Original Article

Trends of Hanging Deaths in Vadodara– An Autopsy based Prospective Study

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Abstract

The position of knot (typical/atypical) and type of hanging (complete/partial) play an important role in the causation of death in hanging. Ligature material and ligature mark also provides information regarding manner and cause of death.Total 1803 medicolegal autopsies were performedduring one year study period, out of which 189 (10.48%) cases were of hanging.

In our study, 134 (70.89%) were male and 55 (29.10%) cases were female with male to female ratio of 1:0.4. We observed that in 104 (55.03%) cases the hanging was complete whereas 85 (44.97%) cases the hanging was partial. The typical hanging cases were 62 (32.8%) andatypical hangings cases were 127 (67.2%). Soft ligature materials were used in 143 (75.66%) cases. Hard ligature materials were used in 46 (24.34%) cases.Dupatta, a soft-ligature material mostcommonly used in all cases.

Key words: Hanging; Ligature materials- soft, hard; Position of knot; Complete & Partial hanging.

Introduction

Asphyxia is a frequent cause of death in many pathological processes. Mechanical asphyxia is characterised by mechanical occlusion of external air passages leading to anoxia and death. According to the cause, four fundamental variants can be identified: hanging, strangulation, suffocation and drowning.Recently hanging has risen as common mode of committing suicide[1].

In many cases ligature mark is the only evidence present and its characteristics are well defined and explained in many literatures. How ever descriptions of the ligature material are not frequently reported forstudy. The position of knot (typical/atypical)and type of hanging (complete/partial)play an important role in the causation of death in hanging. With this background, the present study attempted to focus only on the characteristic features of the ligature

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material and type of hanging (typical/atypical, complete/partial).

Material and Methods

Ethical Permission- Medical College and SSG Hospital, Vadodara IECBHR/14-2020, DATED-31/01/2020.

The present study isprospective observational study and has been carried out at Department of Forensic Medicine and Toxicology, Govt. Medical College &S.S.G. Hospital, Vadodara, during period from November 2019 to October 2020. Ethical clearance was obtained from the institutional ethical committee.

The medico-legal death cases are which occurring under unnatural (including suicidal, homicidal, and accidental), suspicious or unknown circumstances. During the study period, total of189 cases of hanging were reported and autopsy were conducted at mortuary complex of Forensic Medicine and Toxicology, Govt. Medical College & S.S.G. Hospital which examined in detailfor ligature material, type of hanging- complete, partial, typical, atypical. Decomposed hanging cases were excluded from the study.

Result

During this one-year period total 1803 medicolegal autopsies were performed, out of which 189(10.48%) caseswere of hanging.As shown in table 1, out of 189 cases of hanging 134 (70.89%) were male and 55 (29.10%) cases were female.

Considering, the age group 21 to 30 years constituted most of cases (n=61; 32.27%). It was observed that out of 32 cases from age group of 11 to 20 years 27 cases belongs to 16 to 20 years of age group.The youngest victim was 14 years old while oldest was 83 years old.

We observed that the age group 21 to 30 years constituted highest number of cases in males (n=44, 32.84%), followed by 31 to 40 years with 38 (28.35%) cases. In female maximum cases 19 (34.54%) were from 21 to 30 years of age group followed by 11 to 20 years of age group with 17 (30.90%) cases. Most common ligature material used in allage group is Dupatta. (**Table-2)**

Complete hanging is seen in 104 (55.03%)cases where no part of body was touching groundin which72 were male and 32 were female, whereas 85 (44.97%) cases the hanging was partial where at least one body part was touching the groundin which 62 were male and 32 were female.

As described in table 2, out of total 189 cases of hanging typical hanging were in 62 (32.8%) cases out of which 44 were male and 18 were female.Atypical hangings were in 127 (67.2%) cases out of which 90 were male and 37 were female. Dupatta is most common material used in all types of hanging cases. (Table-3)

As shown in **Table-4,** soft ligature materials were used in 143 (75.66%) cases, out of which 93 (65.03%) cases were male and 50 (34.96%) cases were female. Most common soft ligature material is Dupatta, used by 110 (58.2%) victims (males-69 and females-41). Hard ligature materials were used in 46 (24.34%) cases, of which 41 (89.13%) were male and 5 (10.87%) cases were female, most common was nylon rope which was used by 25 (13.2%) cases (male-22, female-3), followed by cotton rope which was used by 20 (10.6%) cases and least common was belt used by 2 cases.

Table 1: Distribution of cases according to sex and age group

Age group (Years)	Hanging		
	M (%)	F (%)	T (%)
0 to 10	00	00	00
11 to 20	15 (11.19)	17 (30.90)	32 (16.93)
21 to 30	44 (32.83)	19 (34.54)	61 (32.27)
31 to 40	38 (28.35)	11 (20)	49 (25.92)
41 to 50	21 (15.67)	03 (5.45)	24 (12.69)
51 to 60	08 (5.97)	02 (3.63)	10 (5.29)
61 to 70	06 (4.47)	02 (3.63)	08 (4.23)
71 to 80	01 (0.74)	01 (1.81)	02 (1.05)
81 to 90	01 (0.74)	00	01 (0.52)
Total	134 (70.9)	55 (29.1)	189

Table-2 : Distribution of cases according to ligature material used in age group.

Ligature Material	0-20 Years		Total	21-40 Years		Total	≥41 Years		Total
	Male	Female		Male	Female		Male	Female	
Dupatta	8	15	23	40	20	60	21	7	28
Sari	1	1	2	10	6	16	6	1	7
Bed Sheet	3	0	3	4	0	4	0	0	0
Nylon rope	1	1	2	16	2	18	5	0	5
Cotton rope	1	0	1	11	2	13	5	0	5
Belt	1	0	1	1	0	1	0	0	0
Total	15	17	32 (16.9%)	82	30	112 (59.2%)	37	8	45 (23.8%)

Table-3: Distribution of cases according to type of hanging and ligature material

Ligature Material	Complete Hanging		Total	Partial Hanging		Total	Atypical Hanging		Total	Typical Hanging		Total
	Male	Female		Male	Female		Male	Female		Male	Female	
Dupatta	36	23	59	33	19	52	49	29	78	20	13	33
Sari	8	6	14	9	2	11	11	5	16	6	2	8
Bed Sheet	3	0	3	4	0	4	5	0	5	2	0	2
Nylon rope	11	1	12	11	2	13	13	1	14	9	2	11
Cotton rope	12	2	14	5	0	5	11	2	13	6	0	6
Belt	2	0	2	0	0	0	1	0	1	1	0	1
Total	72	28	104	62	23	85	90	37	127	44	17	61

Table-4: Distribution of cases according to ligature material

Ligature material	Male		Female		Number	Type of ligature material- total no. (%)
Dupatta	69	93 (69.4%)	41	49 (89%)	110 (58.2%)	Soft- 142 (75.13%)
Sari	17		8		25 (13.2%)	
Bed sheet	7		0		7 (3.7%)	
Nylon rope	22	41 (30.6%)	3	06 (11%)	25 (13.2%)	Hard- 47 (24.86%)
Cotton rope	17		3		20 (10.6)	
Belt	2		0		2 (1%)	
Total	134		55		189	

Discussion

Commonly ligature material in cases of hanging are not brought with dead bodies to the mortuary. Either it was brought separately or sent for the examination in FSL if required by the investigating officer, but in current study ligature material of all cases were obtained from police.In some cases,people who saw first the victim attempt to rescue the victim by removing the ligature from around the neck and in few cases, they knew it already too late to revive the victim and call police in first placeand, in this scenario, police took photographs and make spot panchnama regarding manner of death and bodies brought to mortuary with ligature around neck. Generally, ligature material is not examined, and its features are not submitted for methodical analysis. But the type of ligature material and position of the knot plays an important role in the mechanism of death and autopsy findings in hanging[2].

In present study majority of hanging victims were male (70.89%) and rest were female (29.11%) with male female ratio of 1: 0.4. Kanchan[3] and Momin[4] observed similar incidence to be 2 times in males. A higher incidence of hanging in males was also reported by Sauraze-Penaranda[5] (77%), Sharma[6] (66.3%).

Similarly, National Crime Record Bureau, India (2019)[1] reported male victims (70.2%) more than the female victims in cases of death by hanging. According to it, the number of male victims was more than that of females for all means of suicides, except those committed by 'self-immolation'.

In our study, the ages of the victims ranged from 14 to 83 years, with an average age of 33 years. Out of 189 cases of hanging, the highest number of cases were noted in the age group of 21-40 years (59.2%), followed by ≥41 Years(23.8%) and 0 to 20 years (16.9%).These findings were consistent with studies around the world by Ahmad and Hossain[7]. Also, similar findings were reported from various parts of India by Joshi and Bharadwaj[8], Vijayakumari[9], Jayaprakash and Sreekumari[10], Saisudheer and Nagraja11, Momin et al4.According to National Crime Record Bureau, India (2019)1, the most common age group committing suicide by hanging is 18 to 30 years.

Regarding the type of hanging, based on suspension, in the present study 55.03% cases were complete hanging and 44.97% were partial type. Similarly, complete hanging was found in majority of cases by Suarez-Penaranda et al[5], Sharma et al[6], Charoonnate et al[12], Saisudheer and Nagraja[11], Suresh Chand et al[13].

In present study typical hanging was present in 32.8% cases and atypical hanging was present in 67.2% cases. Similarly higher incidence of atypical hanging were reported by Sharma et al[6] (88%), Suresh Chand et al[13] (88.4%), Navneet and Shalender[14] (88%), Khalkho and Pathak[2] (54.6%). Sharjia S. et al[15] also reported atypical hanging is more common with 37% cases in comparison with 9% cases of typical hanging.

We found that soft, ligature material (75.66%) was more commonly employed for hanging than the hard pliable materials (24.34%).Similar findings are reported by Naik[16](257 cases of hanging), where he observed that soft ligature like scarf, napkin, sari, bed sheet, etc. were used in 127 (49.52%) cases and hard ligature like jute rope, plastic or nylon rope, electric wire etc. were used in 105 (39.69%) cases. Jayaprakash and Sreekumari[21] reported that soft material was used by 47% of deceased.

In our study, the most commonly used ligature materials for the purpose of hanging were dupatta (58.73%), rope (23.28%) and sari (13.22%). Soft materials specially dupatta and sari were the commonest ligature used for hanging, possibly due to their easy availability, accessibility as they are essential parts of traditional Indian female dressing.

We couldn't find any study describing association between ligature material used in age group and type of hanging. In our study we found soft ligature material dupatta was most usedby both sexes in all age group.

Conclusion

This study has analysed the characteristics of ligature material used in all type of hangingand age groups. A thorough examination of the ligature material and investigation in type of hanging is very important to determine an opinion in cause of death. Any hideousdiscrepancies in this regard may create doubt of foul play or suspicious death. We analysed

that in suicidal hanging soft ligature material dupatta was most usedin Vadodara city.Most common hanging type is complete and atypical. Most of the victims are from 21 to 40 years of age group.

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