Original Research Article

A Cross Sectional Study of Medico-Legal Deaths in Adolescent Age Group Autopsied at Tertiary Care Hospital in Central Karnataka

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Abstract

Background: An adolescent is defined as an individual aged between 11-19 years. They constitute about 21% of the Indian population. Mortality and morbidity occurring in this age group are mostly due to preventable causes. Mortalities in adolescents are cause of concern because they are the future of nation forming a major demographic and economic force. The purpose of this study is to analysis mortality in adolescents.

Methods: The present study is a hospital based, cross sectional and observational study of autopsy reports, police inquest forms, medico-legal case register of medico-legal deaths of adolescent age group victims of ages from 11 to 19 yrs. for a period of three years from January 01, 2020 to December 31, 2022 autopsied at department of Forensic Medicine & Toxicology and in patient case records from Medical Record Department. The cases were evaluated according to age, sex, the cause and manner of death and findings of toxicological analysis. Data was classified and statistically analyzed.

Conclusion: The majority of adolescent deaths were found to be related to external causes, in particular unintentional injuries. The accidental deaths accounts for 75.75% followed suicidal deaths (21.21%). Use of appropriate safety measures and strict law enforcement may significantly reduce accidental deaths in adolescents. Suicides may be prevented by identification of risk factors significant family support and counselling by child psychologist.

Key Words: Adolescent's deaths, Accidents, Suicides, Autopsy.

Introduction

Adolescence is a transitional stage of physical, physiological and psychological development from puberty to adulthood. In the history, the term 'adolescent' was first used in 15th century.[1] WHO defines an adolescent as an individual aged from 11 to 19 years i.e., those in the second decade of their lives.

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In India about 21% (243 million) of population are adolescents.[2] The period of adolescence and puberty have a special importance because it is the most beautiful, most powerful, and most hopeful period of human life.[3] The adolescents are more prone to the dangers of life and are more vulnerable in the face of unnatural events. These characteristics can lead to death of adolescent victims.[4] Mortality and morbidity occurring in this age group is mostly due to preventable causes. Studies showed that about 70% of deaths among adolescents were due to preventable causes such as unintentional injuries, homicides and suicides.[5] According to a study which included the statistics of 187 countries and was reported by Lazano et al.,[6] the road traffic accidents constitute the primary reason of death among those aged 10-19 years. A study of Analysis of medico legal deaths in adolescence conducted by Lalchandra V, Vinod KG, Sachin KM[7] in Kota region of Rajasthan reported more than half of the total adolescent deaths (51%) were due to accidents, followed by suicides (43%). A study conducted in western country, by Minino A[8] in United States reported 68% of all deaths from 1999 to 2006 were between the ages of 12-19 years.

Adolescence is commonly regarded as a healthy time of life, with a peak in strength, speed, fitness, and many cognitive abilities. The unnatural deaths may be due to unintentional or intentional injuries. Unintentional injuries are mainly accidents. Intentional injuries are mainly suicides. During the last decade, unnatural deaths were more common than natural deaths (disease) among adolescents with vehicular accidents accounting for a lion's share.[9]

The use of poisons for suicidal and homicidal purposes dates back to the Vedic era in India. It is reported that 1 to 1.5 million cases of poisoning occur every year, of which nearly 50,000 died.[10] The last quarter of the century has seen tremendous advances in the fields of agriculture, industrial technologies, and medical pharmacology. These advances have been paralleled by remarkable changes in the trends of acute poisoning in developing countries, including India.[11]

Aims and Objectives:

1. To Analyze the Socio-Demographic Profile of Victims of Medico-Legal Deaths in Adolescent Age Group Autopsied from January 01, 2020 to December 31, 2022.
2. To Determine the Cause and Manner of Medico-Legal Deaths in Adolescents Autopsied from January 01, 2020 to December 31, 2022 and To Learn How to Prevent Such Mortalities.

Materials and Methods

The present study is a hospital based, cross sectional and observational study of autopsy reports, police inquest forms, medico-legal case register of medico-legal deaths of adolescent age group victims of ages from 11 to 19 yrs. for a period of three years from January 01, 2020 to December 31, 2022 autopsied at department of Forensic Medicine & Toxicology and in patient case records from Medical Record Department of S. S. Institute of Medical Sciences & Research Centre, Davangere, Central Karnataka , which form the material for the study.

Then, the information furnished by the police in inquest forms, history and detailed information regarding circumstances of death are reviewed for additional information in MLC registers and in patient case records which are usually not recorded in the autopsy reports. The cases are evaluated according to age, sex, the cause of death, the manner of death and findings of toxicological analysis are noted in autopsy case report form. Information pertaining to the time and manner of death, reasons for the death was sought from the police inquest &post mortem examination reports. The data is collected in autopsy case report forms and the collected data is processed using Microsoft Excel and tabulated to deduce findings of the study.

Observations and Results

The present study period isfor three years from January 01, 2020 to December 31, 2022. During the study period total 412 cases were autopsied, out of which 66 victims were adolescents, these cases PM reports, inquest forms and patient case records evaluated & analyzed at Medical Record department at SS hospital & Department of Forensic Medicine, S. S. Institute of Medical Sciences & Research Centre, Davangere. Statistical analysis results obtained using SPSS software, chi square test is formed and p value noted from the result is less than 0.05.

Distribution of cases during the study period: During the study period, total 412 cases were autopsied at S S Hospital mortuary, SSIMS & RC i.e., from 1st January 01, 2020 to December 31, 2022, out of which 66 cases were belonged to the adolescent age group of 11 to 19 years. So, the prevalence of adolescent deaths was 16.01%.**(Table-1)**

Table 1: Distribution of cases during the study period:

Total No. of autopsy cases	412
Total No of Adolescents autopsy cases	66
Percentage of Adolescents autopsy cases	16.01%

Sex wise distribution of cases: Out of 66 autopsied cases studied, 46 were male adolescents (69.69%) and 20 were female adolescents (30.30%). **(Fig- 1)**

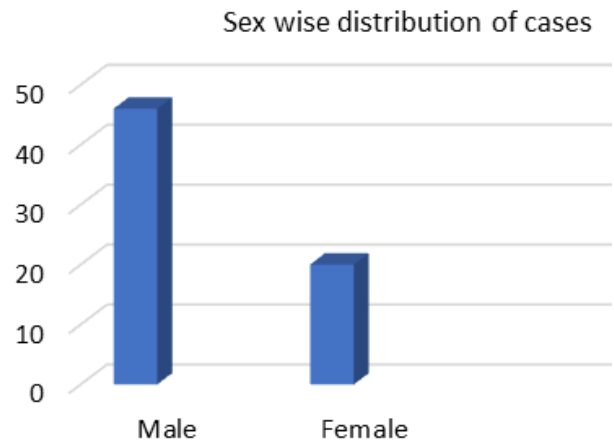

Fig 1: **Sex wise distribution of cases**

Age wise distribution of cases: Among 46 male adolescents, 11 males (23.91%) belonged to early adolescent age group of 11-14 years and 35 male adolescents (76.08%) were belonged to from 15 to19 years age group. Among female adolescents out of 20 cases, majority of the cases i.e., 15 female adolescents were belonged to from 15 to 19 years age group (75%) while only 05 (25%) cases were belonged to early adolescent age group of 11-14 years. (Fig 2) From the above observation it can be inferred that late adolescent period, i.e., 15 to 19 years age group is more prone and vulnerable group of adolescent unnatural deaths.

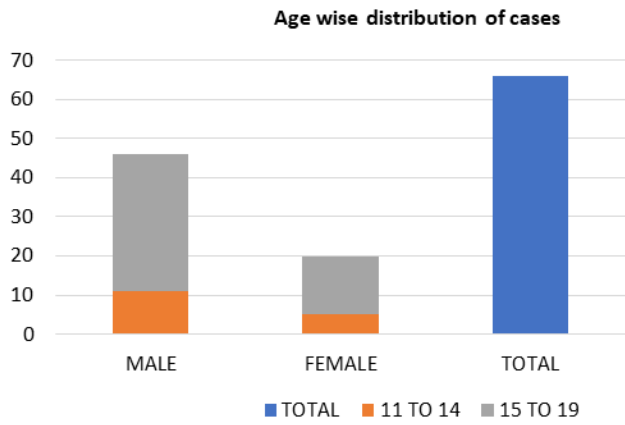

Fig 2: **Age wise distribution of cases**

Region wise distribution of cases: Among total of 66 adolescents 44 cases (66.66%) were in rural area and 22 cases (33.33%) were noted in urban area. (Fig 3) The incidence was highest in rural areas when compared to urban areas.

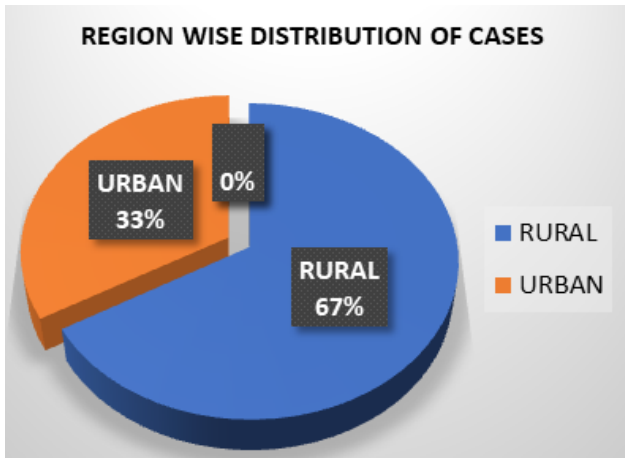

Fig 3: Region wise distribution of cases

Distribution of cases according to Manner of Death: Among 46 male adolescents, 34 male adolescents (73.91%) suffered accidental deaths followed by 10 cases of suicidal deaths (21.73%) and 2 male adolescents died due to natural diseases (4.34%).

Among 20 female adolescents, 16 cases (80%) were succumbed to death due to accidental manner (80.00 %) followed by 04 cases were suicidal (20.00%) in nature and no homicidal cases were noted in both male & female adolescents. (Table 2)

Table 2: Distribution of cases according to Manner of Death

	Accidents	Suicides	Homicides	Natural	Total
Male	34	10	00	02	46
Female	16	04	00	00	20
Total	50	14	00	02	66
Percentage	75.75%	21.21%	00%	03.03%	100%

Distribution of cases according to Cause of Death: Among 66 adolescent victims, 28 adolescent victims (M:22, F:06) were died due to Road Traffic Accidents (42.42%), 13 adolescent victims (M:04, F:09) were died due to Poisoning (19.69%), 08 adolescent victims (M:02, F:06) were died due to Hanging (12.12%), 06 adolescent victims (M:04, F:02) were died due to Fall from height (09.09%), 5 adolescent victims (M:04, F:01)were died due to Snake bite (07.57%), 2 male adolescent victims were died due to Drowning (03.03%), 2 male adolescent victims were died due to Electrocution (03.03%) and 2 adolescent victims (M:1,F:1) were died due to Natural diseases (03.03%). (Table 3)

Table 3: Distribution of cases according to Cause of Death

Cause of Death	Male	Female	Total No. of Cases	Percentage (%)
Road Traffic Accidents	22	06	28	42.42%
Poisoning	08	05	13	19.69%
Hanging	02	06	08	12.12%
Fall from height	04	02	06	09.09%
Snake bite	05	00	05	07.57%
Drowning	02	00	02	03.03%
Electrocution	02	00	02	03.03%
Natural diseases	01	01	02	03.03%
Total	46	20	66	100.00%

Distribution of cases according to Time & Days of Incident: Out of 66 adolescent cases in the current study, 34 adolescent victims suffered the incident during afternoon hours i.e., from 2pm to 6 pm, 16 adolescent victims in morning hours i.e., from 6 am to 2 pm and another 16 cases incident occurred during night hours (8pm to 6am). (Table 4)Most of the adolescent victims experience the hardship during holidays time (N= 38) followed by school days.(N=28) (Fig 4)

Table 4: Distribution of cases according to Time of Incident:

Time of Incident	No. of Cases	Percentage
Morning Hours (8am to 2pm)	16	24.24%
Afternoon Hours (2pm to 6pm)	34	51.51%
Night Hours (8pm to 6am)	16	24.2 %
Total	66	100%

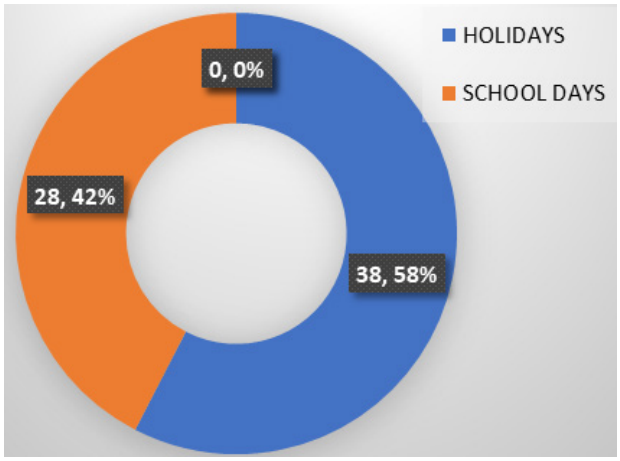

Fig 4: Distribution of cases according to Days of Incident

Discussion

Unnatural deaths claim a substantial number of adolescents lives in developing countries like India. This particular section of society is verymuch needed for building the nation in the future.

The total of 412 cases were autopsied during the study period, out of which 66 cases were belonged to the adolescent age group of 11 to 19 years. So, the prevalence of adolescent deaths was 16.01%. the incidence correlates with study conducted by Sleet DA & others.[12]

Out of 66 autopsied cases studied, 46 were male adolescents (69.69%) and 20 were female adolescents (30.30 %). Out of 46 male adolescents, 11 males (23.91%) belonged to early adolescent age group of 11-14 years and 35 male adolescents (76.08%) were belonged to from 15 to 19 years age group. Among female adolescents out of 20 cases, majority of the cases i.e., 15 female adolescents were belonged to from 15 to 19 years age group (75%) while only 05 (25%) cases were belonged to early adolescent age group of 11-14 years. From the above observation it can be inferred that late adolescent period, i.e., 15 to 19 years age group is more prone and vulnerable group of adolescent unnatural deaths. This finding is similar to previous studies conducted in Bangalore.[13]

The incidence of adolescent deaths was highest in rural areas when compared to urban areas, which has concurrence with the observation made by Kumar A et.al who found in their study conducted at Varanasi involving adolescent age group that 88.37% were rural inhabitants.[14]

Among 66 adolescent victims, majority of adolescent deaths occurred due to Road Traffic Accidents (42.42%), followed by Poisoning (19.69%), Hanging (12.12%), Fall from height (09.09%), Snake bite (07.57%), Drowning (03.03%),Electrocution (03.03%) and Natural diseases (03.03%). Previous study reports by Sleet DA & others 20 show that among adolescent unnatural deaths, fatalities from road traffic accidents (RTA) are prevalent same as observed in the present study. Kanchan T et.al reported in their study conducted at Manipal that Road traffic injuries were responsible for maximum mortalities (38.4%). Males comprised 59.6% of cases. Male-to-female ratio was 1.5:1. Males predominantly died of traffic injuries (45.2%), whereas females as a result of burns (37.4%).[15]

In our study, out of 66 adolescent cases, 34 (51.51%) victims suffered the incident during afternoon hours i.e., from 2pm to 6 pm followed by 16 victims in morning hours i.e., from 6am to 2pm and another 16 cases incident occurred during night hours (8pm to 6am). More deaths during afternoon hours could be attributed to more traffic from 2pm to 6 pm, reckless riding by teenagers after school hours and negligence by the parents/care-takers Most of the adolescent victims experience the hardship during holidays time (N= 38, 57.57%) followed by school days (N=28, 42.42%)due to more exposure of adolescents with their peers to the external environment like bike ride, lakes/pools, playful and careless attitude during holidays time. Similar observation is reported in the study conducted by Amy E Peden et al.[16]

In the present study, out of 66 adolescent victims 14 victims (21.21%) committed suicide by employing various methods. Poisoning was the most preferred method used to commit suicide with 08 cases (12.12%) out of 66 cases, followed by 06 cases (06.06%) of Hanging. In the current study suicide was the second leading cause of death in adolescent's secondary to accidental deaths, this correlates with the previous studies.[17, 18]

The studies conducted in rural areas of India poisoning are the first preferred method to commit suicide because of the easy availability of poisons. Drowning is more in studies conducted in coastal regions. Drowning as a method of suicide is known to occur, but has primarily been described in environments with readily available access to water, such as coastal regions. Drowning remains a significant public health concern, as it is a major cause of disability and death, particularly in children.[19]

In this study most of the cases took place in the rural area which might be due to multiple causes like high probability of snake bite, drowning, death caused by easy accessibility of pesticides at household level etc. As per Ghatak S[20] the most suicidal deaths took place in rural areas because of the higher availability of pesticides combined with poorer access to emergency medical care in such areas. The study by Meel B L[21] reported that trauma accounted for 70.9% deaths and 29.1% deaths were due to other causes such as hanging, drowning, falls from a height and poisoning.

In the present study majority of suicidal deaths in adolescents occurred due to love failure, failures

in exams, after a quarrel with parents for silly issues. As it is possible that Internet-based social sites may facilitate these suicidal phenomena, investigations should include an evaluation of the victim's internet access before the incidence & if so, measures to be taken to curb the potential risk of similar actions by peers.

Conclusion

Adolescence is viewed as a transitional period between childhood and adulthood, whose cultural purpose is the preparation of children for the adult roles. Death in adolescent age is a potential life loss to family and society and reflects socioeconomic and Medical Health Care status at the National and Regional level. Accurate information on the causes and circumstances of such deaths must be obtained by medico-legal investigations and is essential in creating awareness among National policymakers and educators/caregivers, to prevent adolescent deaths.

Inappropriate media reporting practices can sensationalize and glamourize suicides and increase the risk of copycat suicides (imitation of suicides) among vulnerable people. Responsible reporting by media includes, avoiding detailed description of suicidal acts, avoiding sensationalization and glamorization, using responsible language& try to minimizing these suicide reports. The media must start educating the public about the suicide and providing information as to where they can seek help (E.g.: Help line numbers) for their mental health issues. The education department must mandate the school's administrations to make the availability of *child psychologists* around the clock for seeking necessary help by the adolescents and parents.

The current study is throwing light upon the magnitude of adolescent's mortality and urgent need of preventive measures in order to curb these unnatural deaths and to save these valuable lives. The study results providing us a valuable information on unnatural deaths in adolescents and the study data can be used by the stake holders and law enforcement authorities to decrease such preventable mortalities in future like use of appropriate safety measures and strict road traffic rules, which might significantly reduce the accidental deaths in adolescents. Suicides may be prevented by identification of risk factors (mood disorder, impulsive behaviour) by school teachers, parents / caretakers and timely referral to child psychologist. Additionally, we think that the expansion of free youth counseling centers to provide psychological support for adolescents and teenagers will reduce mortality in this age group.

Behaviour change communication by parents, teachers, child psychologists / psychiatrists, career guides, law keepers and other stake holders for fostering friendly environment for upbringing of adolescents is needed to decrease such preventable medico-legal / unnatural deaths and to save these valuable lives for their better future as they are considered as strength of our nation.

Ethical Consideration: Ethical approval obtained from the IERB, S. S. Institute of Medical Sciences & Research Centre, Davangere vide letter No: IERB/372/2023 dated 13/01/2023.

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Conflict of interest: Nil.

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