



ORIGINAL ARTICLE

# Epidemiology of road traffic accident deaths in children in Chandigarh zone of North West India



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**Abstract** The fatalities from Road Traffic Accidents (RTA) constitute a major cause of unnatural deaths among children in Chandigarh zone of North West India. The epidemiology of RTA related deaths in this age group is lacking in our country. This retrospective study (1974–2013) included children ( $\leq 18$  years) who became victims of RTA and subsequently died during the course of treatment. The postmortem and hospital records of the victims were used to collect the epidemiological data regarding age, sex, area of residence, etc. These deaths constituted 9.4% of total road accident deaths reported at this hospital. Out of a total of 709 RTA deaths in children, about 16% were reported in the block year of 1974–78 and this proportion decreased to 9.4% during the block year of 1984–88 and has remained almost constant since then. The maximum number of victims belonged to the states of Haryana (36%) and Punjab (34%). A higher number of deaths were observed in rural population (60%). Most of the fatalities occurred between 12–4 pm (29.9%) and pedestrians (47.8%) were found to be the most commonly affected. The most common affected was the 16–18 year age group (35.3%). Injury to head and neck region (81.4%) was responsible for a majority of deaths. The study concluded that the RTA remains an important cause of unnatural deaths in children. The static proportion of these deaths over the past three decades signifies that the road safety policies have been ineffective in preventing causalities and need further improvements. © 2015 The International Association of Law and Forensic Sciences (IALFS). Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Globally, Road Traffic Accidents (RTA) are the leading cause of unnatural deaths in the world<sup>1</sup> and a major burden on the world's economy causing a yearly loss of about US \$ 518 billion.<sup>2</sup> It is also the foremost cause of unnatural deaths in children, contributing to an annual loss of more than 260,000 lives in the 0–19 year age group.<sup>3</sup>

India contributes one-sixth of the world's population, 29.5% of which belongs to the 0–14 year age group.<sup>4</sup> India

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has witnessed a 10-fold increase in the number of fatalities from 1970 to 2009<sup>5</sup> with one accident occurring every minute and one fatality every four minutes.<sup>6</sup> There was a remarkable increase in the total number of registered vehicles from 1.9 million in 1971 to 127.7 million in 2010.<sup>7</sup> It has been reported that road traffic injuries are the second most frequent cause of death in the 5–14 year age group in India<sup>8</sup> and more than half of all accident-related deaths in children are attributed to RTA (Road Traffic Accidents).<sup>9</sup> Overpopulation, increased number of vehicles on roads, poor road conditions and disregard for traffic rules and regulations are some of the major causes of increased injuries and fatalities in India.<sup>10,11</sup> Hence the present study was carried out to provide a baseline data to policy makers to plan safer transportation routes and in setting up of health care centers in areas that report a higher number of accidents.

## 2. Materials and methods

The present study is an analysis of postmortem records of 709 RTA-related deaths in children ( $\leq 18$  years) in Chandigarh zone, undertaken at Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh between 1974 and 2013. The autopsies on these cases were conducted by the department of Forensic Medicine, PGIMER, Chandigarh. This institute provides tertiary health care to the people of more than half a dozen neighboring states of northern India. The subjects in the present study belonged to Chandigarh zone consisting of the union territory of Chandigarh and the states of Punjab, Haryana and Himachal Pradesh. The states of Punjab and Haryana with the union territory of Chandigarh as the capital city is known as the granary of India, while the hilly state of Himachal Pradesh is known for its horticulture.

The information regarding age and sex distribution, rural/urban distribution, time of the accident, fatal injury and other socio demographic parameters were recorded from the autopsy records of the deceased with the methods of collection remaining the same for the entire study. For this study, the period (1974–2013) was divided into eight blocks of five years. The subjects were divided into four age groups: <5, 6–10, 11–15 and 16–18 years. The double data entry of records in the Microsoft excel was done by two independent persons for ensuring data consistency and reliability. The data thus obtained were analyzed in the SPSS version 16. Chi-square test of goodness of fit was applied for analysis purpose.

## 3. Results (Tables 1 and 2)

Out of a total of 15,212 unnatural deaths reported at this hospital from 1974–2013, 49.7% ( $n = 7561$ ) were due to RTA and of these, 709 were of children making a contribution of 9.4% of total road accident fatalities.

There was an increase of 11-fold in RTA fatalities among children from 1974–78 ( $n = 22$ ) to 2009–13 ( $n = 241$ ). These fatalities in the first five years of study formed nearly 16% of the total RTA deaths in children ( $n = 709$ ) and decreased in proportion to 9.4% in the 1984–88 period and have remained almost stable to be around 9% since then.

The maximum number of fatalities was observed from the state of Haryana (36%) followed by the state of Punjab

**Table 1** Year wise distribution of Road Traffic Accident (RTA) fatalities.

Year	Total unnatural deaths	Total RTA related deaths (B)	Total RTA related children deaths (A)	Proportion of RTA deaths in children(A/B) (%)
1974–78	335	140	22	15.7
1979–83	472	233	34	14.6
1984–88	637	330	31	9.4
1989–93	662	354	31	8.8
1994–98	1047	445	43	9.7
1999–2003	2977	1407	126	9.0
2004–08	3719	1971	181	9.2
2009–13	5363	2681	241	9.0
Total	15,212	7561	709	9.4

**Table 2** Profile of Road Traffic Accident (RTA) fatalities in children.

Parameter	N	%	p value
<i>Age</i>			
Less than 5 years	111	15.7	0.0001
6–10 years	170	24	
11–15 years	168	25.1	
16–18 years	260	35.2	
<i>Sex</i>			
Male	540	76.2	0.0001
Female	169	23.8	
<i>Area</i>			
Rural	428	60.4	0.0001
Urban	281	39.6	
<i>State</i>			
Haryana	260	36.6	0.0001
Punjab	231	32.6	
Chandigarh	90	12.6	
Himachal Pradesh	68	9.6	
Other states	60	8.5	
<i>Time of accident</i>			
8 am–12 pm	147	21.5	0.0001
12 pm–4 pm	205	29.9	
4 pm–8 pm	190	27.8	
8 pm–12 am	63	9.2	
12 am–4 am	17	2.3	
4 am–8 am	63	9.2	
<i>Vehicular occupancy</i>			
Pedestrians	338	47.6	0.0001
Two wheeler occupants	235	33.4	
Three wheeler occupants	15	2.1	
Light wheeler occupants	74	10.4	
Heavy wheeler occupants	40	5.6	
<i>Cause of death</i>			
Head and neck injury	577	81.4	0.0001
Chest injury	7	9.8	
Abdominal injury	29	4.1	
Injury to extremities	19	2.6	
Injury to multiple regions	77	10.8	

(34%), Chandigarh (13%), Himachal Pradesh (9%) and other neighboring states (8%). The rest of the casualties belonged to other states contributing <2% from each state. Though the

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