

MAXILLOFACIAL TRAUMA DUE TO ROAD TRAFFIC ACCIDENTS IN BENIN CITY, NIGERIA: A PROSPECTIVE STUDY

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Abstract

Background: The incidence and causes of road traffic accidents (RTAs) vary with geographical location. The economic and social costs of RTAs are enormous. The knowledge of aetiologic factors and associated injury patterns may be important in planning for prevention and treatment. The aim of this study was to document the aetiological factors and the frequency of maxillofacial injuries due to RTAs.

Methods: Over a six-month period, 312 patients with facial trauma due to RTAs were prospectively studied. The demographic parameters, the cause of the RTA, the vehicle type, the use of seat belts, helmets, and other safety devices were recorded. Distribution of maxillofacial bone and soft tissue injuries by vehicle type as well as associated injuries were documented.

Results: The minibus was the vehicle type most often involved (36.2%) and tyre blowout (21.2%) was identified as the most common contributory factor. Males 117 (37.5%) in the 21 – 30 year- age range were most often involved. The forehead was most often the site of soft tissue injury (37.3%) while the mandible was the facial bone most often fractured (29.2%). Head injury (55.8%) was the commonest associated injury.

Conclusion: The low utilization of safety devices like seat belts and air bags as well as the absence and non-enforcement of road traffic legislation were identified as aetiological factors.

Key words: Aetiologic factors, maxillofacial trauma, road traffic accidents

Introduction

The causes of maxillofacial trauma vary and include road traffic accidents (RTAs), interpersonal violence, falls, sports and missile injuries.^{1,2,3} The relative contribution of each cause depends on such factors as geographical location, socio-economic factors and the seasons of the year.^{4,5} The contributory factors in road traffic accidents include reckless driving, excessive speeding, use of alcohol and other drugs, natural disease as well as road conditions.^{6,7,1} Road traffic legislation, improvements in automobile design, use of seat belts and air bags are known to affect the out come in RTAs.^{8,9,10}

RTA is a leading cause of morbidity and mortality in adults below the age of 50 years and the greatest number of cases are males in the 21–30 year–age group.^{3,11,12} The costs of RTAs to the communities concerned amount to more than those for the treatment of any other major disease.¹² Annually,

over one million deaths are recorded worldwide as a result of RTAs while non-fatal road traffic accidents are a major problem causing hospitalization and permanent disability to thousands of person each year.¹³

The economic and social implications of this problem have initiated research in many countries into the incidence and causation of RTAs, the injuries sustained and how these may be treated or alleviated.¹³ Benin- City, Edo state is located in the south-south geographic zone of Nigeria. It is a gateway to the western, eastern, and northern parts of the country. The University of Benin Teaching Hospital (UBTH) is the largest such facility within a 300 km radius and is therefore a major trauma referral center. The aims of this study were to document the aetiological factors responsible for RTA in our environment and determine the frequency of trauma types.

Patients and Methods

Between June 2000 and December 2000, 312 patients with maxillofacial trauma due to RTA were prospectively studied at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. Selection for the study was based on the presence of a maxillofacial injury due to RTA. Patients with facial injuries from other causes were excluded from the study. All facial bony injuries were diagnosed by conventional and panoramic radiographs. Advanced imaging techniques like computed tomography and magnetic resonance imaging were not used due to patients' financial constraints.

Results

There were 228 (73.0%) males and 84 (27.0%) females giving a male to female ratio of about 2.7:1. Three (1.0%) patients wore seat belts at the time of accident while there was no record of helmet use by motor-cycle riders. Traders and students 197 (63.1%) formed the majority of patients recorded. Ten patients died as a result of injuries sustained giving a

mortality of 3.2% and the saloon car was involved in 5 (1.6%).

Table 1 show the age and sex distribution of the patients. The greater majority was in the 21 – 30 year-age group. Minibuses were the vehicles most often involved (113 or 36.2%) (Table 2). Tyre blowout was recorded as the cause of RTA in 66 (21.2%) patients, while in 52 (16.7%) patients the driver was said to have lost control of the vehicle (Table 3).

In table 4, a total of 338 soft tissue injuries were recorded. The forehead was the commonest site (126 patients; 37.3%) and the minibus was the vehicle most often involved (n=50; 16.0%). Eighty-nine (28.5%) patients sustained maxillofacial fractures. Table 5 shows that mandibular fractures were the commonest facial bone fractures (n=26; 29.2%) and the minibus was the vehicle most often involved (n=10; 11.2%). The least common fractures were orbital fractures (n=8; 9.0%). Forty-six (51.7%) of the facial fractures were bilateral, 20 (22.5%) were on the right side and 23 (25.8%) were on the left side. One hundred and thirty-eight (44.2%) patients sustained injuries to other areas outside the maxillofacial region (figure 6). Head injury in 77 (55.8%) patients was the commonest and one patient (0.8%) had a haemothorax (table 6).

Table 1: Age and sex distribution of patients

Age (years)	M	F	No.	%
0 – 10	16	4	20	6.4
11 – 20	20	10	30	9.6
21 – 30	85	32	117	37.5
31 – 40	66	15	81	26.0
41 – 50	20	16	36	11.5
51 – 60	14	4	18	5.8
61 – 70	4	2	6	1.9
71 – 80	3	1	4	1.3
Total	228	84	312	100

Table 2: Distribution of patients by vehicle types

Vehicle type	No.	%
Minibus	113	36.2
Motorcycle	71	22.7
Saloon	63	20.2
Station wagon	29	9.3
Lorry	18	5.8
Luxury bus	14	4.5
Pick up truck	3	1.0
Bicycle	1	0.3
Total	312	100

Table 3: Distribution of aetiologic factors

Cause	No.	%
1 Tyre blow-out		
(a) back tyre	39	12.5
(b) front tyre	27	8.7
2 Loss of control	52	16.7
3 Head – on collision		
(a) With other vehicle	46	14.7
(b) Motorcycle	7	2.2
(c) Bridge	3	1.0
(d) Logs	2	0.6
4 Non – head on collision		
(a) With other vehicle	46	14.7
(b) With motorcycle	3	1.0
5 Motor vehicle & pedestrian	31	10.0
6 Motorcycle & pedestrian	15	4.8
7 Somersault	16	5.2
8 Brake failure	8	2.6
9 Others		
(a) Avoiding pothole	7	2.2
(b) Avoiding object on the road	3	1.0
(c) Avoiding other vehicle	2	0.6
(d) Over speeding	2	0.6
(e) Sleep	1	0.3
(f) Sudden braking	1	0.3
(g) Loss of back wheel	1	0.3
Total	312	100

Table 4: Frequency of facial soft tissue injuries

Vehicle type	Facial soft tissue injuries											
	Forehead	Scalp	Chin	Cheek	Upper lip	Temple	Lower lip	External nose	Upper eyelid	Tongue	Oral mucosa	Soft palate
Minibus	50	19	18	10	6	12	5	6	3	-	-	-
Motorcycle	23	10	6	8	9	2	11	-	-	2	-	1
Saloon	24	8	5	3	9	7	-	1	5	1	1	-
Wagon	9	4	2	6	-	4	1	1	-	1	1	-
Lorry	13	2	-	1	1	2	-	1	-	-	-	-
Luxury bus	5	3	2	4	4	2	-	-	1	-	-	-
Pick-up truck	2	-	-	-	-	-	-	-	-	-	-	-
Bicycle	-	1	-	-	-	-	-	-	-	-	-	-
Total	126	47	33	32	29	29	17	9	9	4	2	1
%	37.3	13.9	9.8	9.5	8.5	8.5	5.0	2.7	2.7	1.2	0.6	0.3

Table 5: Frequency of facial bone fractures

Vehicle type	Mandible	Zygoma	Nasoetmoidal	Dentoalveolar	Maxilla	Orbital
Minibus	10	6	6	3	4	3
Motorcycle	8	4	2	6	3	3
Saloon	5	3	3	4	3	2
Station wagon	1	1	2	-	1	-
Lorry	2	-	1	-	-	-
Luxury bus	-	2	-	1	-	-
Pick-up truck	-	-	-	-	-	-
Bicycle	-	-	-	-	-	-
Total (%)	26 (29.2)	16 (18.0)	14 (15.7)	14 (15.7)	11 (12.4)	8 (9.0)

Table 6: Distribution of associated injuries

Type	No. (%)
Head injury	77 (55.8)
Fracture of the clavicle	15 (10.9)
Fracture of the femur	13 (9.4)
Fracture of the humerus	8 (5.8)
Fracture of the tibia	6 (4.3)
Fracture of the fibula	5 (3.6)
Fracture of the pelvis	5 (3.6)
Fracture of the ribs	4 (3.0)
Cervical spine injury	2 (1.4)
Ocular injury	2 (1.4)
Haemothorax	1 (0.8)
Total	138 (100)

Discussion

While the incidence of RTAs varies with geographical location, the worst figures are found in developing countries.¹⁴ RTAs are a major cause of maxillofacial trauma and males in the 21–30 year-age group are most often affected.^{3,11,12} These observations are similar to the findings from our study. The Nigerian male is usually more involved in jobs like trading that require frequent traveling. He is also more likely to own a car than his female compatriot. Our study shows that only 3 patients (1.0%) had their seat belt on and there was no record of helmet use by motorcycle riders or airbag deployment. The mandatory fitting and wearing of seat belt for drivers and front seat passengers became statutory in many Western countries after the 1950s.¹³ The legislation making the use of seat belt and helmets mandatory in Nigeria is not enforced. Virtually all motor-cyclists do not wear

helmets and only a few drivers and passengers use seat belts. Seat belts are known to reduce fatality by about 42%, while the non-helmeted motor-cyclist is five times more likely to have a severe or critical head injury and three times more likely to die than his helmeted counterpart¹⁵. The fact that there was no air bag deployment may be due to the fact that most vehicles on Nigerian roads date to the 1980s and early 90s when air bags were not regular features in cars.

The vehicle involved in most accidents in our study is the minibus. This vehicle is preferred by most transporters in Nigeria because it is able to carry more passengers at once (about 18), moves very fast (speed of over 120km/h is common) and is fuel-efficient. Accidents involving such vehicles result in a high number of victims per vehicle. The motorcycle as a commercial means of transport became very popular nationwide from the late 1980s due to economic downturn. The riders are notoriously reckless and many intra-city RTAs in Nigeria now involve motor-cycles.^{11,16,17} Speed and alcohol acting alone or in combination are the two main contributory factors to the occurrence of RTAs and in 95% of cases, human error is culpable.^{7,13} Tyre blowout was the commonest cause of RTA recorded in our study. Most Nigerian car owners because of financial constraints buy second hand or fairly used tyres. In 16.7% of the cases in this study the driver lost control of the vehicle. Nigerian drivers are notoriously fast because the speed limit legislation, of 100km/hr is not enforced and alcohol use is frequent. Since there is no legislation on blood alcohol level above which it is an offence to drive, prosecution cannot be effected. Fatigue,¹⁸ is another important factor especially among commercial vehicle drivers who drive very long distances. Thirty-two (10.2%) of the drivers in

this study were long distance drivers. Only one driver admitted to have slept off during the study. However, the high proportion of loss of vehicle control as an aetiological factor in this study may have a connection here. Its role is worsened by alcohol use.¹³

The state of Nigerian roads is another important factor where years of neglect have created deep potholes. Many of the RTAs in this study were associated with bad roads conditions. Other studies report more RTAs on well paved and broad roads.^{6,7} Maxillofacial injuries from road traffic accidents are common.^{3,11,19,20} Our study showed that all the patients sustained at least one soft tissue injury with 26 patients sustaining injuries at more than 2 anatomical sites. The forehead was the commonest site, probably due to its prominence. The facial bone most often fractured was the mandible. This agrees with data from studies elsewhere.^{21, 22, 23} However, we observed that a higher proportion of the facial fractures were bilateral. This was probably due to the aetiological factor under study (RTA). Some studies have reported a higher incidence of left sided fractures. In such studies, assaults were a common aetiological factor and the assailants were predominantly right-handed.

This study has shown that males of 21 – 30 years old most often sustained maxillofacial injuries in RTAs. It also showed a very low utilization of safety devices and the vehicle most often involved was the minibus. Use of second hand tyres, unenforceable road traffic legislation and bad road conditions were factors identified in the aetiology of these accidents. The fact that the economically productive age-group were mostly involved, and the potential numbers of victims that may be involved in RTA in the geographical area under study demands an urgent public policy response.

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