*Original Research Article*

# An analysis of Socio-Demographic Profile of Asphyxial Deaths in Western Mumbai Region

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## Abstract

**Background**: the study is conducted to determine epidemiology of violent asphyxia deaths in the western Mumbai region and variation in types of asphyxia deaths in relation to age and gender.

**Methods**: Study was conducted in department of forensic medicine of H. B. T. Medical College & cooper Hospital, Mumbai for period (2 years) of January 2015 to December 2016. Total 3114 of autopsies were conducted during the period of which 187(6%) were asphyxial death which are included in this study.

**Result:** 187 out of 3114 medicolegal autopsies were of asphyxial death making incidence rate 5.87% of asphyxial death. Age group most commonly involved in asphyxial death was 21-30 years constitutes 28.8% cases. Male victims constitute of 60.42% cases and female victims were 39.58% cases. Drowning is common in age group 1-20 years constitutes 94.4% of all drowning deaths. Age group 1-10 years all the asphyxial deaths were due to drowning. Hanging is commonest in age group 21-30 years and it constitutes 41.22% of hanging case.

**Conclusion:** Males and young age group population between 11–40 years are more susceptible victims of violent asphyxial deaths. Hanging and drowning was most common cause in this age group. Both types of asphyxial deaths in young population are preventable and needs to be rectified.

***Key words**: Asphyxial deaths, hanging, drowning, ligature strangulation, unnatural deaths.*

## 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 asphyxial 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 asphyxial 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 (bansdola).[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].

Traumatic asphyxia" or Crush asphyxia" is other form of mechanical asphyxia where asphyxiation is caused due to mechanical fixation of chest and abdomen by restricting respiratory movements and thus prevents inspiration. It provides the most extreme demonstration of the 'classic signs' of asphyxia i.e. cyanosis, petechial haemorrhages and congestion. Traumatic asphyxia

occurs in two main conditions building collapse and stampede [5].

The present study is conducted to aim to study and evaluates the socio- demographic factors of the asphyxial deaths which will help to know the incidence of asphyxial deaths amongst the population of western Mumbai region.

## Material and Method

The present study of violent asphyxia deaths was conducted at department of forensic medicine and toxicology at H.B.T. Medical College for the period of two years i.e. 1st January 2015 to 31st December 2016.

The data includes cases of asphyxia deaths referred for post-mortem by police station from western Mumbai (western suburbs) region which comes under the jurisdiction of H. B. T. medical college.

The study includes 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.

**Observations and results:**

**Table 1: Total number of autopsy and its relation to asphyxia death autopsies**

| Period | Total autopsies | Asphyxia deaths (%) |
|---|---|---|
| Jan 2015- Dec 2015 | 1524 | 91 (5.7%) |
| Jan 2016- Dec 2016 | 1590 | 96 (6.03%) |
| Total | 3114 | 187 (5.87%) |

Total 3114 autopsies were conducted in period of two year i.e. Jan 2015- Dec. 2016 out of which total 187 (5.87%) cases were of asphyxial deaths.

**Figure 1 : Age and sex wise distribution of asphyxia deaths**

The study reveals the predominance of male victims 113(60.42%) over female victims which account for 74 cases (39.58%). Maximum number of victims 52 (28.80%) were found in the age group of 21-30 years, followed by age group of 11-20 years accounts for 45 (24%) of cases. Together age group of 11-30 years accounts for more than half of cases 97 (52.8%) and 31-40. 35(18.7%) of cases were belong to 31-40 years age group. Least numbers of cases 5(2.6%) seen in age group of 51 years and above.

**Table 2: Distribution of cases based on the region of deceased.**

| Region | No. of cases | Percentages (%) |
|---|---|---|
| Mumbai district | 149 | 79.68 |
| Thane district | 31 | 16.58 |
| Rest of Maharashtra | 2 | 1.02 |
| Rest of India | 5 | 2.67 |
| Total | 187 | 100 |

It was observed most of asphyxial deaths were from the Mumbai district region (79.68%), followed by adjacent district Thane (16.58%) region like Meera road, Palghar, Vasai and virar.1.02% deaths were from the rest of Maharashtra. While 2.67% cases were from rest of India region from Bihar, Rajasthan and utter Pradesh.

**Table 3: Distribution of asphyxia deaths on the basis of its types**

| Type of asphyxia deaths | No. Of cases | Percentages (%) |
|---|---|---|
| Hanging | 114 | 60.9 |
| Drowning | 54 | 28.8 |
| Ligature Strangulation | 11 | 05.8 |
| Manual strangulation (throttling) | 3 | 01.6 |
| Smothering | 2 | 01.0 |
| Traumatic asphyxia | 3 | 01.6 |
| Total | 187 | 100% |

Hanging is found to be most common type of asphyxial death and accounts for more than half (114

cases, 60.9%) asphyxial deaths, followed by drowning which accounts for 28.8 %( 54) of cases and ligature strangulation 5.8% (11). Least number of cases seen were of smothering 1% (2)

**Table 4: Distribution of cases on the basis of sex and type of asphyxia**

| Type of asphyxia | Male (%) | Females (%) | Total |
|---|---|---|---|
| Hanging | 68(59.64) | 46(40.36) | 114 |
| Drowning | 33(61.11) | 21(38.89) | 54 |
| Ligature Strangulation | 07(63.63) | 04(36.37) | 11 |
| Throttling | 02(66.66) | 01(33.34) | 03 |
| Smothering | 01(50.00) | 01(50.50) | 02 |
| Traumatic asphyxia | 02(66.66) | 01(33.34) | 03 |

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

**Table 5: 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 | - | 26 (48.14%) | - | - | - | - |
| 11-20 years | 19 (16.66%) | 25 (46.29%) | - | - | - | 1(33.33%) |
| 21-30 years | 47 (41.22%) | 2 (3.70%) | 2 (18.18%) | 1(33.33%) | - | - |
| 31-40 years | 28 (24.56%) | 1 (1.85%) | 5 (45.45%) | 1(33.33%) | - | - |
| 41-50 years | 18 (15.78%) | - | 4 (36.36%) | - | - | 2(66.66%) |
| 51- and above | 2 (1.75%) | - | - | 1(33.33%) | 2 (100%) | - |
| Total | 114 (100%) | 54 (100%) | 11 (100%) | 3(100%) | 2(100%) | 3(100%) |

Study reveals that maximum number asphyxia deaths due to hanging were in the age group of 21-30 years and accounts for 41.22% cases. 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 accounts for 45.45% ligature strangulation cases.

## Discussion

In present study asphyxial deaths accounts 5.87% of total autopsies. Finding of this study was consistent with study of Neha Chaurasia , SK Pandey**1** and Amarnath Mishra study which accounts 6.95% of asphyxial death in the city of Varanasi [6], study conducted by Bhim Singh, Mithun Ghosh et.al reveals that the asphyxial deaths accounts for 8.87 % of total autopsies in the city of Meerut [7] . Mangesh R. Ghadge, Dinesh R. Samel study of 10-year duration in thane region reveals that 12.8% of total autopsies were of asphyxial deaths.[8] Patel Ankur P., Bhoot-Rajesh R et.al. Study of violent asphyxial death in the Ahmedabad shows Incidence of violent asphyxia deaths is 5.63% of total autopsies and consistent with present study. [9] Srinivasa Reddy P, Rajendra Kumar R, Rudramurthy study of asphyxial 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]

Present study shows male predominance in asphyxial deaths comprising of 60.42% of all asphyxial deaths and female constitutes 39.58% of asphyxial deaths. Most common age group involved is 21-30 years constitutes 28.80% of cases followed by 11-20 years comprising 24 %. Age group 11-30 together constitutes 52.80% of cases. Neha Chaurasia et.al [6] study in Varanasi reveals predominance of male victims **60.89% and females were 39.11% of total violent asphyxial death and most common age** group involved in **violent asphyxia death was 21-30 years (35.79%), followed by 11-20 years (20.30%) which is consistent with our study.** Bhim Singh et.al [7] study of asphyxial deaths in Meerut city revealed male victims comprising of 68.03% and female victims 31.96% showing predominance of male victims and most common age group involved was 11-30 years constituting 41.55% of asphyxial deaths, this is in consistent with present study. Mangesh R. Ghadge et.al [8] 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%). Patel Ankur P[9] study of 388 asphyxial deaths in Ahmadabad region reveals predominance of male victims male to female ratio was 1.69:1 and most common age group involved was 21-30 years 32.99% cases these findings are consistent with present study. Srinivasa Reddy P [10] study of asphyxial 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. Syed Zubair et.al [11] study in Karachi reveals the male victims were of 75.68% case and females were of 24.32% of cases. Most common age group involved was 15-25 years (33.1%) followed by age group 25-35 years (27.7%)]. Zahid Hussain Khalil et.al.[12] study in Peshawar also shows predominance of male victims in asphyxial deaths (68.46%) and female victims comprising of 32.64% case and most common age group 20-40 years 64.5% case.

Present study revealed most of asphyxial deaths were from Mumbai region (79.68%) from the area of study followed by adjacent region Thane (16.58%). Mangesh R. Ghadge et. al. study [8] finding is similar with present study showing the maximum asphyxial deaths were from region of study i. e. Thane region 81% cases followed by adjacent region of study 8.8%. Rest of Maharashtra constitutes 0.6 % of asphyxial deaths followed by 0.3 % of asphyxial deaths were from rest of India

In present study commonest type of asphyxial death found was hanging in 60.9% cases followed by drowning (28.8%) and ligature strangulation 5.8%. Neha Chaurasia et.al [6] study in Varanasi reveals most common type of asphyxial death was hanging 52.21% followed by drowning 45.02% and strangulation 2.21% these finding consistent with present study. Bhim Singh et.al [7] study of asphyxial deaths in Meerut city shows similar finding with most common method of asphyxia was hanging 60.73% cases followed by drowning 19.63% cases, ligature strangulation 9.13% cases and manual strangulation 5.47% cases. Mangesh R. Ghadge et.al [8] study in thane region also reveals most common type of asphyxial death was hanging 62.5% case followed by drowning 31.2% cases. Patel Ankur P et.al

[9] study in Ahmadabad region found most common type of asphyxial death was hanging comprising of 82.48% cases followed by drowning 14.43% cases and ligature strangulation 3.09%. Srinivasa Reddy P et.al.[10] study of asphyxial deaths in Tumkur reveals most common method of asphyxial death was hanging constituting 61.19% of cases followed by drowning 31.96% cases and ligature strangulation 4.34% cases. Findings of study in Pakistan, Karachi region by Syed Zubair et.al.[11] also similar to present study showing most common type of asphyxial death was hanging 36.48% cases followed by drowning 32.43% cases and ligature strangulation 16.21% cases. However, Findings of study in Pakistan, Peshawar region by Zahid Hussain Khalil et.al.[12] inconsistent with present and other study discussed above showing most common method of asphyxial death was ligature strangulation comprising of 69.2% cases followed by smothering 10.8% cases. Cause of this inconsistent finding may be difference in geographical region/ country.

In present study major types of asphyxial deaths i.e. hanging (59.64%), drowning (61.11%) and strangulation (63.6%) were common in males compared to females. Neha Chaurasia et.al[6] study also shows similar finding hanging (54.5%) and drowning (68.6%) was common in males. Mangesh R. Ghadge et.al.[8] study reveals hanging (74%) and drowning (81%) was common in males however ligature strangulation was common in females (84%). Patel Ankur P et.al.[9] 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%). Syed Zubair et.al.[11] study shows hanging (72.2%), drowning (97.9%) and ligature strangulation (58.3%) was common in males compared to females.

Present study found drowning is common in age group 1-20 years constitutes 94.4% of all drowning deaths. However, in the age group 1-10 years all the asphyxial deaths were due to drowning. Hanging is commonest in age group 21-30 years and it constitutes 41.22% of hanging cases. Bhim Singh et.al.[7] study also found that drowning was commonest in age group 1-10 years and hanging was commonest in age group 21-30 years. Mangesh R. Ghadge et.al.[8] study found that the drowning is commonest among the age group 1-20 years and it constitutes 42.2 % of drowning cases. Hanging is common in the age group 21-30 years and it constitutes 43.8% of hanging cases. Finding of this study is consistent with present study. Patel Ankur P et.al.[9] study reveals that drowning was common in age group 1-20 years and constitutes 49.23% of drowning cases, hanging was common in age group 21-30 years and it constitutes 40% of all hanging cases.

## Conclusions

Present study reveals 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 constituting both together 49.73% 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.

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