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COMPARING ALERTNESS AND INJURY SEVERITY FOLLOWING MOTOR VEHICULAR ACCIDENTS AT A NIGERIAN TERTIARY HOSPITAL

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ABSTRACT

Background: From casual observation of injury patterns in Motor Vehicular Accidents (MVAs), it was sometimes observed that if the victim had been more alert and reacts protectively, injury severity might be reduced. Protective response is often expected to minimize the severity of injuries.

Objective: To determine the relationship between alertness and Injury Severity Score (ISS) in MVA victims.

Design: Prospective hospital based cross sectional study.

Setting: Adult Emergency Department of Obafemi: Awolowe University Teaching Hospital.

Subjects: Adults presenting at the emergency room (ER) following MVAs.

Interventions : Advanced Trauma Life Support(ATLS) protocol for accident victims.

Main Outcome Measures: Injury Severity.

Results: A total of 90 adults had MVAs representing 20% of ER attendances during the period. Young males accounted for 53% of the victims, seated in the middle seats of commercial buses moving at moderate speed, awake and saw the accident coming. Seat belts were used in 30% of patients and 43% had ISS scores > 15. There was no statistically significant association between alertness and ISS.

Conclusion: Victims of MVAs are majorly travellers in our community. We observed that the level of alertness prior to the accident has no significant association with the ISS. Other factors such as seatbelts, state of vehicles and speed limits contribute to the ISS. The calculation of ISS should be done routinely for objective assessment of patients.

INTRODUCTION

A motor vehicle accident (MVA) is the unintended collision of one motor vehicle with another, a stationary object or person, resulting in injuries, death and/or loss of property(1). Accidents occur not only due to ignorance but also due to carelessness, thoughtlessness and over confidence(2).

The use of motor vehicles is growing worldwide; a particular concern emerging in nations where increasing urbanisation, overcrowding and scant regard for the road safety rules are the norm(3).

In the United States, MVAs kill 45,000/year; 60% are < age 35 and account for 500,000 hospitalisations and most of the 20,000 annual spinal cord injuries, at a cost of USD 75 billion/year(1). Road traffic accidents(RTA)

are the most common cause of trauma worldwide, most commonly seen amongst the young, more common in males (88.77%) and occurs in the evening hours(2).

The nature of MVAs could vary from summersaults, collisions, deceleration/acceleration injuries, cyclists and pedestrian injuries (3).

The recognition of RTA as a crisis in Nigeria inspired the establishment of the Federal Road Safety Commission (FRSC) (4). The majority of the accident victims in Nigeria are young adults of the age group 22 to 30 years and about 75% of the accident victims are males(5, 6). Unsafe acts such as reckless and dangerous driving, driving without license, excess speed, alcoholism, faulty pedestrian attitude and others. all constitute the major causes of RTAs in

Nigeria. Other contributory factors include unsafe driving conditions such as road and vehicle defects(5).

Osun State, located in south western Nigeria, is a slightly heavy motorised state with poor road conditions and transport systems. Our hospital, being a major referral centre in the state is bounded by major highways hence the high rate of admissions of victims of RTAs.

Victims of MVAs may be alert just before the accident and may thus prepare themselves physically. This they achieve by mounting protective postures which may reduce the impact of injury thereby reducing the injury severity and also mortality(6). A number of scoring systems have been developed to facilitate consistent trauma triage, severity evaluation, management and prognostication. These include the Injury Severity Score (ISS), the Abbreviated Injury Score (AIS) and the Revised Trauma Score (RTS)(7). The injury severity score (ISS) is a trauma scoring system score which is most commonly used to calculate the severity of trauma(8). It is calculated by squaring the three most injured regions of the body (which have values attached to them) and adding them. If the Injury severity score (ISS) is (> 15), the patient is classified as severely injured(8).

Some studies have reported that the more alert a person is just before an accident, the less the severity of injury, thus those who are asleep, distracted or intoxicated may be more injured or may even die when accidents occur (9, 10). Similar studies are yet to be carried out in our environment where control of use of drugs and alcohol are very stringent.

MATERIALS AND METHODS

After obtaining ethical approval from the Ethics Committee of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Osun State. The study was carried out at the adult emergency department of the hospital. It was a hospital based, prospective, cross sectional study in which consenting consecutive adults (18 years and above), who fulfilled the inclusion criteria were recruited into the study after obtaining consent. Pregnant patients, deaf and/or dumb patients, referred patients and disabled patients were excluded from the study. On arrival at the emergency room, the patients were stabilised

using Advanced Trauma Life Support (ATLS) protocol. An interviewer administered questionnaire was used in which such variables as the bio-data, mechanism of injury, speed of vehicle, position in vehicle and levels of alertness were ascertained. The ISS was also calculated for each victim.

The data obtained from the study was analyzed using the Statistical Package for Social Sciences (SPSS) software for windows version 21 (SPSS Inc., Chicago, Illinois, USA). Association between ISS and these factors were assessed using chi-squared (χ^2) test. For all statistical tests, $p < 0.05$ were considered significant.

RESULTS

Demographic data showed that during the study period, 90 MVA victims were recruited. The mean age of victims was 18 years (20%) in which 58 of them (64.4%) were young while 28 others (28.9%) were in the middle age. There were 53 males and 37 females. Males who sustained severe injuries (i.e ISS > 15) accounted for 29.5% while 16.7% of them had moderate injuries (that is ISS 8-14) also 16.7% sustained mild injuries (that is ISS 1-7).

Table 1 shows the number of victims who were awake, sleeping, drowsy or distracted.

All the accidents occurred on the highway in which 70(78.7%) of the MVAs involved commercial buses and from direct questioning, the vehicles were moving at moderate speed (50%) in which 49(54.4%) somersaulted and collisions accounted for 35(38.9%). Such injuries sustained were majorly mild and accounted for 35.1%. Table 2 shows the number of victims who were awake and saw the accident coming.

Drivers were 11 in number (12.5%) among which none sustained mild injuries while 9.2% sustained severe injuries. Passengers sitting in the middle seat were 52 in number (56.8%) and 30.3% of them sustained mild injuries and 14.5% sustained severe injuries. We noted that 80% of the victims did not wear seat belts and 40.7% of them sustained severe injuries.

Table 4 shows the relationship between alertness and injury severity. The relationship between alertness and injury severity is further analyzed thus: $\chi^2=41.951, df=44, P<0.05$

Table 1
Showing number of victims and level of alertness

State of alertness	Number	Percentage
Drowsy/distracted	3	3.3
Sleeping	8	8.9
Fully Awake	79	87.8

Table 2
Showing those who saw the accident coming

Awake and saw accident coming	Number	Percentage
No	40	43.4
Yes	50	56.6
Total	90	100.00

Table 3
Showing number of people who assumed protective positions

Position assumed for protection	Number	Percentage
Coil Up	13	14.4
Stretch Legs/ Hands	10	11.1
Nothing	59	65.6
Others	8	8.8
Total	90	100.0

Table 4
Objective: Analysis of the relationship between alertness and injury severity

Level of Alertness	Mild	ISS moderate	ISS severe	Total	X ²	df
Drowsy	1.3%	1.3%				
Sleeping	3.8%	6.4%		10.3%	41.951	44
Not Significance						
Fully Awake	34.6%	16.7%		37.2%	88.5%	
Total	38.5%	17.9%		43.6%	100.0%	

X²--chi square

Df--degree of freedom

DISCUSSION

A higher rate of MVAs was observed in this study than previously documented from this same region about a decade earlier (11). Noteworthy age and sex differences were observed. Fewer females than males had MVAs and males suffered more severe injuries. Young males are naturally more active, injury prone and more often have a reason to travel either as a result of their being drivers of commercial vehicles or for family and business reasons. However, plausibly males are also more agile to such extents of being able to react more promptly to potential accident situations thereby lessening the impact and injury severity (5, 7).

All the accidents occurring on the highway may

be attributed to our hospital being surrounded by five major highways and the narrow street roads within the town.

The study also noted that most of the MVAs involved commercial buses which somersaulted followed closely by collisions. The commercial buses (usually 18-seater) are the major means of transportation by the average traveler in our environment which is similar to previous reports (3), however in a study done in Imo state in 2011, private cars were shown to account for 94.7% of MVAs (12). The somersaults may be accounted for by the bad state of these buses, burst tyres, bad state of the roads and over speeding by drivers. The collisions may be accounted for by sleeping drivers, driving without headlamps at night, driving on the wrong side of

highway (13). This would be expected for drivers who may feel the greatest impact of the accident, most of them sustained severe injuries and none of them sustained mild injuries this is however in contrast with finding done in 1994 at Finland where most of the accidents were due to alcohol intoxication and cannabis abuse by the driver (9). Interestingly, most of the passengers involved sat at the middle seat and sustained mild injuries.

The benefits of the use of seatbelts cannot be overemphasized (14) and this is reflected in the large number of those who did not use it and the consequent severe injuries they sustained.

The analysis also showed that 53.5% of the victims reasoned that the speed of the vehicle was within normal limit. In Nigeria, the maximum speed limit as prescribed by the FRSC is 100 km/hr.(4). Unlike previous studies(2), most of the road users in our environment travel in the daytime, this may thus account for the majority of the victims who were fully awake, saw the accident coming but could do nothing to protect themselves. Few victims made such efforts such as coiling up and stretching legs/hands when compared with a study done in 2012(15). Interestingly however is the report that there is an almost equal number of severely injured and mildly injured victims amongst this group, the few who were not fully awake had more severe injuries.

In this study, most injuries seen were severe with an ISS above 15. This is similar to the findings of Okeniyi et al however carried out on children at our centre(7).

Using the chi-squared test, the findings above thus reveal that there is no statistically significant relationship between level of alertness and severity of injury in MVA victims. This implies that the state of alertness at the time of accident has no relationship with the severity of injury unless that attributed to chance.

In conclusion, MVAs from commercial buses are common on our highways. The level of alertness just before the accident is not related to the severity of injury sustained using the ISS as an objective tool. Other factors such as use of seatbelts, poor state of vehicles and roads have been identified as plausible determinants of the injury severity. We therefore

recommend education of the public on these factors and future studies to scientifically find the relations.

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