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Department of Forensic Medicine & Toxicology, Third Floor, Library Building, Seth G S Medical College & KEM Hospital, Parel, Mumbai, Maharashtra, India. Pin-400 012. Email id: mlameditor@gmail.com Phone: 022-24107620 Mobile No. +91-9423016325.



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Original Research Article

A Study of Unnatural Deaths in Adolescent Age Group in a Tertiary Care Centre, Hyderabad, Telangana

Kavya Vaddi^a, K V, Ramana Murthy^b, Rahul M Band^c, Ashwinikumar B Sapate^{d*}, Madhusudan R Petkar^d, Ajay L Ghangale^e

^aAssistant Professor, ^cAssociate Professor, ^dProfessor, ^eProfessor and Head, FMT, Dr. D Y Patil Medical College Hospital & Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India.

^bProfessor, Department of Forensic Medicine & Toxicology, Osmania Medical College, Hyderabad, Telangana, India.

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Abstract

Introduction: According to UNICEF/UNO276725/Das, India has the largest adolescent population (aged between 10 to 19 years) in the world, which is 253 million. A retrospective study was conducted from 2015-2018 of unnatural adolescent deaths for which medico-legal post-mortem examinations were conducted at the mortuary of Osmania General Hospital, Hyderabad. The objective of the study was to find out the magnitude and causes of unnatural deaths in adolescents. **Material and Methods:** Autopsy findings, police or magistrate reports, and toxicology reports were reviewed. Data was gathered and reviewed retrospectively for 424 adolescents of whom 407 were unnatural deaths. **Results:** The main causes of unnatural deaths were hanging (25%), burns (20%), and head injuries (18%) and multiple injuries (16%). But considering the reasons behind the causation of head injuries and multiple injuries, road traffic accidents are the leading cause of unnatural deaths amongst the adolescent age group in the study period. Age-wise no difference was observed in unnatural deaths. Significantly ($P < .0001$) more females hanged themselves compared to men (33% vs 18%). Deaths due to burns were more in females than males (32% vs 8%). Head injuries were more common ($P < .0001$) in men compared to females (23% vs 12%). **Conclusion:** This study showed a broad picture of unnatural deaths among adolescents in Hyderabad. Free-of-cost counselling sessions should be arranged to avoid traffic accidents and suicides among adolescents.

1. Introduction

In India, there are 253 million adolescents in the age group 10-19 years.¹ Adolescence is the age group when a child changes to turn into an

adult. It is like a metamorphosis where there is physical, cognitive, and psychological development.

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*Corresponding author: Dr Ashwinikumar B. Sapate, Professor, Department Of FMT, Dr. D Y Patil Medical College Hospital & Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune. (M): +91-9225632392, Email: fmtabsapate@gmail.com
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This development is from puberty to legal hood. These rapid changes in the human body mark the adolescent stage as the most critical phase in the development of a healthy individual.² This age group comprises individuals in a transient phase of life requiring nutrition, education, counselling, and guidance to ensure their development into healthy adults. They are susceptible to several preventable and treatable health problems, like, unsafe sex leading to STI/HIV/AIDS, nutritional disorders, alcohol, abuse of substances, mental health concerns, injuries, and violence.¹ An observational study has reported adolescent aggressive behaviour determinants, including important biological, psychological, and social predictors. These are nutritional deficiency, attitude toward aggression, low family income, and unusual peer association.³ Adolescence is staged into early (10 to 13 years), middle (14 to 17 years), and late (18 to 21 years) adolescence.⁴

There are several studies conducted on the deaths among adolescents in India. A Report by Sushmita Dey, from Times of India on 10th May 2016 mentioned self-harm is the top reason for adolescent or youth deaths in India causing close to 60,000 deaths annually in the age group of 15 to 24 years.⁵ A study was conducted in Khammam, Telangana district with 45 cases, aged between 15 to 24 years. The objective was to evaluate suicide among adolescents and youths. The suicide rate was 13.97%. The highest incidence amongst the 25[55.55%] cases was from adolescents aged from 15 years to 18 years.⁶

A cohort study of 46 post-mortem examinations carried out in Guntur Medical College reported the main cause of death was accidents (54.34%), suicides (34.95%), and homicides /abatement (8.69%).⁷ A study conducted at Gandhi Medical College, Secunderabad, included all female cases of suicidal deaths in the age group of 12-24. The main motive behind the suicides was emotional disturbances (21%). The most common method adopted for suicide was "Hanging (53%)."⁸ Rakhi Dandona⁹ talks about the deaths due to drowning of children from 1 to 19 years old in Bihar. The survey covered 224 077 children. The findings from this large representative sample of children documented the variations in unintentional drowning deaths in Bihar. Debata's study from Northern India with 434 unnatural deaths among children 1 to 19 years old children found the most vulnerable age included

children between 11–19 years (74.5%). The commonest cause of death in all ages was flame burns (58.3%), road traffic accidents 15%, electrocution 7.8%, and poisoning 6%.¹⁰ Another study found reasons for death were motor vehicle crashes (20%); and firearm-related injuries (15%). Among firearm deaths, 59% were homicides, 35% were suicides, and 4% were unintentional injuries.¹¹

Despite being thought as a healthy stage, we still note many natural and unnatural deaths happening worldwide. This study emphasizes on the unnatural causes of deaths in early and mid-adolescent aged individuals reported in a Tertiary Care Hospital in Hyderabad, India.

2. Objectives

- To determine the magnitude of unnatural deaths.
- To analyze male and female child deaths.
- To find out the causes of unnatural deaths in adolescents.

3. Materials and methodology

This is a retrospective study of three years from 2015-18 of unnatural adolescent deaths for which medico-legal post-mortem examinations were conducted at the mortuary of Osmania General Hospital, Hyderabad. The data of forensic autopsies conducted in the years 2015-18 are reviewed retrospectively with autopsy findings, police or magistrate reports, and toxicology reports. Ethics committee approval was obtained from Institutional Ethics Committee, Osmania Medical College (ECR/300/Inst/AP/2013/RR-16).

Inclusion criteria: All unnatural deaths of age between 10 to 17 years which were reported to the mortuary of Osmania General Hospital, Hyderabad for medico-legal autopsy.

Exclusion criteria: All other cases which do not fit into the age criteria. Late adolescents were excluded.

Sample size: 424

Study Period: 3 years

Institutional Ethics Committee permission for waiver of consent was obtained.

4. Results

Amongst the study population, the number of unnatural deaths are of a significant number as compared to natural deaths i.e. the study sample N= 424, the number of natural deaths were 17 (4%) and unnatural deaths were 407 (96%). The gender distribution in total sample is shown in **table 1**. Out of these 407 unnatural deaths, 229 (56.27%) deaths were male and 178 (43.73 %) were female. As

mentioned in **Table 2**, the maximum deaths were by hanging followed by burns, head injury and then multiple injuries.

Table 1: Gender distribution (Total sample)

Gender	Number (%)
Male	241 (56.8)
Female	183 (43.2)
Total	424 (100)

Table 2: Gender-wise causes of unnatural death (P<.0001)

Causes of death	Male	Female	Total
Hanging	43 (18.8)	58 (32.6)	101 (24.9)
Burns	19 (8.3)	61 (34.3)	80 (19.7)
Head injury	53 (23.1)	22 (12.4)	75 (18.4)
Multiple injuries	49 (21.4)	17 (9.6)	66 (16.2)
Drowning	35 (15.3)	3 (1.7)	38 (9.3)
Poisoning	17 (7.4)	14 (7.9)	31 (7.6)
Electric shock	10 (4.4)	3 (1.7)	13 (3.2)
Strangulation and Throttling	1 (0.4)	0	1 (0.2)
Miscellaneous	2 (0.9)	0	2 (0.5)
Total	229 (100)	178 (100)	407 (100)

But considering the reasons behind the causation of multiple injuries and head injuries, road traffic accidents are the leading cause of unnatural deaths

Table 4: Age category-wise reasons for unnatural deaths, p = 0.172

Causes of unnatural death	Age categories in years			
	10 – 12 No (%)	12 – 14 No (%)	14 – 16 No (%)	>/= 16 No (%)
Hanging	7 (10.3)	7 (22.6)	44 (25.0)	43 (32.8)
Burns	18 (26.5)	6 (19.4)	34 (19.3)	22 (16.8)
Multiple injuries	8 (11.6)	4 (12.9)	34 (19.3)	20 (15.3)
Head injury	17(25.0)	6 (19.4)	28 (15.9)	23 (17.8)
Drowning	9 (13.2)	6 (19.4)	16 (9.1)	7 (5.3)
Poisoning	7 (10.3)	1 (3.2)	13 (17.4)	10 (7.6)
Electric shock	1 (1.5)	1 (3.2)	6 (3.4)	5 (3.8)
Strangulation and Throttling	1 (1.5)	0	0	0
Miscellaneous	0	0	1 (0.6)	1 (0.8)
Total	68 (100)	31 (100)	176 (100)	131 (100)

No – Number of cases.

5. Discussion

The present study indicated that only 4% deaths were due to natural causes of death and a massive 96% of deaths were due to unnatural causes of deaths. This study of unnatural deaths was carried out on 407 adolescents aged between 10 and 17 years in Hyderabad region in which 56.27% were male. The main reasons for unnatural deaths were hanging (above 12 years of age), burns (maximum between 10 to 12 years of age), head injuries and multiple injuries (more between 10 to 12 years of age).¹² Few deaths took place because of drowning, poisoning, and electric shock.

The present study found hanging was the most common cause of unnatural death and was

amongst the adolescent age group in the study period.

Significantly $p < 0.0001$, more deaths among females were because of suicidal hanging and due to burns. Unnatural deaths were observed more in males compared to females due to head injuries, multiple injuries, drowning, poisoning, and electric shock.

Table 3: Age category distribution

Variable	Age category	Number
Age (Years)	10 - 12	68 (16.7)
	12 - 14	32 (7.9)
	14 - 16	176 (43.2)
	>/= 16	131 (32.2)
	Total	407 (100)

As mentioned in **Table 3**, about 75% of unnatural deaths were between 14 to 17 years of age. As mentioned in **Table 4**, hanging was observed more in the above 14 age group, burns were observed more between 10 to 12 age group, multiple injuries were found more in the above 14 age group and head injuries were equally distributed between 10 to 17 years of age.

observed more in females compared to males. This result is consistent with a study conducted by B.J. Medical College, Pune with adolescents aged between 10 to 19 years, reported hanging (79.76 %) was the most common method used for committing suicide.¹³ The same finding was reported in the study from Secunderabad.^{8,14} Hanging or suicide may be because of emotional disturbances⁸, love affairs, family disturbances, and addiction.¹³

There are some studies on unnatural deaths due to craniocerebral injuries¹⁵ and natural deaths.¹⁶ A qualitative analysis by Debata PK of post-mortem data of unnatural deaths among 1 to 19-year-olds found flame burns (58.3%) were the commonest cause of death in all ages. This was followed by road

traffic accidents 15%, electrocution 7.8% and poisoning 6%.¹¹ Our study reported lower numbers than this study; burns at 20%, electric shock at 3.2%, and poisoning at 7.6%. In the study by C Sivagurunathan, et al², it was discussed that Road traffic injuries, followed by HIV/AIDS and then self-harm were the leading causes of death amongst adolescents, and injuries continue to be the leading cause of unnatural deaths. The findings of the above study are similar to this study with regards to multiple injuries. A study conducted by Rao⁷, reported more males 28 (60.86%) than female deaths 18(39.13%) and our result is consistent with their study. Their study also found the highest number of deaths between 14 to 16 years. This study showed that 9% of deaths were due to drowning. However, the intentions behind the drowning were not similar to the study by Dandona.⁹ The results of the present study were similar to Debata's study with 434 unnatural deaths in children aged 1–19 years.¹⁰ The reasons for unnatural deaths were burns, electrocution, and poisoning.

In another study, by Rebecca M. Cunningham¹¹, the findings showed highest deaths were due to injuries (60.6%) followed by vehicle accidents (12%). In our study, injury-related accidents were 34.6%. Strict rules should be laid by the government if minors are found driving motor vehicles.¹⁷⁻²⁰ The speed limit should be maintained near residential and school areas. When the leading causes of death are found to be unnatural, then efforts should be made to decrease the number of deaths. It can be as simple as following traffic rules, or maintaining standards in the construction of roads and school buildings/residential buildings so that children don't fall off of them.

From this retrospective study, it is evident that the first most common cause of unnatural death is due to road traffic accident considering both head injuries and multiple injuries and the male gender was found to be more affected than the females in these accidents. Thus, it is evident that traffic awareness programs must be made in schools to create awareness amongst teenagers so that they understand the rules of the Motor Vehicle Act. Even parents must be made aware to not handover vehicles to their children at a vulnerable age. The second most common cause of unnatural death is due to hanging. This denotes the emergence of incorporating awareness programs regarding mental health in schools and junior colleges. It is also

important to make the parents understand that psychiatric illness is just like physical illness which has to be given no less attention. Parents and children should be educated on how depression can endanger a person to self-harm. Special attention should be given to girls. Educational institutions should make sure that they do not pressure their pupils into strenuous academic activity, and score-oriented teaching. Every institute should have a counsellor available so that the child is free to go and talk about his/her issues regarding any matter.

6. Conclusion

This study showed the magnitude of unnatural deaths is enormous. Most of the causes for unnatural deaths are the same though the numbers differ in different states in India. Road traffic accidents seem to be the major reason behind unnatural deaths amongst adolescents and especially in male gender. The inquisitiveness to learn new things starts at this phase of the life, thus there should be strict disciplinary control over usage of motor vehicles before they reach the age of 18 years. Adolescents lack experience in handling situations and are mostly prone to peer pressure.

Adolescents, parents and teachers should have an open conversation. The early signs of loneliness, aggressive behaviour, and behavioural changes should be observed by the parents and staff at the educational institutions. Several offline and online counselling sessions should be arranged free of cost to avoid suicides and road traffic accidents among adolescents, and also students should be followed up to assess the effect.

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