

'Flying Coffins' and Neglected Neuropsychiatric Syndromes in Oman

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النعوش الطائرة و المتلازمات النفسية العصبية المهملة في عمان

عزيز النعماني، سمير العدوي

In addition to raising awareness, this article is a tribute to our colleagues who were killed or maimed in road accidents. In the recent past, we have lost Dr. Andrzej Krolkowski of our Obstetrics & Gynecology Department and more recently Mr. Yusuf Zahran Al-Waili, Pharmacy Department, Sultan Qaboos University Hospital.

*"It began with three young friends taking what they thought was
A life time ride on a night of fun
The engine roared on speed, but slippery road waited
Lost control and crashed
Two out of three died
As the one who drove remained alive in a vegetable state
He wished he could bring his friends back
In misery of this loss their families were wrecked
As he remained in vegetable state
Agonized with memories"*

Nasra Al-Adawi

IMPROVING HEALTH SERVICES TO TRAUMATIC brain injury (TBI) patients and their families is paramount for the social and economical future of any country. The consequences of TBI are varied, but nevertheless devastating, both to the individual and to society in general. Recently there has been tremendous improvement in emergency care, acute medical management and modern neurosurgical interventions in Oman. One obvious omission from this development is neuropsychiatric intervention and rehabilitation using a multidisciplinary approach, including speech therapy and other outreach services, to integrate victims of brain injury back into the community. As in other countries, survivors of TBI are left with irreversible and debilitating neuropsychiatric complications. These

complications are critical for the quality of life of both patients and their relatives.¹

Studies have shown that the most important factors predicting the post-rehabilitation adjustment, in addition to the severity of the brain damage, are psychosocial complications such as the nature of emotional and behavioural disturbances, the nature and responses of the family and the extent to which the patient has full insight into their functional impairment.²

In psychiatric parlance, these sequels of TBI amounts to the loss of functions that are an integral part of one's selfhood and, because of their isomorphic and protean signs and symptoms, they are generally neglected in algorithms of healthcare. Utilizing the rehabilitation process is important for these patients since

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Table 1: Causes of death and disability 1998-2020

1998 - Disease or Injury	2020 - Disease or Injury
1. Lower respiratory infections	1. Ischaemic heart disease
2. HIV/AIDS	2. Unipolar major depression
3. Perinatal compromising conditions	3. Road Traffic Injuries
4. Diarrhoeal diseases	4. Cerebrovascular disease
5. Unipolar major depression	5. Chronic obstructive pulmonary disease
6. Ischaemic heart disease	6. Lower respiratory infections
7. Cerebrovascular disease	7. Tuberculosis
8. Malaria	8. War
9. ROAD TRAFFIC INJURIES	9. Diarrhoeal diseases
10. Chronic obstructive pulmonary disease	10. HIV/AIDS

Adapted from: Murray CJL, Lopez AD, eds. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020. Boston, MA, Harvard School of Public Health, 1996.

minor gains in function can help alleviate the significant life alterations felt by their families. Lower scores in indices of quality of life commonly found in such patients tend to increase the cost of their care. The aim of this paper is to highlight some of these subtle and yet debilitating impairments that have negative effects on a meaningful existence. The causative factors of TBI in Oman will be considered, with particular attention to road traffic accidents (RTAs).

THE MAGNITUDE OF THE PROBLEM

Each year at least 10 million people worldwide sustain TBI and it is becoming increasingly clear that TBI is a leading cause of death and disability.³ Most disheartening, TBI impacts individuals who are at their most productive in their respective society, namely, those who are under 45 years of age.⁴ If one considers that this age group is at risk, then the situation in Oman is likely to be critical, as 88.6% of the Omani population are within this age group.⁵

Each year 300-400 per 100,000 people in Oman incur TBI. This amounts to approximately 17 to 23 persons per day sustaining TBI.⁶ In a survey conducted by Ministry of Health,⁷ out of 17,791 individuals surveyed, 116 of them reported to have suffered 'serious accidents' in the preceding years. Interestingly, 60.8% of the reported accidents were due to transport and

traffic accidents. Approximately 11% of those injured had been admitted in hospital "for long time" and at least 1.2% of them were living with varying degrees of disabling conditions that manifest as physical handicap. Little has been reported on their emotional, cognitive and behavioural functioning.

Converging views strongly suggest that RTAs are the main source of TBIs, estimated to cause between 42.1% and 95% of TBI in Oman.⁸ This statistic translates into a major cause of personal suffering for patients and their families and a loss of productivity for the nation. As the brain is one of the organs that is compromised with all the adverse consequences in term of personality change, reduced self-care and overall diminution of quality of life, the family members who are responsible for their injured relative's care tend to be in an 'emotional paradox' when the life of a previously healthy individual is irrevocably altered.⁹ While the disabled person may not even realize anything has happened to him or her, the family may go through the burden and distress of 'burying' the person they previously knew and trying to develop a relationship with a new and less affable stranger.¹⁰

With the increasing rates of RTAs and vehicle ownership, this situation is predicted to become worse in the coming years. Each day 140,000 people are injured and 3,000 die from RTAs world wide.¹¹ RTAs are the second leading cause of death among adults aged 15 to 44 years old. RTAs was the eighth leading cause of disability-adjusted life years' loss (DALYs) in 2000 and will become the third leading cause of DALYs by 2020³ [Table 1], obviously outstripping the current 'enemies of health' such as communicable diseases and malnutrition.¹²

Studies have shown that there is no one strategy to reduce the rising tide of morbidity and mortality from RTAs. It appears that a myriad of socio-cultural factors contribute to RTAs¹³, each one often having its own individual set of factors. There is cross-national disparity in the occurrence of RTAs with developing countries suffering under the heaviest burden. In general, the majority of the accidents in developing countries affect non-drivers such as passengers and other road users. However, this view does not hold for Oman and her neighbouring countries. Previous studies have shown that the mortality from RTAs in Gulf countries is higher than that in developing countries with similar car ownership ratios [Table 2].¹⁴ The effect of RTAs appears to be evenly distributed for both drivers and

Table 2: Statistical comparison of fatalities due to road traffic accidents (RTA) in United Kingdom, United States, United Arab Emirates, Oman and Qatar

Country and year	United States 2000	UK 2000	United Arab Emirates 2000	Oman 2000	Qatar 2000
Mortality from RTA	41,471	3,409	673	492	85
Registered vehicles	217,028,000	28,890,000	575,929	477,948	303,245
Fatality per 100,000 vehicles	19.1	11.8	116.8	102.9	28
Fatality rate per 100,000 Population	15.1	5.7	21.6	20.5	14.7
Population per vehicle	1.3	2.1	5.4	5	1.9

Adapted from: Bener A, Crundall D. Road traffic accidents in the United Arab Emirates compared to Western countries. *Advances in Transportation Studies an international Journal* Section 2005; A 6: 5-12.

non-drivers. The majority of non-drivers are children. If we compare the situation to industrialized countries, then the extent of the problem becomes even more obvious. The number of fatalities per hundred thousand vehicles in Oman is nearly four times greater than that of UK. In real terms, Oman's mortality for road crashes was 28 per 100,000 of the population by the end of 2005, which far exceeds the global average of 19 per 100,000. Mortality and morbidity from RTAs in Oman continue to increase annually. The situation is so serious that some commentators have dubbed motor vehicle 'flying coffins'¹⁵ and resultant death as "vehicular manslaughter".¹¹ Studies from the United Arab Emirates suggests that approximately 62% of RTAs leading to fatalities are due to "carelessness" and "excessive speed".¹⁴ In Oman, a study has shown that children are generally either left unrestrained in a car without a seatbelt or in compliance to local traffic regulations.¹³

In addition to the huge human and social cost of these injuries, the related economic cost is also substantial. It has been estimated that just acute in-patient medical care costs the Oman national coffers approximately 3.3 million Omani riyals a years (c. US \$8.5 million). If we add the cost of the services and support these patients need in the community, the figure would be much higher. Furthermore, this cost is only for the moderate and severe cases of injury, which are brought to medical attention. There is also the yet to be calculated the cost of 'doctor shopping' where distressed family venture abroad in a bid to find a cure for their loved ones.

There is a bright spot in this gloomy situation. In

some countries, due to the improvement of road safety and emergency care, the mortality from RTAs has actually decreased as shown in Table 3. Although some critics would point out that the decrease in mortality has paradoxically resulted in some victims surviving to live with more severe and debilitating, disability prevention is still infinitely superior to rehabilitation. Oman has been instrumental in advocating road safety within the United Nations which has culminated in a campaign for "Global Road Safety - A Shared Responsibility".¹⁶ In 2006, there was also indication that the number of RTA had reached asymptote.¹⁷ This resulted in a lower death rate, but still means that an unacceptably high number of people are surviving with more or less severe sequelae of RTAs. It is possible that decrease in mortality may be partly due to recently improved critical care services as well as vigilant surveillance on the highways to curb speeding.

NEUROPSYCHIATRIC SEQUELAE OF TBI

In addition to the various physical complications of TBI triggered by RTAs, there are significant numbers of survivors of RTAs who are marked with cognitive, behavioural and emotional impairment.¹⁸ Despite being isomorphic complaints, these neuropsychiatric impairments have been estimated to affect 0.7% to 44% of the survivors of RTAs depending on various factors including diagnostic criteria used, survey methodology and astuteness of the health-care provider. Cognitive and emotional impairment from RTAs tends to lead to poor impulse control whereby a premorbidly healthy individual may indulge into high risk taking. One im-

Table 3: Changes in road traffic fatality rates (deaths per 10,000 population), 1972-1998

Country or area	Change (%)
Canada	-63%
Hong Kong	-62%
Sweden	-58%
France	-42%
New Zealand	-33%
USA	-27%
Japan	-24%

Source: Modified from Kopits E, Cropper M. Traffic fatalities and economic growth. Washington, DC, The World Bank, 2003 (Policy Research Working Paper No. 3035)

plication of this is that the adverse effect of RTAs may beget cognitive impairment that compromise ones social and occupational competencies. It has been empirically demonstrated that some of these victims may succumb to drug and alcohol abuse in order to 'medicate' themselves against the effects of the unremitting afflictive emotions triggered by the injury.¹⁹ These substances interact with the culprit's underlying brain damage to further undermine much needed neuroplasticity and functional recovery.²⁰

In addition to 'classical' psychiatric disorders such as those shown in Table 4, one of the commonest and least well-studied complications of TBI is apathy or sometime called abulia.²¹ Apathy has been defined as lack of motivation that is not attributable to a diminished level of consciousness, cognitive impairment or emotional distress.²² Motivation in TBI patients is essential for physical rehabilitation and for improving their quality of life. Studies have shown that apathy is associated with several adverse outcomes including reduced functional level, decreased response to treatment, poor illness outcome, caregiver distress and chronicity.²³ It has been estimated that approximately 18% to 90% of the survivors of TBI in Oman are marked with poverty of action²⁴ and other negative feature that are important indicators of a poor quality of life.

World Health Organization statistics indicates that depression was the fifth leading cause of disability at the turn of this century. Depression has been predicated to become the second leading cause of disability by 2020³ [Table 1]. It has been reported that up to 77% of TBI patients suffer from poor outputs and self-directedness after TBI. This may reflect the failure of the verbal regulation of behaviour and the spontaneous use of language to formulate strategic action plans;

hence the survivor will become reactive rather than proactive, this suggesting the presence of a major depressive disorder.²⁵ In a study in Oman, 63% of Omani TBI patients had such a temperament.²⁶ The presence of depression is likely to have a negative effect on one's cognitive functioning in addition to impaired motivation and afflictive emotions. Early diagnosis and treatment of depression is important in order to improve the quality of life of these patients. As depressive syndromes have no universal phenotypical presentation, studies are needed to explore how depression in TBI is manifested in the Omani population.

Conceptually related to impaired motivation, another widely neglected sequel of TBI is fatigue. Fatigue is defined as the awareness of a decreased capacity for physical and/or mental activity due to an imbalance in the availability, utilization, and/or restoration of resources needed to perform activity.²⁷ Studies have found the incidence of fatigue in TBI patients to range from 32.4% to 73%.²⁸ Among Omani patients with TBI, unreported data have found that 81% were marked with unremitting fatigue that results in a poor quality of life. Clinicians tend to perceived fatigue as poor compliance or outright laziness. Most discouraging, fatigue in TBI is a chronic problem and not easily amenable to therapeutic interventions. In a sample of individuals with TBI living in the community, 68% were noted to be suffering from fatigue two years post-injury and 73% of patients with TBI had fatigue five years post-injury.²⁹ The majority of these patients were inept in their social and daily living activities.

The fourth neglected negative outcome of TBI is changes to individual cognition that are relevant to memory, attention, executive function and language. These deficits are so common that have been reported in up to 66.7% of TBI patients.²⁸ Impaired cognitive functioning is likely to have a significant impact on one's social and occupational competency. These cognitive impairments sometime occur together with post-concussion symptoms that may manifest as irritability, inattention and impaired vegetative functioning. These functions are critically important in day-to-day life so the persistence of such deficits constitutes an obstacle for long-term functional independence and quality of life. In the instance of sleep/wake cycles, various types of reduced quality of sleep have been described in the literature, for example post-traumatic hypersomnia, post-traumatic narcolepsy and post-traumatic insomnia.³⁰ These conditions and their vari-

Table 4: Traumatic brain injury (TBI) and psychiatric disorders (PD)

Disorder	Cases sustained TBI	Duration of follow-up in year	Cases with PD	% with disorder	Relative risk
Depression	653	7.5	289	44%	7.5
Panic disorder	282	7.5	26	9.2%	5.8
Bipolar affective disorder	374	7.5	15	4.2%	5.3
Obsessive compulsive disorder	282	7.5	18	6.4%	2.6
Anxiety disorder	398	7.5	36	9.1%	2.3
Post-traumatic stress disorder	441	7.5	52	14.1%	1.8
Substance abuse	168	7.5	37	22%	1.3
Schizophrenia	302	4.9	2	0.7%	0.5

Source: Van Reekum, R, Stuss DT, Ostrander L. Apathy: Why Care? J Neuropsychiatry Clin Neurosci 2005; 17:7-19.

ants result in difficulty falling asleep, disturbed sleep, nocturnal awakenings, early morning awakenings, sleeping too much or too little, non-refreshing sleep, daytime fatigue and excessive daytime sleepiness. It is becoming increasingly evident that poor quality of sleep is an independent risk factor for heightened morbidity and mortality.³⁰ To our knowledge, there are no studies in Oman that have examined post-concussion symptoms in survivors of TBI. Such data would be essential for charting the most productive ways to rehabilitate such patients.

The final neglected aftermath of TBI is a peculiar disorder where a poor quality of life is aggravated by a denial of disabilities. In psychiatric literature, this condition is known as anosognosia. Damasio³¹ has stated that there are particular types of brain damaged patient who firmly believe that they are 'fine' despite severe neurological and cognitive incapacities. It has been reported that lack of insight reflects specific deficits resulting from brain damage.³² Incidence of anosognosia, as should be expected, would be difficult to quantify, but it is well known that unawareness of loss of function is directly related to poor functional outcome. A similar generalization can be attributed to other neuropsychiatric complications following brain injury. In spite of their impact on the quality of life, neuropsychiatric complications are largely relegated to a category of 'exotic' conditions that bear little relevance to health care needs in developing countries.

CONCLUSION

Despite these very well documented behavioural, emotional and cognitive complications of TBI, most

patients with TBI worldwide, including Oman, do not receive any services helping them adjust to their newly acquired functional and cognitive limitation. When the past life of a productive member of the society is abruptly and irrevocably lost, the caregiver bears the brunt of such a predicament. Emotional, behavioural and cognitive consequences of TBI are not well understood by family members and, for that matter, by many professionals either. It is not uncommon for clinicians to assume that these patients are exaggerating their symptoms or malingering.³³ The family may find it very difficult to accommodate the erratic and less likeable survivor of the RTA. As a result, emotional or behavioural problems are seen as psychological and not attributed directly to the head injury.³⁴ Unfortunately, this attitude can lead to delayed or wrong treatment of the problem. In Oman, centres to provide such services are ostensibly absent.

It is noteworthy that TBI patients need psychiatric consultation because emotional, cognitive distresses and behavioural problems are responsible for at least as much disability as physical symptoms.¹ Treatment of these complications should lead to decreased handicap, improved quality of life and minimized negative societal impact. In addition to various neuropsychiatric impairments, TBI patients also suffer from challenging social and economic consequences of their injuries. Studies have found that, on average, 15 years post injury 75% of head injury patients are not working and 66% need assistance with their activities of daily living.³⁵ Studies examining the functional prognosis of victims of TBI would be essential in planning future healthcare provision in Oman.^{36,37}

While these victims are struggling with sequelae of RTAs, flying coffins are speeding round the country. For the family or caregivers of these victims, the impact of these moving coffins has resulted in irrevocable loss or handicap of their loved ones. For victims, it does not matter any more since the coffin has either carried them to the next world or blighted their lives with neglected neuropsychiatric syndromes. In either case, the choices are stark.

REFERENCES

- Lishman WA. *The Psychological Consequences of Cerebral Disorder in Organic Psychiatry*. Oxford: Blackwell Science Ltd, 1998.
- Chronister J, Chan F. A stress process model of caregiving for individuals with traumatic brain injury. *Rehabil Psychol* 2006; 51:190-201.
- Murray CJL, Lopez AD, eds. *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Cambridge, Mass: Harvard University Press, 1996.
- Flaada JT, Leibson CL, Mandrekar JN, Diehl N, Perkins PK, Brown AW, Malec JE. Relative risk of mortality after traumatic brain injury: a population-based study of the role of age and injury severity. *J Neurotrauma* 2007; 24:435-45.
- Ministry of National Economy: *Statistical Yearbook 2004*. (28th Edition) Muscat, Oman, 2004.
- Ansari S, Akhdar F, Mandoorah M, Moutaery K. Causes and effects of road traffic accidents in Saudi Arabia. *Public Health* 2000; 114:37-39.
- National Health Survey, 2000: Study of life Style Risk Factors. Directorate of Research and Studies and Directorate of General Health Planning, Vol 1. Muscat: Ministry of Health, 2000.
- Al-Adawi S, Burke DT. Revamping neurorehabilitation in Oman. *Sultan Qaboos Univ J Sci Res Med Sci* 2001; 3:61-64.
- Chiambretto P, Ferrario SR, Zotti AM. Patients in a persistent vegetative state: Caregiver attitudes and reactions. *Acta Neurol Scand* 2001; 104:364-368.
- Niemeier JP, Burnett DM. No such thing as 'uncomplicated bereavement' for patients in rehabilitation. *Disabil Rehabil* 2001; 23:645-653.
- Dahl R. Vehicular manslaughter: the global epidemic of traffic deaths. *Environ Health Perspect* 2004; 112:A628-31.
- Al-Adawi S. Emergence of Diseases of Affluence in Oman: Where do they Feature in the Health Research Agenda? *Sultan Qaboos Univ Med J* 2006; 6:3-9.
- McIlvenny S, Al Mahrouqi F, Al Busaidi T, Al Nabhani A, Al Hikmani F, Al Kharousi Z, et al. Rear seat belt use as an indicator of safe road behaviour in a rapidly developing country. *J R Soc Health*. 2004;124:280-3.
- El-Sadig MI, Nelson NJ, Lloyd OL, Romilly P, Bener A. Road traffic accidents in the United Arab Emirates: trends of morbidity and mortality during 1977-1998. *Accid Anal Prev* 2002; 34:465-476.
- Nantulya VM, Reich MR. The neglected epidemic: road traffic injuries in developing countries. *BMJ* 2002; 324:1139-41.
- Peden M, Scurfield R, Sleet D, Mohan D, Jyder A, Jarawan E, Mathers C. Eds. *World Report on Road Traffic Injury Prevention*. Geneva: World Health Organization, 2004.
- Road Accidents. Royal Oman Police. Muscat, 2006.
- Deb S, Burns J. Neuropsychiatric consequences of traumatic brain injury: A comparison between two age groups. *Brain Inj* 2007; 21:301-7.
- Moser D, Crespo-Facorro B, Robinson RG. Alcohol misuse and mood disorders following traumatic brain injury. *Arch Gen Psychiatr* 2005; 62:742-749.
- Goldstein LB. Neurotransmitters and motor activity: effects on functional recovery after brain injury. *NeuroRx* 2006; 3:451-457.
- Al-Adawi S, Dawe GS, Al-Hussaini AA. Aboulia: neurobehavioural dysfunction of dopaminergic system? *Med Hypotheses* 2000; 54:523-530.
- Marin R. Differential diagnosis and classification of apathy. *Am J Psychiatr* 1990; 147:22-30.
- Van Reekum, R, Stuss DT, Ostrander L. Apathy: Why Care? *J Neuropsychiatry Clin Neurosci* 2005; 17:7-19.
- Al-Adawi S, Dorvlo AS, Al-Naamani A, Glenn MB, Karamouz N, Chae H, Zaidan ZA, Burke DT. The ineffectiveness of the Hospital Anxiety and Depression Scale for diagnosis in an Omani traumatic brain injured population. *Brain Inj* 2007; 21:385-393.
- Thombs BD, Bresnick MG, Magyar-Russell G. Depression in survivors of burn injury: A systematic review. *Gen Hosp Psychiatry* 2006; 28:494-502.
- Al-Adawi S, Dorvlo ASS, Burke DT, Huynh CC, Jacob L, Knight R, Shah MK, Al-Hussaini A. Apathy and Depression in Cross-Cultural Survivors of Traumatic Brain Injury. *J Neuropsychiatry Clin Neurosci* 2004; 16:435-442.
- Aaronson LS, Teel CS, Cassmeyer V, Neuberger GB, Pallikkathayil L, Pierce J, et al. Defining and measuring fatigue. *Image J Nurs Sch* 1999; 31:45-50.
- Masson F, Maurette P, Salmi LR, Dartigues JF, Vecsey J, Destaillets JM, et al. Prevalence of impairments 5 years after a head injury, and their relationship with disabilities and outcome. *Brain Inj* 1996; 10:487-497.

- 29 Oliver JH, Ponsford JL, Curran, CA. Outcome following traumatic brain injury: A comparison between 2 and 5 years after injury. *Brain Inj* 1996; 10:841-848.
- 30 Al-Adawi S, Burke DT, Dorvlo ASS. The effect of methylphenidate on the sleep-wake cycle of brain-injured patients undergoing rehabilitation. *Sleep Med* 2006; 73: 287-291.
- 31 Damasio AR. *Descartes' Error: Emotion, Reason and the Human Brain*. London: Picador, 1996.
- 32 Vuilleumier P. Anosognosia: The neurology of beliefs and uncertainties. *Cortex* 2004; 40:9-17.
- 33 McAllister TW, Arciniegas D. Evaluation and treatment of postconcussive symptoms. *NeuroRehabilitation* 2002; 17:265-283.
- 34 Mayou RA, Black J, Bryant B. Unconsciousness, amnesia and psychiatric symptoms following road traffic accident injury. *Br J Psychiatry* 2000; 177:540-545.
- 35 Dawson DR, Chipman M. The disablement experienced by traumatically brain-injured adults living in the community. *Brain Inj* 1995; 9:339-353.
- 36 Shah MK, Carayannopoulos AG, Burke, DT, Al-Adawi S. A comparison of functional outcomes in hypoxia and traumatic brain injury: A pilot study. *J Neurol Sci* 2007; doi:10.1016/j.jns.2007.04.012.
- 37 Shah MK, Al-Adawi S, Dorvlo ASS, Burke DT. Functional outcomes following anoxic brain injury: a comparison with traumatic brain injury. *Brain Inj* 2004;18:111-117.