department of Forensic Medicine and Toxicology, SMS Medical College, Jaipur, during 2024–2025. A total of 100 confirmed suicidal deaths subjected to medicolegal autopsy were included. Data regarding sociodemographic characteristics, method of suicide, precipitating life events, autopsy findings, cause of death, and survival period were collected from postmortem reports, hospital and police records, and interviews with relatives, and analysed using descriptive statistics. **Results:** Young adults aged 21–30 years constituted the largest group (37%), with males accounting for 78% of cases. Rural residents (52%), single individuals (53%), students and unemployed persons (26% each) were most commonly affected. Most suicides occurred at home (89%). Poisoning was the commonest method (58%), followed by hanging (38%). Love affair-related problems (26%), financial difficulties (23%), and academic failure (19%) were the leading precipitating factors. Shock (60%) and asphyxia (38%) were the principal causes of death, and most victims died within 24 hours of the suicidal act. **Conclusion:** Suicidal deaths predominantly affected young adult males and were strongly associated with psychosocial stressors, with poisoning and hanging being the principal methods. Strengthening mental health services, restricting access to highly lethal poisons, promoting community awareness, and improving medicolegal documentation are essential to reduce suicide-related mortality.

Keywords: Suicide; Autopsy; Poisoning; Hanging; Forensic medicine; Epidemiology; Medicolegal investigation.

INTRODUCTION

Suicide is a major public health concern and one of the leading causes of preventable mortality worldwide. It is defined as death resulting from self-directed injurious behaviour with the intent to die. The World Health Organization (WHO) describes suicide as an act deliberately initiated and performed by the individual with the knowledge or expectation of its fatal outcome.^{1,2}

Recognizing its growing significance, the International Classification of Diseases (ICD-10) includes the concept of intentional self-harm to encompass self-inflicted injuries resulting in death or serious harm.³

Suicide is a complex and multifactorial phenomenon influenced by the interaction of psychological, biological, social, cultural, and economic factors. Mental illnesses, substance abuse, chronic physical diseases, family

conflicts, relationship problems, unemployment, financial stress, academic pressure, social isolation, and traumatic life events are among the major determinants associated with suicidal behaviour.⁴ Consequently, suicide is regarded not only as an individual tragedy but also as an important indicator of broader societal and public health challenges.

Globally, nearly 900,000 people die by suicide each year, with a substantial proportion of these deaths occurring in low- and middle-income countries.^{5,6,7} Suicide predominantly affects individuals in the economically productive age group and remains one of the leading causes of death among young adults worldwide.^{8,9,10,11} India contributes significantly to the global burden, recording 1,70,924 suicides in 2022,^{12,13} representing the highest number reported since 1967 and a suicide rate of 12.4 per 100,000 population.^{14,15} According to the National Crime Records Bureau (NCRB), individuals aged 18–45 years account for nearly two-thirds of all suicide deaths, with males constituting approximately 72.5% of victims.¹⁶ These findings highlight the considerable social and economic impact of suicide on families and society.

The methods of suicide vary according to cultural practices, socioeconomic conditions, and accessibility of lethal means. Hanging is currently the most common method in India, accounting for over half of all reported suicides, followed by poisoning, drowning, burns, railway injuries, and other methods.¹⁷ Knowledge of locally prevalent methods is essential for implementing preventive measures, including restricting access to lethal means and strengthening emergency response systems.¹⁸ From a forensic medicine perspective, suicidal deaths require meticulous investigation through scene examination, police inquest, autopsy, and toxicological analysis to accurately determine the manner of death and differentiate suicide from homicide, accidental, or natural deaths. Autopsy-based studies provide reliable information regarding demographic characteristics, methods employed, injury patterns, and associated medicolegal factors, thereby contributing to a better understanding of suicide epidemiology. Therefore, the present study was undertaken.

Despite several hospital-based and retrospective studies on suicide, limited autopsy-based evidence is available from Rajasthan describing demographic characteristics, methods of suicide, psychosocial risk factors, and medicolegal findings. Therefore, the present study was undertaken to evaluate the profile of suicidal deaths among medicolegal autopsy cases at a tertiary care centre.

Aim

To evaluate the profile of suicidal deaths among medicolegal autopsy cases.

Objectives

- To study demographic characteristics.
- To identify methods of suicide.
- To analyse precipitating life events.
- To evaluate autopsy findings and causes of death.
- To assess medicolegal significance.

MATERIALS AND METHODS

Study Design

This was a cross-sectional descriptive autopsy-based observational study.

The present study was a cross-sectional descriptive autopsy-based observational study conducted in the Department of Forensic Medicine and Toxicology, SMS Medical College, Jaipur, a tertiary care teaching institution receiving medicolegal autopsy cases from Jaipur and surrounding regions. The study was carried out during 2024- 2025 till sample size of 100 was achieved, to evaluate the profile of suicidal death in medicolegal autopsy cases.

Sampling Technique

Consecutive sampling technique was used.

Inclusion criteria

1. Suicidal cases brought for medico-legal autopsy at SMS Medical College, Jaipur.
2. Cases whose attendants or legally responsible persons provided written informed consent for participation in the study.

Exclusion criteria

1. Cases with a controversial history of suicide/accidental/homicidal cases.

Data were collected using a prefixed proforma, postmortem reports, hospital records, police records, and suicide notes, wherever available. Additional information was obtained through interviews with the relatives of the deceased and the investigating officers. Medico-legal autopsies were performed according to standard forensic protocols. Detailed observations regarding the method of suicide, external and internal injuries, toxicological findings, cause of death, and other relevant autopsy findings were documented systematically. Sociodemographic information was obtained from hospital records, police documents, and interviews with relatives. The collected data were entered into Microsoft Excel, cleaned, and analysed using descriptive statistical methods. The results were expressed as frequencies and percentages and presented in appropriate tables and figures.

RESULTS

The majority of cases belonged to the 21–30 years age group (37%), followed by 11–20 years (22%), indicating that young adults constituted the most affected population

in the study Males accounted for 78% of cases, whereas females accounted for 22%, resulting in a male-to-female ratio of 3.5:1. found Specifically in 21-30 years age group.

Table 1: Association of Age Distribution with Gender among Suicidal Death Cases

Age Distribution (in years)	Female		Male	
	No. of Subjects	Percentage	No. of Subjects	Percentage
11-20	8	36.36%	14	17.95%
21-30	9	40.91%	28	35.90%
31-40	4	18.18%	13	16.67%
41-50	1	4.55%	12	15.38%
51-60	0	0.00%	6	7.69%
>60	0	0.00%	5	6.41%
Total	22	100.00%	78	100.00%

Rural residents constituted 52% of cases, while urban residents accounted for 48%, indicating an almost equal distribution with a slight predominance of rural cases.

Single individuals represented the majority (53%), followed by married (41%), divorced (4%) and unknown (2%) suggesting higher suicide occurrence among unmarried individuals in the present study. Most cases were unmarried (54%). Among married individuals, the highest proportion had a marital duration of 2–7 years (18%), followed by more than 10 years (17%). Hindus accounted for 93% of cases, Muslims 6%, and unknown religion 1%, reflecting the demographic characteristics of the study population rather than religion-specific risk.

Educational Status, Occupation and Socioeconomic Profile Graduates constituted the largest group (35%), followed by secondary (24%) and primary education (20%), indicating suicidal deaths occurred across all educational levels. Students (26%) formed the largest occupational group, followed by unemployed (26%) and employed individuals (19%), highlighting students and unemployed persons as vulnerable groups. Most victims belonged to the middle socio-economic class (63%), followed by the lower class (28%), while only 7% belonged to the upper socio-economic class.

Table 2: Distribution of Suicidal Death Cases According to Place of Incidence

Place of incidence	No. of Subjects	Percentage
Farm	1	1%
Home	89	89%
Public Place	9	9%
Workplace	1	1%
Total	100	100%

Most suicidal deaths occurred at home (89%), followed by public places (9%), indicating that the home environment was the commonest site of suicide.

Table 3: Association of Method of Suicide with Gender among Suicidal Death Cases

Method of suicide	Female		Male	
	No. of Subjects	Percentage	No. of Subjects	Percentage
Burns	1	4.55%	1	1.28%
Hanging	8	36.36%	30	38.46%
Poisoning	13	59.09%	45	57.69%
Train Accident	0	0.00%	2	2.56%
Total	22	100.00%	78	100.00%

Method of Suicide Poisoning (58%) was the commonest method, followed by hanging (38%), while burns and train accidents each accounted for only 2% of cases. Poisoning remained the leading method in both sexes, followed by hanging, while burns were relatively more common among females than males. Poisoning and hanging were most common methods of suicide in all sociodemographic aspects.

Table 4: Distribution of Suicidal Death Cases According to Recent Significant Life Events

Recent Significant life event	No. of Subjects	Percentage
Academic Failure	19	19%
Accusatory	1	1%
Family Conflicts	12	12%
Financial Problems	23	23%
Forced actions by parents	4	4%
Love affairs Problems	26	26%
Marital issues	10	10%
Quarrel with neighbours	3	3%
Unknown	2	2%
Total	100	100%

Regarding the Past Medical and Behavioural History Mental illness (15%), alcohol use (15%), previous suicide attempts (8%), and substance abuse were notable risk factors identified among a subset of victims. Love affair-related problems (26%), financial difficulties (23%), and academic failure (19%) were the leading precipitating life events associated with suicide.

Pregnancy-related uterine findings were uncommon, with 68.18% of females showing an empty uterus, Menstrual period 27.27% and 04.45% being in the postpartum period among the female cases of suicide.

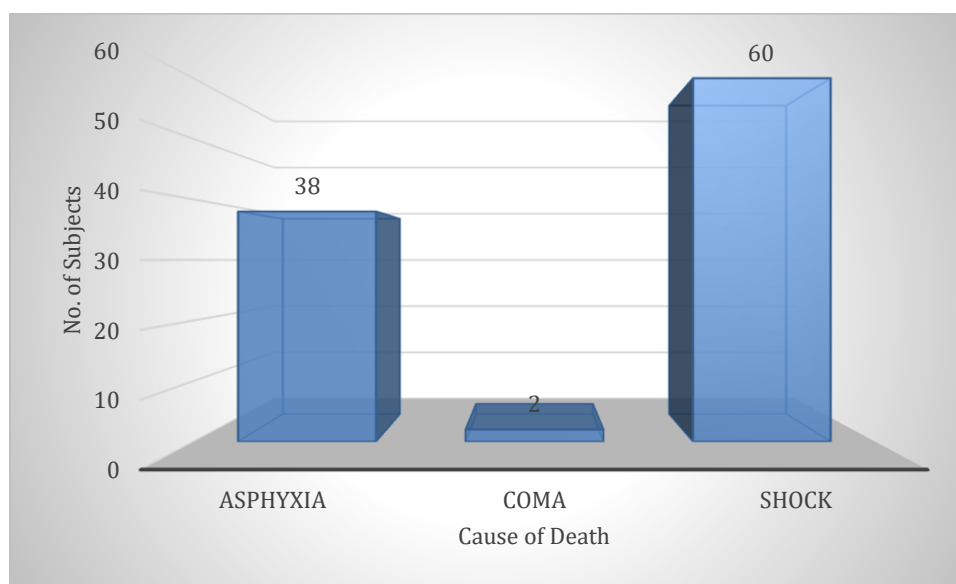


Figure 1: Distribution of Suicidal Death Cases According to Cause of Death

Shock (60%) and Asphyxia (38%) were the leading immediate causes of death, followed by coma in 2% of the cases. Most victims survived for 12–24 hours (40%) or less than 12 hours (28%), indicating that the majority died within the first day.

DISCUSSION

The majority of suicidal deaths in the present study occurred in the 21–30 years age group (37%), indicating that young adults constitute the most vulnerable population. Similar findings have been reported by

Sharma et al. and Uzair et al., who also observed the highest incidence in the 21–30 years age group.

Males accounted for 78% of cases, demonstrating a marked male predominance (male:female ratio 3.5:1). This observation is consistent with studies by Uzair et al.¹⁹

and Barman et al.²⁰. The highest proportion of both male and female victims belonged to the 21–30 years age group, consistent with findings by Gogoi et al.²¹ and Barman et al.²⁰.

Most victims belonged to rural areas (52%), suggesting the influence of socioeconomic and healthcare disparities. Similar findings were reported by Bhullar et al.²², whereas Tejaswini et al.²³ observed urban predominance.

Single individuals constituted the majority (53%) of suicidal deaths, followed by married individuals (41%), indicating that suicide affects all marital groups. This finding differs from studies by Barman et al.²⁰ and Bhullar et al.²², where married individuals predominated.

Students and unemployed individuals each represented 26% of cases, highlighting educational and economic stress as important risk factors. Similar observations have been reported by Barman et al.²⁰.

The home was the commonest place of suicide (89%), consistent with findings reported by Barman et al.²⁰ and Tejaswini et al.²³.

Poisoning (58%) was the most common method of suicide, followed by hanging (38%). Regional differences in the preferred method have also been reported by Sofi et al.²⁴ and Lad et al.²⁵.

Love affair-related problems (26%), financial issues (23%), and academic failure (19%) were the leading precipitating factors, emphasizing the role of psychosocial stressors in suicidal behaviour.

Shock (60%) was the leading immediate cause of death, followed by asphyxia (38%). Comparable observations have been reported by Manigandaraj et al.²⁶.

Most victims died within 24 hours, indicating the importance of early medical intervention. Similar findings have been reported by Tejaswini et al.²³ and Singh et al.²⁷.

Young adults aged 21–30 years accounted for the highest proportion of both poisoning and hanging cases, similar to observations by Bhullar et al.²² and Sharma et al.²⁸.

Poisoning was the predominant method among both males and females, while burns were relatively more common among females, consistent with reports by Uzair et al.²⁹ and Sharma et al.²⁸.

CONCLUSION

The present autopsy-based observational study provides a comprehensive profile of suicidal deaths at SMS Medical College during 2024–25. Suicidal deaths predominantly involved young adults aged 21–30 years, with a marked male predominance. Most victims belonged to rural areas, were single, and were from the middle socio-economic class. Students and unemployed individuals constituted the most affected occupational groups, while love affair-related problems, financial difficulties, and academic failure emerged as the leading precipitating life events. Poisoning, particularly with aluminium phosphide and

organophosphorus compounds, was the most common method of suicide, followed by hanging. Most incidents occurred at home, and visceral congestion was the predominant autopsy finding, with asphyxia and shock being the leading causes of death. The majority of victims succumbed within 24 hours of the suicidal act. These findings highlight the multifactorial nature of suicide and emphasize the urgent need for comprehensive suicide prevention strategies, including mental health promotion, early identification of high-risk individuals, psychosocial support, and restriction of access to highly toxic poisons.

Strengths of the Study

- Autopsy-based study providing reliable medicolegal data.
- Standardized autopsy examination in all cases.
- Comprehensive evaluation of demographic, forensic and psychosocial variables.
- Findings provide important regional epidemiological data for suicide prevention strategies.

Limitations of the Study

- This was a single-center, autopsy-based observational study conducted at a tertiary care hospital; therefore, the findings may not be generalizable to the wider population, rural communities, or other geographical regions with different demographic and sociocultural characteristics.
- The sample size of 100 cases, although adequate for descriptive analysis, may not fully represent the overall epidemiological profile and changing trends of suicidal deaths in the general population.
- Information regarding psychosocial factors, psychiatric illness, substance abuse, family conflicts, financial stress, and other precipitating life events was primarily obtained from police records and interviews with relatives, making the data susceptible to recall bias, reporting bias, and incomplete documentation.
- The study relied on medicolegal autopsy records and official documentation, which may have contained incomplete or missing information regarding psychiatric treatment history, previous suicide attempts, medication use, and psychological assessments.
- Psychological autopsy, an important tool for understanding the mental and emotional circumstances preceding suicide, was not performed due to practical and logistical constraints, limiting detailed assessment of psychological risk factors.

Future Recommendations

- Conduct multicentric studies with larger sample sizes to improve the generalizability of findings and identify regional variations in suicidal deaths.
- Promote multidisciplinary prospective research to identify modifiable psychosocial, psychiatric, socioeconomic, and forensic risk factors for suicide.
- Strengthen mental health services through early screening, counselling, and treatment, particularly for adolescents, young adults, students, and other high-risk groups.
- Increase community awareness to reduce stigma, improve suicide literacy, and encourage timely help-seeking behaviour.
- Establish integrated suicide surveillance systems to improve data collection, trend monitoring, and evidence-based policymaking. Develop and evaluate school-, workplace-, and community-based suicide prevention programs, including crisis helplines and postvention support for affected families

Ethics Approval:

The study was approved by the Institutional Ethics Committee (IEC) and Research Review Board of S.M.S. Medical College, Jaipur, Rajasthan, India. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and applicable national ethical guidelines.

Consent for Publication

As the study was based on medicolegal autopsy cases, informed consent for publication was waived by the Institutional Ethics Committee. Confidentiality of all subjects was strictly maintained.

Data Availability Statement

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request. The data are not publicly available due to medico-legal confidentiality.

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Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this study.

Author Contributions

Dr. Dhanpat Godara: Conceptualization, Data Collection, Literature Review, Data Analysis, Manuscript Preparation.

Dr. R. K. Punia: Study Design, Supervision, Interpretation of Results, Critical Revision and Final Approval.

Abbreviation	Full Form
WHO	World Health Organization
ICD-10	International Classification of Diseases, Tenth Revision
NCRB	National Crime Records Bureau
SMS	Sawai Man Singh
IEC	Institutional Ethics Committee
FMT	Forensic Medicine and Toxicology
MLC	Medico-Legal Case
PM	Postmortem
OP	Organophosphorus
ALP	Aluminium Phosphide

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