

## Original Article

## Violent asphyxial deaths-an autopsy based retrospective study

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Manuscript writing, proof reading

<sup>6</sup>Proof reading

Funding Source: None

Conflict of Interest: None

Received: February 19, 2020

Accepted: July 23, 2020

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## ABSTRACT

**Objective:** To statistically analyze the data of violent asphyxial deaths obtained from PIMS Forensic Record during years 2014-2018.**Methodology:** This was an autopsy based retrospective study was conducted based on the five years January 2014 to December 2018 data collected from Forensic department, PIMS Islamabad. Only asphyxial deaths were further analyzed. Cross tabs were made between types of asphyxial deaths, age and gender of victims using SPSS and Microsoft Excel to evaluate and interpret the results in the form of graphs and charts.**Results:** A total of 650 autopsies were conducted during the period of 5 years i.e. 2014-2018, out of which 69 (10.615%) were violent asphyxia deaths. Ratio of male to female asphyxial deaths was observed as 1.72:1 with a percentage of victims as (62.3%) in males and (37.7%) in females. Among all cases, ligature strangulation was the leading cause of death (40.6%) and smothering was the least common (only 2.9%). Most commonly involved age group was 21-30 years (30.4%).**Conclusion:** Violent asphyxial deaths are most common in young adults. Strangulation came out to be the most common type in both males and females.**Keywords:** Violent asphyxia, strangulation, smothering

**Cite this article as:** Haider A, Zaheer S, Rehman U, Mehmood M, Sadia H, Ain KNU. Violent asphyxial deaths-an autopsy based retrospective study. *Ann Pak Inst Med Sci.* 2020; 16(2): 87-90.

## Introduction

Violence has been a part of human nature since the evolution of life. Despite tremendous development, incidences of violent deaths have not decreased, yet increased drastically. Violent deaths by asphyxia have contributed significantly to un-natural causes of deaths and they are now of common occurrence.

Asphyxia is defined as a condition involving either interference in the process of respiration, or the deficiency of oxygen in inhaled air leading to hypoxia (deprived of oxygen) of organs and tissues, that may lead to unconsciousness or even death. The term asphyxia denotes a mode of dying rather than the cause of death.<sup>1</sup> In forensic, mechanical interference with the process of respiration, leading to anoxic anoxia, causing death, is

usually associated with violence hence is termed as violent asphyxia.<sup>2</sup>

On autopsy, general pathological findings include, cyanosis, venous congestion, petechial hemorrhages, edema of lungs and tissue and fluidity of blood.<sup>3</sup> The brain is the organ most sensitive to hypoxia. In asphyxia deaths, hypoxia causes dysfunction of respiratory center in brainstem that leads to respiratory arrest with bradycardia/asystole.<sup>4</sup>

Mechanical asphyxial situation is marked by physical obstruction at any level between nose and mouth to the alveoli.<sup>5</sup> In forensic medicine context, asphyxia is predominantly classified into four types: hanging, suffocation, drowning and strangulation. Strangulation e.g. throttling or manual strangulation is commonly seen

in homicidal cases while hanging and drowning are usually suicidal.<sup>2</sup>

Strangulation is described as constriction of neck, caused by a pressure other than victim's body weight.<sup>6</sup> Based on means used for strangulation it can be further classified as ligature strangulation and manual strangulation.<sup>2</sup> Strangulation can injure the soft tissues of the neck; the larynx, trachea, esophagus, and cervical spine; and the laryngeal and facial nerves-injuries that may not be immediately apparent.<sup>7</sup> Death by strangulation is the most common form of murder and is considered as homicidal unless postmortem findings confirm accident or suicide.<sup>8</sup>

One of the leading methods of suicide is hanging. It is caused by suspension of the body through ligature causing external compression of neck, with victim's body weight acting as constricting force.<sup>1</sup> Suffocation is death resulting from exclusion of air from the lungs. It is due to means other than neck compression. Due to compressing force of hands over mouth, postmortem findings include bruises and abrasions around mouth and nostrils.<sup>9</sup> Suffocation can be further classified into sub types of smothering, choking and traumatic asphyxia.<sup>2</sup> In compression or traumatic asphyxia external force interferes with the normal expansion of chest or abdomen which is necessary for regular breathing. This external pressure can cause rise in intra-thoracic pressure effects too.<sup>10</sup> In United States of America in 2017, the second most common method implied for suicide after firearm is suffocation (including hanging) and accounts for 27.72% of all suicides.<sup>11</sup>

Drowning is mainly due to immersion in fluid. But it is also a mixture of mechanical pressure due to water and changes in fluid and electrolytes depending on the medium of immersion.<sup>5</sup> In case of drowning removal of clothing, spectacle etc. are indicative of suicide while tying of hands/legs and injuries sustained before entering the water are suggestive of homicide.<sup>6</sup> According to the statistics by WHO, drowning is the 3<sup>rd</sup> leading cause of unintentional injury death worldwide, accounting for 7% of all injury-related deaths.<sup>12</sup>

Several asphyxial deaths are being reported each year in Pakistan but there is not enough statistical data available. So, this study will help to find out the prevalence of different types of asphyxial deaths among different age group and gender at Islamabad which will also help in finding demographic and socio-economic factors affecting violence.

## Methodology

An autopsy based retrospective way of collecting data was performed for all the autopsies conducted from year 2014-18 at Pakistan Institute of Medical Sciences, Islamabad. Results of autopsies conducted in this 5-year span were collected from the post-mortem registers of medico legal record room of PIMS. Total 650 autopsies were conducted in the span of 5-years, out of which 69 were reported to be violent asphyxial deaths. These 69 violent asphyxial deaths were analyzed with respect to categories of male female ratio, age, type and subtype of asphyxial deaths. All those deaths where cause of death was other than asphyxia or those cases left without autopsy were not included. SPSS version 25 and Microsoft excel were employed to evaluate and interpret the results in the form of graphs, tables and charts.

## Results

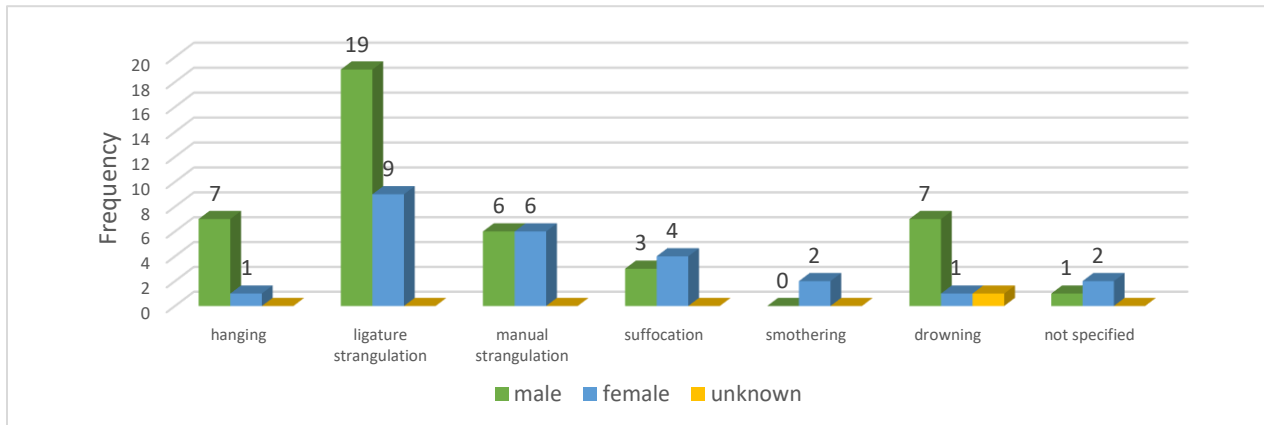
A total of 650 autopsies were conducted during the period of 5 years i.e. 2014-2018, out of which 69 were violent asphyxia deaths. The incident rate according to the data is concluded at 10.61%.

According to the collected data the most common type of asphyxial death was by Ligature strangulation. A total of 28 deaths were caused ligature strangulation which mount to a total of 40.6% of the total deaths by asphyxia. Its followed by manual strangulation and drowning at 17.4% and 13.0% respectively. (Table I)

**Table No I: Types of Asphyxia**

	Frequency	Percent
Hanging	8	11.6
ligature strangulation	28	40.6
manual strangulation	12	17.4
Suffocation	7	10.1
Smothering	2	2.9
Drowning	9	13.0
not specified	3	4.3
<b>Total</b>	<b>69</b>	<b>100.0</b>

Ligature strangulation was most common in both the genders. Drowning and hanging are more prevalent in males. While smothering is recorded only in females. Out of 69 deaths 43 were identified as males and 25 as females. However, gender of one body was unspecified since it was a case of drowning and the body was extremely putrefied. (Figure I)



**Figure 1. Gender and Type Relation**

Most deaths occurred in the age group 21-30 indicating that young people are more prone to asphyxial deaths. The least number of asphyxia deaths were reported among the elderly with least in age group 61-70 followed by the category of 51-60 years. (Table II)

**Table II: Categories of age.**

		Frequency	Percentage
Valid	< 10	7	10.1
	11-20	12	17.4
	21-30	21	30.4
	31-40	11	15.9
	41-50	11	15.9
	51-60	4	5.8
	61-70	3	4.3
Total		69	100.0

Crosstabulation between age groups and the type of asphyxia reveal that ligature strangulation is most common among people in the age group 21-30. However manual strangulation is more common among the adolescence and preadolescence. (Table III)

**Table III: Categories of age \* type of asphyxia Cross tabulation**

	type of asphyxia							Total	
	hanging	ligature	manual	suffocation	smothering	drowning	not specified		
		strangulation	strangulation						
categories of age	< 10	0	1	3	0	1	2	0	7
	11-20	0	4	5	1	0	2	0	12
	21-30	1	12	2	2	1	1	2	21
	31-40	2	5	1	2	0	1	0	11
	41-50	3	4	1	0	0	2	1	11
	51-60	2	0	0	1	0	1	0	4
	61-70	0	2	0	1	0	0	0	3
Total	8	28	12	7	2	9	3	69	

## Discussion

The number of autopsies considered in the present study conclude the rate of asphyxial deaths at 10.615% which is comparable to a study conducted at Karachi where the rate is 7.08<sup>13</sup> and 10 years study at Faisalabad where the rate was 7.66%.<sup>14</sup> This result is in contrast with a four year retrospective study in Peshawar where the rate was low at 3.98%.<sup>15</sup> Males were more affected than females with former forming 62.3% of all victims which is comparable to a 69.06% of males in a study conducted in Pune, India.<sup>16</sup> Highest incidence was observed in age group 21-30 years which is comparable to study conducted in Riyadh, Saudi Arabia.<sup>17</sup> Most common type was ligature strangulation which is in accordance with studies conducted at Peshawar<sup>15</sup> and Lahore.<sup>18</sup> Male predominance is observed in ligature strangulation which is in alignment with the results of studies conducted at Dow, Karachi<sup>13</sup> and Pune, India.<sup>16</sup> It is in contrast with female predominance observed in a study conducted at Lahore.<sup>19</sup> Drowning was also more common in males. Hanging is observed to be more common in males. Out of all the recorded cases of hanging, 87.5% were males. It is parallel to findings of study conducted in Gujrat India

where males were more affected.<sup>20</sup> Smothering was the least occurring method, which is in accordance with many studies like Mangalore,<sup>21</sup> and Maharashtra, India.<sup>22</sup> A rise in asphyxial deaths was seen in the year 2018. It may be due to increased incidences of sexual assaults, familial disputes and socio-economic pressure which increases frustration and depression among people.

## Conclusion

Violent asphyxial deaths are most common in young adults. Strangulation came out to be the most common type in both males and females. A sharp increase in violent asphyxial deaths in the recent year among male and young population is alarming. So, this statistical analysis is helpful in bringing forth these increasing trends and the methods adopted for such activities, thus demanding prompt actions to be taken by the concerned authorities and public itself to reduce the loss of precious lives.

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