

SECOND CARNEGIE INQUIRY INTO POVERTY  
AND DEVELOPMENT IN SOUTHERN AFRICA

Childhood head injuries  
and poverty

by

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## CHILDHOOD HEAD INJURIES AND POVERTY

Head injuries are a major cause of disability and death in childhood.

Studies of the problem in other parts of the world have shown that economic factors contribute to the causes, and have an effect on the outcome of head injuries. (1, 2, 3).

A comparison between underdeveloped and developed countries shows marked differences in the epidemiology of head injury. For example, falls dominate as a cause of head injury in India, where there is a large rural population not exposed to the hazards of traffic, while in the developed countries, like the United Kingdom, road traffic accidents rank highest. (1)

Within countries, differences of social class have also been shown to affect the epidemiological picture, with more children from congested, low-income residential areas, whose fathers are of low occupational status, suffering head injury. (2)

In South Africa, however, the extent of the problem of head injury in childhood has not been adequately documented. Although sporadic studies have examined clinical aspects, such as the nature and management of head injury, scant attention has been paid to prevention and rehabilitation.

In an attempt to locate potential areas of intervention, the Departments of Neurosurgery, Paediatrics and Forensic Medicine at the University of Cape Town are undertaking an epidemiological study of head injury in childhood.

This paper seeks to address some aspects of the causes of such injury, and the inadequate rehabilitation measures for the victims.

## THE STUDY

The first phase was a retrospective analysis of hospital records of those children with head injury severe enough to merit admission to hospital. In a 15 year period, from 1966 to 1981, almost 1800 children were admitted to either the Grootte Schuur or the Red Cross Children's Hospital. The annual frequencies did not show marked fluctuation.

The second phase, which is in progress at the moment, also uses hospital admission as a criterion for inclusion, but examines the causes and outcome of head injury in greater detail.

Because the study is incomplete, this paper will derive emergent trends in the investigation, and will propose possible relationships, based on the experience of others, and a knowledge of the prevailing conditions in Cape Town.

### Constraints of the paper

Official information in South Africa is collected on the basis of population groups, and socio-economic indicators, such as income, occupation and education are not systematically recorded. Because hospital data is available in this form, trends in this paper are derived from data collected by population group, and are examined in relation to conditions of poverty.

Another constraint is the sample selection, whereby only those children who have been admitted to hospital are included in the study. Although this may reflect severity of injury, hospital admission is also dependent on the bias of the admitting medical attendant, and the ease of access to the hospital. Moreover, this criterion excludes a large sector of childhood head injury in the community, for which preventive measures cannot be proposed because of lack of information.

WHO SUFFERS HEAD INJURY?

In the 15 year retrospective study, more than 1 800 children were admitted to hospital following head injury.

	MALE	FEMALE	TOTAL
WHITE	229	115	344
COLOURED	847	415	1262
BLACK	139	75	214
	1215	605	1820

Although the sample includes children with residential addresses from as far afield as Benoni and East London, most of the children lived in the greater Cape Town area.

For the greater Cape Town area, the study sample did not reflect the demographic pattern.

Comparison of study sample with demographic profile in the greater Cape Town area - by percentage (children aged 0 - 14 years)

	<u>STUDY SAMPLE</u>	<u>POPULATION *</u>
WHITE	19	32
COLOURED	69	56
BLACK	12	12
	100%	100%

\* from 1980 census data.

The sample does not mirror the population proportions. This discrepancy could be accounted for by several factors.

One of these is the possibility that White children may be treated at other private facilities, which creates a spurious low proportion.

Conversely, with lesser access to private facilities because of financial limitations, there may be a relatively higher number of Coloured children being admitted to hospital with head injury.

This study does not give a complete epidemiological picture of head injuries, since only those children admitted to hospital are examined. On the one hand, as suggested above, White children may be treated at private institutions, while on the other hand, Coloured and African children may be treated on an ambulatory basis.

This dilemma can only be resolved by a large community-based epidemiological study of the problem, which is not feasible now.

#### CAUSES

Health professionals, parents and members of the community are made particularly anxious by head injuries, which often arouse fears of possible sequelae, even when recovery is apparently excellent.

Therefore, understanding the major causative factors and important variables associated with head injury is a necessary prelude to prevention.

#### Traffic

The major cause of head injury severe enough to merit admission to hospital in the Cape Town study was traffic-related.

Traffic presents a very complex environment for a child, who is unable to anticipate, and therefore, adapt to, traffic hazards. Young pedestrians have little protection in traffic, and toddlers in particular are oblivious of danger.

International studies have shown that the children involved in pedestrian accidents tend to come from families in which there is illness, maternal preoccupation and little opportunity for protected play. The fathers are employed as unskilled workers, and the families live in the more densely populated areas.<sup>(4,5)</sup>

The trend in both the retrospective and the prospective studies in Cape Town indicates that many of the head-injured children live in either the African townships, viz. Langa, Nyanga and Guguletu, or the new township of Mitchells Plain on the False Bay coast.

What are the postulated reasons for this geographical distribution? In the African townships in Cape Town, there are few, if any protected play areas. Children in these areas are forced to play on the pavements, or more often, they play in the streets, where there is very limited traffic control, and poor demarcation of pavements and roads.

Whereas traffic regulations for the rest of Cape Town are enforced by the traffic departments of the local authorities, in the African townships the responsibility for this task rests with the Administration Board, which has only implemented a limited form of traffic control, namely, one set of traffic lights and some stop signs.

The poverty of people living in the African townships does not preclude the use of motor vehicles for transportation to work; inadequate, crowded and expensive public transportation is compelling many more people to the use of private forms of transport. Private transport is also a safe form of getting about when gang-assault of the free roaming pedestrian is so common.

While Mitchells Plain is an example of planned township, with play areas, the wide arterial roads, with few traffic lights, are dangerous for vehicles and pedestrians alike.

The expensive cost of living, together with high rentals and the cost of transportation to places of employment which are far from Mitchells Plain, place an enormous financial burden on families. In many cases, both parents are forced to go out to work, and young children are left in the care of older siblings or of childminders. The latter invariably care for a large number of children, as day-care facilities are grossly inadequate, and stringent regulations governing the structure and size of day care centres militate against the creation of many more "legal" facilities.

Although the "illegal" childminders play a vital role in the absence of alternative facilities, the large numbers of children in their care makes supervision of play difficult, and places the young children at greater risk of all kinds of mishap, including traffic-related injury.

The word "accident" implies that the event is not predictable or preventable. However, it appears that head injuries from pedestrian accidents are a predominantly social disease of poor urban areas, and that they are imminently preventable.

### FALLS

In the causes of head injury in childhood, this is another significant category. In some series reported in the literature, falls are the dominant cause of head injury. (6,7) The study under review eliminated consideration of those falls which produced minor head injury for which hospitalisation was not necessary. In the Cape Town study, falls ranked second to traffic in the cause of head injury, in all except the youngest age groups.

In the coloured and African children, falls from a height were the most common type of fall.

Details of the setting of most falls are not available in the retrospective study, but provision has been made for the collection of detailed data in the prospective study.

In other studies, one of the common environmental settings for falls from a height causing head injury is the multi-storied dwelling in a poor state of repair. (8,9)

In Cape Town, a prototype of housing for the poor is a multi-storied flat, occupied by many tenants, and having an access of steep staircases with inadequate guard rails - an ideal setting for a toddler to fall!

Another possible association with falls from a height in poor children is the use of adult beds and couches for changing and dressing young infants.

In a review of the subject, Sieben, writing in a paediatric journal in 1971 described the typical home setting for falls from a height in



New York City as follows: "The typical tenement in the Negro and Puerto Rican ghettos of the South East Bronx, where these buildings abound, is without screens or air conditioners, and has a prominent fire escape, frequently used as a play area by children. When one walks through this area on a warm day, one is impressed by the social function served by the windows: children of all ages, as well as adults, lean out to talk to neighbours, to cool off, or to watch the activity in the streets below."

He also states: "It is a sad commentary on our society that at the present time the illegal accumulation of refuse about these buildings appears to save more lives than any legal measures requiring appropriate window guards."<sup>(8)</sup>

#### WHAT HAPPENS AFTER THE INJURY?

In Cape Town during the 15-year period of the retrospective study, almost 1 000 children died as a result of head injury either at the site of the accident, or on the way to hospital.

This indicates the severity of the injury inflicted when the child pedestrian is struck by a motor vehicle. The lack of health care facilities to provide emergency care for the head-injured child at or near the scene of the accident in the townships, or on the way to hospital may be an added factor.

The area of Mitchells Plain, which is almost eight years old and has a population of approximately 200 000 people, has two half-day hospitals and one full day hospital. This service is complemented by about 20 general practitioners, of whom only one lives in the area.

Emergency care after hours has to be sought at hospitals such as Grootte Schuur and Red Cross Children's Hospital, several kilometers (and about R4,00 in transport fees!) away.

In the African townships, where there is a similar dearth of emergency services, ambulances have to be called to transport patients to hospital for emergency care. In most cases, these ambulances only go as far as the local police station, to which injured patients have to find their own way.

Therefore the head-injured child in the township has the problem of gaining access to hospital as a further burden.

#### AND AFTERCARE?

In other studies of head injury in childhood, broad categories of mortality and morbidity have been used to assess outcome. (7,10)

To provide guidelines for rehabilitation and to assist in the planning of education curricula, neuropsychological assessment is essential for a more detailed qualitative description of outcome.

Very few studies of motor and intellectual function following such injury have been published.

A paper by Brink and others in California<sup>(11)</sup> reviewed the outcome of severe head injury in 52 children, all of whom had some neurological impairment, including spasticity, visual and auditory deficits, seizures and retardation; more than two thirds also had speech defects. The academic performance of the majority of those children enrolled in school was impaired, and many had personality and behaviour problems.

An assessment of intellectual performance following head injury in 97 children<sup>(12)</sup> revealed a significant association between intellectual impairment and severe brain trauma.

Neuropsychological testing on 45 head-injured children in another series in Texas<sup>(13)</sup> not only demonstrated early neuropsychological sequelae and long-term deficit following severe injury, but also residual intellectual impairment in children with relatively mild injuries.

In the Cape Town study, folder review of the children admitted to hospital with head injury showed that about 90% were discharged home. However, no systematic neuropsychological assessment was made; such assessment is being done on children in the prospective study.

No results are available yet.

In the absence of any outcome data, an attempt at speculation would be foolhardy.

However, a review of the facilities for handicapped children is appropriate. These, like the data, are presented by population group. <sup>(4)</sup>

### Education services

#### White children

The Department of Education, in addition to ordinary classes, also provides special classes which cater for pupils who cannot cope with the normal school curriculum, and who are placed in these classes after full psychological testing.

There are a number of school clinics where psychological guidance and some remedial tuition is carried out, and at high schools, teacher-psychologists have been introduced to assist with vocational guidance and counselling.

There are other special schools, some of which are state-aided, providing tuition for the physically or mentally handicapped children.

#### Coloured children

In addition to normal classes, there are, in certain primary schools, adjustment or adaptation classes for mentally handicapped children.

There is one school clinic in Heideveld, a township on the Cape Flats, and a few state-aided schools for the physically and mentally handicapped.

### African children

Normal education is not yet compulsory for African children, and in the Western Cape there is only one special school for physically handicapped children.

### Institutions for the mentally handicapped

State institutions for the mentally handicapped are limited in number, and have very long waiting lists.

There are a few day centres in the Western Cape, concentrated in Cape Town, and organised by welfare agencies such as the Cape Mental Health Society.

Most of the residential centres are privately funded or stated-aided, and the fees charged make these inaccessible to poor children.

Although the extent of the problem of handicap following head injury in children in Cape Town is not known, the international experience indicates that the neuropsychological and psychological sequelae are significant, and that active rehabilitation programmes and appropriate educational facilities are an integral part of the management of head injury in childhood.

It is clear that in anticipation of the sequelae of head injury the after-care facilities need to be extended to enable those who do not have money to have a fair chance of access.

### CONCLUSION

The retrospective study of childhood head injury in a 15-year period in Cape Town in which approximately 1 800 children were admitted to hospital, and a further 1 000 died at the site of injury or en route to hospital, has shown that this is a problem which needs to be addressed.

In this paper, in which associations are proposed, and educational and rehabilitation facilities for the handicapped child are briefly reviewed, there are indications that the poor child in Cape Town is not only at risk for head injury, but also, following such injury, has constraints on his access to emergency health care in the early period, and later, to appropriate educational and rehabilitation facilities.

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## REFERENCES

1. Chowdhary, U.M.: Comparative epidemiology of head injuries in developed and developing countries  
J. Irish. Med. Assoc. (1978): 71(18), 617
2. Klonoff, H., Robinson, G.C.: Epidemiology of head injury in children  
Amer. J. Publ. Hlth. (1971): 61, 2405
3. Dillon, H., Leopold, R.L.: Children and the post-concussion syndrome  
J.A.M.A. (1961): 175, 86
4. Backett, E.M., Johnstone, A.M.: Social patterns of road accidents to children: some characteristics of vulnerable families  
Brit. Med. J. (1959): 1, 409
5. Read, J.H.: Traffic accidents involving child pedestrians.  
Pediatr. (1969): 44, 838
6. Rune, A.: Acute head injuries in children  
Acta. paed. Scand. (Suppl.) (1970): 209, 3
7. Hendrick, E.B. et al.: Head injuries in children  
Clin. Neurosurg. (1964): 11, 46
8. Sieben, R.L. et al.: Falls as childhood accidents: an increasing urban risk  
Pediatr. (1971): 47(5), 886
9. Krawitz, H. et al.: Accidental falls from elevated surfaces in infants from birth to one year of age  
Pediatr. (Suppl.) (1969): 44, 869
10. Browne, L.A.: Head injuries 1972 - 1973  
J. Irish. Med. Assoc. (1977): 70(6), 197
11. Brink, J.D. et al.: Recovery of motor and intellectual function in children sustaining severe head injuries  
Develop. Med. Child Neurol. (1970): 12, 565
12. Chadwick, O., Rutter, M. et al.: Intellectual performance and reading skills after localised head injury in childhood  
J. Child Psychol. Psychiat. (1981): 22, 117
13. Levin, H.S., Eisenberg, H.M.: Neuropsychological outcome of closed head injury in children and adolescents  
Child's Brain (1979): 5, 281
14. Directory of Services for Children: Department of Paediatrics and Child Health, University of Cape Town, 1983