

Retrospective study of pediatric autopsy findings in a tertiary care center: an evaluation

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Abstract

Paediatrics is a branch of medicine which is concerned with wellbeing of infants, children, adolescents, their physical, mental, and psychological development. Paediatric forensic autopsy is useful to evaluate us the natural and unnatural childhood deaths, their reasons, steps for prevention and their management, which is both useful to the branch of Forensic Medicine and the Medical researchers. A 3year retrospective study was conducted in M.P. Shah Government Medical College, Jamnagar during the period of January 2014 to December 2016. Out of total 3743 autopsies performed, a total of 253 cases belonging to paediatric age-group were the material of the study. Accidental deaths are the most common manner of deaths and mostly affected age-group is 12-17 years. The leading cause of death are burns, drowning, road traffic accidents and snake bite. Accidental burns and suicidal hanging were more common in females in the age-group 12-17 years. Accidental drowning and RTA were common in the males. In the present study, snake bite envenomation was also one of the leading causes of unnatural deaths in children and was mostly seen in the age range of 2-10 years.

In India, both natural and unnatural childhood deaths are emerging as major public health problem. Various educational programmes, preventive strategies, and dissemination of information are necessary to create awareness and is must to reduce the unnatural deaths.

Keywords: Paediatric autopsy, Unnatural children deaths, Trauma, Manner of death.

Introduction

Pediatrics is a branch of medicine which is concerned with wellbeing of infants, children, adolescents, their physical, mental, and psychological development. Pediatric forensic autopsy is useful to evaluate us the natural and unnatural childhood deaths, their reasons, steps for prevention and their management, which is both useful to the branch of Forensic Medicine and the Medical researchers. In India, both natural and unnatural childhood deaths are emerging as major public health problem. Along with natural deaths concerned with diseases, fatal trauma is one of the major common findings in pediatric autopsies. Injuries are the areas of major concern in the age group of one year and above, attributing to the most causes of unnatural deaths. The vast majority of child injury deaths occur in low and middle income countries where the injury mortality rate among those aged less than 15 years is five times higher than that in the high-income countries.¹ A three year retrospective study was carried out in pediatric autopsy cases so as to stastically analyze the autopsy findings in both natural and unnatural deaths, so as create useful data to implement preventive measures for injury reduction and better understanding and management of the fatal childhood diseases.

Materials and Methods

A 3 year retrospective study was conducted in M.P. Shah Government Medical College, Jamnagar during the period of January 2014 to December 2016. Out of total 3743 autopsies performed, a total of 253 cases belonging to pediatric age-group were the material of the study.

Data was collected after obtaining the permission from the concerned authority from the Department of Forensic Medicine & Toxicology through the autopsy reports maintained in the same department. The demographic data included age, sex, mechanism of trauma, manner of injury, cause of death and the nature of death whether natural or unnatural. The data was compiled and analyzed using appropriate statistical techniques.

Results

Table 1: Year wise distribution of pediatric autopsies

Year	Total no. of autopsies	Total no. of pediatric autopsies
2014	1166	73(6.2%)
2015	1129	98(8.6%)
2016	1348	82(6.1%)
Total	3743	253(100%)

Table 2: Age wise & sex-wise distribution of cases

Age(in years)	Male	Female	Total
0-3	37(59.6%)	25(40.3%)	62(24.5%)
3-6	26(66.6%)	13(33.3%)	39(15.4%)
6-9	19(67.8%)	9(32.1%)	28(11.0%)
9-12	10(55.5%)	8(44.4%)	18(7.1%)
12-17	47(44.3%)	59(55.6%)	106(41.9%)
Total	139(54.9%)	114(45.05%)	253(100%)

Table 3: Manner of death

Manner of death	Total
Suicidal	32(12.64%)
Accidental	172(67.9%)
Homicidal	14(5.5%)
Natural	35(13.8%)
Total	253

Table 4: Manner of death

Mechanism of trauma	Manner of death	Male	Female	Total
Burns	Accidental	8	26	34
	Suicidal	1	3	4
	Homicidal	2	0	2
Poisoning	Accidental	7	4	11
	Suicidal	2	8	10
	Homicidal	0	0	0
Hanging	Accidental	0	0	0
	Suicidal	6	12	18
	Homicidal	1	1	2

Table 5: Mechanism of trauma

Mechanism of trauma	Cause of death	Total
Road traffic accidents	CCI	21
	Non-CCI	12
Burns	Shock	21
	Septicemia	19
Drowning	asphyxia	37
Poisoning	Poisoning	21
Electrocution	Electrocution	9
Snake bite	Toxaemia	30
Fall down	CCI	3
	Non-CCI	3
Hanging	Asphyxia	20
Assault		4
Scalds	Septicemia	4
AEFI	Shock	2
Violent asphyxia deaths	Asphyxia	4
Jaundice	Complications	3
Sudden death		24
Others	Epilepsy	3
	Crushed under the falling wall	5
	Dog bite	2
	Blunt injury to the abdomen	2
	Congenital heart disease	1
	Retrosternal cyst	1
	Railway accident	2
Total		253

There were total 253 autopsies of children done during the period of 3 years at the Department of Forensic Medicine & Toxicology, M.P. Shah Government medical college, Jamnagar. Among them, year wise distribution of cases showed that out of 1166 autopsies, 73(6.2%) cases belonging to pediatric age-group were autopsied in the year 2014 and 98(8.6%) cases in 2015, out of 1129 and 82 (6.1%) cases in 2016, out of 1348 autopsies (Table 1).

In our study, out of total 253 cases, 139 were male and 114 were female. There were total 62(24.5%) cases belonging to the age-group <3 years, 39(15.4%) cases belonging to the age-group 3-6 years, 28(11%) cases belonging to 6-9 years age-group, 18(7.1%) cases in 9-12 years and 106(41.9%) cases were belonging to the age-group 12-17 years. There were more cases of both male and female in the age-group of 12-17 years, 47(44.3%) cases of male and 59(55.6%) cases of female with maximum number

cases of female were observed in this age-group followed by the age-group of <3 years, in which 37(59.6%) cases were male and 25(40.3%) cases were female. Least number of cases (total 18) were seen in the age-group of 9-12 years in which 10(55.5%) were males and 8(44.4%) cases were female (Table 2).

The study also showed that out of total 253 cases, 32(12.64%) were suicidal, 172(67.9%) were accidental, 14(5.5%) was homicidal and 35(13.8%) cases were belonging to natural death. There were 40 deaths recorded due to burns, out of which 34 were accidental, 4 were suicidal and 2 were homicidal. There were 21 cases recorded due to poisoning, out of which 11 were accidental and 10 were suicidal. There were 20 cases due to hanging, from which 18 were suicidal and 2 were homicidal (Table 3&4).

In our study, out of total 253 cases, 33 cases were due to road traffic accidents, 40 cases were due to burns, 37 cases due to drowning, 21 cases due to poisoning, 9 cases due to electrocution, 30 cases due to snake bite, 6 cases due to fall down from height, 20 cases due to hanging, 4 cases each due to due to assault, violent asphyxia deaths and scalds, 2 cases due to AEFI, 3 cases due to jaundice, 24 cases were sudden death and 16 cases were due to other reasons (Table 5).

Discussion

In this retrospective study of total 253 cases, there were 139(55.9%) cases of male and 114(45.05%) cases of female, indicating the male predominance. These findings are consistent with Chowdhury et al,² Singh et al³, Siddappa et al,⁴ and Avachat et al.⁵ In all the age-group, the males were at higher risk except in the age-group of 12-17 years, where female were at higher risk. The reason for female preponderance is that most of the female were involved in cooking and got accidental burns (Table 4).

In the present study, considering the manner of death, accidental deaths were maximum accounting for 172cases (67.9%), followed by suicidal cases which were 32(12.64%) and least were homicidal being 14 cases (5.5%). There were 35 cases (13.8%) where the cause of death was natural. These findings were consistent with Siddappa et al,⁴ PalimarV⁶ and Meel BL.⁷

In our study, there was maximum number of fatalities due to burns injury, accounting for 40 cases. There were 34 cases of accidental burns, out of which 26 cases were female. The reason being females were mostly involved in cooking and lacking the safety measures. Cooking at the floor level and wearing saree or dupatta and ignorance were the other reasons. In the study conducted by Peddi,⁸ the most common cause of pediatric burns were due to the scalds and flames was the second common cause. Their findings showed that incidence of burns were higher in males than females. In the present study, the findings were inconsistent with above studies. There were only 4 cases of scalds burns which were seen in each of the 2 males and females in the age-group 0-3 years.

There were 21 cases of poisoning, out of which 11 were accidental and 10 were suicidal. The accidental cases were mostly seen in the males within the age-group up to 5 years and suicidal cases were mostly seen in the females in the age-group of 12-17 years age-group. The reason being, the easy availability and accessibility of the agricultural poisons in the home. These findings are consistent with Siddappa et al.⁴

Suicidal hanging were common in the females with age-group 12-17 years accounting for 12 out of total 18 cases, which may be due to sudden hormonal changes during menses or may be the sudden mood swings. In the study conducted by Waytt et al,⁹ 10 out of 12 children were male in the age-group <15 years who committed suicidal hanging.

There were total 33 cases of Road traffic accidents deaths, in which male preponderance was seen (24 male cases to that 9 female cases) and Most of them sustaining the cranio-cerebral injury. The study done by Palimar V⁶, Meel BL⁷ and Bakkannavar¹⁰ showed the RTA was a leading cause of death, but in the present study, it was the third highest reason.

There were total 37 cases of drowning accounting for second highest reason for unnatural deaths which may be due to children in the rural or semi-urban areas like to bathe in pond or canals without any supervision. These findings were consistent with the study of Avachat et al.⁵ Males were at greater risk of drowning than females, accounting for 27 cases as compared to 10 cases of females and were common in the age range of 3-8 years. These findings were consistent with Cavalcanti AL et al¹¹ and Tyler et al.¹²

Apart from the common causes of unnatural deaths like, poisoning, hanging, burns and road traffic accidents, there was total 30 cases of snake bite being one of the major factors for the unnatural deaths. On analysis of the data, it was revealed that out of 30 cases, 16 were male and 14 were females with slight male preponderance. These findings are consistent with Kshirsagar VY et al,¹³ Shyna KP et al¹⁴. This gender difference is attributed due to the outdoor activities of the male children. Most of the children involved were in the age-group of 2-10 years. In a study conducted by Karunayake et al¹⁵ in Sri Lanka, highest numbers of bites were in the age range of 6-12 years.

In the present study, 14 deaths were homicidal in nature. Out of 14 cases, 2 were due to hanging, 4 due to drowning, 4 due to assault, 2 due to burns and 1 case each due to smothering and manual strangulation. In our study, male preponderance was seen as compared to females. These findings were in contrast to the study done by Siddappa et al⁴ in which female preponderance was seen.

Conclusion

Accidental deaths are the most common manner of deaths and mostly affected age-group is 12-17 years. The leading cause of death are burns, drowning, road traffic accidents and snake bite. Accidental burns and suicidal hanging were more common in females in the age-group 12-17 years. Accidental drowning and RTA were common in the males.

In the present study, snake bite envenomation was also one of the leading causes of unnatural deaths in children and was mostly seen in the age range of 2-10 years.

Recommendations

Since the leading causes of death in this region are burns, drowning, road traffic accidents and snake bite, following are our recommendations:

1. Educational programmes conveying the knowledge to the children and parents regarding the use of safety measures in cooking.
2. Young children must receive swimming instructions and should be under the adult supervision. Additionally small ponds, irrigation ditches and wells should be covered with fences or gates to prevent children from falling into it. These preventive strategies are important and should be implemented in rural area where risk of drowning is higher.
3. To reduce the road traffic accidents, rules should be made to reduce speed/speed limit in the residential areas, school or other play areas. The use of helmets, provision for seat belts and use of bicycle helmets should be made compulsory. Strict drink-driving laws should be made.
4. Dissemination of information regarding the steps to avoid snakebite to parents and children should be done. Correct first aid measures, quick transport and proper training of primary health care workers should be given to bring down the mortality rates.

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Abbreviations

1. AEFI- Adverse Events Following Immunization
2. RTA- Road Traffic Accidents

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