

Assessment the Different Modalities of Transport of Patients to the Accident and Emergency

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ABSTRACT

Background; Road traffic injuries (RTIs) constitute a leading cause of death in persons aged 15-44 years. More than 1.2 million deaths occur yearly worldwide from RTIs; 90% of these deaths are recorded in developing countries for a variety of reasons. Road traffic accidents (RTAs) and its associated injuries are a major public health problem in developing countries. The overall effects of these injuries constitute social, economic and psychological losses the magnitude of which is enormous.

Timely emergency pre-hospital care and subsequent transportation of accident victims to the health facility helps reduce the accident and injury outcomes.

Objective; To assess the different modalities of transport of patients to the accident and emergency.

Methodology; The study was a descriptive cross sectional study, carried out at the accident and emergency unit of Aminu Kano teaching hospitals Kano, between July to mid-August, 2021. A structured pro forma was used for data collection. Data collected was analyzed using Statistical Package for Social Sciences version 20.0. (IBM)

A total of 92 RTA victims brought to the emergency units who met the inclusion criteria and data collection and modality of transport were determined through an interviewer administered Data collected was analyzed using Statistical Package for Social Sciences version 20.0. (IBM)

Result; Patients were mostly transported to hospital by relatives in 41% and no patient was picked from scene of accident by ambulance.

Conclusion; The study assessed the different methods of transport of accident victims brought to the emergency department of Aminu Kano Teaching Hospital Kano.

Keywords: pre hospital care, road transport accident, accident victims.

INTRODUCTION

The Decade of Action for Road Safety (2011–2020) was established by UN General Assembly Resolution 64/255 (2010) to accelerate coordinated international action aimed at reducing the number of deaths due to road traffic injuries. The 2030 Agenda for Sustainable Development has recently reiterated this priority by setting a target for 50% reduction in road traffic accidents by the year 2020¹.

For the purpose of this research, we will dwell on the availability of pre hospital care of the accident victims of patients brought to the accident and emergency department of Aminu Kano Teaching Hospital, Kano. This is because the outcome of any accident is largely dependent on the pre hospital care given to the victims, it reduces morbidity and mortality by up to 50%², accident victims are mainly conveyed to the hospital by ambulance service in developed countries, however in developing and underdeveloped societies, accident victims are mainly transported to the hospital by bystanders and patient relatives, however only a small proportion are transported

by the para medics after contact has been made by universal contact numbers which are rarely available in developing countries³.

In Nigeria most of the accident victims are rescued by bystanders who are mostly traders trading along highways, farmers, and drivers of commercial vehicles who have no basic knowledge on first aid and lifesaving-

g maneuvers such as cardiopulmonary resuscitation⁴. The world health organization postulated that even the most sophisticated emergency care system is ineffective if bystanders fail to recognize a serious injury or do not know how to call for help⁵.

In most countries of Europe, drivers are required to pass a test on basic life support before they are issued driver's license, or must carry first aid kits in their vehicles⁶. The proportion of patients who die before reaching hospital in low- and middle-income countries is over twice that in high-income countries³, suggesting that strengthening pre hospital systems could have enormous impact. Optimal pre hospital care is provided by a responsive system that can rapidly dispatch equipped ambulances with trained providers and extrication services where needed, but where this is not available, there are many ways to improve basic care at the scene of a crash. In countries where there are areas with limited or delayed access to care, protocols for mobile phone notification of community-based lay responders have been shown to be effective as a bridge to formal pre hospital care⁷. In the many countries without any ambulances services or certified pre hospital providers, organized systems for training and dispatching trained lay providers have been shown to improve care⁶.

Road traffic injuries are the ninth leading cause of death globally⁸, and such injuries are predicted to become the third leading cause of death and disability by 2021, Road traffic accidents (RTA), falls and intentional violence have been identified as the major vectors of traumatic injury⁹. It is essential to appreciate that the metabolic response initiated in the immediate aftermath of trauma will continue to evolve and the risk of mortality is substantial unless the correct and timely interventions are performed.

Such timely interventions are usually provided by the first set of responders to the scene of the accident. In industrialized societies, first responders are usually paramedics, or other road users who have training on basic life support and have first aid kits in their vehicles, and subsequently communicate with ambulance service via universal toll free numbers⁵, however such is not available in developing and underdeveloped nations like Nigeria.

In low- and middle-income countries, RTIs constitute the ninth leading cause of death and the tenth leading cause of disability-adjusted life years (DALYs)⁸. A number of factors account for the high RTIs in these countries including poorly maintained vehicles, inadequate traffic enforcement, inefficient pre-hospital emergency medical response and overburdened healthcare infrastructure¹⁰. As a result, about 80% of the injury deaths in these countries are said to occur in the pre-hospital setting⁵.

Many of these deaths could be prevented with the timely arrival of competent emergency pre-hospital medical services at the accident scene. Timely emergency pre-hospital care to traffic accident victims at the accident scene and subsequent transportation to the health facility may reduce the probability of injury severity and deaths. Regarding injury severity and death, trauma experts consider the first 60 minutes (termed the "golden hour") after the injury occurred as the most important period to save lives. The risk of death or severe injury is believed to increase after this period¹¹.

Recently, the World Health Organization has proposed training of layperson first responders as the first essential step in developing Emergency Medical Services systems in settings where the formal pre-hospital system is not available¹². This system has been found to be effective in reducing traffic accident-induced mortalities in most countries. A previous study revealed that about 51% of severely injured persons in Kumasi, Ghana died in a pre-hospital setting¹³. This suggests that improving pre-hospital care to RTA victims is important to reduce "the mortality of critically injured road accident casualties". This stresses the urgency to establish layperson first responder care systems in Nigeria (as proposed by the WHO) where formal pre-hospital care is inadequate. Pre-hospital care and post-crash intervention happen to be the focus of the fifth pillar of the UN Decade of Action of Road Safety 2011–2020 which aims to reduce the anticipated magnitude of RTAs and casualties⁶. After a road crash, an organized pre hospital care, as well as prompt medical attention, has proven to reduce the

morbidity and mortality among the victims. In Nigeria, the state of post trauma response is very poor. Only a few cities such as Abuja, Lagos, and Port-Harcourt have an organized emergency medical service. The FRSC is also ill-equipped to carry out this responsibility¹⁴.

In Nigeria, injuries and deaths resulting from RTA are on the rise and are Nigeria's third-leading cause of overall deaths, the leading cause of trauma-related deaths and the most common cause of disability¹⁵. The situation is especially problematic in Nigeria because the volume of traffic is expected to rise, from 8 million vehicles in 2013, to about 40 million by 2020¹⁶.

RTA has physical, social, emotional, and economic implications. Fatalities, physical disability, and morbidity from road accidents predominantly affect the young and the economically productive age groups. Survivors often endure a diminished quality of life from deformities and disabilities, posttraumatic stress and loss of personal income, in a country not well known for exceptional rehabilitation services. The rest of the populace live in perpetual and pervasive fear of traveling occasioned by not feeling safe on the roads. The overall effects of these injuries constitute social economic and psychological losses of great magnitudes¹⁷.

Every year, over 39,000 Nigerians die from road crashes. In the 2018 Global Status Report on Road Safety, the World Health Organization (WHO) estimated road traffic fatalities in Nigeria at 39,802, while the estimated rate per 100,000 deaths stood at 21.4.¹⁸ The aim of this study was to assess the different modalities of transport of patients to the accident and emergency

METHODOLOGY

The study was conducted at the accident and emergency unit of the Department of Surgery, Aminu Kano Teaching Hospital. The hospital is located in the city of Kano, which is one of the major cities in northern Nigeria and the largest commercial center of the region with population of over thirteen million (13,076,892) by end of 2013¹⁴. Aminu Kano Teaching Hospital, with 700 bed capacity serves as a referral center for other health institutions within the state and neighboring states of Jigawa, Katsina, Bauchi, Yobe and beyond. Surgery department offers both inpatient and outpatient care, emergency services are provided for patients in acute state at the trauma division on a daily basis. Patients are usually sent to the surgical side of the emergency unit, after they have been seen by the triage, who are usually two to three medical officers stationed to triage the different presentations, usually surgical, medical, dental, ENT, and others, patients are provided first line treatment before they are attended to by their respective team members. Patients are seen as referred cases or as first presentation to the surgical unit following RTA.

Ethical Approval; Ethical approval was obtained from the hospital's research ethical committee before conducting the research. A consent form was administered to the respondents who accepted to participate in the study, after the purpose, the nature and the complications of the research was explained to them. The respondents' reserved the right to withdraw from the study for whatever reason. The management of patients who did not consent to participate was not affected in whatever way. Personal data obtained was regarded as strictly confidential and was not divulged to any third party. Data was entered into, and stored in a password protected personal computer. The study was a descriptive cross sectional study conducted on patients who met the inclusion criteria and presented during the study period of two months. Inclusion criteria All trauma cases presenting to the accident and emergency unit and their relatives who consented to the study.

Exclusion criteria patients brought in dead Those who, or whose relatives do not consent for the study

The sample size will be calculated using the formula for estimating minimum sample size for descriptive studies i.e.

$n = Z^2 Pq / d^2$ (Cochran formula)

Where:

n = Minimum sample size for each group

Z = Value of the standard normal deviate corresponding to 5% level of significance. The value obtained from the normal distribution table = 1.96

P = Using 6% prevalence of patients who are transported to the accident and emergency unit using ambulances 38.

$$q = 1 - 0.06$$

$$= 0.94$$

d = Degree of precision/type 1 error

$$= 5\% (0.05)$$

$$n = (1.96)^2 (0.06) (0.94)$$

$$(0.05)^2$$

$$n = 86.7$$

To account for missing observation forms and possible errors in filling the forms 10% attrition rate would be added.

$$n = 10\% \text{ of } 86.7 = 8.67$$

$$n = 86.7 + 8.67 = 95.37$$

This is rounded up to 95

Relatives or first responders of consecutive trauma patients presenting to the accident and emergency were interviewed. This involved assessment of the mode of care given to the victims of accident brought to the accident and emergency unit of AKTH. The persons who delivered the accident victims were questioned using an interviewer administered questioner and then patients' clinical state at presentation were assessed. Patients that satisfied the inclusion criteria and consented to participate were recruited consecutively until this sample size was obtained.

The study employed quantitative method of data collection. The help of a registrar from the surgery department who is the casualty officer, and triage officers of the unit were sought as research assistants for this study. They were trained for one day on the contents of the questionnaire, obtaining consent and interview process.

All accident victims brought to the accident and emergency unit of Aminu Kano Teaching Hospital, Kano were recruited into the study. Patients and their care givers who were eligible, were adequately informed about the study and their consent was obtained

At presentation, the persons who brought the accident victims were asked a number of questions as to the mode of accident, modality of extrication, the nature of vehicle, care given at accident site, were there any mortalities, how was the patient brought to the hospital, was any care given to him/her while he/she was on transit using a questionnaire. Patient status at presentation was assessed, bio data taken, vital signs were also taken and documented, and morbidity was evaluated as the form of care given, if patient was transfused, if patient had surgery, length of hospital stay, and outcome of care were all assessed. An interviewer – administered, semi-structured questionnaire was used to collect data from eligible respondents .

Patient's demographic, clinical and outcome data were collected and entered into a pro forma prepared for the study. Data cleaning was done, where data was checked manually for errors; and coding of questionnaires done before data entry using the Statistical Package for Social Sciences (SPSS) software version 19 (IBM). Quantitative variables were described using measures of central tendency (mean, median) and measures of dispersion (standard deviation) as appropriate and qualitative data as n (%). Student's t-test was used to test the

significance of differences in quantitative variables. Cronbach's alpha was used to assess the reliability of different estimates. In all tests $P < 0.05$ was considered to indicate statistical significance.

RESULTS

Ninet two road crash victims were seen at the accident and emergency departments of Aminu Kano teaching hospital during the study period, this represent 96.8% response rate. There were 63 males and 29 females. The ages Ranged between 1year and 72years. The mean age was 30.3 ± 13.3 years.

Those transported using ambulance were those who were transported from a referring center, and accounted for the higher percentage of patient who had intervention while on transit.

Table 6: A table showing the transport modalities used to convey patients to hospital.

Mode of Transport	Frequency	Percent	Valid Percent	Cumulative Percent
Ambulance	2	2.2	2.2	2.2
Commercial vehicle	32	34.8	34.8	37
Tricycle	31	33.7	33.7	70.7
Personal care	27	29.3	29.3	100
Total	92	100	100	—

Those transported using ambulance were those who were transported from a referring center, and accounted for the higher percentage of patient who had intervention while on transit. A two by two cross table analysis done to correlate between patients rescued by persons with and without prior training on basic life support showed that there was more mortality in the group rescued by those without training on basic life support. However, fisher's exact test showed no statistically significant difference between the two groups.

Table 9: A table showing the association between the different variables outcome of trauma.

Variable		Outcome			
		Discharged n (%)	Died n (%)	Total n (%)	P-value
Care given at the scene	No intervention	65 (70.6%)	3 (3.3%)	68 (73.9%)	0.009
	Intervention	18 (19.6%)	6 (6.5%)	24 (26.1%)	
Care given on transit	No intervention	63 (68.5%)	6 (6.5%)	69 (75.0%)	0.686
	Intervention	20 (21.7%)	3 (3.3%)	23 (25.0%)	
Time from accident to rescue	<3 hours	74 (80.4%)	9 (9.8%)	83 (90.2%)	0.591
	4–8 hours	9 (9.8%)	0 (0.0%)	12 (9.8%)	
Time from rescue to hospital	<3 hours	39 (42.4%)	0 (0.0%)	39 (42.4%)	0.01
	4–8 hours	34 (36.9%)	9 (9.8%)	43 (46.3%)	

	9–24 hours	7 (7.6%)	0 (0.0%)	7 (7.6%)	
	>1 day	3 (3.3%)	0 (0.0%)	3 (3.3%)	
Training on BLS	Yes	12 (13.0%)	0 (0.0%)	12 (13.0%)	0.358
	No	71 (77.2%)	9 (9.8%)	80 (87.0%)	

DISCUSSION

The availability of emergency medical services (EMS) is paramount to the survival of accident victims, this is more pronounced in developed countries where there is effective EMS. World over the commonest age group involved in road traffic accident are those within the age bracket 30 to 45 years, and this is also corroborated in this study where the commonest age group is 15 to 45 years accounting for 64.1 percent of the patients. Males are more involved than females with males accounting for 61.8 percent of the patients. This also conforms to the demographics of Road traffic accidents in a study carried out in Oshogbo where males accounted for 75% of the patients³⁹. This also corroborate with another study in south east Nigeria, by Obiora Itake et al, who found out that males accounted for about 72% of the study population⁴⁰. Another study by Sugam Shrestha et al in India also found a male predominance of 70%⁴¹. This is expected as males are more involved in economic activities which majorly involve travels.

Accident victims are mostly rescued and transported to secondary health facilities by relatives and bystanders in 64.2% of cases, this is also the case in a study by BA Solagberu et al, who also reported 60%⁴³, however in industrialized nations as reported by R Hamblin et al that ambulance service account for 75% of hospital deliveries⁴⁴, in shape contrast as only 2.2% of patients were transported using ambulance, and this is usually from a secondary center to place of definitive care, in this case AKTH, followed by officers of the Nigerian police, road safety corps, or civil defense. These patients usually arrive at the place of care within three hours of accident in about 90.2 % of cases.

Patients are transported mostly in commercial vehicles in 34% of cases, tricycles 33.8%. No patient was picked from the scene of the accident using ambulance. This however is the opposite of what obtains in developed countries where all patients are transported using ambulance service⁴⁵.

A bivariate analysis done of the different variables using fishers exact test show no association between status of the rescues on basic life support with a p-value > than 0.05, however this is not unexpected as all the rescuers who had training on basic life support were mainly passing by, or co-occupants in the vehicle. They had no instruments or first aid kit with them to institute management. The above finding shapely contrast with what is obtained in developed countries as the paramedics are grounded in basic life support and this positively impacts on the morbidity and mortality of accident victims.

CONCLUSION

This study found out that patients are mostly transported to place of definitive care by their relatives in personal cars, and tricycles, with little or no resuscitative measures instituted while on transit. The study also shows that there is an association between care given at the accident site and outcome of trauma of accident victims brought to the emergency unit, it also shows statistical significance between early presentation at the emergency and outcome of trauma, with a p values <0.05.

LIMITATIONS

There was no effective ambulance service in Kano state at the time of this study. Most patients are usually on referral from other centers after the accident via hospital ambulances, therefore the first responders may not be available for interview. The need for urgent attention to accident victims may sometimes not permit the

RECOMMENDATIONS

Government should provide toll free numbers that other road users, and residents along major highway can use in the case of road traffic accidents.

Government should provide effective ambulance services along major highways, and requisite staff such as emergency medical workers, and paramedics should be trained, in the interim, ambulance drivers should be trained on simple life saving procedures such as bleeding control and airway maintenance at the scene of accidents.

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