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Research Article

A prospective study of paediatric autopsies conducted at Bapuji Hospital and Research Centre, Davangere

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Abstract

Pediatrics is the branch of medicine dealing with children and their diseases. Injury & Violence are major killers of children and adolescents under the age of 18 years throughout the world, and are responsible for about 950000 deaths each year. Unnatural childhood deaths are not only associated with intense trauma and separation distress, but also relate to a sense of self neglect to protect children from harm. Out of 532 autopsies performed during the study period from January 2010 to December 2013, 87 victims belongs to the pediatric age group, were autopsied at the Department of Forensic Medicine & Toxicology at J.J.M.Medical College's, Bapuji hospital and Research center, Davangere.

The purposes of this study were to report the autopsy findings of unnatural child deaths, and to identify the prevalence of specific factors such as age, sex, postmortem findings, cause of death and manner of death. The adolescent age group (12–18 years) were most commonly affected, with a significant male preponderance. Many of the cases were accidental in nature with road traffic accident being the cause. There was much coexistence of the parameters typical of both industrialization and population explosion in developing countries, indicating the epidemiological transition.

It is important to find out the origin and causes of childhood deaths to guide health policies in preventing the unnatural deaths. Besides, different legal approaches are also needed for different causes.

Keywords: Pediatric autopsy, Unnatural childhood deaths, Cause of death, Manner of death

1. Introduction

Pediatrics is the sole discipline concerned with all aspects of the well-being of infants, children, and adolescents, including their health, their physical, mental, psychological growth and development and their opportunity to achieve full potential as adults. Autopsies in Pediatric cases serve a variety of useful and important roles not only for Forensic Medicine purpose but also for medical researchers. Paediatric autopsy mainly includes postmortem examination of unnatural childhood deaths up to the age of 19 years. Unnatural childhood deaths are not only associated with intense trauma and separation distress, but also relate to a sense of self neglect to protect children from harm. Injury and violence are major killers of children throughout the world, responsible for about 950000 deaths in children and young people under the age of 18 years each year. In 1990, injuries in the developing countries contributed to 13% of total disability adjusted life years among children. It is expected that by 2020, this share will increase to 22%. [1]

Injuries remain the major problem because of the effects on social, physiological, economic and medical issues. Besides, they are a severe problematic part of public health. [2]

Therefore, a Prospective study of pediatric autopsy cases was analyzed by statistical method to create useful database in this region. This study was pinpointed to report the autopsy findings of unnatural children deaths, and to identify the prevalence of specific factors such as age, sex, postmortem findings, cause of death, manner of death and seasonal variation.

2. Material and Methods

A 4 year prospective study was conducted between January 2010 to December 2013, which included a total of 532 autopsies conducted at the Department of Forensic Medicine & Toxicology, JJM Medical College, Davangere. Out of 532 autopsies performed during the study period, 87 victims belonging to the pediatric age group were the material of this study.

The data was collected regarding the age, sex wise distribution of cases, manner and cause of death at autopsy, through police inquest and by direct interrogation with the relatives and friends. The data thus obtained was statically analyzed using SPSS software version 11.5 and depicted in the form of results.

3. Results

Total number of cases which were autopsied in the 4 year study period was 532 out of which 87 (16.35%) were paediatric unnatural deaths at Bapuji hospital and Research center, Davangere.

The year wise distribution of cases showed that out of 87 Pediatric medico legal cases autopsied 42(15.16%) cases were autopsied in 2010 out of a total of 277 cases and 14(12.96%) cases in 2011 out of a total of 108 cases and 14(16.86%) cases in 2012 out of a total of 83 cases and 17(25.37%) cases in 2013 out of a total of 67 cases. (Table-1)

Table 1:- Year wise distribution of paediatric unnatural deaths.

Year	Total Number of cases autopsied	TOTAL Number of paediatric unnatural deaths	percentage of paediatric unnatural deaths
2010	277	42	15.16 %
2011	108	14	12.96 %
2012	83	14	16.86 %
2013	67	17	25.37 %
Total	532	87	16.35 % the % cannot be 100% as Paediatric autopsy constitutes to 16.35% only.

In our study out of 87 cases there were 49 males (56.38%) and 38 females (43.67%). (Table 2)

Table 2:- Sex wise distribution of cases

Year	Male	Female	Total
2010	26	16	42
2011	9	5	14
2012	7	7	14
2013	7	10	17
Total	49 **(56.38 %)**	38 **(43.67 %)**	87

Out of 87 cases 3(3.44%) were in the age group of < 1 year, 16(18.39%) were in the age group of 1-3 years, 12(13.79%) were in the age group of 3-6 years, 13(14.94%) were in the age group of 6-12 years and 43(49.42%) were in the age group of 12-19 years (Table 3).

Table 3:- Age wise distribution of cases

Age Year	Infant (Up to 1 Year)	Toddler (1 – 3 Years)	Preschool (3 – 6 Years)	School (6 – 12 Years)	Adolescent (12 - 19 Years)	Total
2010	NIL	6	5	5	26	42
2011	1	2	2	3	6	14
2012	2	4	NIL	2	6	14
2013	NIL	4	5	3	5	17
Total	3	16	12	13	43	87
Percentage	**3.44 %**	**18.39 %**	**13.79 %**	**14.94 %**	**49.42 %**	**100 %**

The study also showed that out of a total of 87 paediatric cases autopsied, 62 cases (71.26 %) died due to accident, 20 cases (22.98 %) were suicidal and 5 cases (5.74 %) died due to homicide at our hospital. (Table-4)

Table 4:- Manner of death

Manner of death	Number of Cases	Percentage
1) Accidental	62	71.26 %
2) Suicidal (Poisoning + Hanging)	20	22.98 %
3) Homicidal	5	5.74 %
Total	**87**	**100%**

In our study, among 87 paediatric deaths, 23 deaths were due to road traffic accidents, 22 deaths were due to poisoning, 18 deaths were due to burns/scalds, 5 deaths were due to snake bite/scorpion sting, 8 deaths were due to fall from height, 7 deaths were due to hanging, 1 died due to drowning, 1 case of assault and 2 deaths which were classified as others were due to gore injury by goat, fall of slab. (Table-5)
Among 62 accidental child hood deaths, 23 deaths were due to road traffic accidents, 16 deaths were due to burns/ Scalds, 8 deaths were due to fall from height, 5 deaths were due to snakebite/ scorpion sting, 5 deaths were due to poisoning, 2 deaths were due to hanging, 1 death was due to drowning, 1 death was due to gore by goat and another one death was due to due to fall of slab.

Among 20 suicidal child hood deaths, 15 deaths were due to poisoning, 5 deaths were due to hanging. (Table-5)

Table 5:- Pattern of death

Cause of death	Number of Cases	Percentage
1) R.T.A.	23	26.43 %
2) Poisoning	22	25.28 %
3) Hanging	7	8.04 %
4) Burns / Scalds	18	20.68 %
5) Snake bite / scorpion sting	5	5.74 %
6) Fall from height	8	9.19 %
7) Drowning	1	1.14 %
8) Assault	1	1.14 %
7) Others	2	2.29 %
Total	**87**	**100 %**

Among 5 cases of homicide, 2 deaths were due to poisoning and other 2 deaths were due to burns, and 1 died due to assault. (Table-6)

Table 6:- Pattern of Homicidal death

Cause of Death	Number of Cases
1) Poisoning	2
2) Burns	2
3) Assault	1
Total	**5**

4. Discussion

Injury and violence are major killers of children throughout the world, responsible for about 950000 deaths in children and young people under the age of 18 years each year. In 1990, injuries in the developing countries contributed to 13% of total disability adjusted life years among children. It is expected that by 2020, this share will increase to 22%. Injuries in any form remain the major killer in 44% of the death among children of 1 to 4 years of age and 74% among 15 to 19 years. Motor vehicle accidents (MVAs) are the leading causes of death in children aged 1-19 years, followed by suicide (predominantly by poison & hanging) or homicide. [1]

In our study paediatric autopsy constituted 16.35 % of total autopsies conducted. This was almost similar to study done at Manipal south India[3] (10.12 %), Jammu[4] (12.25 %) and Brazil[5] (21 %), Transkei region of South Africa[6] and John R Hall study[7]. Our study is in contrast with the study done at Kuala Lumpur[8] which accounted for only 4.9 % of total autopsies.

In the present study out of 87 unnatural childhood deaths, 49 (56.38 %) were males and 38 (43.67 %) were females and male predominance was obvious. This parameter is in concurrence with studies done at Manipal, south India[3] (55.5% male and 44.5% female) and studies done by John R Hall & coworkers [9](50.5% male and 49.5% female), Kim A Collins & coworkers [10] (57.5% male and 42.5% female), Jonathan P Wyatt & coworkers[11] (60.5% male and 39.5% female), Frederic P Rivara & coworkers[12] (56.5% male and 43.5% female). The reasons for male preponderance is that, they are more active compare to the female counterpart throughout the childhood days. In contrast to this, female predominance was noted in studies conducted by Pramod Kumar & coworkers[13] (57.4% female and 42.6% male) and Byard RW& coworkers [14](53.3% female and 46.7% male).

The age wise distribution of unnatural child hood death in our study, shows gradual increase in the number of fatalities from toddler to adolescent age group, and adolescent 49.42 % were predominantly involved. This was in agreement with the study done by Palimar V, Arun M. & Bhagavath Prashantha [5]. The reasons being adolescents are more exposed to external environment and are adventurous, rebellious in nature at this age, more impulsive.

In the present study when the manner of death was taken into consideration, accidental deaths topped the list with 62 (71.26 %) cases followed by 20 (22.98 %) suicide cases and the least being 5(5.74 %) homicidal (5.74 %) cases. These findings were correlating with the studies done by Palimar V, Arun M. & Bhagavath Prashantha [5] and Meel BL [6].

Among accidental deaths, 23 fatalities were due to road traffic accidents followed by 16 deaths were due to burns, 8 deaths were due to fall from height, 5 deaths were due to poisoning, 5 deaths were due to snake bite / scorpion sting, 2 deaths were due to hanging, 1 death was due to drowning, 1 gore by goat and 1 slab fall. This is similar to the conclusions drawn by the paediatric Death review Committee report 2010 of the deaths on the province of Ontario[15]. Road traffic accidents were predominated in study done at Manipal[3] and studies done by Palimar V, Arun M. & Bhagavath Prashantha[5], Meel BL [6], Jonathan P Wyatt & coworkers [11], Meiers S & coworkers[16] and Williamson LM & coworkers [17]. The road traffic accidents being more common could be attributed easy access to two wheelers at an early age and rash driving methods adopted by the children and adolescents. Also reflexes may not act well in a child when a fast approaching vehicle is seen coming towards the child and the road may be a playground for the children resulting in death due to a Road Traffic Accident.

Our study results in consistent with an Indian study; accidental poisoning was common in children below 5 years of age whereas suicidal poisoning was more after 13 years of age [18]. Accidental poisoning predominated in another study done in Boston [19].
In our study, among 20 suicidal deaths, 15 terminated their life by consuming poison which were commonly encountered because of their easy accessibility at their agricultural homes and 5 committed suicide by hanging, which were the second most common cause of death, this was in consistent with the study done at Manipal [3] and Canadian statistics [15].

The increase in burn fatalities and accidental consumption of Kerosene could be due to use of the kerosene stove or mud stove, where fire wood is used or kerosene or pump stove is used, resulting in easy accessibility of stove & kerosene to children's.

The suicidal victims were predominantly females (15 adolescents), which may be due to the sudden emotional nature of a female, sometimes blamed to the hormonal changes during their menses which is in similarity with the studies done by Baca-Garcia E & coworkers[20], Magos A & coworkers [21] Fourestie V. & coworkers [22].

In the present study 5 unnatural childhood deaths were homicidal in nature. Out of the 5 cases, 2 female were victims of burns, 2 female were victims of poisoning and 1 was a male child who died due to assault, this was in consistent with the studies done at Manipal[3], united states[14] & Virginia [23]. Here there was a female predominance seen, since the female child was disliked by low socio economic, illiterate families because of facing difficulties in providing food, shelter, education and marriage. This may be the reason of female homicidal deaths.

5. Conclusion

Accidents accounted for the majority of childhood unnatural deaths. The Road Traffic Accidents, accidental burns & scalds are leading causes of death. Adolescent males in the age group of 12-19 years are commonly involved. This indicates that an immense responsibility lies with the parents and caregivers to prevent such childhood deaths. Accurate information on causes and circumstances of such deaths through a process of medico-legal investigations is essential in creating an awareness among the National policy makers and educators/caregivers, to prevent this type of childhood unnatural deaths. A need for further similar studies is stressed & maintenance of Pediatric MLC register to know the pattern of childhood fatalities and legal complications and further reducing the pediatric fatalities in future. To conclude there is a very little information regarding the number of paediatric autopsies in developing country like ours. This suggests that each & every centers conducting autopsies should come up with such studies to reflect the magnitude of occurrence of unnatural childhood deaths.

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