

**A Hospital-Based Study to Evaluate Asphyxial Deaths: An Observational Study****Ambedkar Ranjan****Assistant Professor, Department of Forensic Medicine and Toxicology, Maa Vindhyawasini Autonomous State Medical College, Mirzapur, Uttar Pradesh, India****Received: 12-06-2023 / Revised 14-07-2023 / Accepted 20-08-2023****Corresponding author: Dr. Ambedkar Ranjan****Conflict of interest: Nil****Abstract:****Aim:** The aim of the present study was to analyze asphyxial deaths in region of eastern UP.**Methods:** The present study of violent asphyxial deaths was conducted at Department of Forensic Medicine and Toxicology, Maa Vindhyawasini Autonomous State Medical College, Mirzapur, Uttar Pradesh, India College for the period of two years. Total 3215 of autopsies were conducted during the period of which 200 (6.22%) were asphyxial death which are included in this study.**Results:** Hanging was found to be most common type of asphyxial death and accounts for more than half (120 cases, 60%) asphyxial deaths, followed by drowning which accounts for 28% (56) of cases and ligature strangulation 5% (10). Least number of cases seen was smothering and manual stragulation 2% (4). It was observed all types of asphyxia deaths common in males compared to female except smothering which accounts for same number of cases. The study revealed that maximum number asphyxia deaths due to hanging were in the age group of 21-30 years. All the asphyxial deaths in age group of 1-10 years were due to drowning alone. Maximum number of ligature strangulation seen in age group of 31-40 years.**Conclusion:** The Present study revealed that males and young age group population between 11–30 years are more susceptible victims of violent asphyxial deaths. Suicidal deaths as a result of hanging and accidental deaths as a result of drowning in this age group are the major causes of asphyxial deaths in present study. This young adult group is most active group of population and more exposed to external environment and stress and strain of life which leads to suicide by means of hanging in this age group.**Keywords:** Method of Asphyxiation, Manner of Death, Cause of Death, Autopsy.

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**Introduction**

The term asphyxia commonly means 'lack of oxygen'. However, etymologically, the term has been translated from the original Greek, implying 'pulselessness/absence of pulsation'. How the lack/absence of oxygen is related to pulsation may be explainable on the fact that the air (pneuma) necessary for maintaining life is carried through the blood (i.e., through the oxy-Hb) and therefore, this movement of air obviously will come to a standstill when movement of blood ceases, i.e. pulselessness occurs. Hence, failure or interruption of one function is inevitably linked to the each other. [1]

Violent asphyxial deaths have significant contribution to unnatural deaths (suicidal, homicidal and accidental). There are various types of violent asphyxia deaths like hanging, strangulation, smothering, throttling, traumatic asphyxia, choking and drowning. The hanging is most common type of asphyxia death and it is one of the leading methods of committing suicide. [2]

Strangulation is one of the forms of asphyxia death where compression of neck structures caused by a constricting force other than the body's own weight. The constricting force exerted by different means such as ligature (ligature strangulation), by hand (throttling), by elbow (mugging) and by bamboos (bandsola). [3] In drowning, access of air to lungs is prevented by submersion of body in water or fluid medium. Drowning is most commonly accidental in nature. Study conducted by United Nations World Health Organization reveals that in South Asia, about 90,000 people are drowned to death every year. Most South Asian countries have higher drowning death rates than the world average. [4]

Asphyxial deaths are divided into different methods, such as strangulations (hanging, manual, ligature), suffocations (environmental, smothering, choking, mechanical, suffocating gases), chemical asphyxia (carbon monoxide, hydrogen cyanide, hydrogen sulfide), and drownings. [5] Additionally,

in some cases, the victim dies as a result of the combination of different mechanisms of asphyxia. Hanging is a form of asphyxia death due to constriction of the air passage at the neck, as a result of suspension of the body by a ligature in the form of a noose, applied in such a manner, when weight of the body or other part of the body e.g. head, act as a constricting force. [6] Asphyxia means 'lack of oxygen'. Hanging is ordinarily presumed to be suicidal unless the circumstantial and other evidences are strong enough to rebut the presumption. [7] When the constricting force of the ligature causes compressing narrowing of laryngeal and tracheal lumen causing blockage of the airway. [8]

The aim of the present study was to analyze asphyxial deaths in region of eastern UP.

### Materials and Methods

The present study of violent asphyxia deaths was conducted at Department of Forensic Medicine and

Toxicology, Maa Vindhyawasini Autonomous State Medical College, Mirzapur, Uttar Pradesh, India College for the period of two years. Total 3215 of autopsies were conducted during the period of which 200 (6.22%) were asphyxial death which are included in this study.

The study included the asphyxia deaths of victim with age more than year (infant deaths exclude) and case of asphyxia deaths due to environment suffocation.

The preformed proforma was used to record the various parameter of study like age, sex, type of asphyxia death, post-mortem findings and cause of death. The information of cases was obtained from police inquest, ADR forms, statement of relatives of victims, hospital papers, and history obtained from relative, friends accompanying with deceased person.

### Results

**Table 1: Distribution of asphyxia deaths on the basis of its types**

Type of asphyxiadeaths	No. of cases	Percentages (%)
Hanging	120	60
Drowning	56	28
Ligature Strangulation	10	5
Manual strangulation(throttling)	4	2
Smothering	4	2
Traumatic asphyxia	6	3
Total	200	100%

Hanging was found to be most common type of asphyxial death and accounts for more than half (120 cases, 60%) asphyxial deaths, followed by drowning which accounts for 28% (56) of cases and ligature strangulation 5% (10). Least number of cases seen was smothering and manual stragulation 2% (4).

**Table 2: Distribution of cases on the basis of sex and type of asphyxia**

Type of asphyxia	Male	Females	Total
Hanging	70	50	120
Drowning	36	20	56
Ligature Strangulation	7	3	10
Throttling	3	1	4
Smothering	2	2	4
Traumatic asphyxia	4	2	6

It was observed all types of asphyxia deaths common in males compared to female except smothering which accounts for same number of cases.

**Table 3: Age wise distribution of cases based on type of asphyxia**

Age group / Type of asphyxia	Hanging	Drowning	Ligature Strangulation	Throttling	Smothering	Traumatic asphyxia
1-10 years	-	28	-	-	-	-
11-20 years	20	26	-	-	-	2
21-30 years	50	1	1	2	-	-
31-40 years	30	1	6	1	-	-
41-50 years	18	-	3	-	-	4
51- and above	2	-	-	1	4	-
Total	120	56	10	4	4	6

The study revealed that maximum number asphyxia deaths due to hanging were in the age group of 21-30 years. All the asphyxial deaths in age group of

1-10 years were due to drowning alone. Maximum number of ligature strangulation seen in age group of 31-40 years.

## Discussion

Asphyxial death is a common incident in forensic practice, and determination of the manner of death is very important. The manners of death can be accidental, suicidal, homicidal, or natural due to main methods of asphyxia. In such deaths, autopsy plays a major role to solve the case; the scene investigation and collection of samples are also of importance. [9]

Hanging was found to be most common type of asphyxial death and accounts for more than half (120 cases, 60%) asphyxial deaths, followed by drowning which accounts for 28% (56) of cases and ligature strangulation 5% (10). Least number of cases seen was smothering and manual strangulation 2% (4). Srinivasa Reddy P, Rajendra Kumar R, Rudramurthy study of asphyxia deaths at District hospital, Tumkur, Karnataka shows that total 19.14% autopsies were of asphyxial deaths. [10] Syed Zubair, Ahmed Tirmizi, Farhat Hussain Mirza and Hamid Ali Paryar study of Medico legal investigation of violent asphyxial deaths in Karachi Pakistan shows the incidence of asphyxial deaths 7.08% of total autopsies conducted. [11] It was observed all types of asphyxia deaths common in males compared to female except smothering which accounts for same number of cases. Neha Chaurasia et al [12] study also shows similar finding hanging (54.5%) and drowning (68.6%) was common in males. Mangesh R. Ghadge et al [13] study reveals hanging (74%) and drowning (81%) was common in males however ligature strangulation was common in females (84%). Patel Ankur P et al [14] study found hanging (60%) and drowning (85.7%) was common in males however strangulation was common in females (66%). Srinivasan Reddy P et al [10] study found hanging (57.83%) and drowning (69.28%) was common in males however strangulation was common in females (78.9%).

The study revealed that maximum number asphyxia deaths due to hanging were in the age group of 21-30 years. All the asphyxial deaths in age group of 1-10 years were due to drowning alone. Maximum number of ligature strangulation seen in age group of 31-40 years. Mangesh R. Ghadge et al [13] study in thane region also shows predominance of male victims which constitute 64.2% of cases and female were of 26.8% of cases and most common age group involved was 21-30 years (37.9%) followed by age group 31-40 years (17.4%). Srinivasa Reddy P10 study of asphyxia deaths in Tumkur shows predominance of male victims 59.14% and female victims were of 40.86%, most common age group involved was 21-30 years comprising of 34.93% of cases followed by age group 11-20 years constituting 20.105 of case. These findings are consistent with present study.

## Conclusion

The Present study revealed that males and young age group population between 11–30 years are more susceptible victims of violent asphyxial deaths. Suicidal deaths as a result of hanging and accidental deaths as a result of drowning in this age group are the major causes of asphyxial deaths in present study. This young adult group is most active group of population and more exposed to external environment and stress and strain of life which leads to suicide by means of hanging in this age group. However accidental deaths by drowning are second common cause of asphyxial deaths in young group indicates lack of supervision and carelessness. Both these types of asphyxial deaths part of young population are preventable and needs to be rectified.

## References

1. Krishan Vij, Textbook of Forensic Medicine and Toxicology, Elsevier 2011 5th edition, 111 -112 &117.
2. Reddy K S N: The essential of forensic medicine and toxicology, K. Sugunadevi, 28th edition 2009;299-333.
3. Parikh C.K.: Parikh CK's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology. 8th edition. ; CBS Publishers; 2005 , p. 3.47.
4. The need for Drowning Prevention Programs in South Asia.
5. DiMaio DJ, DiMaio VJM. Asphyxia. In: Forensic Pathology. Boca Raton, FL: CRC Press; 1993:207–251.
6. J.B. Mukharjee. Textbook of Forensic Medicine and Toxicology, 3rd Edition.
7. Krishan Vij. Textbook of Forensic Medicine and Toxicology, 5th Edition.
8. K S N Reddy. Essentials of Forensic Medicine and Toxicology, 11th Edition.
9. Modi J.P. Medical Jurisprudence, 25 edition. Lexus Nexus Butter worths, New Delhi ; 2017.
10. Srinivasa Reddy P, Rajendra Kumar R, Rudramurthy. Asphyxial Deaths at District hospital, Tumkur - A Retrospective Study. J Indian Acad Forensic Med. April-June 2012, 34(2):146-148.
11. Syed Zubair Ahmed Tirmizi, Farhat Hussain Mirza and Hamid Ali Paryar Medico legal investigation of violent asphyxial deaths - an autopsy-based study. Journal of the Dow University of Health Sciences Karachi 2012, Vol. 6 (3): 86-90.
12. Chaurasia N, Pandey SK, Mishra A. An epidemiological study of violent asphyxial death in Varanasi region (India) a killing tool. J Forensic Res. 2012;3(10):174.
13. Mangesh R. Ghadge, Dinesh R. Samel, Socio-demographic factors in mechanical asphyxial deaths in Thane region, Maharashtra, India In-

ternational Journal of Research in Medical Sciences. 2016 Sept ;4(9):4078-4083.  
14. Patel AP, Bhoot RR, Patel DJ, Patel KA. Study of violent asphyxial death. International jour-

nal of medical toxicology and forensic medicine. 2013;3(2 (Spring)):48-57.