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## Evaluation of the status of the pre-hospital trauma care in road traffic accidents in Kancheepuram district of Tamil Nadu

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### ABSTRACT

**Objective:** To evaluate the status of the pre-hospital trauma care in a road traffic accidents in a rural area of Kancheepuram district.

**Methods:** A cross-sectional study of two months duration (June and July 2014) was conducted in the tertiary care hospital of a medical college, and its affiliated urban/rural health centers. Universal sampling was used and all road accident victims were enrolled as study participants. The required information was obtained with the help of a semi-structured questionnaire. Ethical clearance was obtained before the start of the study. SPSS version 18 was used for data entry and statistical analysis. Descriptive statistics were calculated for all the variables.

**Results:** A total of 80 (77.7%) study subjects were from the productive age group (15–45 years). Most of the accidents were reported at night time [43 (41.7%)], on weekends [59 (56.5%)], and involved two-wheelers [81 (78.6%)]. In addition, 69 cases (67%) of the victims were not aware of the existence of emergency ambulance services, while only 6 (5.8%) of the victims were brought to the hospital in an emergency ambulance.

**Conclusions:** The study findings clearly suggest that the quality of the pre-hospital trauma care for road traffic accident victims in a rural area of Kancheepuram district lacks on multiple dimensions and there is an immense need to improve and strengthen the range of services to save the lives of the victims.

## 1. Introduction

The recent global estimates suggest that about 1.24 million people die while almost 50 million people are exposed to injuries every year on the roads[1]. In fact, a large proportion of the road traffic accidents (RTAs) occurs in developing nations (which are already struggling to cope with their existing morbidities), it is extremely difficult to deal with the aftermaths of RTAs (*viz.* handling of acute complications, rehabilitation care, *etc.*) [1,2]. In view of the rising incidence of RTAs, the current decade 2011–2020 has been declared as the “decade of action for road safety” [2]. Epidemiological studies performed under heterogeneous settings have indicated that a wide gamut of parameters and potential risk factors contribute towards the causation or amplification of the consequences of accidents [1,3-6].

Findings of a descriptive study revealed that the precipitating cause in most of the accidents with fatal outcome was personal problems, recent conflicts, and intake of alcohol by the deceased

person and that majority of the accidents were reported either at the beginning or towards the end of their journey [7]. In a retrospective study performed in hospital settings based on the information obtained from the trauma research center, motorcycle (59.2%) was the most common mechanism of injury and about one-fourth of trauma patients had more than two injured organs (the most common site: head and neck) [8].

In an analysis of RTAs with respect to road-users in Greece, brain trauma (among motorcyclists and pedestrians); abdominal injuries/spinal cord trauma (among car occupants); and pelvic injuries (among pedestrians) were the most common body part involved [9]. Similar sort of trends and determinants have been identified in other studies done in different settings [10,11].

In a qualitative study done in Iran to assess the functioning of pre-hospital trauma care, it was demonstrated that very few victims received adequate and appropriate treatment at the accident site or during transport and were generally brought to the hospital by lay persons [12]. The scenario becomes dismal in rural areas where most of the deaths result, even before the victims reach the hospital [13-16]. In fact, a cohort study concluded that efficient pre-hospital trauma system can remarkably minimize the death rates attributed to RTAs [17]. These facts have seriously necessitated the need for

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availability and accessibility of good quality pre-hospital care in all areas of the country, to minimize the RTA related morbidity, mortality and disability[18].

Despite establishment of regional institutes on highways or initiation of emergency ambulance services, the overall situation in the nation has not improved much as most of them are restricted to urban areas of the country[19-21]. In addition, there is a dearth of studies done with an aim to assess the effectiveness of pre-hospital care in rural areas, South India. Thus, the current study has been planned to study the socio-demographic profile of the victims of RTAs and to evaluate the status of the pre-hospital trauma care in a rural area of Kancheepuram district.

## 2. Materials and methods

### 2.1. Study setting

A cross-sectional study of two months duration (June and July 2014) was conducted in the tertiary care hospital of a medical college, and its affiliated urban/rural health centers.

### 2.2. Sampling method

Universal sampling was used and all road accident victims were enrolled as study participants.

### 2.3. Inclusion and exclusion criteria

All road accident victims who availed medical attention in the study settings during the study period were enrolled as study subjects. Those RTA victims who were not willing or succumbed to the injury before the interview were excluded. Further, unconscious/unstable patients were also excluded.

### 2.4. Study tool

A semi-structured questionnaire was used to elicit the desired information. The questionnaire was pre-tested on ten individuals (who were not included in the final study analysis) and based on the obtained responses, the questionnaire was modified.

### 2.5. Sample size

Total 103 RTA victims were included in the study in the two months after considering the inclusion and exclusion criteria.

### 2.6. Study variables

In this paper, the patients' socio-demographic parameters, place of the accident, the time of the accident (day/night), damaged organs, the type of vehicle involved in an accident, pre-hospital care status, and outcome of RTAs were the study variable.

### 2.7. Methodology

Once the victims of RTAs were stabilized, all the study participants/guardian (in case of children) was interviewed face to face with the help of the pre-tested semi-structured questionnaire after obtaining

their written informed consent (for children-informed consent from the guardian/parents would be obtained). The medical officers of the health centers were also sensitized about the study and importance of different questions. The modified Prasad's Socioeconomic Status Classification was employed to classify the study subjects in different socioeconomic classes[22]. The National Classification of Occupation was used to categorize the individuals based on their occupation[23].

### 2.8. Ethical considerations

Ethical clearance was obtained before the start of the study. Written informed consent was obtained from the study participants (patient/guardian of children) and utmost care was taken to maintain privacy and confidentiality.

### 2.9. Statistical analysis

SPSS version 18 was used for data entry and statistical analysis. Descriptive statistics were calculated for all the variables.

## 3. Results

The information depicted in Table 1 represents the distribution of RTA victims as per their socio-demographic profile. The majority of the subjects [80 (77.7%)] were from the age-group of 15–45 years. Most of the victims were the driver/pillion rider (94/103), while the rest of them were passengers in the four-wheeler/pedestrians (9/103). Out of the 6 subjects who were less than 15 years, five were travelling in either four-wheeler or motorcycle, while the remaining one got injured while crossing the road. Most of the study participants were male (75/103), educated (94/103), and employed in semi-skilled (67/103) type of work.

**Table 1**

Socio-demographic parameters of the 103 victims of RTAs. *n* (%).

Socio-demographic parameters	Number	
Age (years)	< 15	6 (5.8)
	15–30	54 (52.4)
	30–45	26 (25.2)
	45–60	10 (9.7)
	> 60	7 (6.8)
Sex	Male	75 (72.8)
	Female	28 (27.2)
Religion	Hindu	92 (89.3)
	Muslim/Christian/Others	11 (10.7)
Education	Illiterate	9 (8.7)
	Primary/Middle/High school	71 (68.9)
	Post-high school/Graduate and above	23 (22.3)
Occupation	Unskilled	15 (14.6)
	Semi-skilled	67 (65.0)
	Skilled	21 (20.4)
Socio-economic class	Lower	8 (7.8)
	Middle	81 (78.6)
	Upper	14 (13.6)

Table 2 demonstrates the variable dimensions of RTAs among the study subjects. Most of the RTAs were reported on weekends (59/103), especially in rural areas (84/103), with most of them being reported in the night time as compared to rest of the day. In addition, most of the victims (driver/pillion rider) injured in accidents were

travelling on two-wheelers (*viz.* motorcycle, scooter, *etc.*) than those on four-wheelers. In most of the RTAs, the injuries were not restricted to a single body part, with maximum injuries being in upper and lower extremities. However, only 3 (17.6%) and 33 (40.7%) of the victims were using personal protective measures in four-wheelers and two-wheelers at the time of their accident, respectively. Another 33 (33.7%) injured victims were either using mobile phones or had consumed alcohol at the time of their accident. Also, only 60 (61.2%) victims had a valid license, while remaining 38.8% were either not having license at all or the license had expired.

**Table 2**Parameters of RTAs. *n* (%).

Parameters of RTAs		Number (%)
Time of accident	Early morning (4–8 am)	29 (28.2)
	Day (8 am–4 pm)	11 (10.7)
	Evening (4–8 pm)	20 (19.4)
	Night (8 pm–4 am)	43 (41.7)
Mechanism of injury	Motorcycle/Two-wheeler	81 (78.6)
	Car/Four wheeler	17 (16.5)
	Pedestrian/Bicycle/Others	5 (4.9)
Involvement of body parts <sup>†</sup>	Upper extremities	81 (78.6)
	Lower extremities	73 (70.9)
	Head and neck	19 (18.4)
	Abdomen	9 (8.7)
	Others (back, pelvic region, <i>etc.</i> )	13 (12.6)
Compliance with safety measures (Car/Four wheeler) ( <i>n</i> = 17)	Use of seat belt	3 (17.6)
	Mobile phone use/Alcohol consumption	7 (41.2)
	Valid license	11 (64.7)
Motorcycle and other two-wheelers ( <i>n</i> = 81)	Use of helmet	33 (40.7)
	Mobile phone use/Alcohol consumption	26 (32.1)
	Valid license	49 (60.4)

<sup>†</sup>: Responses are not mutually exclusive.

Table 3 reflects the particulars of pre-hospital trauma care. Only 69 (67.0%) of the victims were aware of the existence of emergency ambulance services (existence of a phone number to contact and call ambulance at accident site), while the rest of them have never heard of the same. Only 6 (5.8%) of the victims were brought to the hospital in the emergency ambulance, while for remaining (94.2%) cases the ambulance either did not reach or was not called for due to the poor awareness among victims/bystanders, or brought to the hospital by other modes of transport. The ambulance took almost (35 ± 15) min to reach the site of the accident and another (20 ± 10) min to reach the hospital from the site of the accident. Furthermore, in 4 (66.7%) of the ambulances, no attending doctor was present. Out of the 103 victims of the RTA who reached the health care setting, 78 (75.7%) were managed on an out-patient basis while remaining 25 (24.3%) were appropriately managed based on their injuries or clinical condition, or referred to higher centers for radiological investigations and further management.

**Table 3**Pre-hospital care among victims of RTA. *n* (%).

Pre-hospital care		Number (%)
Type of interventions done before bringing patient to the hospital <sup>†</sup> ( <i>n</i> = 103)	Washing of wound/First-aid	34 (33.0)
	Splint	4 (3.9)
	Resuscitation	0 (0.0)
Arrival of ambulance at the site of accident ( <i>n</i> = 103)	Yes	6 (5.8)
	No <sup>#</sup>	94 (91.2)
Presence of doctor in ambulance ( <i>n</i> = 6)	Yes	2 (33.3)
	No	4 (66.7)
Cardio-pulmonary resuscitation services in ambulance ( <i>n</i> = 6)	Yes	1 (16.7)
	No	2 (33.3)
	Don't know	3 (50.0)

<sup>†</sup>: Responses are not mutually exclusive; <sup>#</sup>: No precise information was available regarding ambulance was called and still it did not reach the site of accident.

## 4. Discussion

Our cross-sectional study had been conducted to evaluate the quality of the emergency trauma care services in a rural area of South India. It was one of the very few studies conducted in the past in similar settings and thus its findings could definitely motivate the policy makers to revise the existing services.

The present study showed that almost 80 (77.7%) of the RTA victims were from the 15–45 years age-group. Similar trends of age-group preponderance have been observed in various other studies[10,24]. Most of the victims were from young age-group in most of the settings as they generally had a risk taking behavior and did not follow traffic regulations consistently. However, in contrast to many other studies, the study of Markogiannakis *et al.* revealed that elderly people were the victims of RTAs (probably because of the delayed reflexes in the old-age or absence of a companion while they were using roads)[9]. The involvement of the extreme age-limits indicates that the public health professionals are falling short in their efforts to protect them effectively.

In similarity with the present study, all the other epidemiological studies have shown male preponderance[9,24,25]. This can be attributed to their risk-taking behavior and influence of peer pressure. In the present study, a large proportion of RTAs 59 (57.3%) were reported on weekends. This could be because of the lifestyle which people adopt in the modern society, where they usually work for 5–6 days a week and weekend is the time to release their job related stress[7,11].

Similar to our study, other descriptive studies have also shown that most of the RTAs were reported at night time[7,24]. Varying reasons like absence of traffic police, no traffic signals in the night time, minimal traffic and thus people drive beyond the recommended speed limits, complete absence/insufficient lights on the roads, *etc.*, have been proposed. In addition, similar to the present study, two-wheelers were most commonly involved in accidents in different other studies, which essentially because of the unstable nature of the two-wheelers[7,9-11].

However, the most shocking finding was that only 36.7% (36/98) of the vehicle-users were using either helmet or had fastened their seatbelt at the time of their accident, despite being aware of the adverse consequences[26]. On a similar note, another study identified that only 3% of the motorcyclists were wearing a helmet at the time of the accident[8]. This not only highlights the ignorant nature of the people, but also the failure of the public health system to motivate people to use personal protective equipments[26,27].

Another concern which raised questions about the reach of public health services was that almost 25% of the RTA victims were not aware of the existence of emergency ambulance services. This calls for a strong campaign involving all stakeholders to enable optimal utilization of the available services[18,28,29]. Furthermore, only 6 (5.8%) RTA victims were brought to the health care setting in the emergency ambulance, while for remaining cases the ambulance either did not reach or was not called for due to poor awareness among victims/bystanders.

In addition, only 2 (33.3%) of the emergency ambulances had an attending doctor, which reflects the shortage of the health care professionals in the health sector in India. Some of the other

studies showed that in most of the cases, injured people were accompanied by non-medical persons[28,29]. The present study had its limitation that it was performed in a single institution, and thus findings cannot be extrapolated to the entire South India.

In conclusion, the study findings clearly suggest that the quality of the pre-hospital trauma care for RTA victims in a rural area of Kancheepuram district lacks on multiple dimensions and there is an immense need to improve and strengthen the range of services. In addition, the study identified the crucial areas which need further attention from the program managers to eventually formulate a comprehensive strategy to bridge the existing gap and thereby reducing the morbidity and mortality associated with RTAs.

### Conflict of interest statement

We declare that we have no conflict of interest.

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