Original Research Article

Autopsy based retrospective study of hanging cases in Kolhapur district Maharashtra

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ABSTRACT

A retrospective study was conducted from 1st January 2018 to 31st December 2019 in RCSM Government Medical College and CPR Hospital, Kolhapur, Maharashtra, India. A total of 3430 autopsies were carried out of which 443 (12.91%) cases were death due to hanging. The study revealed that, the natures of hanging in all the cases were suicide. Male constitute 76.67% and female (23.32%). In regards to age, 54.17% of the cases felt within 20 to 40 years. The most common reason for the hanging was family disputes (34.98%).Occupational status of victims, it was observed that (41.10%) were labour. The choice of ligature material was nylon rope (42.25%) followed by saree (19.82%), cotton dupatta (8.74%), bedsheet (11.37%) respectively.

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1. Introduction

Violent asphyxial deaths are one of the most important cause for unnatural deaths occurring nowadays. Hanging is the form of violent mechanical asphyxial death which is caused by constriction of the neck, as a result of suspension of the body, where the constriction force is the weight of the body.1 to cause hanging, full suspension of the body is not always required. According to Anton J. L. van Hoof, hanging was the most common suicide method in primitive and pre-industrial societies.2 The World Health Organization (WHO) estimates that of the nearly 900,000 people who die from suicide globally every year, 170,000 are from India.3 However, India’s National Crime Records Bureau (NCRB) – which report official suicide rates based on police reports – estimated only 135,000 suicides in 2011.4,5Hanging is invariably suicidal. Accidental and homicidal hangings are rare.6

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old age above 61 years total 22 [6.41%] cases were found. The most vulnerable age group for hanging was observed as 11-40 years in which 246 [71.72%] cases was reported. This particular age group is most active period in one’s life. Frustration due to various reasons such as financial problems, the burden of livelihood, unemployment, and poverty contributed to their death.

Table 1 shows that of the total 343 cases, males constituted for 263 (76.67%) cases and females accounted for 80 (23.32%) cases. The 21-30 years age group, constituted 111 (32.36%) cases, accounting for the maximum number of cases, followed by 31-40 years group 84 (24.48%) cases and the 41-50 years group 51 (14.86%) cases. Table 2 shows the occupational status of the victims. With regard to occupation, most of the victims were labour 141 (41.10%) cases followed by housewives 49 (14.28%) in number, students 34 (9.91%), farmers were 27 (7.87%) service personals 14 (4.08%), drivers 22 (6.41%) and farmers 6 (1.74%). In this study, majority of victims were below 40 years, and the frequency of fracture of hyoid bone was found increased with age as it got ossified. [Table 7]

4. Discussion

The present retrospective study was carried out in the Department of Forensic Medicine & ToxicoLOGY, R.C.S.M. Government Medical College & C.P.R. Hospital, Kolhapur (Maharashtra) during the period from 1st January 2018 to 31st December 2019. It has been compared with other similar studies carried out in different parts of the country to bring out the similarities and differences.

In the present study, the total number of hanging cases conducted were 343 [10.00%], almost similar cases was observed by Manoj K Baishya et al., seven less number of cases was observed by N. Vijayakumari, Patel A P et al. observed 332 cases of hanging in their study period. In another study conducted by Kumar and Verma in Lucknow (India) a total of 4405 cases were autopsies in a five year period of which only 10% cases were due to hanging. In this study, cases in age group between 21-30 years accounted for the maximum number, with 33.10% of all cases. Similar observation, regarding to, age in hanging cases were observed by Udhayabanu R et al., twelve 32.25%, Patel AP et al. (32.98%) and Vijayakumari N et al. observed 332 cases of hanging in their study period.

In this study, cases in age group between 21-30 years accounted for the maximum number, with 33.10% of all cases. Similar observation, regarding to, age in hanging cases were observed by Udhayabanu R et al., twelve 32.25%, Patel AP et al. (32.98%) and Vijayakumari N et al. observed 332 cases of hanging in their study period. However, in this study, the highest number of victims was found in the age group of 21-30 years, which is 33.10% of all cases. The reason can be related to failures in overcoming stress and demands of life such as unemployment, financial problems, causing mental distress, depression, and feeling of worthlessness resulting in such measures to end life. The study showed male preponderance with males accounting for 263 (76.67%) of all the cases. Similar observation with regards to sex in hanging were recorded by Udhayabanu R et al. (70.32%), Momin SG et al. reported 66.6% were male cases with male: female ratio of 1.5:1. The study showed male preponderance with males accounting for 263 (76.67%) of all the cases. Similar observation with regards to sex in hanging were recorded by Udhayabanu R et al. (70.32%), Momin SG et al. reported 66.6% were male cases with
Table 1: Age & sex wise distribution

<table>
<thead>
<tr>
<th>Age group</th>
<th>Male</th>
<th>Percentage</th>
<th>Female</th>
<th>Percentage</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
</tr>
<tr>
<td>0-10 yrs</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>11-20 yrs</td>
<td>27</td>
<td>10.26</td>
<td>18</td>
<td>22.50</td>
<td>45</td>
<td>13.11</td>
</tr>
<tr>
<td>21-30 yrs</td>
<td>82</td>
<td>31.17</td>
<td>29</td>
<td>36.25</td>
<td>111</td>
<td>32.36</td>
</tr>
<tr>
<td>31-40 yrs</td>
<td>65</td>
<td>24.71</td>
<td>19</td>
<td>23.75</td>
<td>84</td>
<td>24.48</td>
</tr>
<tr>
<td>41-50 yrs</td>
<td>40</td>
<td>15.20</td>
<td>11</td>
<td>13.75</td>
<td>51</td>
<td>14.86</td>
</tr>
<tr>
<td>51-60 yrs</td>
<td>28</td>
<td>10.64</td>
<td>2</td>
<td>2.50</td>
<td>30</td>
<td>8.74</td>
</tr>
<tr>
<td>61 &amp; above</td>
<td>21</td>
<td>7.98</td>
<td>1</td>
<td>1.25</td>
<td>22</td>
<td>6.41</td>
</tr>
<tr>
<td>Total</td>
<td>263</td>
<td>100</td>
<td>80</td>
<td>100</td>
<td>343</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Ligature material used

<table>
<thead>
<tr>
<th>Ligature Material</th>
<th>Male</th>
<th>Percentage</th>
<th>Female</th>
<th>Percentage</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
</tr>
<tr>
<td>Nylon rope</td>
<td>142</td>
<td>53.99</td>
<td>5</td>
<td>6.25</td>
<td>147</td>
<td>42.25</td>
</tr>
<tr>
<td>Cotton Dupatta</td>
<td>9</td>
<td>3.42</td>
<td>21</td>
<td>26.25</td>
<td>30</td>
<td>8.74</td>
</tr>
<tr>
<td>Cotton rope</td>
<td>15</td>
<td>5.70</td>
<td>3</td>
<td>3.75</td>
<td>18</td>
<td>5.24</td>
</tr>
<tr>
<td>Saree</td>
<td>21</td>
<td>7.98</td>
<td>47</td>
<td>58.75</td>
<td>68</td>
<td>19.82</td>
</tr>
<tr>
<td>Bed Sheet</td>
<td>35</td>
<td>13.30</td>
<td>4</td>
<td>5.00</td>
<td>39</td>
<td>11.37</td>
</tr>
<tr>
<td>Electric wire</td>
<td>14</td>
<td>5.32</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>4.08</td>
</tr>
<tr>
<td>Cable wire</td>
<td>27</td>
<td>10.26</td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>7.87</td>
</tr>
<tr>
<td>Total</td>
<td>263</td>
<td>100</td>
<td>80</td>
<td>100</td>
<td>343</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3: Position of knot

<table>
<thead>
<tr>
<th>Occiput</th>
<th>Percentage</th>
<th>Right side of neck</th>
<th>Percentage</th>
<th>Left side of neck</th>
<th>Percentage</th>
<th>Not appreciable</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43</td>
<td>12.53</td>
<td>132</td>
<td>38.48</td>
<td>115</td>
<td>33.52</td>
<td>53</td>
</tr>
</tbody>
</table>

Table 4: Occupational status of victim

<table>
<thead>
<tr>
<th>Ligature Material</th>
<th>Male</th>
<th>Percentage</th>
<th>Female</th>
<th>Percentage</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
</tr>
<tr>
<td>Labour</td>
<td>135</td>
<td>51.33</td>
<td>6</td>
<td>7.50</td>
<td>141</td>
<td>41.10</td>
</tr>
<tr>
<td>Farmer</td>
<td>27</td>
<td>10.26</td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>7.87</td>
</tr>
<tr>
<td>Service</td>
<td>11</td>
<td>4.18</td>
<td>3</td>
<td>3.75</td>
<td>14</td>
<td>4.08</td>
</tr>
<tr>
<td>Student</td>
<td>21</td>
<td>7.98</td>
<td>13</td>
<td>16.25</td>
<td>34</td>
<td>9.91</td>
</tr>
<tr>
<td>Housewife</td>
<td>0</td>
<td>0</td>
<td>49</td>
<td>61.25</td>
<td>49</td>
<td>14.28</td>
</tr>
<tr>
<td>Driver</td>
<td>22</td>
<td>8.36</td>
<td>0</td>
<td>0</td>
<td>22</td>
<td>6.41</td>
</tr>
<tr>
<td>Unemployed</td>
<td>47</td>
<td>17.87</td>
<td>9</td>
<td>11.25</td>
<td>56</td>
<td>16.32</td>
</tr>
<tr>
<td>Total</td>
<td>263</td>
<td>100</td>
<td>80</td>
<td>100</td>
<td>343</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5: Reasons for hanging

<table>
<thead>
<tr>
<th>Reason</th>
<th>Male</th>
<th>Percentage</th>
<th>Female</th>
<th>Percentage</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
<td>No</td>
<td>Percentage</td>
</tr>
<tr>
<td>Family disputes</td>
<td>78</td>
<td>29.65</td>
<td>42</td>
<td>52.50</td>
<td>120</td>
<td>34.98</td>
</tr>
<tr>
<td>Financial problems</td>
<td>69</td>
<td>26.23</td>
<td>15</td>
<td>18.75</td>
<td>84</td>
<td>24.48</td>
</tr>
<tr>
<td>Harassment</td>
<td>9</td>
<td>3.42</td>
<td>5</td>
<td>6.25</td>
<td>14</td>
<td>4.08</td>
</tr>
<tr>
<td>Mental Illness</td>
<td>43</td>
<td>16.34</td>
<td>9</td>
<td>11.25</td>
<td>52</td>
<td>15.16</td>
</tr>
<tr>
<td>Personal affairs</td>
<td>56</td>
<td>21.29</td>
<td>6</td>
<td>7.50</td>
<td>62</td>
<td>18.07</td>
</tr>
<tr>
<td>Unknown reason</td>
<td>8</td>
<td>3.04</td>
<td>3</td>
<td>3.75</td>
<td>11</td>
<td>3.20</td>
</tr>
<tr>
<td>Total</td>
<td>263</td>
<td>100</td>
<td>80</td>
<td>100</td>
<td>343</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 6: Post-mortem findings on external examination

<table>
<thead>
<tr>
<th>S. No.</th>
<th>External Findings</th>
<th>No. of victims</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Imprint of ligature material</td>
<td>296</td>
<td>86.29</td>
</tr>
<tr>
<td></td>
<td>Single mark</td>
<td>251</td>
<td>75.86</td>
</tr>
<tr>
<td></td>
<td>Multiple marks</td>
<td>47</td>
<td>13.70</td>
</tr>
<tr>
<td>2</td>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Above thyroid</td>
<td>321</td>
<td>93.58</td>
</tr>
<tr>
<td></td>
<td>At thyroid</td>
<td>15</td>
<td>4.37</td>
</tr>
<tr>
<td></td>
<td>Below thyroid</td>
<td>2</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>Pale</td>
<td>25</td>
<td>7.28</td>
</tr>
<tr>
<td>3</td>
<td>Face</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Congested</td>
<td>318</td>
<td>92.71</td>
</tr>
<tr>
<td></td>
<td>Protruded &amp; bitten</td>
<td>229</td>
<td>66.76</td>
</tr>
<tr>
<td>4</td>
<td>Tongue</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inside the mouth</td>
<td>114</td>
<td>33.23</td>
</tr>
<tr>
<td>5</td>
<td>Cyanosis of nails, fingers, lips, ear lobes</td>
<td>277</td>
<td>80.75</td>
</tr>
<tr>
<td></td>
<td>Hand</td>
<td>55</td>
<td>16.03</td>
</tr>
<tr>
<td></td>
<td>Legs</td>
<td>60</td>
<td>17.49</td>
</tr>
<tr>
<td>6</td>
<td>Postmortem Lividity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Back</td>
<td>228</td>
<td>66.47</td>
</tr>
<tr>
<td></td>
<td>Legs</td>
<td>60</td>
<td>17.49</td>
</tr>
<tr>
<td>7</td>
<td>Dribbling of saliva</td>
<td>225</td>
<td>65.59</td>
</tr>
<tr>
<td>8</td>
<td>Sub-conjunctival haemorrhage</td>
<td>184</td>
<td>53.64</td>
</tr>
<tr>
<td>9</td>
<td>Discharge of semen</td>
<td>91</td>
<td>26.53</td>
</tr>
<tr>
<td>10</td>
<td>Discharge of urine &amp; feces</td>
<td>95</td>
<td>27.69</td>
</tr>
<tr>
<td>11</td>
<td>Struggle marks</td>
<td>5</td>
<td>1.45</td>
</tr>
</tbody>
</table>

Table 7: Post-mortem findings on internal examination

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Internal examination</th>
<th>No. of victims</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Larynx &amp; Trachea</td>
<td>47</td>
<td>13.70</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Congested</td>
<td>268</td>
<td>78.13</td>
</tr>
<tr>
<td></td>
<td>Petechial haemorrhage</td>
<td>28</td>
<td>8.16</td>
</tr>
<tr>
<td>2</td>
<td>Tissue under ligature mark</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glistening white</td>
<td>298</td>
<td>86.88</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>45</td>
<td>13.11</td>
</tr>
<tr>
<td></td>
<td>Platysma tear</td>
<td>6</td>
<td>1.74</td>
</tr>
<tr>
<td></td>
<td>Hemorrhages in SCM muscle</td>
<td>63</td>
<td>18.36</td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>332</td>
<td>96.79</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>11</td>
<td>3.20</td>
</tr>
<tr>
<td>3</td>
<td>Hyoid fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>5</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>338</td>
<td>98.54</td>
</tr>
<tr>
<td>4</td>
<td>Thyroid Fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>5</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>338</td>
<td>98.54</td>
</tr>
<tr>
<td>5</td>
<td>Tear in intima of carotid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>53</td>
<td>15.45</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>3</td>
<td>0.87</td>
</tr>
<tr>
<td>6</td>
<td>Fracture dislocation of cervical vertebra</td>
<td>3</td>
<td>0.87</td>
</tr>
</tbody>
</table>

male: female ratio of 1.5:1.

In the present study the commonest choice of ligature material used was nylon rope 147 (42.25%) of cases and least preferred choice was the electric wire 14 (4.08%). These findings were contrary to the observations made by Udhayabanu R et al.11 and Vijayakumari N et al.8 Dupatta was the most commonly used ligature in the studies done by Sharma BR et al.,13 Patel AP et al.,9 Ahmad et al.14 The wide nature of variations in the choice of ligature material depends on the dressing fashion of the population and occupation & different factors like sex of the victim, culture, geographic location and place of act.

In present study position of the knot in a majority of cases was found present in right and left side of neck 38.48% and 33.52% respectively [atypical hanging]. Similar findings were observed by Manoj K Baishya et al.,7 and differ from Mishra P.K. et al.15 With regard to occupation, most of the victims were labour 141 (41.10%) cases followed by house wives 49 (14.28%) cases, unemployed 56 (16.32%) in number, students were 34 (9.91%) 1 service personals 14 (4.08%), drivers 22 (6.41%) and farmers 27 (7.87%). These findings are consistent with the study done by Udhayabanu R et al,11 and Samanta AK et al.16

In the present study it was found that the most common reason of hanging among these cases were family disputes (marital unhappiness) with 120 (34.98%) cases followed by financial problems 84 (24.48%) cases, personal affairs 62 (18.07%) cases, mental illness 52 (15.16%), and reason could not be determined in 11 (3.20%) cases. Similar findings were reported by Dinesh Rao17 that the major motivating factors for hanging were domestic/family related issues comprising 82 cases (31.06%) and Udhayabanu R et al11 81 cases (52.25%). Saisudheer T et al18 observed that 18% of cases were due to family related issues.

On external examination it was seen that the ligature mark was situated at and above the level of thyroid cartilage
while in 15 (4.37%) & 7 (2.04%) cases ligature mark was situated at the level of thyroid cartilage & below thyroid cartilage respectively. Congestion of face because of venous occlusion was noticed in 318 cases (92.71%). Dribbling of saliva from the angle of mouth opposite to the knot, the surest sign of ante-mortem hanging was noticed in 225 cases (65.59%). In 60 cases (17.49%) the distribution of post-mortem lividity was typical of hanging means in legs, feet while in 55 (16.03%) cases it was found on hands and forearms suggestive that lividity was fixed because the body was suspended for more than 4 to 6 hours. In 228 cases (66.47%) the lividity was noticed on back side only when body was released from the point of suspension within a few minutes after death. Discharge of semen was seen in 91 cases (26.53%) whereas discharge of urine/faeces was noticed in 95 (27.69%) cases. La facie sympathetic and defence wounds were noticed in none of the cases under the study.

On internal examination larynx & trachea was congested in 268 (78.13%) cases while white-glistening subcutaneous tissue under ligature mark was seen in 298 (86.88%) cases and haemorrhages in sternocleidomastoid muscles were detected in 63 (18.36%) cases. Hyoid bone fracture was noted in 332 (96.79%) cases & thyroid cartilage fracture was not found in 338 (96.79%) cases while tear in intima of carotid artery was found in 53 (15.45%) cases.

5. Conclusion

Suicide by hanging is a major public health issue of the world especially in developing countries. Physical illness, mental disorder, quarrel with spouse, poverty, are major causative factors which are directly or indirectly responsible for committing suicides. To overcome this problem, prior information and knowledge about suicidal behaviour of persons, risk factors associated with it and early diagnosis of psychiatric disorders is required at familial and societal level. In addition, grooming of children at home to build a healthy child and make them mentally strong to face the harsh realities of life. Investigating agencies, media persons, social workers, health personnel, psychiatrics, non-governmental organisations (NGOs), political leaders, Governments and even the common man should play their role in identifying the underlying factors in the society to prevent the precious loss of life to family as well as society.

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7. Conflict of Interest

None.

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