A STUDY ON THE CHANGING PROPORTION OF UN-NATURAL DEATHS IN PUNJAB STATE (INDIA) WITH SPECIAL REFERENCE TO ROAD ACCIDENTS (1996-2013)

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Abstract

In the last two decades India has emerged as a vibrant economy, witnessing rapid urbanization, migration of people and changing pattern of consumption. The intensity of motorized vehicles has risen by many folds without a matching investment in infrastructure development. Road safety has figured as the most sensitive and crucial issue while addressing to the problem of accidental deaths in the country. Road accidents form the highest proportion of accidental deaths. The present study is an attempt to examine the magnitude, proportion and growth of road accidental deaths and to ascertain the intensity of deaths in road accidents by different types of vehicles in the state of Punjab (India) from 1996 to 2013.

To examine nature of road accidents during the period of analysis, the different type of vehicles and their ownership (whether private or government) is scrutinized. Further in order to ascertain rate of road accidental deaths, magnitude of road accidental deaths per lakh of population in different years in Punjab, is computed. To analyse the growth of road accidental deaths under various types of vehicles, average annual compound growth rates were computed. There has been a spurt in intensity of road accidental deaths and injuries during the period of analysis in the state of Punjab, causing a rise in proportion of road accidental deaths in total accidental deaths by 24.3 percent. Among the different type of vehicles, the fatality rate is maximum by trucks and lorries due to overloading, driving under the influence of intoxicants and lengthy working schedule.

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In the last two decades India has emerged as a vibrant economy, witnessing alterations in the socio-demographic, economic and political way of life. There has been rising income trend especially among the middle income classes. This has led to rapid urbanization, migration of people and changing pattern of consumption. They are readily adopting mechanization and experiencing revolution in technology in all spheres of life. The intensity of motorized vehicles has risen by many folds without a matching investment in infrastructure development. Road safety has figured as the most sensitive and crucial issue while addressing to the problem of accidental deaths in the country. Road accidents form the highest proportion of accidental deaths. There are both natural and un-natural causes of accidental deaths. The natural causes (Avalanche, Cold and Exposure, Cyclone/Tornado, Starvation/Thirst, Earthquake, Epidemic, Flood, Heat Stroke, Landslide, Lightning, Torrential Rains etc.) constitute a meager part to the extent of 5 to 6 percent of total accidental deaths. The different causes of unnatural deaths are Air-Crash, Collapse of Structure (House Building, Dam, Bridge), Drowning Boat, Electrocution, Explosion, Falls (Fall from Height, Fall into Pit/Manhole), Factory/Machine Accidents, Fire (Fireworks/Crackers, Short-Circuit, Gas Cylinder/Stove Burst), Fire-Arms, Sudden Deaths (Heart Attacks, Epileptic Fits/Giddiness, Abortions/Child Birth, Influence of Alcohol), Killed by Mines or quarry disaster, Poisoning (Food Poisoning/Accidental Intake of Insecticide, Spurious/poisonous liquor, Leakage of poisonous gases, Snake Bite/Animal Bite), Stampede, Suffocation, Traffic Accidents (Road, Rail-Road Accidents, Other Railway Accidents).

Road accidents (figuring among the unnatural causes of accidental deaths) usually refer to traffic accidents in which there is a motor vehicle collision with another vehicle, person, animal, obstruction like trees or poles etc. Such an accident leads to injury, death, disability, vehicle damage and property damage. It is a worldwide phenomenon which causes human and financial loss and the cost has to be borne by the society and the individuals involved. The World Health Organization (WHO) uses the term road traffic injury to describe the vehicle collisions. A 2004 report by WHO states that road traffic injuries are a major problem which needs effective and sustainable efforts for prevention. The report forecasts that if new initiatives are not taken to combat this problem worldwide road traffic injuries would rise by 65 percent by 2020 and by 80 percent in low-income and middle- income countries.

There is an urgent need to take appropriate actions to put a check on the deteriorating road safety measures. Road safety measures include appropriate engineering aspect of both roads and vehicles, as well as provision of efficient health and hospital services. In India the problem is unique and catastrophic with little precedence of such a situation in highly motorized countries. Here the road space is jointly shared by cars, buses, three-wheelers, rickshaws, animal carts, scooters, bicycles and pedestrians. Highways pass through rural areas with high density of population and there is an absence of parallel road links for slow and non-motorized traffic. Illegal encroachments on the road spaces are a further nuisance which causes many road accidents. Driving licenses are issued without effective scrutiny and examination. India's road traffic injuries pose a huge public health and development problem killing almost around 1.4 lakh people, injuring or disabling about 4.7 lakh persons and damaging 1.6 crore vehicles a year (NCRB, 2013).

The rate of deaths due to road accidents (number of deaths in road accidents / number road accidents * 100) is highest in the state of Punjab to the extent of 72.6 after Meghalaya, Mizoram and Nagaland whereas it is only 31.0 in all India basis. (NCRB, 2013) There has been a spurt in number of vehicles as Punjab figures among the states having high density of registered vehicles.

The present study is an attempt

1. To examine the magnitude, proportion and growth of road accidental deaths in the state of Punjab during a period of eighteen years (1996-2013).
2. To ascertain the intensity of deaths in road accidents by different types of vehicles in the state of Punjab (1996-2013).

METHODOLOGY

The data on total accidental deaths, road accidental deaths, in the state of Punjab from 1996 to 2013 is subjected to primary and graphical analysis. To examine nature of road accidents during the period of analysis, the different type of vehicles and their ownership (whether private or government) is scrutinized. Pie chart is used to express the share of different categories of vehicles in road accidental deaths. To study the composition of road accidents, the year wise proportion of road accidents in total accidents since 1996 is reckoned and expressed through histogram. Further in order to ascertain rate of road accidental deaths, magnitude of road accidental deaths per lakh of population in different years in Punjab, is computed. The rate of accidental deaths defined as the number of deaths per lakh inhabitants is universally taken as a realistic indicator since it balances the effect of growth in population. To analyse the growth of road accidental deaths under various types of vehicles, average annual compound growth rates were computed using the following formula.

$$Y = a\, b^t\, e^u$$

Y = Yearly expenditure on Police

t = Time period

u = Stochastic term

a and b are constants which were estimated by principle of least square using following formula

Average C.G.R. =   (b – 1) 100

Sources of Data

|	Type of Data	Source
i)	Year wise accidental deaths and road accidental deaths in Punjab from 1996 to 2013.	Various annual issues of Accidental Deaths and Suicides in India, National Crime Records Bureau, GOI from 1996 to 2013.
ii)	Mid-year population in Punjab from 1996 to 2013.	Directorate Census Operation, Punjab from 1991 to 2011.
iii)	Vehicle-wise road accidental deaths in Punjab in 1996 and 2013.	Various annual issues of Accidental Deaths and Suicides in India, National Crime Records Bureau, GOI from 1996 to 2013.

DISCUSSION

Clearly shown in Table 1 given in Appendix, that road accidental deaths in the state of Punjab has shown a positive trend, irrespective of the awareness campaigns launched by the state traffic police department, efforts towards development and management of road infrastructure, provision for safer vehicles by automobile companies, provision of health and hospital services etc.

The magnitude of total road accidental deaths during the period of eighteen years (1996-2013) is 38714 has risen annually from 1041 in 1996 to 4588 in 2013 at an average annual compound growth rate (AACGR) of 9.50 percent, highest being in 2011 to the extent of 4897. The average annual road accidental deaths during the period of analysis were 2151. The highest spurt was in the year 2011 partly due increase in number of vehicles on the road and partly due to the absence of a coordinated official policy to control the problem. It has followed an upward trend with minor fluctuations in certain years.

## DEATHS IN ROAD ACCIDENTS IN PUNJAB (1996-2013)
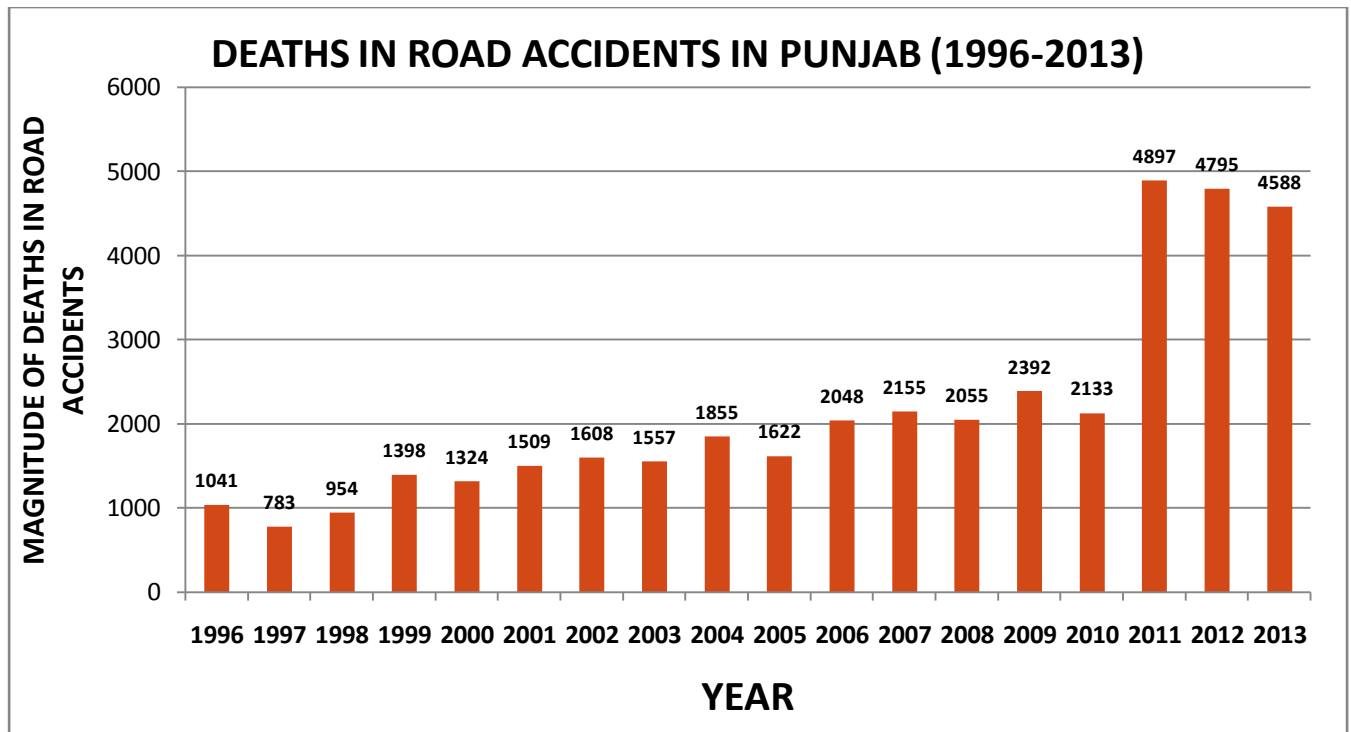
The proportion of accidental deaths on road to total accidental deaths has varied between 22.2 to 46.5 during the period of analysis (1996-2013), with average annual proportion of 31.0 and highest being in the year 2011. The proportion has also shown a positive trend with a sharp rise in last three years, from 2011 onwards. Total accidental deaths in Punjab by all causes have risen from 3657 in 1996 to 10577 in 2013 at AACGR of 6.79 percent, highest being in 2012 to the extent of 10721. The highest contribution to these deaths has been due to road accidental deaths.

PROPORTION OF DEATHS IN ROAD ACCIDENTS AND OTHER ACCIDENTAL DEATHS (1996-2013)
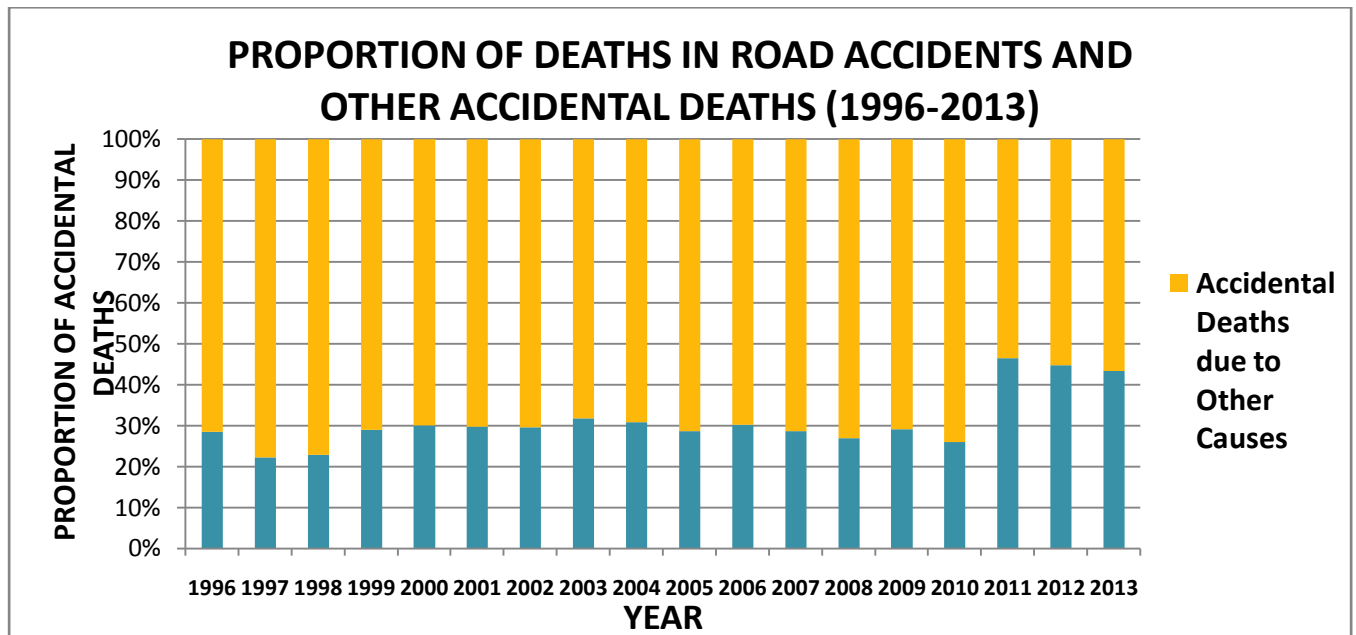
The rising intensity of the problem can be judged from the rate of accidental deaths. The rate of accidental deaths indicates the number of deaths per lakh inhabitants, which is universally taken as a realistic indicator since it balances the effect of growth in population. The rate of accidental deaths has increased from 4.7 in 1996 to 16.2 in 2013, ranging between 3.4 in 1997 to 17.7 in 2011. There is an urgent need to recognize the worsening road safety situation in order to take appropriate action. Road traffic injury prevention and mitigation should be given the same attention and scale of resources that are currently being channelized towards other predominant health issues, if increasing human loss and injury on the roads, with their devastating human impact and large economic cost to the society are to be avoided. (Report GOI, 2007)
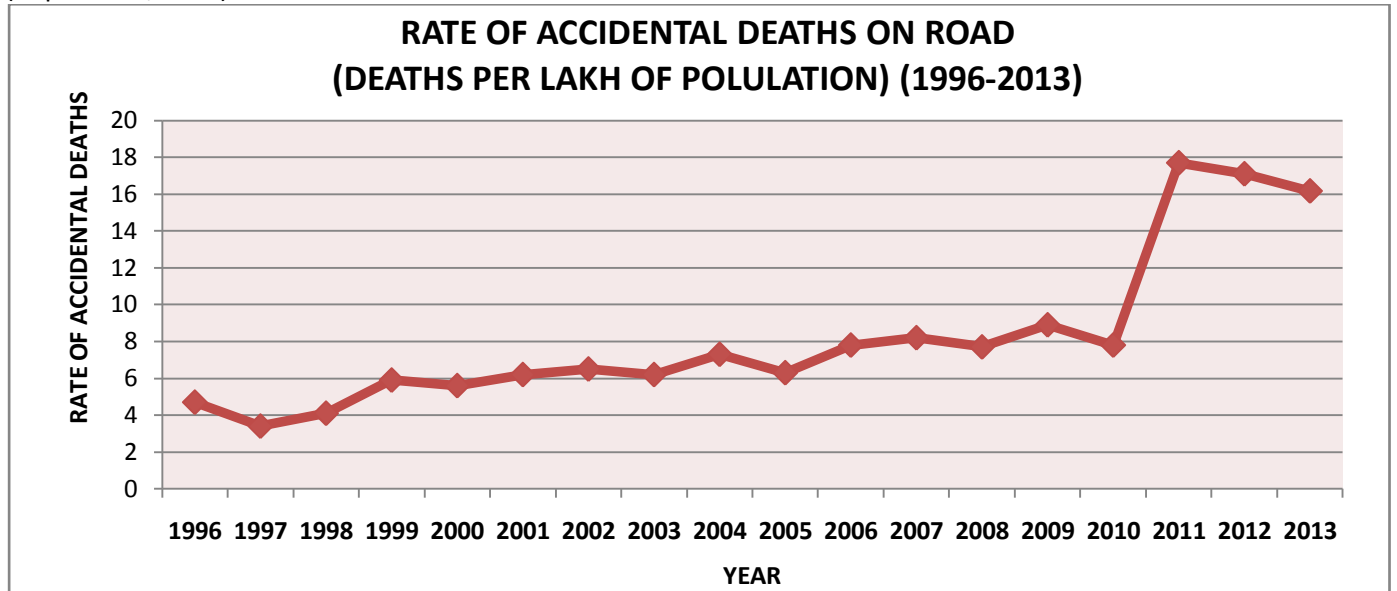
Clearly shown in Table 2 given in Appendix, average proportion of road accidental deaths caused by governmental owned vehicles during the period of analysis (1996-2013) is 5.4 percent. The highest contribution was in the year 2002 to the extent of 20 percent.
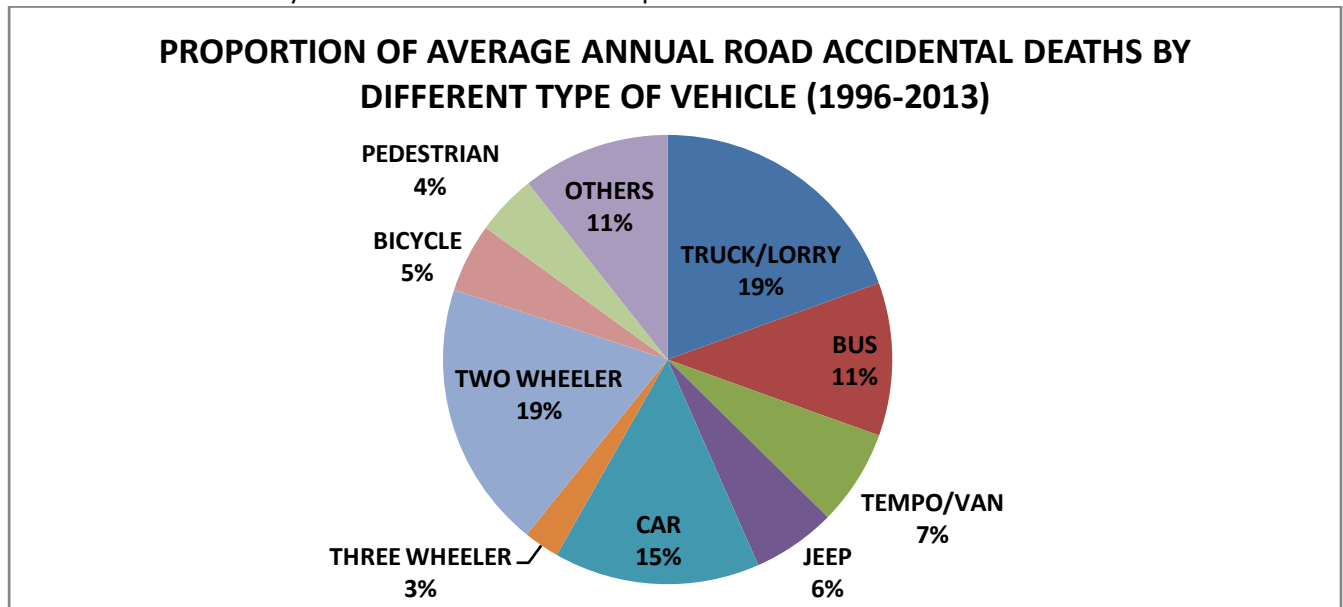
Among the different type of vehicles, the average annual quantum of fatality in road accidents is maximum by trucks and lorries to the extent of 424, constituting 19.7 percent of total casualties followed by the category of two wheelers (419), cars (323) and buses (240) with 19.5%, 15% and 11.2% respectively. The minimum average annual quantum of fatality in road accidents is on three wheelers constituting 2.6 percent of total casualties. The reason responsible for this is that they are comparatively less in number and moreover the speed limit is regulated as mostly it is used for commercial purposes, within cities and towns. The average annual fatality of pedestrians is also sufficiently large to the extent of 95 experienced an AACGR of 8.37 percent during the period of analysis, due to lack of provision for subways near educational institutions and other office-market centers. Moreover the provision of footpaths and zebra crossings in urban and sub-urban areas are bleakly maintained. The AACGR, indicating the growth in road accidental deaths is highest in case of cars to the extent of 15.9 percent during a period of eighteen years (1996-2013), followed by others (15.54%) and two wheelers (14.36%).

SUGGESTIONS AND POLICY IMPLICATIONS

1. There is a pressing need to regulate heavy vehicles including trucks, lorries, buses, tempo and vans which are primarily used for commercial purposes as they collectively form 38 percent of total casualties during the period under study. Their speed limits, cargo carrying limit (over-loading) and passenger carrying limit must be regulated and strictly followed. It is also suggested that yellow, orange and such bright colours should be used on heavy vehicles because the bright colours make them more visible when parked under low light conditions. It is more relevant in countries like ours, where the parking and lighting regulations are scantily followed. White coloured cars are most visible and had least chances to be involved in an accident. (Monosh University, Accident Research Centre of Melbourne).

2. There is need to identify black spots and correct the defects (engineering and architectural aspects) of road infrastructure. Moreover the inferior construction of roads is causing deterioration of safety standards for heavy and fast moving vehicular traffic. A large number of fatal accidents can be avoided by appropriately curing such defects by concerned authorities at the earliest.

3. Dedicated traffic police force is vital for patrolling and managing traffic in cities and towns. A special highway police force must be constituted to enforce road safety on the National Highways. This issue was discussed by a specialized committee, which was of the view that borrowing personnel from the state police force was not a satisfactory arrangement as there was no guarantee of continuity, capacity or uniformity in dealing with traffic management and road safety issues on National Highways. The committee noted that the Central Government was examining the possibility of employing the Central Industrial Security Force (CISF) for the purpose (Report, 2007).

4. There is a need to develop and efficiently run a dedicated emergency medical service at least at all national and state highways to extend required medical assistance in case of any mishappening. It will substantially reduce fatalities and large economic cost to society.

5. It is also proposed to launch a drive against drunken driving with stringent penalties and moreover liquor shops must be removed from national/state highways.

CONCLUSION

It is concluded from above discussion that there has been a spurt in intensity of road accidental deaths and injuries during the period of analysis (1996-2013) in the state of Punjab, causing a rise in proportion of road accidental deaths in total accidental deaths by 24.3 percent. Higher growth in density of vehicular traffic as compare to growth in the density of roads is the primary cause of the problem. Moreover the quality of roads (engineering, architecture and constructional aspects) is not appropriate, causing deterioration of safety standards for heavy and fast moving vehicular traffic. Among the different type of vehicles, the

fatality rate is maximum by trucks and lorries due to overloading, driving under the influence of intoxicants and lengthy working schedule.

The situation is alarming and growing at a very high rate (above nine percent) in Punjab and there are no signs of declining in near future. It is expected that at given growth of earnings of large populace, the density of vehicular traffic is yet to climb peak rate, indicating worsening of the problem. There is an urgent need to synchronize various agencies involved in road infrastructure development and vehicular traffic management. A comprehensive approach including all the efforts stated above must be executed with outmost dedication to check burgeoning road accidental deaths.

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APPENDIX

TABLE 1: MAGNITUDE, PROPORTION AND RATE OF ROAD ACCIDENTAL DEATHS IN PUNJAB (1996-2013)

YEAR	MID YEAR POPULATION (IN LAKHS)	TOTAL ACCIDENTAL DEATHS	TOTAL ACCIDENTAL DEATHS ON ROAD	RATE OF ACCIDENTAL DEATHS ON ROAD	PROPORTION OF ACCIDENTAL DEATHS ON ROAD IN TOTAL ACCIDENTAL DEATHS
1996	219.2	3657	1041	4.7	28.5
1997	228.1	3531	783	3.4	22.2
1998	231.0	4169	954	4.1	22.8
1999	233.7	4829	1398	5.9	28.9
2000	236.2	4409	1324	5.6	30.0
2001	242.9	5050	1509	6.2	29.8
2002	247.7	5440	1608	6.5	29.6
2003	251.1	4885	1557	6.2	31.8
2004	254.4	6013	1855	7.3	30.8
2005	257.6	5648	1622	6.3	28.7
2006	260.8	6786	2048	7.8	30.2
2007	263.9	7546	2155	8.2	28.6
2008	266.9	7638	2055	7.7	26.9
2009	269.8	8208	2392	8.9	29.1
2010	272.7	8216	2133	7.8	25.9
2011	277.0	10532	4897	17.7	46.5
2012	280.8	10721	4795	17.1	44.7
2013	283.8	10577	4588	16.2	43.4
TOTAL	4577.6	117855	38714	147.6	558.4
AVERAGE (1996-2013)	254.3	6547	2151	8.2	31.0
AACGR (1996-2013)	1.44	6.79	9.50	8.01	2.54

Source: Accidental Deaths and Suicides in India, National Crime Record Bureau, Ministry of Home, G.O.I.

Note: The rate of accidental deaths defined as the number of deaths per lakh inhabitants is universally taken as a realistic indicator since it balances the effect of growth in population.

TABLE 2: ACCIDENTAL DEATHS ON ROAD IN PUNJAB (TYPE OF VEHICLE) (1996 – 2013)

Type of Vehicle / Year	Truck/Lorry	Bus	Tempo/Van	Jeep	Car	Three Wheeler	Two Wheeler	Bicycle	Pedest-rian	Others	Govt. vehicle	Total	Proporti-on of Deaths on Govt. Vehicles in Total
1996	606	142	121	125	79	62	170	73	68	92	153	1041	14.7
1997	142	120	58	59	74	16	175	33	30	76	44	783	5.6
1998	230	122	68	46	84	20	157	50	62	15	63	954	6.6
1999	372	235	94	80	102	28	197	57	54	179	140	1398	10.0
2000	342	185	126	90	127	29	174	55	60	136	70	1324	5.3
2001	319	258	139	117	166	51	237	62	70	90	155	1509	10.3
2002	324	245	147	121	235	140	3	239	71	83	322	1608	20.0
2003	393	214	126	98	221	57	270	55	40	83	92	1557	5.9
2004	355	228	158	88	265	39	407	94	71	150	135	1855	7.3
2005	321	215	156	84	286	53	1	414	1	93	111	1622	6.8
2006	380	200	112	101	311	52	473	81	76	262	58	2048	2.8
2007	366	238	136	106	347	43	483	93	113	230	77	2155	3.6
2008	337	210	90	92	293	55	487	86	131	274	50	2055	2.4
2009	388	217	122	129	399	45	607	85	156	244	57	2392	2.4
2010	272	196	149	201	370	63	500	69	78	334	40	2133	1.9
2011	838	441	299	318	817	70	1176	154	242	542	154	4897	3.1
2012	798	382	311	279	777	98	1149	143	252	606	171	4795	3.6
2013	841	472	290	221	864	96	883	101	132	688	218	4588	4.8
Total	7624	4320	2702	2355	5817	1017	7549	1944	1707	4177	2110	38714	5.4
Average	424	240	150	131	323	56	419	108	95	232	117	2151	5.4
AACGR	4.94	5.52	6.42	7.40	15.9	6.21	14.36	5.12	8.37	15.54	0.59	9.50	
Vehicle- wise Proportion of deaths	19.7	11.2	7.0	6.1	15.0	2.6	19.5	5.0	4.4	10.8	5.4	100.0	

Source: Accidental Deaths and Suicides in India, National Crime Record Bureau, Ministry of Home, G.O.I.