

## PRE-HOSPITAL CARE IN NIGERIA: A COUNTRY WITHOUT EMERGENCY MEDICAL SERVICES

BA Solagberu, CKP Ofoegbu, LO Abdur-Rahman, AO Adekanye, US Udoffa, J Taiwo  
*Department of Surgery, University of Ilorin Teaching Hospital Ilorin, Nigeria.*

### ABSTRACT

**Objectives:** Efficient pre-hospital transport (emergency medical services, EMS) is associated with improved outcomes in road traffic injuries (RTI). This study aims to discover possible interventions in the existing mode of transport.

**Methods:** Persons bringing all RTI victims to the Emergency room (ER) over a 4-year period and the injury arrival intervals were noted prospectively.

**Findings:** There were 2,624 patients (1,886 males and 738 females); only 2,046 (78%) had clear documentations of three categories of persons bringing victims to ER: Relatives (REL, 1,081, 52.83%); Police/Federal Road Safety Corps (P/F, 827, 40.42%) and Bystanders (BS, 138, 6.74%). No intervention was provided during transport. Within 1 hour, 986 victims (48.2% of 2,046) arrived ER brought by P/F (448, 21.9%), REL (439, 21.5% of 2,046), and BS (99, 4.8%). These figures, in each instance, represent 40.6 % of total victims brought by REL; 54.2% by P/F and 71.7% by BS. However, after 6 hours, REL were the main active group as they brought 94.5% (359 of 380) patients of this period. In 91 victims (4.4%) the injury arrival time was not captured.

**Conclusion:** This study has identified three groups of persons involved in pre-hospital transport with nearly 50% getting to ER within 1 hour without any intervention or prior notification of ER. Absence of EMS obscures pre-hospital death records. The P/F responsible for only 40% of transport should be trained and equipped to offer basic trauma life support (BTLS). The REL and BS (both responsible for 60% of transport) represent a pool of volunteers for BTLS to be trained.

**Key Words:** Pre-hospital care, Emergency, Nigeria.

*(Accepted 29 January 2008)*

### INTRODUCTION

Road traffic injuries (RTIs) constitute a leading cause of death in persons aged 15-44 years<sup>1</sup>. More than 1.2 million deaths occur yearly world wide from RTIs; 90% of these deaths are recorded in developing countries for a variety of reasons<sup>2</sup>. Many millions more who survive suffer deformities and disabilities. The overall effects of these injuries constitute social, economic and psychological losses the magnitude of which is enormous. We have previously reported RTIs accounting for 63% morbidity and 72% mortality among trauma victims who present to the emergency room<sup>3-5</sup>. In Europe, 50% of deaths from RTI occur within a few minutes at the scene of the crash or on the way to a hospital, 15% at the hospital within 4 hours of the crash and 35% after 4 hours<sup>6</sup>. It has also been established that organised pre-hospital transport has contributed to reducing morbidity and mortality in RTI victims; the greater reductions occur in countries with advanced

EMS like the USA, as opposed to those with basic or no EMS at all like Mexico and Ghana, respectively<sup>7</sup>. Mock et al identified economic levels in the three different countries as the obvious cause because EMS is capital-intensive. A previous study from Nigeria showed that only 6% of injured victims were transported to hospitals in ambulances while 94% were taken in private cars and public vehicles<sup>8</sup>. Another report documented an avoidable death rate of 40%<sup>9</sup> although we have reported a preventable trauma death rate of 73% in the emergency room<sup>10</sup>. Although these reports had blamed the obvious absence of EMS without fully studying the existing means of getting patients to the hospital, however uncoordinated these might be. Realizing that immediate establishment of organized EMS is not feasible because of cost and lack of new health policy, this study was done to investigate what obtains at present during pre-hospital transport with a view to identifying cost-effective areas of intervention ahead of future establishment of EMS. Certainly, correcting the present state of affairs will afford an opportunity

of not only reducing the morbidity and mortality but it will also show the magnitude of mortalities at the scene of RTI and during transport; all of which will become baseline data for effective interventions.

## METHODOLOGY

Data on all RTI victims who presented to the emergency room (ER) of the University of Ilorin Teaching Hospital, Ilorin, were prospectively collected over a 4 year period from January 2001 to December 2004.

Patients received in this tertiary level of health care were mainly from 6 states (Kwara, Kogi, parts of Oyo, Osun, Ekiti and Niger States) of the 36 States structure in Nigeria constituting some 12 million of the over 120 million population in Nigeria. A major road linking the Southwest of Nigeria to the Northern Nigeria passes through Ilorin City. Data was collected on each patient by the casualty officer and recorded in a proforma designed for age, sex, hospital numbers of patients, type of injury and those with road traffic injuries were further studied to identify the persons that brought the victim to the hospital, the injury arrival interval distributed into 0-1 hr, >1-6 hr, > 6-24 hr, >24-48 hr and > 48 hr, presence or absence of airway protection or circulatory support prior to arrival in the ER. The data was retrospectively analyzed and interpreted.

## RESULTS

There were 2,624 RTI victims brought to the ER of the hospital during this period, 1,886 males and 738 females; M: F ratio being 2.6: 1. The age range is 2 to 95 years with the modal age group in the 31-40 years. Seventy eight per cent of the 2,624 (that is 2,046 victims) had complete records for further analysis.

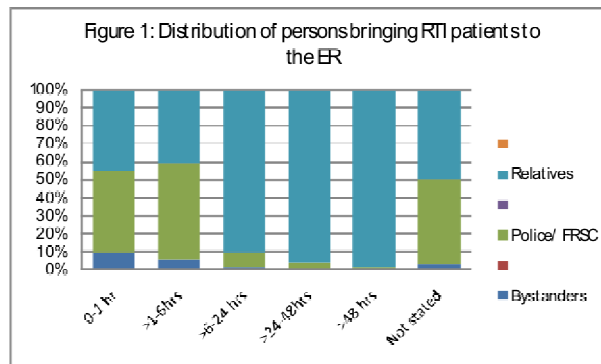
Three groups of persons were identified to be involved in pre-hospital transport; Relatives (REL) - defined as someone who knows the patient (patient himself/ herself, friends, neighbours or family members), Police/Federal Road Safety Corps (P/F) Police men or Federal Road Safety Commission personnel performing their statutory duties on the highway and Bystanders (BS) defined as someone who did not know the RTI victim before bringing him/her to hospital.

Relatives represent the largest category bringing 1,081 (52.83%) victims followed by the P/F which brought 827 (40.42%) and BS with only 138 (6.74%) patients. Nine hundred and eighty six (986) victims (48.2% of 2,046) were brought within 1 hour of injury. Of these 986 victims, REL, PF/FRSC and BS were responsible for 439 (44.5%), 448 (45.5%) and 99 (10%) respectively (Figure 1) showing the comparative efficiency of each of the three groups within 1 hour. Figure 1 also shows that after 6 hours, REL were the main active group as they transported

94.5% (359 of 380) of the victims and demonstrating the burden of injuries on them while those charged with statutory duties have relaxed their roles.

None of the victims was brought to the hospital with protection of the airway or support of circulation understandably due to lack of training or absence of equipments.

Figure 1: Distribution of Persons Bringing RTI Patients to the Emergency Room.



Three groups of persons were involved in transport under 24 hrs with the impact of Police and the FRSC marked between 1-6hrs. Bystanders are effective mainly in the first hour. After six hours, transport is mainly done by relatives and these may include persons doing inter-hospital transfer or rural-urban transfers such that after 24hrs it is mainly relatives that bring patients.

Figure 2: Crashed Vehicle used to bring Victims to the Hospital.



Note nurses and other persons around the ER milling around the vehicle.

**Figure 3: Officers of the Federal Road Safety Commission (FRSC) Transporting a Patient without Support to the Spine.**



Note that the same vehicle has been used for carrying apparently dead persons in the trunk of the car. May be they were salvageable minutes earlier!

**Figure 4: Relations involved in bringing patients.**



Note that the fractured extremities have not been splinted.

**Figure 5: "Accident Clinic" Built by the Federal Road Safety Commission for Accident Victims on the Highways.**



Four of such have been built now in the country (the picture shows the Sagamu location on the Lagos-Ibadan Expressway), but they lack facilities other than for what is necessary that an ambulance can carry. Valuable time is lost while keeping patients here instead of direct transfer to the hospital.

## DISCUSSION

The World Health Organisation (WHO) recently released a monograph on pre-hospital trauma care systems to demonstrate the importance of the subject<sup>11</sup>. One limitation of this study is that those who died at the scene of RTI or during transportation to the hospital could not be captured into this study for obvious reasons. Many developing countries have no emergency medical services (EMS) which have proved vital in reducing death rates in the developed countries. Several wrong myths about EMS have been dismissed by Kobusingye et al<sup>12</sup> especially the notion that having ambulances equates the existence of EMS. Granted that the cost of establishing an advanced EMS for developing countries might be better deployed to cost-beneficial injury prevention programmes, identifying such latter programmes may be possible through a surveillance of some crucial phases of injury, for instance the pre-hospital phase. What then can we do with the existing system in our country? We can research into it to understand its value, we can change what is necessary to move it to higher level by taking into consideration existing local realities, we can use evidence to confront unhelpful practices especially as represented by the policy of the Federal Road Safety Commission in building clinics on the highway, which unhappily has received presidential approval and we can plan for the future establishment of an appropriate EMS. This study has identified three categories of persons involved in pre-hospital transport of RTI patients in a representative section of Nigeria. That nearly 50% were brought within the first hour of injury suggests that the existing process is not hopeless, especially when viewed within the background of absent communication between the scene of crash and the hospitals. Similar to Ghana<sup>13</sup> and Kenya<sup>14</sup> where commercial vehicles move RTI victims to the hospital, sometimes it is one of the crashed vehicles that is used in the transport (Figure 2). One great limitation of such means of transport is the limitation on the number of victims to be moved and that certain injured persons with spinal cord injury would not enjoy optimal transfer. In spite of this, such patients are sometimes moved in a sitting position, a situation that worsens their clinical state<sup>15</sup>.

The statutes setting up the Highway Patrol Team of the Nigerian Police and the Federal Road Safety Commission (FRSC) provide for their being involved

in moving road crash victims to the hospital; however, the absence of adequate training or well equipped vehicles that would facilitate first aid and /or safe transport guarantees that their practice is appalling (Figure 3). This is concrete evidence of need for their training in basic trauma life support (BTLS). Ironically, these officers are probably dedicated to their work in the absence of equipment and training! Without evidence based data, the command of the FRSC has embarked on building clinics on the highways for giving first aid (Figure 5), such misplaced priority constitutes a waste on the meagre resources of the commission since hospitals already exist and all the officers had to do was to be efficient in pre-hospital transport and move patients to the appropriate hospital, in a “scoop and run” fashion.

In this study, approximately 60% of the victims were brought by both REL and BS accounting for a significant proportion of the transport (Figures 1 and 4). This throws up interesting prospects in intervention. We posit that training volunteers in BTLS from these two categories will lead to great reduction in RTI morbidity and mortality since they would probably get to the scene of the injury first. In their report published since 1996, Demetriades et al found that patients with severe trauma transported by private means (friends, relatives, bystanders, or police (non-EMS group) had better survival than those transported via the EMS group (trained paramedic)<sup>16</sup>. Some studies have shown improvements in survival after training of bystanders and villagers on trauma care<sup>17,18</sup>. In countries with limited resources, a lot of improvement in outcome is assured when basic life support measures are operational within the first few minutes of injury. A reduction in mortality from 40% to 9% was seen in Cambodia after basic first aid training to 5000 people who were likely to be first on the scene in that country strewn with landmines<sup>19</sup>. Our study suggests great benefit to Nigeria if this training is extended to these existing categories of persons bringing RTI victims to the hospital.

This study also showed that none of the patients arrived at the hospital with airway protection or circulatory support or stoppage of external haemorrhage. Evidence abounds that if BTLS which can be provided by inexpensive interventions is rapidly and consistently applied, the major advantages of prehospital care would be realised<sup>20-22</sup>. Indeed, the United States developed a programme of first aid for bystanders called “First There, First Care” which consists of five sections: stop to help, call for help, assess the victim, start the breathing and stop the bleeding<sup>23</sup>. Persons trained this way are encouraged to keep certain items in their vehicles such as gloves and bandages so that they

have some things to help them carry out the first tasks. In Ghana, taxi drivers were trained in bringing patients to the ER since they are often the ones who come in contact with the patients first<sup>13,24</sup>. We believe that the first aid training or BTLS training would be a cheap forerunner to the establishment of an organised EMS which should ultimately lead to a reduction in morbidity and mortality from RTIs in Ilorin, Nigeria. And certainly we can do a lot with our existing means of transporting patients to the hospital by following the example from Ghana. This does not ignore the concomitant need for improvement in emergency room services in the hospital which will simultaneously benefit from improvements in the pre-hospital phase<sup>10,26</sup>. Indeed, it has been documented that improvement in the hospital care of trauma patients offers more hope than whatever can be gained from pre-hospital care<sup>25</sup>. This has not been validated in developing countries where notification of trauma hardly exist, road transport is for an extended period of time and real access to standard care a major obstacle. It remains to be validated that circulatory support and airway protection during this window of need can be useful.

## REFERENCES

1. **Holder Y, Peden M, Krug E et al (Eds).** Injury Surveillance Guidelines, World Health Organization, 2001.
2. **Murray CJL, Lopez AD.** Global health statistics: a compendium of incidence, prevalence and mortality estimates for over 200 conditions. Harvard School of Public Health, Boston: Harvard University Press, 1996.
3. **Solagberu BA, Duze AT, Ofoegbu CPK, Adekanye AO, Odelowo EOO.** Surgical morbidity and mortality pattern in the accident and emergency room- a preliminary report. Afr J Med med Sci 2000; 29: 315-8.
4. **Solagberu BA, Adekanye AO, Ofoegbu CPK, Kuranga SA, Udoffa US, Abdur-Rahman LO, Odelowo EOO.** Clinical Spectrum of Trauma at a University Hospital in Nigeria. Eur J Trauma 2002; 28:365-9.
5. **Solagberu BA, Adekanye AO, Ofoegbu CPK, Udoffa US, Abdur-Rahman LO, Taiwo JO.** Epidemiology of trauma deaths. West Afr J Med 2003; 22: 177-81.

6. Post Impact Care Working Party, European Transport Safety Council. Reducing the severity of road injuries through impact care. Brussels, European Transport Safety Council, 1999.
7. **Mock CN, Jurkovich GJ, nii-Amon-Kotei D, Arreola-Risa C, Maier RV.** Trauma mortality patterns in three nations at different economic levels: implications for global trauma system development. *J Trauma* 1998, 44: 804-12.
8. **Adeyemi-Doro HO, Sowemimo GOA.** Optimal care for trauma victims in Nigeria. *Trauma Quarterly* 1999; 14:295-300.
9. **Onwudike M, Olaloye OA, Oni OOA.** Teaching Hospital Perspective of the Quality of Trauma Care in Lagos, Nigeria. *World J Surg* 2001; 25: 112-5.
10. **Solagberu BA, Kuranga SA, Adekanye AO, Ofoegbu CPK, Udoffa US, Abdur-Rahman LO, Taiwo JO.** Preventable trauma deaths in a country without emergency medical services. *Afr J Trauma* 2003; 1: 39-44.
11. **Sasser S, Varghese M, Kellermann A, Lordmand JD.** Prehospital trauma care systems. Geneva, World Health Organisation 2005.
12. **Kobusingye OC, Hyder AA, Bishai D, Hicks ER, Mock C, Joshipura M.** Emergency medical services in low and middle income countries: recommendations for action. *Bulletin World Health Organisation* 2005; 83: 626-31.
13. **Forjough S.** Transport of the injured to hospitals in Ghana: the need to strengthen the practice of trauma care. *Pre-hospital Immediate Care* 1999; 3:66-70.
14. **Nantulya VM, Reich MR.** The neglected epidemic: road traffic injuries in developing countries. *BMJ* 2002; 324:1139-41.
15. **Solagberu BA.** Spinal cord injuries in Ilorin, Nigeria. *West Afr J Med.* 2002; 21: 230-2.
16. **Demetriades D, Chan L, Cornwell E, Belzberg H, Berne TV, Chan D, et al.** Paramedic vs. private transportation of trauma patients; effect on outcome. *Arch Surg* 1996; 131:133-8.
17. **Razzak JA, Kellerman AL.** Emergency Medical Care in Developing Countries: Is it Worthwhile? *Bulletin World Health Organisation* 2002; 80:900-5.
18. **Ali J, Adam RU, Gana TJ, Williams JI.** Trauma patient outcome after pre-hospital trauma life support program. *J Trauma* 1997; 42:1018-22.
19. **Husum H.** Rural pre-hospital trauma systems improve trauma outcome in low-income countries. A prospective study from North Iraq and Cambodia. *J Trauma* 2003; 54:1188-96.
20. **Bunn F, Kwan I, Roberts I .** Effectiveness of Pre-Hospital Trauma Care. *Cochrane Injuries Group.* January 2001.
21. **Cooke MW.** How much to do at the accident scene? *BMJ* 1999; 319:1150.
22. **Eckstein M, Chan L, Schneir, Palmer R.** Effect of prehospital advanced life support on outcomes of major trauma patients. *J Trauma* 2000; 48: 643-8.
23. United States National Highway Traffic Safety Administration. First there, first care. Washington, DC, US Department of Transportation, 2000.
24. **Mock NC, Tiska M, Adu-Ampofo M, Boakye G.** Improvements in prehospital trauma care in an African country with no formal emergency medical services. *Journal of Trauma* 2002 ;53:90-7.
25. **Joshipura MK, Shah HS, Patel PR, Divatia PA, Desai PM.** Trauma care systems in India. *Injury* 2003;34:686-92.
26. **MacFarlane, Benn CA.** Evaluation of emergency medical services systems: a classification to assist in determination of indicators. *Emerg Med J* 2003; 20: 188-91.