Original Article

The health condition of spinal cord injuries in two Afghan towns

H Deconinck*,¹

¹*Geneva Foundation, To protect Health in War, 6 Route de Ferney, 1202 Geneva, Switzerland*

Study design: Cross-sectional.

Objectives: To describe the population with spinal cord injury (SCI) in two major towns of Afghanistan.

Setting: Kabul and Herat, Afghanistan, March–July 2001.

Methods: The residents of Kabul and Herat ($N=311$) with traumatic SCI were retrieved and investigated. They underwent standardised interviews and clinical examinations assessing socio-demographic characteristics and information on health condition, injury, quality of life and rehabilitation outcome.

Results: The study population could be considered as the survivors in the harsh living conditions in Afghanistan of a supposedly much larger group, counting proportionately fewer females and fewer cervical lesions than expected. Acute care was practically nonexistent. Prevalences of urinary tract infections and pressure sores were high as no good management was available. Basic rehabilitation helped persons with SCI to attain a fairly good level of independence (total functional independence measure score mean = 95, SD = 19). Their quality of life was significantly lower than their neighbours of same age and sex ($P < 0.0001$). Along with the economic security and good access to the home, the use of the orthopaedic centre of the International Committee of the Red Cross (ICRC) contributed to a better quality of life.

Conclusion: Thanks to the rehabilitation programme of the ICRC providing a basic but comprehensive rehabilitation, persons with SCI in Afghanistan are coping rather well. This result is remarkable considering the difficult economic and sanitary circumstances in the poorest country in the world.

Spinal Cord (2003) **41**, 303–309. doi:10.1038/sj.sc.3101443

Keywords: spinal cord injury; functional independence; disability; rehabilitation; quality of life; Afghanistan

Introduction

The International Committee of the Red Cross (ICRC) has provided medical care for war wounds in Afghanistan since 1981, including cases with spinal cord injury (SCI). Considering the high number of spinal cord cases, occupying beds for long periods of time, the ICRC opened in 1983 a paraplegic centre in Hayatabad (Pakistan), which was handed over to the Pakistani Red Crescent Society in 1996. It treated over 1700 patients during these first 14 years. From 1996 onwards, the programme for SCIs moved to Afghanistan. Small spinal injury units in surgical hospitals and orthopaedic centres as well as a home-based follow-up programme were established. Because of the long-term involvement of the ICRC, the interest grew to study the population

with SCIs in this country with a long history of war and a destroyed health system. As the home-care programme was most developed in Kabul, the populations with spinal cord injuries of Kabul and Herat were selected and compared.

Methods

The cross-sectional survey took place from March to July 2001, including all 311 residents with traumatic SCI of Kabul ($N=257$) and Herat ($N=54$). Thanks to the health services and relief aid provided by the ICRC, the cohort of SCIs was accessible and could be considered as exhaustive.

In total, 10 study investigators received a 10-day training. Even though it was planned to have mobile teams conducting home visits, in Kabul home visits were

*Correspondence: H Deconinck, 9, Chemin des Barrières, 34230 Le Pouget, France

interrupted for security reasons. The remaining three quarters of the Kabul cohort were invited to the orthopaedic centre instead, while in Herat all persons were visited in their homes.

Information was obtained through interview, observation and clinical examination with a standardised questionnaire. Socio-demographic characteristics and information on injury, health condition and rehabilitation were recorded. Levels of functional independence, disability and quality of life were assessed with the functional independence measure (FIM), World Health Organisation Disability Assessment Schedule II (WHO-DAS II) and World Health Organisation Quality of Life scale-Bref (WHOQOL-Bref) measuring tools. Interviews and indicators were adapted to the cultural and socio-political circumstances of a country at war with limited health services. Medical investigations therefore were exclusively based on simplified clinical examinations and clinical signs excluding laboratory tests. For each person with spinal cord injury interviewed, a neighbour of similar age and sex was selected, and submitted to the WHOQOL-Bref questionnaire. No information on mortality could be obtained from any information source.

The data were analysed with SAS-PC, version 8.01. Tests of statistical significance used were Student's *t*-test, Pearson's correlation test, Wilcoxon and Kruskal-Wallis tests, Spearman's rank-order correlation test for normal and non-normal continuous data and χ^2 test and Fisher's exact test for discrete data. Odds ratios were calculated to estimate the magnitude of an association

between two variables. The multivariate analysis used the step-by-step logistic regressions to control confounding. Level of significance at *P*-value 0.05 was respected for all tests.

Results

Socio-demographic characteristics

Estimations on the prevalence rates of cases with SCI in Kabul and Herat were 0.13 per 1000 (257/2 million) and 0.11 per 1000 (25/0.23 million), respectively. In the two rural districts of Herat province, prevalence rates were 0.06 per 1000 (13/0.22 million) for Enjeel and 0.10 per 1000 (12/0.12 million) for Gozara.

Table 1 summarises the patients' characteristics. The median age of the study population was 32 years; there were three children. Eight persons with SCI (3%) were residing in hospital. Ethnicity was distributed as follows: 164 Tadjik (53%), 84 Pashtoon (27%), 48 Hazara (15%) and 15 Uzbek and Turkmen (5%). Nearly half of the study population could read and write having spent on average 4 years at school, although, 170 persons (54%) never attended school. Literacy rate for the study population was three times higher for a man than for a woman ($P=0.009$, OR = 3.099 [CI 1.283–7.485]). More people with SCI were married than single, before as well as after injury (62%). In all, 22 persons (7%) changed marital status after injury: two married and 20 divorced or widowed. Households counted an average of seven persons with extreme values of 1 and 33. A

Table 1 Patient characteristics of the total study population ($N=311$), and the subpopulations of Kabul ($N=257$) and Herat ($N=54$)

	Total population	Kabul	Herat	P
Age, mean (SD), median	34 (12.0), 32	34 (12.1), 31	36 (11.6), 36	0.0969
Age of injury, mean (SD), median	8 (5.1), 7	8 (4.8), 7	8 (6.3), 8	0.6450
Age at injury, mean (SD), median	26 (11.7), 23	25 (11.5), 22	28 (12.4), 26	0.1770
Male (%)	91	90	94	0.2947
Urban (%)	80	86	54	<0.0001
Literacy (%)	47	49	35	0.0504
Marital status (%)	62	61	65	0.6086
Employment (%)	27	29	20	0.2067
Good access to the home (%)	52	56	37	0.0128
War wounds (%)	59	63	37	<0.0001
Cervical lesion (%)	7	7	6	0.7000
Complete lesion (%)	80	80	80	0.9691
Pressure sores (%)	32	30	43	0.0538
Contractures (%)	43	41	54	0.0831
Spasticity (%)	55	58	41	0.0238
Pain (%)	74	77	56	0.0009
Spine deformity (%)	35	35	32	0.5816
Recurrent urinary infection (%)	54	49	76	<0.0001
Constipation (%)	72	70	80	0.1549
Negative feelings (%)	59	61	51	0.1250
Dissatisfaction with sex life (%)	72	71	74	0.7204
WHOQOL-Bref score, mean (SD), median	57 (9.1), 56	57 (9.1), 57	53 (8.3), 53	0.0135

large number of the injured persons (194 or 62%) were the heads of the household.

Employment rates decreased from 77% before injury to 27% after injury. All persons at work after injury were self-employed except for four who had a fixed employment. Households had an average of one economic active member, while 114 households (37%) were without income. In all, 33 persons with SCI (10%) had a family member working abroad of whom 11 received remittances. A total of 74 patients (24%) received a loan and assistance from the microcredit programme of the ICRC to start an economic activity.

In all, 119 families (38%) rented the home they lived in, 93 families (30%) owned the home and 99 families (32%) used a home for free. Homes had an average of two rooms and one in two had access to a garden. For the Kabul subpopulation, access to a garden was positively associated with a better quality of life ($P=0.031$, $OR=1.752$ [CI 1.09–2.90]).

The Herat subpopulation had a lower level of urbanity and a worse access to the home than the Kabul subpopulation.

Injury information

The median age of the SCI was 7 years with the oldest accident dating from 1978. In all, 34 persons (11%) had the accident as a child and 27 persons (9%) after the age of 44. Major causes of injury were shelling (38%) and fall (26%). Other causes were gunshot (15%), traffic accident (11%), mine (5%), violence (2%) and others (3%). For 182 cases (59%), the cause of injury was due to war wounds of which 62% were due to shelling, 28% to gunshot and 10% to mine explosion. There was a significant difference in aetiology of SCI between the subpopulations of Kabul and Herat. In Kabul two on three (63%) and in Herat one on three (37%) were due to war.

The neurological levels of SCI were thoracic 47.0%, lumbar 45.7%, cervical 6.7% and sacral 0.6%, representing a complete lesion in 80% and an incomplete lesion in 19% of the cases. Three cases had totally recovered. The severity of injury was similar in Kabul and Herat subpopulations.

Delay of hospitalisation was obtained from six cases and averages 3.4 days. It was common that patients stayed for some time immobilised at home in the hope of recovery. Public transport, that is, overloaded buses driving on bad roads were the means of transportation of the injured and sick. Median self-reported duration of initial hospitalisation was 60 days with a range of 900 days; two cases had never been hospitalised for their initial injury. Almost half of the study population (45%) had received a laminectomy.

Health condition

Only those health conditions that were relevant to spinal injuries and possible to diagnose were assessed (Table 1). The following prevalences were found: urinary and

bowel incontinence 96%, pain 74%, constipation 72%, urinary tract infection 57%, spasticity 55%, contractures 43%, important weight loss 37%, spine deformity 35%, drug treatment 37% and pressure sores 32%. Spine deformity was more prevalent among those with injury as a child: 24 out of 34 against 84 out of 277 ($P<0.0001$, $OR=5.51$ [CI 2.39–12.98]).

Mental health was assessed through the self-perceived presence of negative feelings, as part of the WHOQOL-Bref. In total, 180 persons with SCI (59%) report suffering from frequent spells of negative feelings in comparison with 70 neighbours of the same age and sex (23%) ($P<0.0001$, $OR=4.82$ [CI 3.34–6.95]). Higher prevalences of negative feelings were found for women with SCI than for men with SCI, 71.4 and 57.6%, respectively ($P=0.1551$).

In total, 219 adults with SCI (70%) reported having a dissatisfied sex life in comparison with 11 (3.6%) of the neighbours of the same age and sex ($P<0.0001$, $OR=68$ [CI 34.02–137.27]). Male persons with SCI had a two times greater chance of being dissatisfied with their sex life than the female cases with SCI ($P=0.0268$, $OR=2.3$ [CI 1.01–5.62]).

Mean self-perceived quality of life scores on the WHOQOL-Bref scale¹ were significantly lower for persons with SCI (mean = 56.6, $SD=9.1$) than for their neighbours of the same age and sex (mean = 70.0, $SD=7.4$) ($P<0.0001$). Factors associated with better quality of life retained by the multivariate analysis were easy access to the home, economic security of the household and use of the orthopaedic centre in case of a problem (Table 2).

The Herat subpopulation had less spasticity and pain than the Kabul subpopulation, but more urinary tract infections and a lower quality of life.

Rehabilitation

The level of independence was assessed with the FIM.² The mean total FIM score was 94.7 ($SD=18.5$). The maximum total FIM score of 126 stands for complete independence. Thus, the study population had, on average, a modified dependence with supervision, that is, activities of daily living were carried out with the help of an assistant in the role of supervisor. The extent of the injury and prevalence of medical complications, such as spasticity, pressure sores and contractures were influencing factors for the level of independence (Table 3). The WHODASII score measured the level of disability.³ Compared to the reference world population, the mean WHODASII score of 55.7 ($SD=12.7$) placed the study population at the top 0.5% of worst of health. The Spearman's rank correlation revealed a negative correlation between FIM and WHODASII scores ($r=0.620$; $P<0.001$).

Most patients frequented the orthopaedic centres of the ICRC on a regular basis. Only 19 patients (6%) had never returned to the orthopaedic centre after initial rehabilitation. Limitation in use was due to difficulties related to distance (80%), finances (17%) and transport

Table 2 Influencing factors of a better level of self-perceived quality of life^a ($N=306$; missing three children and two adults not able to cooperate with questions)

<i>Logistic regression, Hosmer–Lemeshow goodness of fit test, $P=0.8212$</i>			
<i>Outcome variables^b</i>	<i>P</i>	<i>Adjusted OR</i> <i>[confidence interval at 95%]</i>	<i>Crude OR</i> <i>[confidence interval at 95%]</i>
Easy access to home	<0.0001	3.38 [2.06–5.53]	3.87 [2.41–6.22]
Head of household is economic active	0.0006	2.50 [1.48–4.22]	2.98 [1.82–4.88]
Use of orthopaedic centre of the ICRC in case of problem	0.0049	2.50 [1.32–4.76]	3.20 [1.77–5.81]

^aBetter self-perceived quality of life denotes a WHOQOL-Bref score above the median of 56

^bOther variables with $P<0.05$ introduced but not retained by the model were access to garden, good nutritional status, no history of urinary tract infection, independent use of transport, high level of motor functioning and independence

Table 3 Influencing factors of a better motor functioning and independence^a ($N=308$; missing: three children)

<i>Logistic regression, Hosmer–Lemeshow goodness of fit test, $P=0.4398$</i>			
<i>Outcome variables^b</i>	<i>P</i>	<i>Adjusted OR</i> <i>[confidence interval at 95%]</i>	<i>Crude OR</i> <i>[confidence interval at 95%]</i>
Low neurological lesion	<0.0001	8.81 [2.05–37.94]	6.89 [1.99–23.92]
Incomplete neurological lesion	0.0035	7.33 [3.31–16.22]	4.83 [2.49–9.37]
Absence of spasticity	0.0010	2.50 [1.45–4.30]	2.51 [1.58–3.97]
Age at time of accident <23 y	0.0018	2.36 [1.38–4.05]	1.66 [1.06–2.60]
Employment after injury	0.0009	2.07 [1.11–3.85]	2.19 [1.31–3.67]
Good condition of home	0.0240	1.91 [1.09–3.34]	2.60 [1.62–4.19]
Absence of pressure sores	0.0491	1.80 [1.00–3.21]	2.17 [1.33–3.54]
Absence of contractures	0.0438	1.75 [1.01–3.00]	2.49 [1.57–3.94]

^aBetter motor functioning and independence denotes a motor FIM score above the median of 62

^bOther variables with $P<0.05$ introduced but not retained by the model were economic security and no history of urinary tract infection

(3%). The majority of the patients (246 or 79%) tended to return to the centre in case of a problem related to their disability. Out of 282 men, 48 (17%), and out of 29 women, 2 (7%) had a male primary caregiver, totalling 14% of the study population with a male caregiver. Two men lived alone managing without the help of anybody.

In Herat, persons with SCI had made fewer adaptations to their homes than in Kabul but had bought more life adjusting equipment. Level of independence was slightly worse and level of disability slightly higher in Herat than in Kabul subpopulations but the differences were not significant (Table 4).

Discussion

The male-to-female ratio of 9:1 is unusual as a 4:1 ratio is a common finding for SCIs.^{4–6} A study on functional disabilities conducted in Kandahar in 1996 found a male-to-female ratio of 3:1.⁷ Perhaps, Afghan females are less vulnerable to spinal injuries than the men, because tradition confines them to their homes. Or perhaps, men have a better access to medical care and therefore a lower mortality. A similar male-to-female

ratio of 9:1 is found for the amputee population frequenting the orthopaedic centre of the ICRC in Kabul.⁸

Literacy rates are slightly better than the national figures, 50% against 46% for men and 24% against 16% for women respectively.⁹ The better results are possibly due to the urban residence. Interestingly, as disabled children do not have access to school, the ICRC has established an educational programme from which 11 boys and one girl of the study population benefit, receiving private schooling at home.

The majority of the interviewed people were married before injury. This contradicts findings that single people are more vulnerable to spinal accidents.⁵ Perhaps, being married increases survival from SCI in Afghanistan. In addition, few change marital status. Male paraplegics remain the heads of their families, while female paraplegics often see their spouses remarry. Hence, the disabled wife remains a respected member of the family and maintains her social status. The national employment rate is unknown but the situation in the labour market is grim, even for the able Afghan population. Many families have no income. Consequently, the orthopaedic programme of the ICRC

Table 4 Rehabilitation characteristics of the total study population ($N=311$), and the subpopulations of Kabul ($N=257$) and Herat ($N=54$)

	<i>Total population</i>	<i>Kabul</i>	<i>Herat</i>	<i>P</i>
Independent moving inside home (%)	64	66	57	0.2442
Independent moving outside home (%)	41	42	35	0.3527
Independent use of public transport (%)	9	9	7	0.7140
House adapted (%)	64	65	60	0.4260
Home adaptations made (%)	31	34	19	0.0307
Equipment for comfortable living (%)	13	11	22	0.0308
Male primary caregiver (%)	14	15	9	0.2240
Total FIM score, mean (SD), median	95 (18.5), 97	95 (18.0), 97	93 (20.5), 96	0.3790
Motor FIM score, mean (SD), median	60 (17.8), 62	61 (17.5), 62	58 (19.2), 61	0.3410
WHODASII score, mean (SD), median	56 (12.7), 57	55 (12.9), 56	58 (11.7), 58	0.1030

distributes relief items to persons with SCI. Subsequently, relief assistance alleviates the stress of the disabled and grants him or her a new role of participation in the economic security of the family. It helps him or her to rebuild the self-esteem. In addition, the ICRC has started a socio-economic rehabilitation project for disabled enhancing employment, microcredit initiatives and vocational training.

Living conditions are poor and differences in living standards small. Homes are often located upstairs of complicated buildings with unprotected roof terraces and narrow stairs. Bathrooms are often shared and inaccessible for wheelchairs. The Taliban denied any form of entertainment such as music, 'profane' literature, television, film, sports and other elements of leisure.

The US prevalence rate of SCIs is about 0.8 per 1000.^{5,6} This is six times higher than the prevalence rate found in our survey. Mortality rates are significantly higher during the first year after injury than during subsequent years.^{5,6} The mortality rate for SCI during the first year in the US is 48%⁵ and in Zimbabwe 90%.¹⁰ Thus, a high early mortality can be expected in Afghanistan because of the weak health-care system.

Besides the high prevalence of war wounds, falls account for many spinal injuries. It is common in Afghanistan to have unprotected wells and roof terraces and narrow fly-over passages, which are a permanent risk for falls. Similar findings are reported in an Indian study, where 66% of the 884 SCIs admitted in 8.4 years are because of falls from heights or in unprotected wells.¹¹

Cervical lesions are fewer than expected, suggesting a low survival. A Croatian postwar study reports 17% of cervical lesions¹² and the US national statistics 52%.⁶

The delay in hospital admission is not surprising considering that a mere 26% of the Afghan population has access to hospitals for common ailments and injuries.⁹ In addition, in war situations, cases with SCI are bottom of the list of priority for transportation and treatment when triage of wounded need to be done.¹³ A study conducted on war wounded residing in Kabul in 1996 found that only 11% of the wounded arrive at the

hospital during the first 6 hours after injury.¹⁴ A study on SCIs in Brazil finds a median delay of 3 days.¹⁵ Surgical interventions for SCI are not recommended in war conditions.^{13,16} They are popular in Afghanistan, as they give a ray of hope for improvement. Unfortunately for many cases they are the cause of medical complications or aggravated outcomes. The long duration of hospitalisation is explained by early development of complications. Long hospitalisation is found in India, 75 days,¹¹ Croatia, 160 days¹⁷ and Nigeria, 90 days.¹⁸

Major secondary complications of SCI, such as pneumonia, pulmonary emboli and septicaemia, result in early mortality and the more so in the Afghan set-up. Pneumonia is the principal cause of death for persons with SCI above 55 years of age and injury from nonintentional accidents and suicide for those below 55 years of age.¹⁹ Unfortunately, for the Afghan study population, no information could be obtained either on causes of death or on accidental or self-inflicted injuries with the exception of occasional burns. High prevalences of urinary tract infections and pressure sores can be attributed to poor training and poor care. Appropriate preventive care reduced the prevalence of pressure sores with 13% in Nigeria.¹⁸ Counselling regarding proper nursing technique and hygiene could decrease urinary tract infection incidence with 65% in the US.²⁰

The Afghan individuals with SCI consider achieving pregnancy as decisive in the satisfaction with sex life. This interpretation of sexuality differs from that of Western societies where psychosocial rather than physical factors, and thus the emotional quality of the relationship, are important for a satisfying sex life and relationship.²¹

Suicide or self-inflicted mutilations, subjects of taboo in the Afghan culture, do occur, but no incidence information is available neither for the general population nor for cases with SCI. The author knows of one suicide case with SCI in 2002. In addition to the mental stress put on the individual because of the SCI, there are the effects of the long-lasting war and political instability.²² Several studies confirmed that combined effects of war-related trauma and human rights abuses

by Taliban officials had a profound effect on the population's mental health.²³

Quality of life is defined as individual's perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.²⁴ Goals, expectations, standards and concerns of life have changed dramatically for all Afghans and the more so for the disabled Afghan. Extent of injury, medical complications, marital status and level of disability usually found in other surveys appear to be of subordinate importance to quality of life to the study population.^{4,25,26} However, lower ratings of quality of life associated with access to the home and economic security, are in concordance with conclusions drawn from other studies.^{4,26} A specific factor associated with a better quality of life for individuals with SCI in Afghanistan is the use of the orthopaedic centre, underlining the importance of follow-up care.

The ultimate goal of comprehensive rehabilitation in individuals with SCI has shifted over time from an extension of their life expectancy to an attainment of an optimal level of independent living and quality of life.⁴ The level of independence of the Afghan cohort is not as good compared to patients in France (median total FIM scores = 117 and 113),²⁷ but is better than those in Israel (mean total FIM score = 87).²⁸ Associations of the level of independence with the extent of injury, age at time of injury and employment are also found by other surveys. However in Afghanistan, medical complications and condition of the home are associated with better independence. Living with a partner, an influencing factor of better independence found in several studies,^{4,13,29,30} was not retained by the multivariate analysis of the Afghan study.

Several studies underline emotional adaptation as a key to success for rehabilitation and integration in the society. Attitudes of assisting teams are crucial in obtaining this aim.⁴ This emphasises that access to and use of the orthopaedic centre of the ICRC in Afghanistan is important. The more so, as access to health services and qualified health personnel, in general, in Afghanistan is difficult. The orthopaedic centres in Kabul and Herat very much assist the disabled in their emotional adaptation process; it is an extraordinary meeting place for all disabled receiving rehabilitation and counselling on all matters of life. In addition, patients with SCIs under treatment are encouraged to designate a specific caregiver who receives training by the staff in the hospital and later in the orthopaedic centre. However, the study found that for 83% of the patients, the caregiver changed once the patient was discharged. Targeting the training to the definite caregiver could make an improvement.

Conclusion

Little data exist on SCIs in the developing world and little health information is available in Afghanistan

illustrating the importance of conducting a survey in Afghanistan, in spite of the unfavourable conditions during Taliban rule.

The cohort of SCI cases is a result of a rude natural selection. Many have died early. Amazingly, many have survived. The surviving SCI population of Kabul and Herat cope rather well with the disability considering the difficult economic and sanitary circumstances in the poorest country of the world. The SCI programme of the ICRC, providing comprehensive care demonstrates that satisfactory results can be achieved with basic rehabilitation and follow-up care using the existing health structures. The management of urinary incontinence and the subsequent recurrent urinary tract infections are a major problem and need to be addressed. Prevention of pressure sores needs attention.

The population with SCI constitutes one of the most disadvantaged groups in the Afghan society. Culturally, it is believed that disabled persons live only a passive life, which is a burden for all. Instead, the rehabilitation programme of the ICRC proves that a sustainable reintegration in the community is possible, and that persons with SCIs can fulfil an active role.

Acknowledgements

This study has been made possible by a grant from the Geneva Foundation. We thank Alberto Cairo, coordinator of the orthopaedic programme of the ICRC in Afghanistan, and his colleagues for the extensive assistance to the survey and the motivation to care for the disabled.

References

- 1 World Health Organization. *WHOQOL-Bref introduction, administration, scoring and generic version of the assessment, field trial version*. Programme on Mental Health, WHO: Geneva 1996, pp 1–11.
- 2 Minaire P. La mesure d'indépendance fonctionnelle (MIF), Historique, présentation, perspective. *J Réadapt Med* 1991; **11**: 168–174.
- 3 World Health Organization. *WHODASII, disability assessment schedule, training manual WHO classification, assessment and survey team*. WHO. Geneva 2000, pp 1–12.
- 4 Kemoun G, Daverat P, Petit H. Qualité de vie des blessés médullaires, Revue de la littérature. In: Herisson C, Simon L (eds). *Evaluation de la qualité de vie*. Mason: Paris 1993, pp 169–174.
- 5 Kraus JF *et al*. Incidence of traumatic spinal cord lesions. *J Chron Dis* 1975; **28**: 471–492.
- 6 Spinal Cord Injury, Facts and Figures at a Glance of National Spinal Cord Injury Information Network. Available at: <http://www.spinalcord.uab.edu>. Accessed 3 April 2002.
- 7 Lambert ML *et al*. Household survey of locomotor disability caused by poliomyelitis and landmines in Afghanistan. *BMJ* 1997; **315**: 1424–1425.
- 8 Cairo A. *Orthopaedic centre activities*. Internal Report, ICRC: Afghanistan 2000, pp 1–4.

- 9 Statistics 2001 of United Nations Children's Fund Country. Available at: <http://www.unicef.org/statis/Country1.html>. Accessed 15 November 2001.
- 10 Levy L *et al.* Problems, struggles and some success with spinal cord injury in Zimbabwe. *Spinal Cord* 1998; **36**: 213–217.
- 11 Shanmugasundaram T. The care of SCI patients in the developing nations—can we stem the rot. *Paraplegia* 1988; **26**: 10–11.
- 12 Jankovic S, Busic Z, Primorac D. Spine and spinal cord injuries during the war in Croatia. *Mil Med* 1998; **163**: 847–849.
- 13 Dufour D (ed). Spinal cord injuries. In: Dufour D (ed). *Surgery for victims of war*. CICR: Geneva 1988, pp 165–175.
- 14 Coupland RM, Samnegaard HO. Effect of type and transfer of conventional weapons on civilian injuries: retrospective analysis of prospective data from Red Cross hospitals. *BMJ* 1999; **319**: 410–414.
- 15 Brasil AV, Coelho DG. The neurological outcome of acute spinal cord injury in a neurosurgical hospital of a developing country. *Spinal Cord* 1998; **36**: 353–356.
- 16 Hammoud MA, Haddad FS, Moufarrij NA. Spinal cord missile injuries during the Lebanese civil war. *SurgNeurol* 1995; **43**: 432–437.
- 17 Rukovansjki M. Spinal cord injuries caused by missile weapons in the Croatian war. *J Trauma* 1996; **40**(suppl): 189–192.
- 18 Iwegbu CG. Traumatic paraplegia in Zaria, Nigeria: the case for a centre for injuries of the spine. *Paraplegia* 1983; **21**: 81–85.
- 19 DeVivo MJ *et al.* Cause of death for patients with spinal cord injuries. *Arch Intern Med* 1989; **149**: 1761–1766.
- 20 Barber DB, Woodard FL, Rogers SJ, Able AC. The efficacy of nursing education as an intervention in the treatment of recurrent urinary tract infections in individuals with spinal cord injury. *Nurs* 1999; **16**: 54–56.
- 21 Kreuter M, Sullivan M, Siosteen A. Sexual adjustment and quality of relationship in spinal paraplegia: a controlled study. *Arch Phys Med Rehabil* 1996; **77**(6): 541–548.
- 22 World Health Organization. *The invisible wounds: the mental health crisis in Afghanistan*. Afghanistan Crisis-Special Report, WHO/SDE/EHA November 2001, pp 1–3.
- 23 Rasekh Z, Bauer HM, Manos MM, Iacopino V. Women's health and human rights in Afghanistan. *JAMA* 1998; **280**: 449–455.
- 24 World Health Organization. *Measuring quality of life*. WHO Division of Mental Health, WHO: Geneva 1997; pp 1–10.
- 25 Westgren N, Levi R. Quality of life and traumatic spinal cord injury. *Arch Phys Med Rehabil* 1998; **79**: 1433–1439.
- 26 Dijkers M. Quality of life after spinal cord injuries: a meta-analysis of the effects of disablement components. *Spinal Cord* 1997; **35**: 829–840.
- 27 Barbin JM, Bilard J, Gaviria M, Ohanna F, Varray A. La mesure d'indépendance fonctionnelle chez le paraplégique traumatique: étude différentielle d'un groupe sportif et non-sportif. *Ann Réadapt Méd Phys* 1999; **42**: 297–305.
- 28 Catz Q *et al.* SCIM-spinal cord independence measure: a new disability scale for patients with spinal cord lesions. *Spinal Cord* 1997; **35**: 850–856.
- 29 Ditunno JF. Functional outcomes in spinal cord injury (SCI): quality care versus cost containment. *J Spinal Cord Med* 1997; **1**: 1–7.
- 30 Krause JS, Crewe NM. Long term prediction of self-reported problems with spinal cord injury. *Paraplegia* 1990; **28**: 186–202.