

# Emergency Medical Services Outcome Assessment in Lagos, Nigeria: Review of Cases of "Brought in Dead" Patients

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## Abstract

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**Key words:** BID; Pre-hospital transport; Emergency medical services; LASUTH; Road traffic injuries.

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**BACKGROUND:** This study sets out to establish a database of BID patients presenting at the Lagos State University Teaching Hospital (LASUTH).

**METHOD:** A retrospective study of consecutive "Brought in Dead" (BID) patients seen from April to November 2011 at the surgical emergency room of the Lagos State University Teaching Hospital (LASUTH) was done using a validated questionnaire.

**RESULTS:** A total of 144 BID patients were seen during the study period. There were 112 males or 78% and 32 females or 22% of the total (M:F=3:1). The age group with the largest number of victims was the 31-40 age groups; and there were 37 patients (30.8% of 120 cases captured under age group). Trauma also accounted for 104 patients (72.2%) with 52 (36.1%, 50% of trauma cases) of these caused by Road traffic injuries (RTI), and Gunshot injuries accounting for 21 (14.6%, 20.2% of trauma cases). Among the Trauma BID cases from RTI, 4-wheeled vehicles accounted for 20 cases (19.2%, 40% of RTI), whilst motor cycle injuries accounted for 12 cases (11.5%, 24% of RTI).

**CONCLUSION:** The study shows that road traffic injuries and gunshot injuries, accounted for 70% of BID cases presenting at LASUTH. Majority of cases of RTI are from 4 wheeler vehicles (40%) and motorcycles (24%).

## Introduction

It is established that prehospital transport is the weak link within a trauma system in both developed [1] and developing [2] countries. One index of measuring the efficiency and effectiveness of the prehospital transport is the number of "Brought in dead" (BID) patients presenting as dead in the hospital.

Emergency center (EC) records of BID from a casual observer at the Lagos state university teaching hospital (LASUTH) revealed an alarming number of 300 of such cases in a one year period. A previous study on pre-hospital transport in another part of the country [2] had identified three categories of pre-hospital transport: by Police/Federal road safety commission; Friends/Family and Bystanders.

Organized Emergency medical services (EMS) have not taken root in the country and the nearest to an EMS is the ambulance system, which is available in Lagos state but not for twenty four hours or seven days a week. Indeed, the number of such ambulances has not covered the entire catchment area of the patients visiting the hospital. Since some of the BID patients could have been alive at the point of departure, no matter by what method they were being transported, the fact that they got to the hospital dead should arouse a desire to investigate such deaths as an index of the pre-hospital transport in Lagos state.

In the setting of an emergency centre the confirmation of death and the diagnosis of BID could pose technical challenges. Standard diagnostic criteria of absence of electrical activities on electrocardiogram (ECG) and electroencephalogram

(EEG) may pose some challenges in the emergency setting. In developing countries the BID cases diagnosed at hospitals may not meet standard set criteria for confirmation of death other than the absence of pulse and respiration [3]. Indeed it is needful to institute cardiopulmonary resuscitation except when specific absolute conditions are present which allow the patient on arrival to be immediately pronounced dead [4, 5]. The Lagos state traffic laws of 2012 banning some categories of transport vehicles, is believed to have registered changes in the cases of BID brought to LASUTH. This study which was conducted before the ban is aimed at assessing the outcome of the existing medical service prior to the commencement of the new traffic law. It will also serve as a basis of comparison in further proposed prospective studies on the outcome of services after the new laws became operational.

The aims of this study are: (a) to investigate the demographic and epidemiological pattern of cases of BID brought to LASUTH as an index of Prehospital Emergency medical service; and (b) to be a preliminary reference for further studies on the clinical parameters in BID patients that will help to direct planning and establish appropriate emergency policy.

### Patients and Methods

This is a retrospective study which covered an eight-month period (April to November 2011). It was carried out in a tertiary hospital in Lagos state, Nigeria at the Lagos State University Teaching Hospital, Ikeja, Lagos (LASUTH). Lagos State (a conurbation of cities) is the most populous State in Nigeria, a West African country which is also the most populous country in Africa.

The study was designed to evaluate all cases of BID patients presenting at the surgical emergency center and captured in the nurse's emergency center record at LASUTH during this period. The cases of BID entered into the nurses records were verified as BID if there was no pulse, no response to painful stimulation and dilated fixed pupils on presentation. A validated questionnaire was used to re-structure the nursing records to include patients demographic data, ante-mortem diagnosis if any, place of referral or injuries, cause of injury, region of body injured, and in the cases of road traffic injuries the type of vehicles involved, time of injury, arrival time at LASUTH, availability or otherwise of rescue team or organization. Data analysis for frequencies and percentages was performed using the statistical package for social sciences (SPSS) version 17.

### Results

A total of 144 BID cases were seen between April and November of 2011. There were 112 males

(78%) and 32 females (22%). Of the 91 cases captured under marital status, 68 cases (74.7%) were married whilst 23 cases (25.3%) were single.

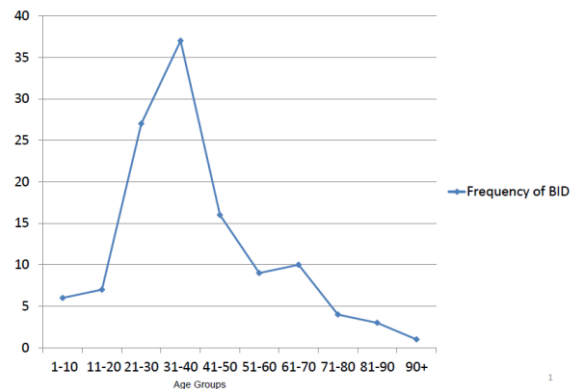


Figure 1: The age distribution of the affected patients.

With regards to occupational distribution, Civil servants accounted for 14 cases (9.7%) of the 83 cases captured. Others included Artisans 11 cases (7.6%), Businessmen 11 cases (7.6%), Drivers 10 cases (6.9%), Students 10 cases (6.9%) and the least was 7 unemployed cases (4.9%). The age distribution of the affected patients showed that among the 120 cases captured for age groups, the age group 31-40 yrs had the highest number of 37 (30.8%), whilst the lowest figures of 4 (3.3%), 3 (2.5%) and 1 (0.8%) were in the 71-80, 81-90 and beyond 90 years age groups (Figure 1).

Majority of the BID cases seen were from within Lagos -103 cases (90.4%) out of 114 captured cases. With respect to immediate care, only 36 cases representing 33% of 109 captured cases had opportunity of immediate medical attention. The initial centres of medical attention before referral to LASUTH were Government general hospitals 26 cases (18%), private hospitals 21 cases (14.6%), unspecified centres 13 cases (9%), alternative medicine 3 cases (2.1%) in the 63 cases captured. The injury arrival time was less than 6hrs in 22 (65%) out of the captured 34 cases. Out of the remaining 12 cases captured, 5cases (15%) arrived after 6 hrs but within 12 hrs. The remaining 7 cases (20%) were brought in between 12 hrs and up till over 48 hrs.

Other results are as shown in the Tables 1-5.

Table 1: Distribution of cases of BID from Trauma.

Aetiology of trauma	Frequency	Percentage
RTI	52	50.0
Stabs	4	3.8
Gunshot	21	20.2
Falls	6	5.8
Home Accident	5	4.8
Burns	6	5.8
Stab and Gunshot	2	1.9
Electrocution	4	3.8
Assault	2	1.9
Surgery	2	1.9
<b>Total</b>	<b>104</b>	<b>100.0</b>

\*RTI- Road traffic injury.

## Discussion

The aim in a well-organized emergency medical service is to drive towards a reduced percentage of preventable deaths [6]. A total of 144 cases of BID captured in this study despite its limitations are reflective of the inadequacies inherent in the pre-hospital care in Nigeria as well as in Lagos State even though Lagos is still the only state with an ambulance transport system in operation. The distribution of causes of BID in this study is different from the pattern in more developed societies where non trauma causes account for a greater proportion of cases [7]. In a similar study from a more developed part of the world, more dead on arrival cases were found among patients with ischemic heart diseases with sudden cardiac arrests [3, 7]. However in the referenced reports, the study setting covered both medical and surgical causes of BID. In the present study, majority of the cases were the result of Trauma (104 cases or 72%) whilst non trauma causes accounted for 40 cases or 28% of the total number. The findings in this study implicating a negative trend for the economic workforce and productivity of Lagos is the occurrence of more BID cases in Civil servants (10%), males (78%), who are married (75%) and are in the active workers age group of 31-40 yrs (30%) (Figure 1).

**Table 2: Trauma cases: Part of the body affected.**

Part of the body	Frequency	Percentage
Head and neck	30	32.3
Abdomen	8	8.6
Extremities	11	11.8
Chest	10	10.8
Spine	1	1.1
Multiple	30	32.3
Others	3	3.2
<b>Total</b>	<b>93</b>	<b>100.0</b>

In reducing cases of BID from RTI, primary preventive measures including good road networks as well as enforcement of traffic regulations are complementary to restriction of classes of vehicles considered to be contributory to high rate of casualties. The second arm of reducing BID cases from injuries is to have in place a well organized emergency service. In this report, even though 22 cases (65%) of RTI arrived at the trauma center within 6hours, only 36 trauma BID cases had the opportunity of immediate rescue attention. In an effective emergency medical service, the components of importance include the reaction time of rescuers to the scene of trauma, the on the scene capabilities in resuscitation, the rapidity of transport to trauma centre including the level of professional competence in life support steps as well as the presence of a well prepared trauma centre with adequate complement of the required professionals. In this study only one-third of the cases captured (33%) had immediate rescue attention with the highest group or 26% of rescuers being Police and road safety officials, both groups majorly untrained in life support methods. In an analysis of 725 consecutive occupational accidents,

(on the way to or from work) and road traffic accidents over a period of 2 years, Braun et al concluded that immediate intervention by non-professionals in first aid, rapid arrival of the emergency care team, sufficient volume and oxygen substitution along with other acute care measures, and rapid transport to an appropriate trauma care facility, all improved the prognosis of the accident victims [8].

**Table 3: RTI trauma cases: Types of Vehicles causing injuries.**

Type of vehicle	Frequency	Percentage
Pedal cycle	1	2.3
Motor cycle	12	27.3
Tricycle	1	2.3
4-Wheeler	20	45.5
8-Wheeler	8	18.2
16-22 Wheeler	2	4.5
<b>Total</b>	<b>44</b>	<b>100.0</b>

The major rescuers identified in this study were mainly Policemen and members of the Federal road safety workforce who had little or no training in life support. This may not only have accounted for the poor outcome with the cases arriving as BID but also presented major limitations of this study in that the time to response and the initial physiology were difficult to ascertain as most patients were not brought by appropriate emergency crew members and when brought in by the ambulance services, the records were not submitted. The findings in this study of more frequent head and neck as well as limb injuries (Table 2) which might not have received the required on-site skilled resuscitation is reflected in the alarming number of BID cases. Results of further similar studies capturing specific and relevant clinical information in the injured patient against the background of their initial physiology may be needed to advise on the need to consider intensifying basic life support training for the major categories of rescuers identified in this study, mainly Policemen and road safety officials in addition to the ambulance staff.

**Table 4: RTI cases of BID: Nature of rescuers.**

Transfer method	Frequency	Percentage
Lasambus	3	7.1
Police	9	21.4
FRSC	2	4.8
Relatives	5	11.9
Bystanders	5	11.9
Others	18	42.9
<b>Total</b>	<b>42</b>	<b>100.0</b>

\*LASAMBUS- Lagos State ambulance service; FRSC- Federal road safety corps.

Whilst the frequency of BID is an index of the level of prehospital care, the overall outcome of patients brought alive to the trauma centre will become an assessment of the level of hospital care. Significantly this study shows that between Road traffic injuries (RTI) and gunshot injuries, 73 out of 104 cases of BID from trauma are to be found, with both causes accounting for 70% of cases of BID due to trauma. Amongst the cases due to RTI, 4 wheeler vehicles 20 cases (45%) and motorcycles 12 (27%) were the leading transport vehicles responsible for BID. Head and extremities injuries were the commonest involved parts of the body in BID cases as seen in Table 2. Death rate from these causes can be

reduced further in a well organized prehospital care. The findings from a proposed similar but prospective study more than twelve months following the new laws will go further to assess the impact of governmental legislation on motorcycles in particular with the aim of further adequate enforcement thereby preventing dangers posed by recklessness in the operations of this category of transport vehicles. As in developed centers in other parts of the world the state ambulance service should be organized to participate more in the salvage effort by motivation through more training and provision of equipment [9, 10]. The findings from this study which should lead to an improved knowledge of the emergency medical service needs in Lagos should with the help of further prospective studies on the subject lead to appropriate planning by the authorities [11], which will help control the problem.

In conclusion, there is a need for further work on this subject in a prospective manner with standardized recruitment of BID cases based on the appropriate definition of death using electrocardiographic (ECG) and electroencephalographic (EEG) criteria. The study scope should be expanded to investigate the non-traumatic causes of BID which will also add to the quality of information needed to understand the emergency medical service needs of our community. The impact of the 2012 legislation in Lagos state restricting motorcycles and other transport vehicles will also be a useful target of future studies on the subject. To the best of our knowledge it is still rare in our local setting to come across this kind of study and we are using this communication to draw the attention of researchers to this subject.

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