

Analysis Of 47 Road Traffic Accident Admissions To BMH Shaibah

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ABSTRACT

Objective

To analyse road traffic accident (RTA) admissions to British Military Hospital (BMH) Shaibah with respect to seatbelt usage, position in vehicle, age, type of injury and mechanism of injury.

Method

Retrospective analysis of discharge summaries and hospital notes of all service personnel admitted to BMH Shaibah due to RTA, from August 2003 to January 2004.

Results During the study there were 315 reported RTA, 3 fatalities, and 47 inpatient admissions. 87% of admissions were male; in 32% of cases the vehicle had rolled and 28% of individuals admitted had been ejected from the vehicle. 85% of individuals had not been wearing their seatbelts and none of the ejected individuals had been restrained. 92% of those ejected were travelling in the rear of the Land Rover. Of those ejected, 38% suffered more than one type of injury, and 62% suffered a fracture, (accounting for 50% of all fractures admitted). 34% of admissions had sustained a fracture, and were evacuated to the UK.

Conclusions

These figures correlate well with previous evidence showing the likelihood of serious injury is increased by more than 300% if the patient is ejected. Those travelling in the rear of a Land Rover would appear to be in the most dangerous position. Seatbelts are the single most effective means of reducing fatal and non-fatal injuries in motor vehicle accidents. Standing orders states that seatbelt use is mandatory, but compliance is poor. This may be due to misconceptions on the relative dangers faced by soldiers in Iraq. Education and enforcement needs to be more effective if the Army is to reduce the number and seriousness of injuries attributable to RTA.

Introduction

Road traffic accidents (RTA) continue to be the single greatest cause of death amongst British Service personnel, both at home and

on operations. During 2002/2003 RTA accounted for 40% of all service deaths (76 personnel). Seventy service personnel were medically discharged as a result of their injuries. The estimated cost to the Ministry of Defence was £100,240,000 (1).

British Military Hospital (BMH) Shaibah is the British field hospital for UK forces in Iraq. It is located at Shaibah Airfield, the primary UK forces logistic base, approximately 15 kilometres south of Basrah. The hospital serves approximately 10,500 British forces personnel in its area of responsibility.

The risk of RTA in Iraq is understandably greater than in the UK for several reasons. Traffic laws are variably enforced. Local civilians driving the wrong way on dual carriage ways, often on donkey and carts, combined with a disregard for what limited road markings and traffic signs exist, increase the likelihood of accidents. Speed limits are not always apparent and are rarely adhered to by Iraqi civilians. The Iraqi police force is undergoing retraining and reorganisation, and in the current security situation traffic law enforcement is not a priority. Poor road surfaces, often rutted and pot-holed, coupled with inadequate street lighting, creates a challenging environment to drive in.

The value of passenger restraints in reducing injury is well established. The likelihood of serious injury is increased by more than 300% if the patient is ejected from the vehicle. During a vehicle rollover, unrestrained occupants can impact any part of the interior of the passenger compartment. This mechanism produces more severe injuries because of the violent, multiple motions that occur during the rollover. This is especially true for the unbelted occupant (2).

The Land Rover is the vehicle most frequently used by service personnel in Iraq. It is used for both transporting personnel and in patrolling, where it is modified by the fitting of anti-roll bars over the rear seating area, with caging attached to the sides to protect against thrown objects. Soldiers may then stand in the rear, facing outwards, to provide flank observation and protection. This is known as providing "top cover".

Method

A retrospective analysis of British service personnel admitted to BMH Shaibah, due to RTA, from 1st August 2003 to 12th January

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2004. The British Forces' Master Driver collects the total number of all RTA involving service personnel in Iraq, regardless of seriousness or degree of injuries. Data was retrieved from inpatient notes and a review of all discharge summaries for the above time period.

Table 1. Frequency distribution of accident by age, sex, vehicle type, position of occupants in the vehicle and seat belt use.

Age Range	Sex		Vehicle Type		Position of occupant			Seat Belt	
	M	F	HGV	Land Rover	Front	Rear Seated	Top Cover	Yes	No
17-20	16	1	1	16	7	5	5	3	14
21-24	7	1	1	7	4	2	2	1	7
25-28	7	2	1	8	4	4	1	1	8
29-32	5	-	1	4	1	4	-	-	5
33-36	5	2	1	6	5	2	-	2	5
37-40	-	-	-	-	-	-	-	-	-
41-44	-	-	-	-	-	-	-	-	-
45-48	1	-	-	1	1	-	-	-	1
Total	41	6	5	42	22	17	8	7	40
%	87	13	11	89	47	36	17	15	85

Table 2. Mechanism of RTA and injury.

Mechanism of RTA	Number (%)
Uncomplicated	32 (68)
Vehicle rolled*	15 (32)
Mechanism of injury	
Uncomplicated	32 (68)
Occupant ejected	13 (28)
Occupant trapped	2 (4)

* In two instances the vehicle rolling also caused the occupants to be ejected.

Table 3. Position of those occupants ejected.

Position	Number (%)
Front	1 (8)
Rear seated	9 (69)
Top cover	3 (23)

Data was collected on date of admission, age, sex, type of vehicle, position in vehicle (front, rear seated or top cover), seatbelt use, mechanism of RTA, mechanism of injury, and type of injuries sustained. Mechanism of RTA was categorised as either uncomplicated (vehicle stayed upright) or complicated if the vehicle rolled. Entrapment or ejection of an occupant from the vehicle during the accident was also noted. The types of injuries were categorised into soft tissue injuries or fractures/ dislocations, and by body regions.

Results

During the 24-week time period there were 315 RTAs reported in our area of responsibility, with 3 fatalities. Forty-seven service personnel (41 male, 6 female) subsequently required admission to hospital.

Thirty six percent of the admissions were from the 17 – 20 age group and 40 (85%) were not wearing seatbelts. Seatbelt use was

consistently low amongst the various age groups. Half of the women did not wear seatbelts. Seven out of 22 (32%) of the 'front-seated' admissions wore seatbelts while none of those rear-seated wore them. Not wearing a seatbelt was a universal finding in those ejected from their vehicle, conversely no-one wearing a seatbelt was ejected. The distribution of admitted patients according to age, sex, position in vehicle and seatbelt usage is given in Table 1. Tables 2 and 3 describe those patients in terms of mechanism of injury and accident and position in the vehicle. Injury types and body distribution of those injuries is contained in Table 4.

Discussion

The ways of minimising accidents and reducing injury severity are well known. According to Haddon's conceptual framework (3), developed in the early 1970s and outlined in Table 5, there are 3 principal factors in injury occurrence: 1 - the injured person (host), 2 - the injury mechanism (vehicle), and 3 - the environment in which the injury occurs.

Haddon's matrix has been adopted by the National Highway Traffic Safety Administration (NHTSA), and its application in the United States has resulted in a sustained reduction in the fatality rate per vehicle mile driven over the past two decades (2). The majority of the patients admitted in this study were young, which is unsurprising considering the demographics of the Army population, but it is well established that this age group is more likely to be involved in road traffic accidents anyway (4).

The distribution of casualties in the vehicle was 47% from the front compartment, and 53% from the rear including rear seated and top cover. This approximately equal distribution may be due to the Land Rover being the principle vehicle involved and that they tend to be fully manned on journeys to provide their own security.

Seatbelt Legislation

Standing Orders for British forces on operations in Iraq state that the wearing of seatbelts is mandatory in all vehicles that are equipped with them, including rear passengers (5), but only 15% of our admissions (all front seated) were wearing seatbelts, although it is accepted that it is not possible to be restrained while standing as top cover. Legislation has had a substantial impact on the use of seatbelts, which is one of the most effective methods of reducing injury in motor vehicle crashes (6-10). This is particularly true amongst truck drivers where the lack of seatbelt use explains the severity of their injuries from RTAs (11). The group most likely not to be wearing seatbelts in fatal motor vehicle crashes are young males, passengers and low -income groups (12-14).

Table 4. Injuries Sustained and use of seat belt. 12 (26%) Patients suffered more than one type of injury.

Type of injury	Number of personnel who sustained specific injury					
	Position of Occupant			Seat Belt Use		Totals of specific injuries
	Front	Rear Seated	Top Cover	Yes	No	
Head Injury	6	3	1	1	9	16% (10)
Spine-soft tissue	5	4	4	2	11	21% (13)
Spine-fracture	2	1	0	1	2	5% (3)
Limb-soft tissue	5	7	2	1	13	23% (14)
Limb-fracture	4	4	2	1	9	16% (10)
Trunk-soft tissue	6	1	0	0	7	12% (7)
Trunk-fracture (Ribs/clavicle/scapula)	0	2	2	0	4	7% (4)

Table 5. Haddon's Factor- Phase Matrix For Motor Vehicle Crash Prevention.

	Pre event	Event	Post event
Host	Avoidance of alcohol use	Use of safety belts	Bystander delivers care
Vehicle	Antilock brakes	Air- bag deploys	
Environment	Speed limits	Impact absorbing barriers	Access to trauma system

It is noticeable that seatbelt use amongst those most likely to be involved in RTA (young, males and drinkers of alcohol) has been significantly less responsive to seatbelt laws and their enforcement status (15).

It has been found in an another study of 237 service personnel, who travelled frequently in Iraq, that 78% of those questioned were aware that seatbelt use was mandatory throughout the vehicle (Ward NJ – unpublished data). The disparity of actual seatbelt use amongst those admitted, compared to soldier's knowledge of the seatbelt regulations may be due to various factors. Young males and passengers are less likely to wear seatbelts anyhow. There is also a risk to coalition vehicles from improvised explosive devices (IED) and ambushes, and as such the occupants may perceive the use of a seatbelt as restrictive in using a weapon or in exiting the vehicle in the event of such an emergency.

Table 6. Multiple injury rate and mechanism of injury.

Mechanism of injury	Multiple injuries in group
Ejected (13)	38% (5)
Not ejected (34)	21% (7)

Table 7. Fracture rate and mechanism of injury.

Mechanism of injury	Fractures in group
Ejected (13)	62% (8)
Not ejected (34)	24% (8)

The Role of Ejection in Injury

Ejection is defined as the physical removal of an occupant's body either partially or completely from a vehicle during a collision

and subsequent ground impact. Ejection places patients at greater risk from virtually all injury mechanisms and mortality is significantly increased (2). This is demonstrated in Tables 6 and 7.

Twenty eight per cent of those patients admitted had been ejected from the vehicle. Of the 13 ejected, those with more than one type of injury accounted for 42% of all admissions with multiple injuries. The fractures amongst the 13 occupants ejected accounted for 50% of all fracture injuries. This supports well-recognised research that ejected victims result in the highest in-hospital mortality, largest need for intensive care, and longest hospital stay than any other motor vehicle collisions group (16). None of the ejected occupants were wearing their seatbelts, however, it should be noted that those on top cover cannot be restrained in any way. Those in the rear compartment of a Land Rover accounted for 92% of those ejected, most probably due its open nature and that none of the rear compartment occupants were wearing their seatbelts. Of those ejected from the rear compartment 75% were seated, and 25% were standing. 48% of those admitted who had been in the rear of the vehicle, had been ejected. In the event of an RTA, this makes the rear compartment the most dangerous place to be in a Land Rover.

Data on outcome of those with soft tissue injuries was not collected, however, as they had necessitated an inpatient admission this will have resulted in a temporary loss of manpower for their unit and a degree of rehabilitation afterwards when they may not have been fully fit for duties. One third of those admitted had sustained a fracture, requiring aero-medical evacuation and permanent loss of manpower.

The prevention of ejection and, therefore, risk of multiple and more severe injuries by wearing a seatbelt is strikingly demonstrated by this study, but despite the Ministry Of Defence's seatbelt policy being clear, well advertised and understood by most service personnel, compliance is low. Education of service personnel needs to be more effective and include the reasons why seatbelts should be worn, even in a hostile environment such as Iraq. The negative aspects of not wearing a seatbelt should be emphasized, so that service personnel are fully aware that even in the event of a simple RTA they are exposing themselves to the risk of serious injury. Manpower is the British Army's most important asset, and any mechanism to sustain its fighting force should be adopted.

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