

# Unnecessary Admissions of Head-injured Patients at the University Hospital of the West Indies

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## ABSTRACT

*The prospectively collected data in the Jamaica National Trauma Registry operated by the Section of Surgery identified 88 patients who were admitted with head injury to the University Hospital of the West Indies over a one-year period. There were 67 males (76.1%), the mean (SD) age of the entire group being 35.02 ( $\pm 18.45$ ) years. Intentional injuries occurred in 47.2%. The Injury Severity Score was greater than 15 in 19.3%, severe head injuries occurred in 19% and overall mortality was 16%. Care in the Intensive Care Unit (ICU) was extended to only half of those with the severe injuries. The Scottish Intercollegiate Guidelines Network (SIGN) method was used to assess the appropriateness of admission to hospital. Sixteen (18%) of the 88 patients were inappropriately admitted according to SIGN guidelines. Increased efficiency may result from standardization of admission criteria for head-injured patients and consistent implementation of the SIGN guidelines for admission without increased risk to patients. This may be expected to minimize unnecessary admissions and result in considerable cost savings.*

# Ingresos Unnecesarios de Pacientes con Lesiones Cefálicas en el Hospital Universitario de West Indies

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## RESUMEN

*En los datos recopilados prospectivamente en el Registro Nacional Jamaicano de Traumas (Jamaica National Trauma Registry), operado por la Sección de Cirugía, se identificaron 88 pacientes que habían ingresado con lesiones cefálicas al Hospital Universitario de West Indies, por un período de más de un año. Había 67 varones (76.1%), y la edad mediana (SD) del grupo en su totalidad fue 35.02 ( $\pm 18.45$ ) años. En el 47% ocurrieron heridas intencionales. La Puntuación de Severidad de la Lesión fue mayor de 15 en 19.3%; las lesiones cefálicas severas ocurrieron en 19%, y la mortalidad general fue 16%. El cuidado en UCI se extendió sólo a la mitad de las lesiones severas. El método conocido como Scottish Intercollegiate Guidelines Network (SIGN), se usó para evaluar hasta que punto el ingreso al hospital era adecuado. Dieciséis (18%) de los 88 pacientes fueron ingresados inadecuadamente según los lineamientos de SIGN. Puede producirse un aumento de la eficiencia a partir de la estandarización de los criterios de admisión para los pacientes con lesiones cefálicas y la implementación sistemática de los lineamientos de SIGN para los ingresos, sin aumento de riesgo para los pacientes. Hay razón para esperar que esto minimice los ingresos innecesarios y traiga consigo un ahorro considerable de los costos.*

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## INTRODUCTION

Trauma, particularly head injury, is a common reason for hospital admission in Jamaica (1). Patients admitted to the

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University Hospital of the West Indies (UHWI) are admitted directly or on transfer from other institutions. Admissions are usually decided by the various general surgical services that assess the patient in the Accident and Emergency (A&E) department. Some patients are admitted by the neurosurgical service if they are consulted about the patient by the A&E, or by general surgery services. No uniformly agreed admission policy is practised by all admitting services.

The potential complications after a head injury may be very serious but occur in the minority of patients, most of whom may be identified through clinical examination and various investigations. Debate has occurred about the management of those patients with mild injuries who are clinically normal on assessment but who may still be at risk for the development of complications. Routine admission of all these patients for observation, as was commonly done in the past, is a potentially wasteful practice, since benefit is difficult to demonstrate in the vast majority of patients who are discharged unchanged usually on the day following admission (2–5). The risk of development of complications in a patient who is neurologically normal and has normal skull X-rays on assessment in A&E has been estimated to be between 1/3000 and 1/6000 (4), justifying their discharge to the care of a responsible adult under specific circumstances. Guidelines have been developed to maximize the chances of identifying patients at increased risk for the development of complications while minimizing unnecessary admissions and the associated waste of resources (2).

The Scottish Intercollegiate Guidelines Network (SIGN) publication is an evidence-based national clinical guideline in widespread usage in the United Kingdom (UK). It includes recommendations for discharge from A&E for patients who are clinically and radiologically normal. These specify that observation at home may be appropriate for patients who have made a full neurological recovery from a head injury by the time of their assessment in A&E, including recovery from any brief period of post-traumatic amnesia and loss of consciousness of less than five minutes. In addition, a responsible adult should be available and willing to observe the patient for at least 24 hours, full verbal and written instructions should be given to that adult, there should be easy access to a telephone and transportation, and opportunity for the patient to be observed at a location which is reasonably close to the hospital.

At the UHWI, trauma accounted for 37% of all patients seen in the A & E department. Sixteen per cent of trauma cases may be admitted (1). Of all general surgery admissions to the UHWI, 20% are victims of trauma, the most common reason for admission. The head is the region most commonly injured (6). In the UK, approximately 20% of head-injured patients who attend A&E departments are admitted (3, 7).

Spending on healthcare by the Government of Jamaica amounted to only 3.9% of the national budget in 2001–2002 (8). Low capital investment in healthcare, ageing infrastructure and equipment, shortage of adequately trained staff of all grades of healthcare workers, all contribute to a situation of acutely scarce resources. Against this background, the waste of resources associated with trauma care of epidemic proportions, particularly for intentional injuries make cost containment an important consideration for all health workers.

There are no data that accurately estimate the specific daily cost of head injury management in hospital in Jamaica.

It has been estimated that A&E management of trauma patients at the UHWI costs an average of US\$70.00 (1). The cost of hospital care must be greater.

This study was done to determine the profile of head-injured patients who are admitted to the UHWI, to estimate the number of potentially unnecessary admissions to hospital and to identify any possible cost savings.

## SUBJECTS AND METHODS

The study group comprised 88 patients of all ages who were admitted to the UHWI, over the one-year period October 2001 to September 2002, due to head injury and were identified from prospectively collected data in the Jamaica National Trauma Registry administered by the Section of Surgery.

The data collected included age, gender, aetiology of injury, admission and discharge dates, the Glasgow Coma Scale (GCS) score (9), Injury Severity Score (ISS) (10), type of injury, other injuries, the Glasgow Outcome Score (GOS) (11) and investigations including plain X-rays, computed tomography and magnetic resonance imaging scans of the head and cervical spine. The SIGN guidelines (2) were applied to the study sample to assess the appropriateness of hospital admission.

Data were expressed as frequencies or means with standard deviations as appropriate and were analyzed using the Statistical Package for the Social Sciences (SPSS) version 10.0 for Windows software programme.

## RESULTS

During the study period, 88 patients were admitted to the UHWI with a clinical diagnosis of head injury. Their characteristics are given in Figure 1. There were 67 males (76.1%),

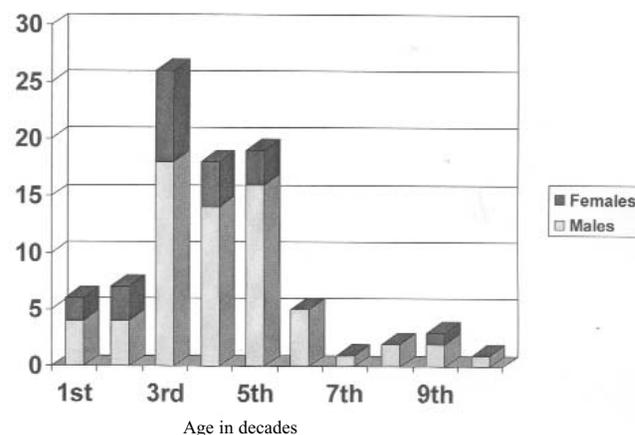


Fig 1: Age and gender distribution of head-injured patients.

the mean (SD) age of the entire group being 35.02 ( $\pm$  18.45) years. Most were in the third decade of life and the majority were below 50 years old.

Most patients (80.7%) had ISS of 1–15 but 17 (19.3%) had ISS of greater than 15, indicative of major trauma (Fig. 2). Seventeen patients (19%) had severe head injuries (GCS

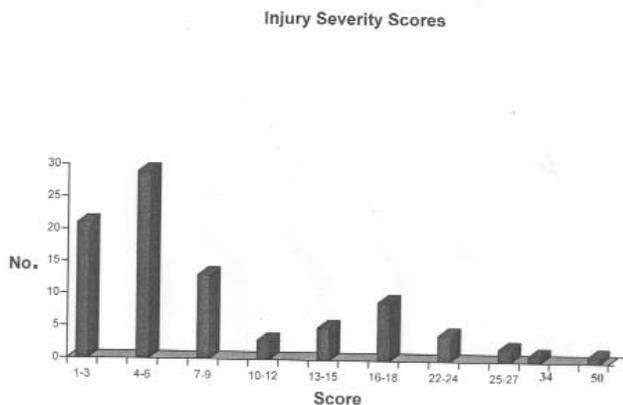


Fig. 2: Injury severity scores of admitted head-injured patients.

# 8) but only nine of these were admitted to the Intensive Care Unit. Most patients (68%) had minor head injuries (GCS 13–15) while 13% had moderate head injuries (GCS 9–12; Fig. 3).

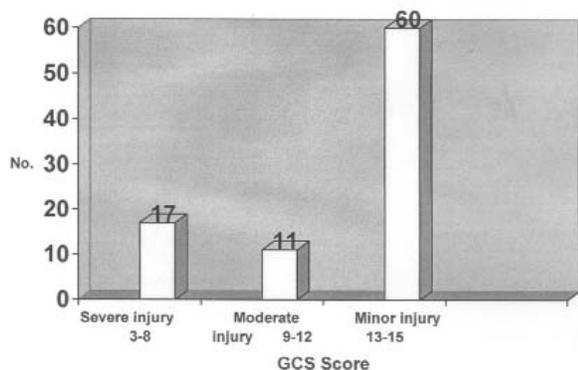


Fig. 3: GCS scores of admitted head-injured patients

While 53% of the entire group were admitted as a result of an unintentional injury such as a road traffic accident, falls or other work, sport or home-related accidents, 47% were intentional injuries due to gunshot wounds, stone throwing, physical fighting and penetrating injuries from sharp weapons (Table 1).

Table 1: Aetiology of injuries

Aetiology	No of patients	Per cent
Unintentional	47	53
RTAs	30	
Falls	10	
Other*	7	
Intentional	41	47
Sharp weapons	9	
Gunshots	11	
Other <sup>o</sup>	21	

Other\* – other unintentional injuries including work, sport or home related accidents.

Other<sup>o</sup> – other forms of intentional injuries including stone throwing and fighting.

It was found that 16 of those admitted (18%) did not meet the SIGN guidelines criteria for admission to hospital.

Mean hospital stay for the entire group was 9.83 days and median stay 3.50 days. Eighty per cent of appropriately admitted patients were discharged after a median stay of 5.5 days but admission time varied from 0–115 days. Death occurred in 15.9% of admitted head-injured patients. Patient outcome is given in Table 2.

Table 2: Patient outcome.

Patient outcome	No of patients	Percentage	Mean age (yrs)
Home	71	80.7	33.5
Died	14	15.9	37.4
Long-term care	3	3.4	54.5
<b>Total</b>	<b>88</b>	<b>100</b>	<b>35.0</b>

**DISCUSSION**

During the one-year study period, 88 patients were admitted to the general surgery wards with head injuries, most with minor injuries. Their age and gender profile were typical of patients seen with injuries in Jamaica (1, 6).

Almost one in five (19%) had serious injury reflected in ISS scores of over 15 and GCS scores of eight or less. Modern management of severe head injury requires intensive care techniques for optimum benefit to patients (12). It is not surprising in our circumstances that only half of those with serious injuries were admitted to the intensive care unit which has only eight beds and to which admission is often difficult due to bed, equipment and staff shortages. The impact of this on their outcome is unknown.

These results show that 18% of admissions for head injury at the UHWI are potentially unnecessary if the SIGN guidelines are used. These findings suggest that significant cost savings may be realized at this institution by the uniform application of head injury guidelines for minor injuries, as with the adoption of other guidelines for severe injury in the same hospital (13). Evidence-based guidelines have been touted to reduce cost, improve outcome, reduce complications and increase efficiency when applied to disease management including head injury (2, 12, 14).

This study cannot assess those patients with minor injuries who were appropriately discharged from the A&E at UHWI following application of the SIGN or similar guidelines applied by the assessing medical officers. Such discharge as well as head injury observation advice is currently done at the UHWI. These findings suggest that such a decision-making process may be inconsistent.

It is reasonable to assume that other hospitals in Jamaica practice the traditional method of head injury management more frequently. It is therefore possible that the quantum of possible cost savings may be even greater outside of the UHWI. This area deserves further study.

Within the UHWI, there would seem to be a need to standardize the admission criteria for minor head injury in the interests of efficiency and to minimize waste of resources. All those responsible for policy decisions should discuss the issue, agree on the guidelines which should be followed, allow enough time for promulgation and education, consistently implement the agreed guidelines and audit their application.

## REFERENCES

1. McDonald A, Duncan ND, Mitchell DIG, Fletcher PR. Trauma aetiology and cost in the Accident and Emergency Unit of the University Hospital of the West Indies. *West Indian Med J* 1999; **48**: 141–2.
2. Scottish Intercollegiate Guidelines Network. Early Management of Patients with a Head Injury. Royal College of Physicians of Edinburgh. August 2000.
3. Brown SR, Raine C, Robertson CE, Swann IJ. Management of minor head injuries in the accident and emergency department: the effect of an observation ward. *J Accid Emerg Med* 1994; **11**: 144–8.
4. Mendelow AD, Teasdale G, Jennett B, Bryden J, Hessett C, Murray G. Risks of intracranial haematoma in head injured adults. *Br Med J* 1983; **287**: 1173–6.
5. Teasdale GM, Murray G, Anderson E, Mendelow AD, MacMillan R, Jennett B et al. Risks of acute traumatic intracranial haematoma in children and adults: implications for managing head injuries. *BMJ* 1990; **300**: 363–7.
6. Crandon I, Carpenter R, McDonald A. Admissions for trauma at the University Hospital of the West Indies. A prospective study. *West Indian Med J* 1994; **43**: 117–20.
7. Strang I, MacMillan R, Jennett B. Head injuries in accident and emergency departments at Scottish hospitals. *Injury* 1978; **10**: 154–9.
8. Jamaica Budget Memorandum, Central Government Budget 2001/2002. FY 2000/1.
9. Teasdale G, Jennett B. Assessment of coma and impaired consciousness. *Lancet* 1974; **II**: 81–84.
10. Baker SP, O'Neil B, Haddon W Jr, Long WB. The Injury Severity Score: a method for describing patients with multiple injuries and evaluating emergency care. *J Trauma* 1974; **14**: 187–96.
11. Jennett B, Bond M. Assessment of outcome after severe brain damage. *Lancet* 1975; **I**: 480–4.
12. Guidelines for the management of severe head injury. Brain Trauma Foundation, American Association of Neurological Surgeons, Joint Section on Neurotrauma and Critical Care. *J Neurotrauma* 1996; **13**: 641–734.
13. Bruce CAR, Jackson AGA, Crandon IW. Outcome of evacuated acute intracranial masses. *West Indian Med J* 2001; **50 (Suppl 2)**: 45.
14. Maas AI, Dearden M, Teasdale GM, Braakman R, Cohadon F, Iannotti F et al. EBIC – Guidelines for management of severe head injury in adults. European Brain Injury Consortium. *Acta Neurochir (Wein)* 1997; **139**: 286–94.