

# Prevalence of Suicidal Hanging in males of 3<sup>rd</sup> Decade of life

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## ABSTRACT

**Objective:** This study was carried out to find the manner and gender variation in various age groups of asphyxial deaths in Lahore.

**Study Design:** Observational study.

**Place and Duration of Study:** This study was conducted at the Department of Forensic Medicine King Edward Medical University, Lahore, during January 2006 to December 2008.

**Materials and Methods:** A total of 2979 autopsies had been carried out. After detailed scrutiny 220 cases of asphyxial deaths were selected for this study. The post-mortem reports, police papers and hospital notes were studied. The parameters selected in those asphyxial deaths were age, sex, means of constriction, level of application of force and fracture of hyoid bone.

**Results:** Amongst this total number of autopsies in 220 cases, the cause of death was asphyxia (7.39%). Hanging surpassed amongst all asphyxial deaths 104 which was 47.27%, ligature strangulation was next in number 64(29.09%) and then the throttling 52(23.64%)

Out of these 104 cases of hanging 72 were males and males dominated as per M/F ratio shown as 2.25:1.0. The 3<sup>rd</sup> decade age group i.e.; 21-30 years had higher incidence of males than females. The homicidal manner was 126 (57.27%), suicidal 68(30.91%) and in un-determined it was 26 (11.82%).

**Conclusion:** Hanging remains the commonest method of suicide in males especially in age group of 21-30. Strangulation with ligature and manual throttling are the other methods used in homicidal deaths. The post-mortem findings showed damage to the structures above the thyroid cartilage which favors death due to hanging and throttling. And the trauma to the tissues below thyroid cartilage is consistent with ligature strangulation. The fracture of Hyoid bone is commonly seen in ligature strangulation.

**Key Words:** Mechanical Asphyxia, Hanging, Strangulation, Manual Throttling, Hyoid Bone.

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## INTRODUCTION

Neck is a conduit of very important vital structures, Carotid, Vertebral and jugular blood vessels, Spinal Cord and Cranial nerves, Trachea and Esophagus. So these vital structures are likely to be damaged in all sorts of trauma including mechanical interference at the level of neck. This will result in asphyxia and it is the commonest method adopted in homicidal asphyxial deaths by ligature or manual compression.

Hanging is defined as a form of asphyxial death in which the weight of the body acts as the mechanical force of interference in the process of respiration<sup>1</sup>. This compression can also be achieved by other means as direct trauma on neck by blow, neck being compressed in arms lock, accidental fall on the neck and entrapment in ropes<sup>2</sup>.

The resultant outcome of mechanical asphyxia depends upon the amount of compressive force applied and the physiological changes manifested by the involved structure, individually or in total. The result also depends upon the means used for constriction and the magnitude of force being used.

To compress jugular vein weight of 2 kg is required, it will block the return of blood flow to the heart and the pathological findings will be elicited as cyanosis, congestion and petechiae. Carotids arteries require 3.5 kg and will result in cerebral ischemia. Compression of carotid bodies by trauma will cause stimulation of Vagus nerve, which will cause sudden cardiac arrest. The air flow can be blocked either by direct force or indirectly by pushing the base of tongue against the posterior pharyngeal wall. As the trachea is a hard cartilaginous structure and it is not possible to occlude it easily, but a weight of 15 kg can achieve this. Direct trauma by any means on the larynx will cause fractures of hyoid and thyroid bones<sup>(2, 3, 4, 5, 6)</sup>.

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The resultant asphyxia so achieved will appear as non-specific asphyxial finding and can be seen as the pathological entities. The anoxia caused by falling oxygen level in blood will result in the form of damage to the endothelium which will result in capillary dilatation, increased permeability and pooling of blood. These pathological damages can be manifested as cyanosis, congestion, petechial hemorrhages, oedema and fluidity of blood. The stasis of blood will cause further reduction in circulating volume of blood and further anoxia.

**MATERIALS AND METHODS**

This observational study was conducted at the Department of Forensic Medicine King Edward Medical University, Lahore, during January 2006 to December 2008. A total of 2979 autopsies had been carried out. After detailed scrutiny 220 cases of asphyxial deaths were selected for this study. The post-mortem reports, police papers and hospital notes were studied. The parameters selected in those asphyxial deaths were age, sex, means of constriction, level of application of force and fracture of hyoid bone.

**Inclusion Criteria:** The case in which the cause of death was hanging by ligature and constricting force was the weight of the body.

**Exclusion Criteria:** The other deaths which occurred due to any other form of trauma to the neck other than hanging were not included in this study.

**RESULTS**

During the study period of 2006-2008 the total number of autopsies was 2979 and out of these 220 (7.38%) were asphyxia deaths. (Table No. 1)

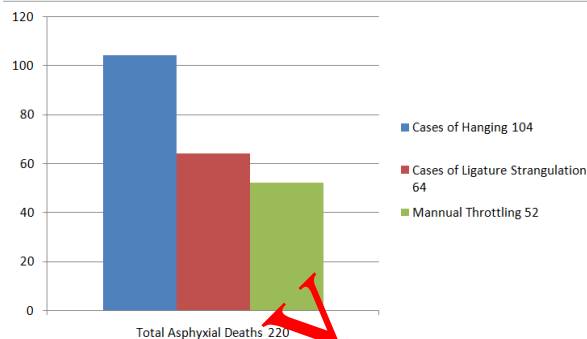
**Table No. 1 Kinds of Weapons Used in All 2979.0 Autopsy Cases**

	Total	%age
Blunt	403.0	13.52%
Sharp Edged	256.0	8.5%
Fire-arms	1285.0	43.13%
Poisoning	74.0	2.48%
All Types of Burns	50.0	1.68%
Mechanical Asphyxial Deaths	220.0	7.38%
Electricity	19.0	0.64%
Drowning	17.0	0.57%
Blasts	65.0	2.18%
Natural Causes	347.0	11.65%
Cause Un-Determined	213.0	7.15%
Total	2979.0	100.00%

**Obstruction at the Level of Neck:** In this study we included three types of neck compression. There were total of 220 cases of neck compression. Out of these 220, hanging was found in 104 cases (47.27%) and 64 were of ligature strangulation (29.09%).(Table No. 2) (Figure 1).

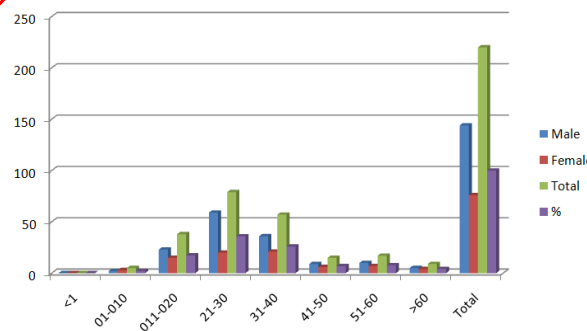
**Table No.2 Types of Obstruction at the Level of Neck (220 cases of Asphyxial Deaths)**

Types of Mechanical Asphyxia	Number of Cases	Percentage
Hanging Cases	104.0	47.27%
Ligature Strangulation Cases	64.0	29.09%
Throttling Cases	52.0	23.64%
Total Number of Cases	220.0	100.00%



**Figure No.1: Types of Obstruction at the Level of Neck (220 cases)**

**Age and Sex Distribution:** The third decade of life between 21-30 years (35.91%) was the most prevalent age group. The next higher age was 31-40 years (25.91%) and the ages between 11-20 years was next in the sequence (17.27%). Out of these 144 (65.45%) were male in all 220 asphyxial deaths, and 76 were females (34.55%). (Figure No. 2)



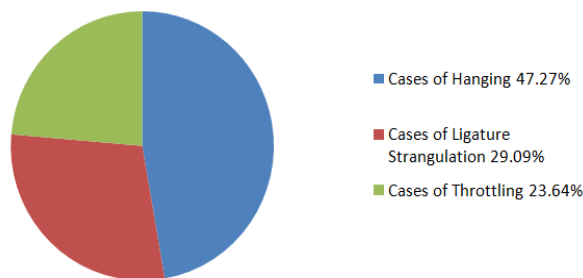
**Figure No. 2: Age and Sex Distribution in 220 cases**

Hanging had a higher incidence in both sexes in 3<sup>rd</sup> decade of life. Whereas in strangulation & throttling were high in 4<sup>th</sup> and 5<sup>th</sup> decade respectively. (Table No. 4) In first decade of life there was no case of hanging. The males cases were more in number than females (2.25:1) in hanging, as compared to strangulation (2.05:1) and throttling (1.26:1) (Table No. 3).

In all deaths male hanging showed highest incidence in 3<sup>rd</sup> decade and females in 2<sup>nd</sup> decade of age group. In ligature strangulation males were more in number in 3<sup>rd</sup> decade and females in 4<sup>th</sup> decade. Males, in throttling, were more in number in 3<sup>rd</sup> decade of age

group. While the females showed higher number in 4<sup>th</sup> decade. (Table No. 3)

**The Manner of Death in all Cases of Hanging (104)**



**Figure No: 3: Manner of Death in all Cases of Hanging**

**Manner of Death:** By manner of death we mean that the cause of death is natural or un-natural. Only the homicidal and suicidal deaths were included in this study as un-natural deaths. Those deaths in which the cause of death remained undetermined were not included. There was no case of accidental asphyxia.

57.27% (126) were cases of homicide, 30.90% (68) were suicide, and 11.82% (26) were cases in which the manner remained un-determined (Table 4).

In homicidal deaths M/F ratio was 2.15:1.0, in suicidal cases it was 2.77:1.0 and 1.6:1.0 in un-ascertained deaths (Table No. 4).

**Manner of Death in Hanging:** Out of all asphyxial deaths, 104 cases were that of hanging and amongst them 68 cases were suicidal showing an incidence of 68.50%. And the male to female ratio was 2.78:1.0. The predominant number was of males and particularly in 3<sup>rd</sup> decade while the females showed a rise in 2<sup>nd</sup> decade.

Homicidal hanging was 9.62% (10 cases). The highest incidence was seen in 3<sup>rd</sup> decade in both sexes. Male had higher incidence than females in all decades with M/F ratio of 1.5:1.

The un-determined hanging was seen in 26 cases (25%). The highest incidence was seen both males and females in 2<sup>nd</sup> decade. M/F ratio was 1.6:1. (Fig. No. 3) (Table No. 5)

**Table No. 4: Sex & Age Variation in All Asphyxial Deaths (220 Cases)**

Age In Years	Total Number of All Types of Asphyxial Deaths	Hanging Cases (104 Cases) Male/Female Ratio 2.25:1		Cases of Ligature Strangulation Male/Female Ratio 2.05:1		Cases of Throttling (52 Cases) Male/Female Ratio 1.26:1	
		Males	Females	Males	Females	Males	Females
<1 yrs.	-	-	-	-	-	-	-
1-10 yrs.	-	-	-	1.0	2.0	1.0	1.0
11-20 yrs.	38.0	14.0	10.0	6.0	3.0	3.0	2.0
21-30 yrs.	79.0	28.0	9.0	17.0	6.0	14.0	5.0
31-40 yrs.	57.0	19.0	4.0	12.0	7.0	5.0	10.0
41-50 yrs.	15.0	4.0	4.0	2.0	1.0	3.0	1.0
51-60 yrs.	17.0	5.0	4.0	3.0	1.0	2.0	2.0
>60 yrs.	9.0	2.0	1.0	2.0	1.0	1.0	2.0
Total No. of Cases	220.0	72.0	32.0	43.0	21.0	29.0	23.0

**Table No. 5: The Manner of Death in All Deaths in this Study (Total Asphyxial Deaths=220)**

Age In Years	No. of Cases	Homicidal Cases Male/Female Ratio 2.15:1.0			Suicidal Cases: Male/Female Ratio 2.77:1.0			Un-Determined Cases: Male/Female Ratio 1.6:1.0		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
<1 Yrs.	-	-	-	-	-	-	-	-	-	-
1-10 Yrs.	5.0	2.0	3.0	5.0	-	-	-	-	-	-
11-20 Yrs.	38.0	8.0	6.0	14.0	5.0	9.0	14.0	7.0	3.0	10.0
21-30 Yrs.	79.0	36.0	11.0	47.0	20.0	6.0	26.0	4.0	2.0	6.0
31-40 yrs.	57.0	20.0	14.0	34.0	16.0	2.0	18.0	3.0	2.0	5.0
41-50 Yrs.	15.0	8.0	2.0	10.0	4.0	1.0	5.0	-	-	-
51-60	17.0	6.0	3.0	9.0	5.0	-	5.0	-	3.0	3.0
>60	9.0	6.0	1.0	7.0	-	-	-	2.0	-	2.0
Total	220.0	86.0	40.0	126.0 (57.27%)	50.0	18.0	68.0 (30.91%)	16.0	10.0	26.0 (11.82%)

**Table No. 6: The Manner of Death in All Cases of Hanging (104)**

Age In Years	Total No. of Cases	Cases of Homicidal Hanging 10 (9.62%) Male/Female Ratio 1.5:1.0		Cases of Suicidal Hanging 68 (65.38%) Male/Female Ratio 2.78:1.0		Un-Determined Cases 26 (25.0%) Male/Female Ratio 1.6:1.0	
		Male	Female	Male	Female	Male	Female
<1 Yrs.	-	-	-	-	-	-	-
1-10 Yrs.	-	-	-	-	-	-	-
11-20 Yrs.	24.0	2.0	1.0	5.0	6.0	7	3.0
21-30 Yrs.	37.0	4.0	2.0	20.0	5.0	4	2.0
31-40 Yrs.	23.0	-	-	16.0	2.0	3	2.0
41-50 Yrs.	8.0	-	-	5.0	1.0	0	3.0
51-60 Yrs.	9.0	-	-	5.0	1.0	0	3.0
>60 Yrs.	3.0	-	1.0	-	-	2.0	-
Total Cases	104.0	6.0	4.0	50.0	18	16.0	10.0

## DISCUSSION

**Incidence of Death:** Out of 2979 autopsies which were conducted during this study period, 220 cases were that of asphyxial deaths having an incidence of 7.39%. This incidence is greater than studied by 1.6%<sup>7</sup>, 1.75%<sup>8</sup>, and 1.88%<sup>9</sup> of all deaths of interference at the level of neck. While in other studies carried out it was 2.94%<sup>10</sup> of those all types of deaths and 24.53% of all asphyxial deaths. In another study it was 5%<sup>11</sup> of all types of deaths and 82% was of hanging in total of asphyxial deaths. Other studies when were compared they showed 1.17%<sup>12</sup>, 12.4%<sup>13</sup> and 5.5% of all un-natural deaths but the incidence of our study was lower than 15.7%<sup>14</sup>.

**Types of Compression of Neck:** In this study the number cases of hanging was 104, which was 47.27%. The cases of ligature strangulation were 64 and were 20.09%. The cases of manual throttling were 52 (23.64%). The findings in this study are comparable with those of (cases of hanging 57%, cases of strangulation 21%, and cases of throttling 18%)<sup>9</sup>, (cases of hanging 61.17%, cases of ligature strangulation 21.19% and cases of throttling 17.64%)<sup>8</sup>, (cases of hanging and ligature strangulation 80.7% and cases of throttling 19.3%)<sup>7</sup>, (cases of hanging/cases of ligature strangulation 85% and cases of throttling 6%)<sup>15</sup>, (cases of ligature strangulation 12.4%)<sup>13</sup>, (cases of ligature strangulation 19.23%, cases of throttling 46.15%)<sup>10</sup>, (cases of hanging 41.8%, cases of ligature strangulation 2.9% and manual throttling 2.3%)<sup>14</sup>, (cases of hanging 69%)<sup>11</sup>.

**Distribution of Sex and Age:** The age group 21-30 i.e.:3<sup>rd</sup> decade of life shows the highest incidence in all asphyxial i.e., hanging, ligature strangulation and throttling amongst all age groups. This incidence can be compared with the studies which have been carried out previously. They showed in one study 57%<sup>11</sup> cases of hanging in all types of asphyxial deaths, and the age group with predominance was 3<sup>rd</sup> decade<sup>12</sup>. In another study average age was 41.9 years<sup>14</sup>. A study done by Bowen<sup>16</sup> showed greater incidence of hanging the age

ranging from 50-59 years. In another study Guarner & Hanzlick<sup>17</sup> found out the average age of 31 years the highest incidence in USA.

**Male/Female Ratio:** Male/female ratio in our study in hanging is 2.25:1.0, in ligature strangulation it is 2.05:1.0 and in manual throttling it is 1.26:1.0. So the incidence of males than females is clearly distinct in all three types of asphyxial deaths.

Hanging has shown that 69.23% were males. This is more than females, which is 30.76%. This incidence is comparable with that of Azmak<sup>14</sup> which showed 83.9% were male, and a ratio of male to female as 2.7:1.0 in Bashir MZ<sup>9</sup> et al. The males were 73.07% and females 26.92% in this study.

The males were 58.9% and females 41.02% in ligature strangulation and throttling in the study of Bashir MZ<sup>9</sup>. The study of Azmak D<sup>14</sup> has shown 1.0:3.0 in cases of ligature strangulation and 1.0:2.0 in cases of manual throttling. Srivastava AK<sup>10</sup> had shown that in his study 30.77% were males and 69.23% were females, showing the incidence of females higher than the males.

**Manner of Death:** In our study the un-natural homicidal deaths have shown a higher incidence as compared to the study carried out by Bashir MZ<sup>9</sup>. In which the homicidal deaths were 45.05%. But our incidence is lower than that in the study of Demirci S<sup>13</sup>, which was 85%.

The suicidal deaths in our study were 30.90%, which is lower than that in the study of Bashir MZ<sup>9</sup> which had shown 45.45% and the study of Azmak D<sup>14</sup> has shown it 47%. This is higher incidence than that shown by Demirci S<sup>13</sup> as 15%.

The incidence of suicidal hanging in our study was 65.38%, which shows at lower value that which was calculated by Bashir MZ<sup>9</sup> showing a percentage of 86.53%. 9.62% homicidal deaths have also shown a higher value than 3.84%<sup>9</sup>. Which is lower than the study of Bowen DA<sup>16</sup>, showing 95%.

Accidental hanging was not reported in our study; whereas Bowen DA<sup>16</sup> had shown a percentage of 5% deaths of auto-erotic accidental asphyxia.

## CONCLUSION

It is one of the commonest causes of deaths in our country. Suicidal hanging is the most preferred method of self-killing. Suicide occurs mostly in younger age groups especially in 3<sup>rd</sup> decade of life, and males showing higher incidence than females because of the responsibilities of living on their shoulders mainly.

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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