



DEMOGRAPHIC AND CAUSAL ANALYSIS OF MEDICOLEGAL AUTOPSIES: A FIVE-YEAR RETROSPECTIVE STUDY AT A FORENSIC MEDICINE DEPARTMENT IN NEW DELHI, INDIA

Forensic Medicine

Dr Harsh	Senior Resident, Maulana Azad Medical college, New Delhi.
Dr Rohit Kumar	Junior Resident Academic, Maulana Azad Medical college, New Delhi.
Dr Sunil Naagar	Director Professor & Head, Maulana Azad Medical college, New Delhi.
Dr Dhiraj D. Buchade*	Professor, Maulana Azad Medical college, New Delhi. *Corresponding Author
Dr Rupesh Chandra	Senior Resident, Maulana Azad Medical college, New Delhi.

ABSTRACT

Objective: This study aimed to comprehensively analyze mortality patterns through autopsies, specifically focusing on age, gender, and causes of death categorized by the manner of death. The primary objective was to find out variations in fatalities across demographic segments and identify prevalent causes, contributing to a better understanding of mortality trends. **Materials & Methods:** A total of 3,699 autopsies were conducted during the study period. Data were collected and analyzed to assess age and gender distribution, as well as causes of death categorized by the manner of death. **Results:** The 21–30 age group exhibited the highest number of cases, with 687 males (23.38%) and 202 females (26.54%), totaling 889 cases (24.03%). The gender-specific variations in causes such as poisoning, burns, and falls from height. Road Traffic Accidents (RTA) emerged as a leading cause for both males (37.23%) and females (21.55%), contributing to a total of 36.63%. **Conclusion:** The study provides valuable insights into mortality patterns, highlighting the prevalence of RTA and other significant contributors. The age and gender-specific breakdowns offer perspectives, facilitating targeted preventive strategies for diverse demographic segments. The findings contribute to the knowledge base for healthcare professionals and policymakers, informing public health interventions and strategies to reduce fatalities across different age groups and genders.

KEYWORDS

causes of death; manner of death; Road Traffic Accidents (RTA); mortality trends.

INTRODUCTION

Autopsy, derived from the Greek words "autos" meaning self and "opsis" meaning view, literally translates to "to see for oneself." On the other hand, necropsy, originating from "necros" for dead and "opsis" for view, pertains to the investigative dissection of a deceased body to determine whether the death was of natural or unnatural causes. If unnatural, a necropsy seeks to establish the precise manner of the incident, discerning whether it was homicidal, suicidal, or accidental.¹ While the term necropsy is more comprehensive, especially in forensic contexts, the term autopsy is more commonly employed, even in cases involving newborn infants. In the context of newborns, autopsy becomes pivotal in addressing questions related to live birth and viability. An alternative term, postmortem examination, is often used interchangeably with autopsy. However, it suffers from a lack of precision regarding the extent of examination, making it less favored in certain medical and legal circles.²

The phrase "postmortem examination" essentially signifies an investigation conducted after death. However, the term can be misleading, as it may imply a mere external examination without dissection. In some instances, it may even denote that a physician merely observed the fully clothed body during postmortem in a morgue setting.³

A complete autopsy, on the contrary, entails a thorough examination involving the opening of all body cavities and inspecting all organs within the trunk, chest, and head. This meticulous examination, rather than a partial one, is considered essential, especially in the realm of medicolegal post-mortems. The imperative for a comprehensive assessment arises due to the inherent imperfections in the preliminary evidence concerning the potential cause of death. Therefore, a complete autopsy serves as a crucial investigative tool, outline on intricate details that may otherwise remain obscured in the absence of a thorough examination.⁵

METHODS

This retrospective study examines medicolegal autopsies performed on deceased individuals brought to the Department of Forensic Medicine at Maulana Azad Medical College, New Delhi, India, spanning from January 2018 to December 2022. Comprehensive information pertaining to the circumstances of death was gathered from inquest reports, hospital records, and postmortem reports.

Throughout the study period, a total of 3,699 medicolegal autopsies were conducted. Key parameters such as gender, age, causes of death, and manner of death were meticulously recorded. The collected data underwent thorough compilation and analysis while maintaining utmost confidentiality. Causes of death were broadly categorized, encompassing burns, electrocutions, road traffic accidents, hanging, railway injuries, poisoning, drowning, and other natural causes. The study aims to provide valuable insights into mortality patterns, emphasizing transparency and adherence to ethical standards.

RESULTS

Three thousand six hundred ninety-nine autopsies were conducted during the study period. Data from these autopsies were collected and analyzed and subsequent observations were drawn. Table 1 presents a detailed overview of the distribution of cases based on age and gender. The data highlights the varying patterns of fatalities across different age groups. In the 0–10 age group, there were 124 male (4.22%) and 104 female (13.66%) cases, contributing to a total of 228 cases (6.16%). The 11–20 age group witnessed 269 male (9.15%) and 108 female (14.19%) cases, totaling 377 (10.19%). Notably, the 21–30 age group had the highest number of cases, with 687 males (23.38%) and 202 females (26.54%), making up 889 cases (24.03%). As age increased, the number of cases generally decreased, with the 71–80 age group and >80 age group having the lowest counts. The total number of cases in the data set was 3699, with 2938 males and 761 females. This breakdown provides a comprehensive understanding of the distribution of fatalities by age and gender, facilitating targeted approaches for preventive measures and interventions across different demographic segments.

Table 1: Age And Gender Distribution Of Cases

Age group	Male, n (%)	Female, n (%)	Total, n (%)
0–10	124 (4.22)	104 (13.66)	228 (6.16)
11–20	269 (9.15)	108 (14.19)	377 (10.19)
21–30	687 (23.38)	202 (26.54)	889 (24.03)
31–40	714 (24.51)	127 (16.68)	841 (22.73)
41–50	524 (17.83)	83 (10.90)	607 (16.40)
51–60	359 (12.21)	75 (9.85)	434 (11.73)
61–70	185 (6.29)	41 (5.38)	226 (6.10)
71–80	62 (2.11)	15 (1.97)	77 (2.08)
>80	14 (0.47)	6 (0.78)	20 (0.54)
Total	2938	761	3699

Table 2 provides a detailed breakdown of the causes of death categorized by the manner of death. The predominant cause is Road Traffic Accidents (RTA), with 1258 cases, constituting 36.63% of the total. Poisoning, falls from height, and hanging are significant contributors, accounting for 3.86%, 12.86%, and 4.56% of the total cases, respectively. The "Others" category encompasses various causes, predominantly natural deaths, resulting in 1087 cases or 29.38% of the total. Accidental deaths lead the count with 2033 cases, followed by suicidal (437), homicidal (151), and natural (1078) cases. The diverse range of causes and manners of death in this dataset highlights the complexity of mortality patterns, emphasizing the importance of tailored preventive strategies for different scenarios. Additionally, the note clarifies that RTA stands for Road Traffic Accident, providing context for the abbreviation used in the table.

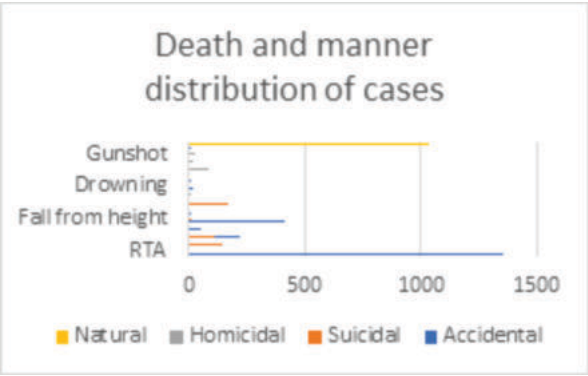


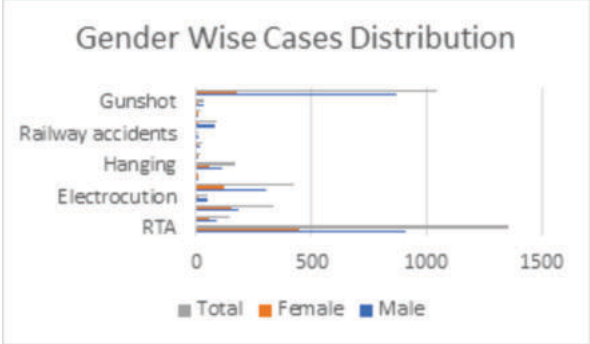
Table 2: Cause Of Death-manner Of Death					
Causes of death	Accidental	Suicidal	Homicidal	Natural	Total, n (%)
RTA	1258	-	-	-	1258 (36.63)
Poisoning	-	141	-	-	141 (3.86)
Burns	218	115	-	-	333 (9.00)
Electrocution	49	-	-	-	49 (1.32)
Fall from height	464	12	-	-	476 (12.86)
Snakebite and insect bite	6	-	-	-	06 (0.16)
Hanging	-	169	-	-	169 (4.56)
Strangulation	-	-	15	-	15 (0.35)
Drowning	22	-	-	-	22 (0.59)
Railway accidents	7	-	-	-	07 (0.18)
Assault	-	-	89	-	89 (2.43)
Stabbing	-	-	16	-	16 (0.35)
Gunshot	-	-	31	-	31 (0.83)
Others	09	-	-	1078	1087 (29.38)
Total	2033	437	151	1078	3699 (100)

RTA: Road traffic accident

Table 3 provides a detailed analysis of the distribution of causes of death by gender, offering valuable insights into the gender-specific patterns of fatalities. Road Traffic Accidents (RTA) stand out as a leading cause for both males and females, with 1094 cases (37.23%) and 164 cases (21.55%) respectively, contributing to a total of 1258 cases (36.63%). Poisoning, burns, and falls from height exhibit notable gender variations. Poisoning affected 91 males (3.10%) and 50 females (6.57%), totaling 141 cases (3.86%). Burns were more prevalent among females, with 153 cases (20.10%) compared to 180 cases (6.12%) in males, resulting in a total of 333 cases (9.0%). Electrocution predominantly affected males (48 cases, 1.63%), while falls from height impacted 358 males (12.18%) and 118 females (15.51%), contributing to 476 cases (12.86%). The "Others" category, which includes various causes, exhibited a substantial gender distribution, with 895 male cases (30.46%) and 192 female cases (25.22%), making up 1087 cases (29.38%). This gender-specific breakdown provides understanding of the differential impact of various causes of death, offering valuable information for targeted preventive strategies and interventions. The total count across all causes of death was 3699, with 2938 male and 761 female fatalities.

Table 3 : Gender Wise Distribution Of Cases			
Causes of death	Male, n(%)	Female, n(%)	Total, n (%)
RTA	1094 (37.23)	164 (21.55)	1258 (36.63)
Poisoning	91 (3.10)	50 (6.57)	141 (3.86)
Burns	180 (6.12)	153 (20.10)	333 (9.0)
Electrocution	48 (1.63)	1 (0.13)	49 (1.32)

Fall from height	358 (12.18)	118 (15.51)	476 (12.86)
Snakebite and insect bite	5 (0.17)	1 (0.13)	6 (0.16)
Hanging	113 (3.84)	56 (7.35)	169 (4.56)
Strangulation	9 (0.30)	6 (0.78)	15 (0.35)
Drowning	19 (0.64)	3 (0.39)	22 (0.59)
Railway accidents	7 (0.23)	0 (0.0)	7 (0.18)
Assault	77 (2.62)	12 (1.57)	89 (2.43)
Stabbing	12 (0.40)	4 (0.52)	16 (0.35)
Gunshot	30 (1.02)	1 (0.13)	31 (0.83)
Others	895 (30.46)	192 (25.22)	1087 (29.38)
Total	2938	761	3699 (100)



DISCUSSION

The Department of Forensic Medicine conducted a total of 3,699 medicolegal autopsies within the study duration. The highest number of postmortems (24.03%) belonged to the 21–30 age group, followed closely by the 31–40 age group (22.73%), a period typically associated with socioeconomic life activities. These age groups are more exposed to various risks and hazards, as noted in similar studies by Radhakrishna et al. [6], Bhabhor and Parmar [7], and Rathod et al. [8].

The male-to-female ratio in autopsies was 3.86:1, underscoring the higher involvement of males in fatalities. This trend is attributed to societal roles, where males often go outside homes for livelihood and are more susceptible to risks such as road traffic accidents, railway incidents, violence, and stress. This aligns with findings from studies by Bhabhor and Parmar [7], Rathod et al. [8], Murthy et al. [5], Radhakrishna et al. [6], Prabjot [9], and Junaidi et al. [10].

Road traffic accidents emerged as the primary cause of death, constituting 36.63% of cases, followed by other natural causes (29.38%) and falls from height (12.86%). Consistent results were observed in studies by Radhakrishna et al. [6], Rathod et al. [8], and Manish et al. [11]. Male dominance was evident in road traffic accident-related deaths (37.23%), while deaths due to other natural causes were more prevalent in females (25.22%). Burns and road traffic accidents were more frequent causes of death in females, attributed to their relatively higher exposure to vehicles and primary driving roles. This trend aligns with observations by Vinay Kumar et al. [12] and Rathod et al. [8].

Accidental deaths constituted the majority (36.63%) of the total autopsies, followed by other natural deaths (29.38%) and homicides (3.67%). This is consistent with findings from studies by Ramalingam and Narendar [13] and Prabjot [9], though contrary observations were reported by Manish et al. [11].

CONCLUSION

In conclusion, the analysis of the three tables provides a comprehensive overview of the patterns of mortality based on various factors. Study reveals the distribution of cases across different age groups and genders, shedding light on how fatalities vary across demographic segments. The data showed that causes of death categorized by the manner of death, emphasizing the prevalence of Road Traffic Accidents (RTA) and other significant contributors, thereby guiding preventive measures. Finally, Table 3 offers a nuanced perspective by breaking down causes of death by gender, showcasing variations in the impact of different causes on males and females. The comprehensive nature of these tables allows for a detailed understanding of mortality patterns, providing valuable insights for healthcare professionals, policymakers, and researchers in devising targeted strategies for prevention and intervention. The recognition of prevalent causes, demographic patterns, and gender-specific trends

facilitates the development of tailored approaches to improve public health and safety.

Conflict Of Interest: Nil.

Source Of Funding: Nil.

Ethical Clearance

This retrospective study maintains confidentiality by not disclosing the identity or other details of the deceased. As such, approval from the Institutional Ethics Committee is not deemed necessary.

REFERENCES

1. Perper, J. A. (1993). Time of death and changes after death: Part 1: anatomical considerations. In W. U. Spitz (Ed.), **Spitz and Fisher's Medicolegal investigation of Death** (3rd ed., pp. 14-50). Charles Thomas Publisher.
2. Kannan, K., & Mathiharan, K. (Eds.). (2012). **Modi-A textbook of Medical Jurisprudence and Toxicology** (24th ed.). LexisNexis Butterworth's Nagpur.
3. Curran, W. J. (1971, July). The Medico-legal autopsy and Medico-legal investigation. **Bulletin of the New York Academy of Medicine*, 47*(7), 766-775.
4. The Punjab Medical Manual* (2nd ed.). (1933). Superintendent. Government Printing. Punjab, Lahore; App. XXXVII: CII, Chapter X, p. 154. Para 595.
5. Murthy, M. S. N., Dutta, B. N., & Ramalingaswami, V. (1963). Coronary atherosclerosis in North India (Delhi Area). **Journal of Pathology and Bacteriology*, 85*, 93-101.
6. Radhakrishna, K. V., Makhani, C. S., Nikhil, S., Sachin, C., Sarala, M., & Khan, R. N. (2015). Profile of medicolegal autopsies conducted at tertiary medicolegal centre in southwestern India. **International Journal of Healthcare and Biomedical Research*, 3*, 70-75.
7. Bhabhor, R., & Parmar, A. (2018). Profile of medicolegal autopsies at a tertiary centre in Bhavnagar region. **Journal of Indian Academy of Forensic Medicine*, 40*, 383-386.
8. Rathod, A. L., Garg, R. K., & Zine, K. V. (2018). Study of postmortem cases to establish the mortality patterns in Aurangabad district of Marathwada Region. **Journal of Indian Academy of Forensic Medicine*, 40*, 17-22.
9. Prabjot, S. (2000). **Alarming Rise in Fatalities**. Chandigarh: The Tribune.
10. Junaidi, K. A., Pujar, S. S., Honnunar, R. S., Jirli, P. S., Koulapur, V. V., Ali, K., et al. (2020). Profile of medicolegal autopsy cases at tertiary care centre in Belagavi, Karnataka. A one year retrospective study. **Medico Legal*, 20*, 170-174.
11. Manish, K., Khaja, A. J., Deepak, S., & Umesh, S. R. (2020). Profile of medicolegal autopsy cases conducted at tertiary care centre, Kalaburagi, Karnataka. **Indian Journal of Forensic Medicine and Toxicology*, 14*, 269-274.
12. Vinay Kumar, M. S., Ajay Kumar, S., & Raghavendra Babu, Y. P. (2017). An autopsy based study on fatal road traffic accidents in Koppal. **Journal of Indian Academy of Forensic Medicine*, 39*, 375-377.
13. Ramalingam, S., & Narendar, R. (2016). Profile of medico - legal cases which are brought for autopsy in the year 2015 in the institute of forensic medicine, Madras Medical College, Chennai, Tamil Nadu, India - A retrospective study. **Chettinad Health City Medical Journal*, 5*, 177-183