

Epidemiological Study of Unnatural Death among Children's in Varanasi Area (India)

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Abstract: Introduction: Children are the world's most important resource. Pediatric autopsy mainly includes postmortem examination of unnatural childhood deaths up to the age of 19 years. Aim of the study: To determine the epidemiological features and highlight the outcome of pediatric unnatural deaths in Varanasi area. Material & method: The present retrospective study has been conducted for the period of 5 consecutive years i.e. 2009 to 2013 based on autopsy record of the unnatural death cases among children's deaths. During the study period total numbers of unnatural death cases were 10195 and deaths among children's were 1367. These cases were brought to the Department of Forensic Medicine, IMS, BHU, Varanasi and have been analyzed retrospectively. Result: Total number of cases which were autopsied in the 5 year study period was 10195 out of which 1367(13.41%) were pediatric unnatural deaths. Most of the unnatural deaths in pediatric age 895 (65.47%) were in the age group of 12-19 years. In our study out of 1367 cases there were 773 males (56.55%) and 594 females (43.45%). 707 cases (51.72 %) died due to accident, most of the death due to road traffic accident. 41.33%. Rural habitat 88.37%. Hindu religions 89.83% and most of the death in summer seasons 38.99%. Discussion: Death among children's has a marked effect on resources and management outcomes in the family and community. An epidemiological assessment of causes of death among children's is needed for increased awareness of health problems in this population group, allocating public-health resources and appropriately developing strategies for prevention. Conclusion: Analysis of data for retrospective study suggests that age, sex, habitat, religion and manner of death significantly affect community.

Keywords: Pediatrics age group, forensic autopsy, medico legal case, unnatural death

1. Introduction

Children are the world's most important resource. Pediatrics is the sole discipline concerned with all aspects of well being of infant, children and adolescent, including their health; their physical, mental, and developmental; and their opportunity to achieve full potential as adult. Cause of death varies by developmental status of the nation [Robert M. Kliegman et al; 2011]. Pediatrics (also spelled pediatrics or paediatrics) is the branch of medicine that deals with the medical care of infants, children, and adolescents, and the age limit usually ranges from birth up to 18 (in some places until completion of secondary education, and until age 21 in the United States) [Wikipedia]. The world population growing's at the rate of 1.14% per years, with that of the India growing at the rate of 1.3% per years [worldbank.org]. Some studies on medico legal autopsies have been conducted in India. This study was carried out to highlight the causes, peculiarities and possible factors responsible for pediatric accidental, homicidal and suicidal deaths in Port Varanasi, India. Pediatric 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 [Bakkannavar; 2011].

2. Aim of the Study

To determine the epidemiological features and highlight the outcome of pediatric unnatural deaths in Varanasi area. To detect factors influencing mortality and morbidities in Pediatrics age group.

3. Material and Methods

Present study is carried out at forensic medicine department, Institute Of Medical Sciences, Banaras Hindu University, Varanasi. Relevant information and subjective data like age, sex, habitat, marital status and manner of death among children's have been collected from medico legal autopsy register. Data are analyzed retrospectively for periods of five years from 2009 to 2013. Cases were included in death among Pediatric age group on the basis of confirmation by investigating officer and corroborative finding at medico legal examination.

4. Observations and Result

Total number of cases which were autopsied in the 5 year study period was 10195 out of which 1367(13.41%) were pediatric unnatural deaths. The year wise distribution of cases showed that out of 1367 Pediatric medico legal cases autopsied 271 (19.82%) cases were autopsied in 2009 out of

1986 cases, 282(20.63%) cases were autopsied in 2010 out of a total of 2025 cases, and 272 (19.90%) cases in 2011 out of a total of 1074 cases and 274 (20.04%) cases in 2012 out of a total of 2081 cases and 268(19.60%) cases in 2013 out of a total of 2129 cases. $X^2 = 16.01$; $DF = 16$; $P = 0.45$ (**Table-1**). Out of 1367 cases 77(5.63%) were in the age group of < 1 year, 77 (5.63%) were in the age group of 1-3 years, 92 (6.73%) were in the age group of 3-6 years, 226 (16.53%) were in the age group of 6-12 years and 895 (65.47%) were in the age group of 12-19 years. $X^2 = 12.30$; $DF = 4$; $P = 0.015$ (**Table 2**). In our study out of 1367 cases there were 773 males (56.55%) and 594 females (43.45%) (**Table 3**). The study also showed that out of a total of 1367 pediatric cases autopsied, 707 cases (51.72 %) died due to accident, 70 cases (5.12 %) were suicidal, 51 cases (3.73 %) died due to homicide, natural 59 cases (4.32%), and 480 cases (35.11%) were unknown cause of death were at our hospital (**Table-4**). In our study, among 1367 pediatric deaths, 338 deaths were due to burn, 59 deaths were due to drowning, 22 deaths were due to electrocution, 23 deaths were due to fall from height, 6 deaths were due to fire arm injury, 57 deaths were due to hanging, 4 died due to hypothermia, 3 case of lightning, 36 death due to natural death, 7 due to neck injury, 105 due to poisoning, 6 due to prematurity, 69 due to railways accident, 565 due to road accident, 21 due to still burn, 5 due to strangulation, 19 due to suffocation, 1 due to bomb blast injury, 1 medical negligence, 1 scorpion bite and 19 cases were unknown cause of death (**Table-5**). In our study regarding habitat 1208 case (88.37%) died in rural area, 71(5.19%) died in urban area and 88 cases (6.44%) cause of death were unknown (**Table - 6**). In our study Hindu 1228 cases (89.83%), Muslim 53 cases (3.88%), Christian 1 case (0.07%) and 85 cases were unknown religions (**Table - 7**). In our study summer season 533 cases (38.99%), Rainy 436 cases (31.89%) and in winter 398 cases (29.11%) (**Table -8**).

5. Discussion

5.1. Prevalence of Deaths

In our study pediatric autopsy constituted 13.41 % of total autopsies conducted. This was almost similar to study done at Manipal south India [*Bakkannavar M S; 2011*] (10.12 %), Jammu [*Khajuria B; 2008*] (12.25 %) and Brazil [*Palimar V et al; 2006*] (21 %), Transkei region of South Africa [*Meel B L; 2008*] and John R Hall study [*Peres LC; 2005*]. Our study is in contrast with the study done at Kuala Lumpur [*Bhat S R et al; 2009*] which accounted for only 4.9 % of total autopsies.

5.2. Age

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 65.47 % were predominantly involved. This was in agreement with the study done by [*Palimar Vet al; 2006*]. The reasons being adolescents are more exposed to external environment and are adventurous, rebellious in nature at this age, more impulsive

5.3. Gender

In the present study out of 1367 unnatural childhood deaths, 773 (56.55 %) were males and 594 (43.45 %) were females and male predominance was obvious. This parameter is in concurrence with studies done at Manipal, south India [*Hall J Ret al; 1989*] (55.5% male and 44.5% female) and studies done by [*Hall J R et al; 1989*] (50.5% male and 49.5% female), [*Collins & coworkers et al; 1999*] (57.5% male and 42.5% female).

5.4. Manner of death

In the present study when the manner of death was taken into consideration, accidental deaths topped the list with 707 (51.72 %) cases followed by 70 (5.12 %) suicide cases and the least being 51 (3.73 %) homicidal cases. These findings were correlating with the studies done by [*Palimar V, et al; 2006*] and [*Meel B L; 2003*].

5.5. Cause of death

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 are the leading causes of death in children aged 1-19 years, followed by suicide (predominantly by poison & hanging) or homicide [*Yavuz Y et al; 2007*].

5.6. Habitat

Regarding habitat (88.37%) died in rural area, 71(5.19%) died in urban area. this difference may be due to more rural population, undeveloped road and inadequate health facility.

5.7. Religious

In our study find that Hindu (89.83%), Muslim (3.88%), and Christian (0.07%) religions. Hindu religions predominant than other it is due to more Hindu population.

5.8. Seasonal Variation

In our study summer season (38.99%) cases, rainy (31.89%) cases and in winter (29.11%) cases. These differences were due to in summer season more long day today activity.

6. Conclusion

Most of the deaths are avoidable. Parental monitoring, control of movements, legislation and general concern of the adult population for children's welfare will reduce these largely preventable deaths.

7. Future Scope

Based upon the present study following point may need in future planning regarding prevention of unnatural deaths among children's:-To plan effective preventive strategies regarding road traffic accident as it was most common cause of death. A need for further similar studies is stressed & maintenance of Pediatric MLC registers to know the pattern of childhood fatalities and legal complications and further reducing the pediatric fatalities in future.

8. Acknowledgement

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9. Conflict of Interest

Nil

10. Source of Funding

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11. Ethical Clearance

The present study was approved by "Institutional Ethical Committee" of Institute of Medical Sciences, Banaras Hindu University Varanasi. All the information has been taken under consideration of medical ethical committee.

12. Tables

Table 1: Prevalence of unnatural deaths among pediatrics age group

Year	Total number of autopsy	Number of autopsy of pediatrics age group	% of deaths among pediatrics age group
2009	1986	271	19.82
2010	2025	282	20.63
2011	1974	272	19.90
2012	2081	274	20.04
2013	2129	268	19.60
Total	10195	1367	13.41% of total

Table 2: Age wise distribution of unnatural death in pediatrics age

Year	Infant (<1Years)	Toddler (1-3Years)	Preschool (3-6 Years)	School (6-12 Years)	Adolescent (12-19 Years)	Total
2009	13	12	15	48	183	271
2010	15	18	27	47	175	282
2011	11	14	15	55	177	272
2012	20	16	18	43	177	274
2013	18	17	17	33	183	268
Total	77	77	92	226	895	1367
Percent	5.63%	5.63%	6.73%	16.53%	65.47%	

Table 3: Distribution of gender due to unnatural death in pediatrics age group

Year	No. of male cases	No. of female cases	Total
2009	170	101	271
2010	171	111	282
2011	154	118	272
2012	142	132	274
2013	136	132	268
Total	773	594	1367
percent	56.55%	43.45%	

Table 4: Distribution of manner of death by death among pediatrics age group

Manner	No. of cases	% of cases
Accidentals	707	51.72
Suicidal	70	5.12
Homicidal	51	3.73
Natural	59	4.32
Unknown	480	35.11
Total	1367	100.00

Table 5: Distribution of pattern of death in pediatrics age group

Sr. No.	Cause of death	No. of cases	% of cases
1.	Burn	338	24.73
2.	Drowning	59	4.32
3.	Electrocution	22	1.61
4.	Fall from height	23	1.68
5.	Firearm injury	6	0.44
6.	Hanging	57	4.17
7.	Hypothermia	4	0.29
8.	Lightning	3	0.22
9.	Natural cause	36	2.63
10.	Neck injury	7	0.51
11.	Poisoning	105	7.68
12.	Premature	6	0.44
13.	Railways accident	69	5.05
14.	Road traffic accident	565	41.33
15.	Stillborn	21	1.54
16.	Strangulation	5	0.37
17.	Suffocation	19	1.39
18.	Unknown	19	1.39
19.	Other (Bomb blast injury, medical negligence, scorpion bite)	3	0.22
	Total	1367	100.00

Table 6: Distribution of death among pediatrics age group according to habitat

Sr. No.	Habitat	No. of cases	% of cases
1.	Rural	1208	88.37
2.	Urban	71	5.19
3.	Unknown	88	6.44
	Total	1367	100.00

Table 7: Distribution of unnatural death among pediatrics age group according to religions

Sr. No.	Religions	No. of cases	% of cases
1.	Christian	1	0.07
2.	Hindu	1228	89.83
3.	Muslim	53	3.88
4.	Unknown	85	6.22
	Total	1367	100.00

Table 8: Distribution of seasonal variation among pediatrics age group

Season	Total No. of cases	% of cases
Summer (March-June)	533	38.99
Rainy(July-October)	436	31.89
Winter (Nov.-December)	398	29.11
Total	1367	100

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