Analysis of Medico Legal Autopsies - A 6 year Retrospective Study

Hareesh. S. Gouda, Sunil. C. Aramani
Assistant Professor, Dept. of Forensic Medicine & Toxicology J N Medical College, Belgaum, Karnataka, INDIA

Abstract

Unnatural deaths claim a considerable number of lives, with major share being contributed by Road Traffic Accidents (RTA). In this retrospective study, 908 medico-legal autopsies conducted at the mortuary of the department of Forensic Medicine, J.N.Medical College, Belgaum, Karnataka, during the period from 01-01-2004 to 31-12-2009 were analysed. Victims were predominantly males (75.9%) and maximum number of cases were of RTAs (56%). Majority of the victims were in the age group 21-30 years (32.5%). Most of the RTAs occurred in the evening hours (38.4%) and during summer (39.4%). Motorcyclists were the most commonly involved victims (50.4%) and most common offending vehicle was heavy motor vehicle (16.7%). More than 50% of victims of RTAs died within one week of the accident. Among the cases of poisoning, majority of cases were due to organ phosphorus pesticide (53.6%). In cases of burns, death due to dry heat (86.8%)) was more than moist heat (13.2%) and in maximum number of cases TBSA involved was 81-90% (22.2%). In most of the cases of assault the weapon used was hard blunt weapon (56%).

Key Words: Medico-legal autopsy, Unnatural death, RTA, Burns, Poisoning, Assault

Introduction

Study of medico-legal autopsies points towards the prevalence of category of unnatural death in the society. Unnatural deaths claim a considerable number of lives, with major share being contributed by Road Traffic Accidents (RTA). Accidental deaths are the most common cause of unnatural deaths, which can occur due to natural disasters or unnatural causes like transportation accidents, drowning, fire accidents, poisoning, collapse of structure (house, building etc), falls, factory accidents etc. Among unnatural causes, deaths due to transportation accidents top the list.[1] Prevalence of unnatural deaths is one of the indicators to assess the level of social and mental health in a given region. Pattern of medico-legal autopsies, in other words, profile of unnatural deaths also helps the concerned authorities in the implementation of suitable policies to prevent deaths due to unnatural causes.

For Correspondence
Dr. Hareesh .S. Gouda, Assistant Professor, Dept. of Forensic Medicine & Toxicology, J N Medical College, Belgaum-590010, Karnataka

Materials & Methods

Medico-legal autopsies conducted during the period from 01-01-2004 to 31-12- 2009 at the autopsy block/ mortuary of department of Forensic Medicine, J.N.Medical College, Belgaum, Karnataka are analyzed retrospectively. Cases are categorized into RTAs, burns, poisoning, fall from height, assault, hanging, electrocution, lightning and others (bull gore injury, fall of weight on head, traumatic asphyxia and septic abortion) and brought dead cases which were turned out to be natural death after autopsy. Cases are studied with respect to sex and age. In addition, RTAs are further studied as to type of victim, type of offending vehicle, time of accident, season of accident and survival period; burns cases with respect type (dry and moist), Total Body Surface Area (TBSA) involved (calculated by rule of nine); poisoning cases as type of poison according to the chemical analysis report; cases of assault are studied with respect to type of weapon. Data concerned with the objectives of the study are collected from autopsy reports, police records, hospital records, family members, chemical analysis reports and from all other possible means and analysed.

Results

During the study period of six years, 908 medico-legal autopsies were conducted with maximum number of cases (192 cases; 21.1%) in the year 2007 [Table 1]. Victims were predominantly males 689 (75.9%), whereas, the females were only 219 (24.1%) [Table 1]. In all the six years, males were significantly more than females. Maximum number of cases were of RTAs 508(56%)**,** followed by burns 144(17%) and poisoning 95(10.5%) [Table 2]. In all the types of autopsies, male were more than females except in cases of burns and hanging. Largely involved age group was 21-30 years (295 cases; 32.5%), followed by 31-40 years (186 cases; 20.5%) and 41-50 years (142 cases; 15.6%). Minimum number of victims were in the age group of more than 80 years (2 cases; 0.22%) [Table 3]. Maximum number of RTAs occurred in the evening hours (194 cases; 38.4%), closely followed by afternoon hours (182 cases; 35.8%)

Table 1: Year wise distribution of Medico Legal Autopsies

Year	Male		Female		Total	
	Number	%	Number	%	Number	%
2004	95	76.6	29	23.4	124	13.7
2005	88	81.5	20	18.5	108	11.9
2006	99	77.9	28	22.1	127	13.9
2007	142	73.9	50	26.1	192	21.1
2008	128	73.6	46	26.4	174	19.2
2009	137	74.9	46	25.1	183	20.2
Total	**689**	**75.9**	**219**	**24.1**	**908**	**100**

Table 2. Distribution of medico-legal autopsies based on sex and types of cases:

Type of case	2004			2005			2006			2007			2008			2009			Total				Total(%)
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male		Female		
																			No.	%	No.	%	
RTA	54	07	61	62	07	69	67	07	74	81	17	98	84	10	94	91	21	112	439	86.4	69	13.6	508(56%)
Burns	06	16	22	04	11	14	00	12	12	21	23	44	10	23	33	05	13	18	46	31.9	98	68.1	144(17%)
Poisoning	18	03	21	05	01	06	14	04	17	10	02	12	09	09	18	15	05	20	71	74.7	24	25.3	95(10.5%)
Hanging	00	00	00	01	00	00	00	00	00	01	04	05	00	02	02	00	00	00	02	25.0	06	75.0	08(0.9%)
Fall from Height	11	01	12	09	00	09	09	03	12	23	01	24	12	01	13	19	00	19	83	93.3	06	06.7	89(9.8%)
Assault	03	00	03	06	00	06	03	01	04	04	00	04	04	00	04	04	00	04	24	96.0	01	04.0	25(2.8%)
Electrocution	00	00	00	00	00	00	03	00	00	01	02	03	00	00	00	02	00	02	06	75.0	02	25.0	08(0.9%)
Lightning	00	00	00	00	00	00	00	00	00	00	00	00	00	01	01	00	01	01	00	00.0	02	100.0	02(0.2%)
Others	03	02	05	02	01	03	03	01	04	01	01	02	07	00	07	01	04	05	17	65.4	09	34.6	26(2.9%)
Natural	00	00	00	00	00	00	00	00	00	00	00	00	02	00	02	00	01	01	02	66.7	01	33.3	03(0.3%)
Total	95	29	124	88	20	108	99	28	127	142	50	192	128	46	174	137	46	183	689	75.9	219	24.1	908

Table 3. Age wisedistribution of cases

Type of case	< 10 yrs	10-20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	51-60 yrs	61-70 yrs	71-80 yrs	>80 yrs	Total
RTA	20	41	149	98	92	65	29	13	01	**508**
Burns	03	17	58	38	13	07	05	02	01	**144**
Poisoning	02	18	32	17	10	12	04	00	00	**95**
Hanging	00	02	05	01	00	00	00	00	00	**08**
Fall from Height	03	08	32	20	13	06	02	05	00	**89**
Assault	01	02	05	05	07	03	01	01	00	**25**
Electr.o-cution	00	00	03	03	01	00	00	01	00	**08**
Lightning	00	00	00	01	01	00	00	00	00	**02**
Others	01	05	11	02	04	00	03	00	00	**26**
Natural	00	00	00	01	01	01	00	00	00	**03**
Total (%)	**30 (3.3%)**	**93 (10.2%)**	**295 (32.5%)**	**186 (20.5%)`**	**142 (15.6%)**	**94 (10.4%)**	**44 (4.9%)**	**22 (2.4%)**	**02 (0.22%)**	**908**

Table 4: Diurnal variation of RTA cases

Type of case	Number %
Morning (6.01 am-12 noon)	10620.4
Afternoon (12.01 pm-6pm)	18235.8
Evening (6.01 pm-12 midnight)	19438.4
Night (12.01 am-6 am)	265.4
Total	**508**

Table 5: Seasonal variation of RTA cases

Type of case	Number %
Summer (February to May)	20039.4
Rainy (June to September)	14027.5
Winter (October to January)	16833.1
Total	**100**

Table 6: Accident victim Vs. Offending vehicle (RTAs):

Type of victim	Offending vehicle								Fall	Total	
	Pedal cycle	Motor cycle	Light Motor Vehicle	Medium Motor Vehicle	Heavy Motor Vehicle	Animal Driven Vehicle	Others*	Unknow		No.	%
Pedestrian	02	56	34	13	19	00	00	04	00	128	26.1
Pedal cyclist	00	11	04	02	00	00	00	00	10	27	05.2
Motor cyclist	00	10	32	17	35	00	03	10	151	258	50.4
Occupant of motor vehicle	00	00	00	03	29	00	04	00	52	88	17.1
Occupant of Animal Driven Vehicle	00	00	00	00	02	00	00	00	05	07	01.2
Total (%)	02 (0.4%)	77 (15.2%)	70 (13.8%)	35 (6.9%)	85 (16.7%)	00 (00)	07 (1.4%)	14 (2.8%)	218 (42.9%)	508	100

*Others include collision with stationary objects e.g. tree, wall, electric pole, etc.

Table 7:Cases of RTA based on survival period

Survival Period	Number	Percentage
Brought Dead	04	1.8
< 24 hrs	167	32.9
>1 day & < 1 week	227	44.7
1-2 weeks	82	16.1
> 2weeks	28	5.5
Total	**508**	**100**

Table 8: Distribution of poisoning cases based on type of poison

Type of Poison	Male	Female	Total	
			Number	Percentage
Organophosphorus	42	09	**51**	**53.6**
Organochlorine	07	01	**08**	**08.2**
Pyrethroids	01	00	**01**	**01.1**
Corrosives	06	00	**06**	**06.1**
Snake & Scorpion bite	07	04	**11**	**11.4**
Others	05	08	**13**	**13.4**
More than one poison	04	02	**06**	**6.2**
Total	**71(74.7%)**	**24(25.3%)**	**95**	**100**

Table 9: Distribution of burns cases based on causative agent & TBSA

TBSA	Dry heat			Moist heat			Total	
	Male	Female	Total	Male	Female		Number	%
≤10	00	00	00	00	00	00	**00**	**00.0**
11-20	00	00	00	00	00	00	**00**	**00.0**
21-30	01	01	02	00	01	01	**03**	**02.2**
31-40	02	10	12	00	00	00	**12**	**08.3**
41-50	03	09	12	00	00	00	**12**	**08.3**
51-60	03	08	11	03	00	03	**14**	**09.8**
61-70	04	13	17	03	00	03	**20**	**13.9**
71-80	03	15	18	05	00	05	**23**	**15.9**
81-90	07	21	28	04	00	04	**32**	**22.2**
91-100	06	19	25	02	01	03	**28**	**19.4**
Total	**29**	**96**	**125 (86.8%)**	**17**	**02**	**19 (13.2%)**	**144**	**100**

Table 10: Distribution of assault cases based on type of weapon

Type of Poison	Male	Female	Total	
			Number	Percentage
Blunt	13	01	**14**	**56**
Sharp	06	00	**06**	**24**
Firearm	05	00	**05**	**20**
Total	**24 (96%)**	**01 (4%)**	**25**	**100**

and minimum number of cases in the night (26 cases; 5.4%) [Table 4]. Most of the RTAs occurred during summer (200 cases; 39.4%) [Table 5]. Motorcyclists were the most commonly involved victims (258 cases; 50.4%) followed by pedestrians (128 cases; 26.15). Maximum number cases were of fall from the vehicle (218 cases; 42.9%) and most common offending vehicle was heavy motor vehicle (85 cases; 16.7%) [Table 6]. Among victims of RTAs, in 227 cases (44.7%) the survival period was more than 1 day and less than 1 week. More than fifty percentage of victims of RTAs died within one week of the accident [Table 7]. In cases of poisoning, majority of cases (51 cases; 53.6%) were of organophosphorus compound consumption [Table 8]. Death due to dry heat (125 cases; 86.8%) was more than moist heat (19 cases; 13.2%). In maximum number of cases TBSA involved was 81-90% (32 cases; 22.2%), followed by 91-100% (28 cases; 19.4%) and no cases were present in £10 % and 11-20 % category [Table 9]. In cases of assault, 14 cases (56%) were due to hard blunt weapon, 6 cases (24%) due to sharp and pointed weapon and 5 cases due to firearms (20%) [Table 10].

Discussion

In this study, it was observed that maximum number of unnatural deaths were due to RTAs (56%). This is similar to the results of the studies conducted at, PGIMER, Chandigarh (50.26%);[2] Government Medical College, Jammu (48.92%);[3] Government Medical College, Chandigarh (42.18%).[4] Deaths due to RTA in the study at RM College, Loni[5] was less than half of our result which could be due to the study area (rural as mentioned by the author). Difference in the number of RTA related deaths observed in different studies could be due to the geographical area, conditions prevailing in that region, category of road users, condition of road etc.

In the present study, more than 2/3rd of the victims (75.9%) were males and our result is very much similar to the result of the studies done at PGIMER, Chandigarh (73.4%)[2] and Dhaka Medical College, Dhaka, Bangladesh (73.3%).[6] Predominance of male victims over female may be attributed to the male dominance in the society and variation in the male: female ratio of the population. Generally, the males work outside and are more vulnerable to unnatural deaths.

In our study, most of the victims were in the age group 21-30 years followed by 31-40 years. This result is similar to the study conducted at Government Medical College and Hospital, Chandigarh (21-30 years: 57.27% and 31-40 years: 15.02%).[7] Maximum involvement of these age group could be attributed to the fact that people of this age group are more active, always out of their house, working at office, industries and other places to make a living.

In this study, majority of the victims of RTA were males (86.4%) and maximum victims were in the age group 21-30 years (29.3%), followed by 31-40 years (19.3%). People in extremes of age comprised the minimum number of fatalities. Our findings are similar to the results of following studies: In the study conducted at PGIMS, Rohtak,[8] males were involved in 89.3% of cases and the commonest age group involved was 21-30 years (27.3%), followed by 31-40 years (20.6%). In other study done at Government Medical College, Jammu,[3] majority of the victims were males (88.13%) and most commonly involved age group was 21-30 years (30%), followed by 31-40 years (19.2%). In another study carried out at the Office of Judicial Medical Officer, Colombo,[9] 84.54% of victims were males and maximum number of victims were in the age group 20-29 years (20.12%), followed by 30-39 years (16.10%). In all these studies minimum number of victims were in the extremes of age. In the study conducted at Government Medical College, Chandigarh during the period 1994-2000, revealed a galloping increase in the percentage of female victims and in the year 2000 females outnumbered males.[4] In this study, more than half (67%) of victims were in the age group 21 – 50 years. This may be due to the fact that persons of this age group lead more active life, more mobile and go out for work and keep themselves outdoors most of the time. Maximum number of RTAs (38.4%) occurred between 6 pm to 12 midnight and least number of accidents (5.4%) occurred during night between 12.01 am to 6 am. Our result is similar to the observations made in the study conducted at, GTB Hospital, Shahadra (New Delhi),[10] in which maximum number of accidents (39.4%) occurred during evening hours and minimum (11.89%) in the night; at Greater Lusaka, Zambia,[11] the highest number of accidents (32%) were reported during evening hours and lowest (8.4%) in the night. Maximum number of accidents in the evening may be due to high rush hour traffic, tiredness after a day work, urgency to reach home, poor visibility due to insufficient road lighting, evening is the time to go to and return from entertainment etc. Minimum number of accidents in the night can be explained by the fact that it is the quietest period of the day and most

of the people remain indoor. However, in the study conducted at Manipal, Karnataka,[12] most of the accidents occurred in the afternoon (35.2%) contrary to our result but 30.9% of accidents occurred during evening hours. In the present study, highest number of accidents (39.4%) occurred during summer season. Similar results were observed in other studies.[13,14] However, no significant seasonal variation has been observed in our study. This may be due to the different environmental conditions in different seasons, which act as one of the important contributors to the occurrence of accidents. During rainy season, factors like worsening of the road and poor visibility to drivers due to rain; during winter longer hours of darkness, poor visibility to drivers at night and early hours of the day due to foggy weather conditions and during summer the hot environment makes the person tired, irritable and rash, may lead to increase in the occurrence of accidents. In this study, motorcyclists were the most commonly involved victims and this is similar to the result of the study done at KMC Manipal (Karnataka).[12] In our study, the most common offending vehicle was Heavy Motor Vehicle. Involvement of Heavy Motor Vehicle in accidents can be attributed to their high speed, presence of single space roads, fatigability, intoxication etc. Similar finding was observed in other studies also.[3,4,5] However, percentage of Heavy Motor Vehicle involvement is significantly more than our study.

In majority of the victims of RTAs (44.7%) the survival period was more than 1 day and less than 1 week. In the studies carried out at MLN Medical College, Allhabad[15] and at Manipal, Karnataka,[12] highest number of victims died within 24 hours after the accident which is contrary to the result of our study.

In our study, maximum number of cases of poisoning were due to organophosphorus compounds. This result is similar to the results of the other studies.[16,17,18] This can be attributed to the easy availability as they are sold in open market without strict vigil and low-price. The occupation of most victims being agriculture, these chemicals are almost always present in home and readily procurable. Organophosphates are still the most commonly consumed poison in this part.

In our study, it was observed that more than 50% of the victims of burns were females, which is consistent with other studies.[19,20] This could be attributed to female's close proximity to fire during work at kitchen. Incidence of burns due to dry heat was more common than moist heat, which is similar to results of other studies.[19, 20] Maximum number of victims had TBSA 81-90 % and more than half had TBSA more than 70%. It was observed that mortality rate is directly proportional to the TBSA. Our result is similar to the result of the study done at RIMS, Imphal in which 73.84% of victims had TBSA more than 80%.[21]

In cases of assault, most commonly used weapon was hard and blunt weapon which could be due to their easy availability. This is similar to the result of the study carried out at Medical College, Amritsar, Panjab.[22]

Conclusion

Death due to unnatural causes is a burden to the society, law enforcing authorities and the health care system. Unfortunately, these deaths can not be eliminated completely. However, preventive measures can be employed to minimise deaths due unnatural causes. RTAs contribute major share to such deaths and if occurrence of vehicular accidents are prevented, by strict implementation of traffic rules, improvement of roads and educating people about the road safety mea-

sures, most of the unnatural deaths can be reduced. Cases of accidental burns may be prevented by creating awareness among public about safety measures, first aid education and timely treatment. In India, most of the poisoning deaths are suicidal involving farmers, who usually take the extreme step to end their life because of poverty and loss in agriculture. Farmers are the backbone of every country and they should get helping hand from the Government during their financial crisis. Mortality due to fall from height can be reduced by employing safety measures at workplace. Suitable policies have to be implemented by the concerned authorities to prevent deaths due to unnatural causes.

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