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Productivity outcomes of individuals with spinal cord injury

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Study Design: Cross-sectional study by mail survey of participation in productive activities of individuals who sustained a spinal cord injury (SCI) in Quebec from 1970 to 1993.
Objectives: To determine the level of productivity outcomes of a representative sample and to determine the relationship between the productivity outcomes and some personal and environmental variables.
Settings: Quebec, Canada.
Methods: Four hundred and eighteen subjects (mean of age = 42.1 ± 11.8) were included in this study. Overall productivity was assessed by the participation into five categories of activities (gainful employment, studies, homemaking and family activities, community organizations and leisure activities).
Results: Depending on the severity of injury, 30% to 51% of the variance in productivity outcomes can be explained by a set of ten variables: education, ability to drive a car vehicle, other transportation indices, age related variables and type of locomotion. A discriminant analysis was undertaken to classify the subjects into three levels of productivity (low, moderate and high). The percentage of subjects correctly classified was moderate (54% to 71%) to high (72% to 81%) depending on the productivity levels.
Conclusion: The results confirm the significant contribution of education and transportation to explain the productivity outcomes.
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Keywords: spinal cord injury; productivity outcomes; vocational rehabilitation; employment; environmental factors; participation

Introduction

In developed countries, most people with SCI benefit from adequate medical management followed by comprehensive rehabilitation. Subsequently, a substantial number of individuals will wish to return to premorbid productive activities such as gainful employment or educational training. Others may actively participate in family and social life without necessarily being employed.[1] Therefore, participation in avocational activities must be considered as a successful outcome following comprehensive rehabilitation[2] but very few studies have described what types of post-injury productive roles are currently held after SCI other than traditional employment.[3–6]

The concept of productivity has been generally described as the person's contribution to the family life and to the community.[6–8] Trieschmann[6] defined the concept as being 'all the activities which mainly encourage a worthwhile feeling and personal satisfaction'. Kemp and Vash[7] defined the concept as 'activities of a constructive nature' and suggested that the degree of productivity is one among several criteria of overall adjustment after SCI. DeJong and Hughes[8] proposed a model of productivity outcomes that included five types of activities: gainful employment, homemaking, school or educational programs, community organizations and leisure time activities. They developed a suitable methodology of ranking and weighting to measure the individual productivity outcomes in a cohort of 111 individuals with SCI. This research model contributed significantly to an understanding of the factors affecting post-discharge status of persons with SCI.[9]

Boschen and Gargaro[10] replicated DeJong's findings using a cohort of 547 individuals with SCI to confirm the validity of categories and rankings for the productivity status. They concluded that 'DeJong's rankings are still appropriate in current independent living research, and in at least one other developed nation (Canada) in addition to the United States'.[10] Consequently, it was relevant to determine if the level of participation in productive activities varied for two decades and to look at significant predictors of productivity. The purpose of this project was to

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establish the profile of participation in productive activities of individuals with SCI in Quebec and: (1) to determine the profile of productivity outcomes of a representative sample, and (2) to determine the relationship between the productivity outcomes and some personal and environmental variables.

Methods

Recruitment

The target-population was selected from inpatient files of two rehabilitation centers in the Province of Quebec: The Rehabilitation Institute of Quebec City and The Montreal Rehabilitation Institute. Two thousand two hundred medical records were reviewed and suitable information on medical and socio-demographic characteristics were collected for 1771 individuals who sustained a SCI between January 1st 1970 and December 31st 1993. A random sampling procedure was applied to identify 1000 subjects which constituted the initial sample. Authorization was granted by the 'Commission d'accès à l'information du Québec' to obtain the subjects' current address from the Quebec Health Insurance Plan, a governmental agency administering the public health care system. Practically, a first mail contact was carried out with 976 potential subjects, asking them to participate in a larger project that included the present study. A response rate of 50% was expected from previous experimentation using a similar methodology.

Data collection

These subjects were asked to complete a questionnaire sent by mail, that included an informed consent form and different sections related to: (1) demographics (chronological age; age at injury, time since injury, marital status); (2) educational; (3) medical (severity of injury, locomotion, subjective health status, secondary impairments such as occurrence of spasms or spasticity, urinary tract infections and pressure ulcers); (4) psycho-social (health locus of control[11] and optimism);[12] and (5) environmental variables (Measure of the Quality of the Environment).[13] Specific sections documented hours per week spent in: paid job, educational training, homemaking and familial activities, volunteer organizations and active leisure.

Ranking and weighting of productivity outcomes

The model of productivity of DeJong and Hughes[8] was used to measure the degree of participation of subjects into five types of activities: (1) gainful employment; (2) studies; (3) homemaking and family activities; (4) community organizations; and (5) leisure activities (Table 1). A methodology of ranking and weighting

Table 1 Ranking and weighting of productivity outcomes*

Main occupation	*Homemaking family activities*†	*Community organizations*	*Leisure activities*‡	*Weighted score*	*Number of subjects*	*Productivity levels*
Gainful employment (F)	Yes	Yes	Yes	10	37	
Gainful employment (F)	Yes	Participate in at least 1 of these 2		9.8	28	
Gainful employment (F)	Yes	No	Yes	9.6	32	High
Gainful employment (F)	No or Yes	Participate in at least 1 of these 2		9.4	17	41%
Studies (F)	Yes	Idem		9.0	21	($n=170$)
Studies (F)	No	Idem		8.8	6	
Gainful employment (P)	Yes	Idem		8.4	26	
Gainful employment (P)	No	Idem		8.2	3	
Studies (P)	Yes	Participate in at least 1 of these 2		7.8	10	
Homemaking and family activities	–	Yes	No or Yes	6.8	15	
Community organizations	Yes	–	No or Yes	6.6	10	Moderate
Retirement	Yes	Participate in at least 1 of these 2		6.0	44	39%
Unemployment	Yes	Participate in at least 1 of these 2		5.4	64	($n=163$)
Homemaking and family activities	–	No	Yes	5.2	20	
Homemaking and family activities	–	No	No	4.2	17	
Retirement	No	Participate in at least 1 of these 2		2.8	29	Low
Retirement	No	No	No	1.0	17	20%
Unemployment	No	No	No	0.0	22	($n=85$)

*Ranking of each combination of behaviors (outcomes) adapted from the DeJong and Hughes[2] model. †Homemaking and family activities include one or more of the following: parental role, housekeeping, meal preparation, house or exterior maintenance; ‡Leisure activities include sports, exercise training, playing cards, cinema, hobbies, reading but exclude watching television or listening to radio. Gainful employment (F: full-time $\geqslant$30 h/week, P: part-time $<$30 h/week); Studies (F: full-time $\geqslant$15 h/week; P: part-time $<$15 h/week)

has allowed determining 18 categories of outcomes (on a 0 to 10 scale), with 0 representing the lowest outcome and 10 the highest one. Accordingly, those 18 weighted scores were grouped into three productivity levels: low (0–4.2), moderate (5.2–7.8), high (8.2–10).

Subjects

Four hundred and eighteen individuals who returned the questionnaire with complete data constituted the current sample (Table 2). No significant difference was observed between the sample and the base population for duration of injury, severity of injury and gender. A significant difference of about 2 years was observed for chronological age and age at injury ($P<0.05$). The statistical significance of such a difference seems to be attributable to the large number of subjects (population and sample) and there is probably no clinical significance related to this difference. However, the lower representativeness in the sample of individuals over 60 years of age might limit the generalization of results in this age group.

Statistical analyses

Demographic variables, severity of injury, and level of productivity were described using frequency distributions, means and standard deviations. The chi-square test of independence (χ^2) was used to compare proportions between the population and the sample as well as the proportion of individuals into the three age groups of productivity levels (low, moderate, high) according to the severity of injury. The *z*-test was used to compare mean values when the variance was known between the population and the sample.

Multiple regression was used to determine the association between productivity outcomes and a set of independent variables for the whole sample and for subgroups based on the severity of injury (paraplegia or tetraplegia, complete or incomplete lesion). The independent variables included in the regression model were chosen on the basis of their association with productivity as described in literature or based on a significant correlation (Spearman coefficients) with the dependent variable. Discriminant analysis was undertaken to classify subjects into the levels of productivity (low, moderate, high). The discriminant variables were chosen similarly to those used in the multiple regression analysis. The level of significance for all analyses was set at 0.05.

Results

Overall productivity of the sample

The distribution of overall productivity of the sample was spread over the continuum of the 18 weighted scores (Table 1). The percentage of subjects into the

Table 2 Comparisons of demographic characteristics and severity of injury between the population and the sample

Variables	*Population* (n = *1771*)	*Current sample* (n = *418*)	*Statistical tests*	P-*value*
Chronological age (years)**				
Mean ± 1 SD	44.3 ± 14.2	42.1 ± 11.8	z‡ = –3.79	< 0.001
Range	(17 to 89)	(18 to 79)		
Age at injury (years)§				
Mean ± 1 SD	30.8 ± 13.9	28.0 ± 11.5	z = –4.94	< 0.001
Range	(1 to 90)	(8 to 66)		
Period of injury				
1970–1973	12.8%	13.9%	χ^2† = 3.420	0.636
1974–1977	18.7%	16.3%		
1978–1981	17.7%	16.3%		
1982–1985	17.4%	19.9%		
1986–1989	17.2%	16.3%		
1990–1993	16.2%	17.5%		
Time since injury (years)				
Mean ± 1 SD	13.6 ± 6.7	13.3 ± 6.8	z = –1.05	0.293
Range	(2 to 26)	(2 to 26)		
Severity of injury*				
Tetraplegia Complete	24.6%	23.2%	χ^2 = 1.858	0.602
Incomplete	21.4%	20.8%		
Paraplegia Complete	34.1%	37.6%		
Incomplete	19.9%	18.4%		
Gender				
Female	18.6%	18.2%	χ^2 = 0.035	0.852
Male	81.4%	81.8%		

*Missing values for 160 subjects in the population; **Missing values for 2 subjects in the sample; †Chi-square test comparing proportions between the population and the sample; ‡Z-test comparing mean values between the population and the sample; §Missing values for 2 subjects in the sample and 1 subject in the population

moderate and high levels of productivity were similar (≈40%). One-third of the sample were gainfully employed but a smaller percentage (27%) held a full-time job at the time of the survey. A few individuals (9%) were engaged in an educational process. It is interesting to notice that many participants (37%) reported participation in homemaking and family activities or in community organizations as a main occupation or were involved in those types of activity. These findings indicate that many people had a significant level of productivity even if the participation may vary in duration. However, the most frequent productivity outcomes (for 26% of the sample) were those in which the subjects did not report any main occupation (retired or unemployed) and were more or less involved in homemaking and family activities. About 10% of the sample did not participate in any activities as measured with the concept of productivity.

Severity of injury and productivity levels

The proportion of subjects into the three levels of productivity significantly differed with the severity of injury ($\chi^2 = 21.4$, $P = 0.005$) (Figure 1). Disabilities produced by a complete tetraplegia seemed to diminish the possibility to participate in productive activities since 35% of those individuals reported a low level of productivity which is about twice higher than the percentage observed in any other type of injury. Consequently, only 27% of individuals with complete tetraplegia reported high productivity, a percentage lower than that of the persons with a less severe injury.

Productivity outcomes and associated variables

Regression analyses confirmed that the percentage of explained variance in the productivity differed between the whole sample and each severity of injury as well as

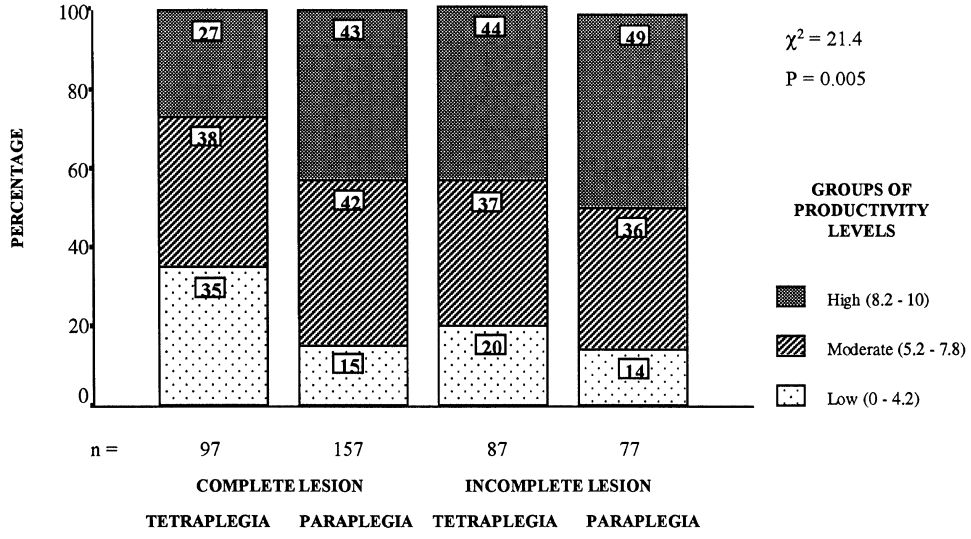

Figure 1 Percentages of subjects into each productivity level according to the severity of injury ($n = 418$)

Table 3 Percentages of partial and total variance in overall productivity (dependent variable) explained by the independent variables for the whole sample and the four severity of injury

Independent variables	*Whole sample (%) n = 397**	*Complete lesion*		*Incomplete lesion*	
		Tetraplegia (%) n = 75	*Paraplegia (%) n = 147*	*Tetraplegia (%) n = 81*	*Paraplegia (%) n = 73*
Schooling (years)	13	7	17		26
Continuation of studies after SCI		28			
Chronological age	4		4		
Age at injury				20	5
Type of locomotion†	3			14	
Ability to drive a car	14		9	7	
Transportation indices‡		9		3	20
Cumulative explained variance	34	44	30	44	51

*Missing values for 21 subjects in the sample; †Type of locomotion referred to: powered wheelchair; manual wheelchair, walking with a technical aid and with or without orthosis; walking without any technical aids; ‡Grouping of variables related to transportation: independence of transportation (at all times); access to adapted transportation; regular type of transportation; independence of using your own transportation

the independent variables that contributed to explain the variability (Table 3).

The explained variance in productivity ranged from 30% to 51%. Education explained a large percentage of variance (7% to 28%) within the whole sample and among three types of injury. Transportation related variables also accounted for a substantial percentage of variance (up to 20%). A higher level of independence to transportation is positively associated to overall productivity. Chronological age and age at injury were variably associated with productivity. Specifically, chronological age seems to be a poor contributor of the explained variance while age at injury had the highest contribution in only one type of injury (incomplete tetraplegia). Finally, the type of locomotion accounted for 14% of the explained variance in the group of incomplete tetraplegia, for which education did not contribute to the observed variability. No other demographic or psychosocial variables were significantly associated with the productivity level.

Discriminant analysis was used to distinguish between the three groups of productivity levels (Gr. 1 = low, Gr. 2 = moderate, Gr. 3 = high) (Table 4). The percentage of subjects correctly classified in each level of productivity showed a large variation within the total sample and the four types of injury. Canonical correlations from 0.56 to 0.69 indicated that the discriminant functions had a moderate ability to discriminate among the three groups which were indicated by the total percentage of subjects correctly classified (54% to 71%). The greatest percentage of successful classification was always in the group of individuals with a high productivity level (71% to 87%). The lowest percentages of classification varied between the low or moderate level depending on the severity of injury. The high frequencies of inclusion of some discriminant variables such as those related to transportation and education confirm that they influence the level of productivity.

Discussion

The purpose of the present study was to examine the profile of participation in productive activities of a group of individuals who sustained a SCI in Quebec over the last three decades. As a main finding, it has been observed that a substantial number of people participated in other occupations than the traditional ones of employment and studies. A significant percentage was engaged in homemaking and family activities with some participation in community organizations and leisure activities. Only a few individuals did not report any productive activity. However, education seems to be an important prerequisite to return to work after SCI.

Various studies have suggested that the adjustment to disability can be measured by the level of productivity.[6–9,14,15] DeJong and Hughes[8] showed a

Table 4 Percentages and numbers of subjects correctly classified in their groups of productivity from a set of discriminant variables for the whole sample and the four severity of injury

	Group 1 (low)	*Group 2 (moderate)*	*Group 3 (high)*	*Total*	*Discriminant variables*	*Standardized coefficients*
Whole sample	54%	53%	71%	61%	Schooling (years)	0.63
n = 393*	n = 43	n = 80	n = 116	n = 239	Ability to drive a car	0.55
					Chronological age	–0.45
					Type of locomotion	0.30
					Transportation indices (#1)	0.24
Complete tetraplegia	48%	64%	80%	63%	Schooling (years)	0.74
n = 77	n = 14	n = 18	n = 16	n = 48	Transportation indices (#2)	0.49
					Continuation of studies after SCI	0.46
Complete paraplegia	62%	32%	73%	54%	Schooling (years)	0.70
n = 149	n = 13	n = 20	n = 48	n = 81	Ability to drive a car	0.57
					Chronological age	–0.48
Incomplete tetraplegia	63%	42%	87%	66%	Age at injury	–0.76
n = 84	n = 10	n = 13	n = 32	n = 55	Ability to drive a car	0.57
					Type of locomotion	0.55
Incomplete paraplegia	46%	71%	79%	71%	Schooling (years)	0.79
n = 77	n = 5	n = 20	n = 30	n = 55	Age at injury	–0.57
					Ability to drive a car	0.24

Transportation indices: #1 = Independence of using your own transportation; #2: Independence of transportation (at all times); *Missing values for 25 subjects in the sample

lower level of productivity among individuals with SCI. In this study, the highest level of productivity was reported by only 15% and the low level reported by 49%. This could be explained by differences in characteristics of the samples. The subjects of the present study were older and showed a longer duration of injury. This may suggest differences in the quality of their adjustment to disability. Compared to the current results, Noreau and Shephard[14] and Boschen and Gargaro[10] showed a similar distribution in productive activities. Boschen and Gargaro[10] proposed that this difference of productivity level compared to DeJong's findings two decades ago, could be explained by an encouraging change facing individuals with disabilities of becoming productive members of society. Other studies[2,7,15–17] documented the level of achievement in productive activities by persons with SCI, but they used different methodological approaches. Therefore, comparison with the present study was limited since the measurement of participation to several areas of productive activities were more qualitative.

Severity of injury and productivity levels

The association between impairment, disability and productivity is often mentioned in studies of adjustment following SCI. In the present study, the individuals with the most severe and those with the least severe injury differed largely in their level of productivity suggesting that variations in disability might affect the participation in productive activity. Previous studies[9,14] found that the severity of a person's disability as measured by a functional index (Barthel) was correlated with productivity outcome but it was not the most significant predictor. Conversely, Krause[15] found that severity of injury (level and extent) was not consistently related to the probability of working or engaging in unpaid productive activity. Goldberg and Freed[18] found a lack of significant correlation between the disability and vocational adjustment and indicated that severe chronic disability by itself failed to predict for adjustment. Kemp and Vash[7] showed that there were no differences in productivity between individuals with paraplegia or tetraplegia when a high level of social support was available. However, the individuals with tetraplegia having less support were significantly less productive. In summary, severity of injury should be taken into account for the adjustment post-injury but the association does not seem to be proportional to the disabilities and therefore other factors should be considered.

Relationships between independent variables and productivity outcomes

Since the level of injury itself does not explain all the variability in overall productivity, the present study tried to identify personal as well as environmental variables that might explain the productivity after SCI.

The results support previous findings that individuals with SCI who completed a higher level of education are more likely to be involved in productive activity such as employment or community organizations. Specifically, an advanced education may significantly reduce the impact of physical disability. In general individuals with a better education were more likely to be socially involved in the competitive labor market as well as in community organizations reflecting a better adjustment.[15] Consequently, traditional rehabilitation should be extended far from the walls of the rehabilitation center and new approaches should be developed to facilitate and encourage educational training. Furthermore, this issue is quite important since the individuals usually sustain their injury at a younger age. Their vocational interests as well as a large access to computer technology are some ways that should be explored in order to improve the level of education.

One of the most relevant findings of the present investigation was the significant association of transportation with productivity outcomes. The frequent inclusion of transportation in the multivariate models clearly indicated that this environmental factor must be considered an important facilitator of productivity achieved following SCI. In the present study, the ability to drive a car was the most significant transportation variable, to explain the variance into overall productivity, except for individuals with complete tetraplegia. In the latter group, the general independence on transportation seemed to be more significant in explaining productivity. Obviously, without sufficient independence in transportation, the participation in many activities such as education, employment, becoming actively involved in community organizations and leisure activities may not be readily possible. Previous studies have also suggested positive effects of transportation on productivity outcomes[3,9,15,16] and emphasised the key role of transportation in fostering an active and productive lifestyle or have observed that individuals with a SCI perceived transportation as an important factor for reintegration into the community. Consequently, interventions that aim at reaching a higher level of productivity may require a larger focus on access to transportation particularly for those with higher levels of disability.

Age-related variables (chronological age and age at injury) appeared to have an inverted association with productivity outcomes, as suggested in previous studies.[9,14,15] It is likely that the process of coping following SCI is slightly easier for a younger person. This suggests that return to pre-injury activities or the development of new interests regarding productive activities may be more easily attainable at a younger age. Finally, the type of locomotion was the only variable related to injury included in the models and it was positively associated to productivity. Even though a higher ability of walking seems to lead to a higher independence, the association with the productivity

levels was not important except for the individuals with an incomplete tetraplegia.

Limitations

Some limitations are inherent to this study. The sample of convenience might have a higher level of education, which may have inflated the observed productivity level and thus brought a potential selection bias. The procedure used to classify the subjects' productivity outcomes (ranking and weighting) seems to lead to a higher validity for the higher levels of productivity that included employment and education. The assessment of productivity outcomes in the low and moderate groups was more difficult since those activities are more complex to quantify in everyday life.

The data collection was made at a specific moment and did not give information on participation in productive activity over time. To better understand post-injury productivity, information has to be collected longitudinally on a longer period of time. Data collected on the environmental variables were based on a generic tool (Measure of the Quality of the Environment) which was not specifically designed for the persons with SCI and not to be used in the context of productivity outcomes. Therefore, the impact of the environment may have been underestimated.

Finally, the present sample has been used to identify the independent variables to insert into the discriminant analyses. Therefore, it is possible that the percentage of subjects correctly classified was slightly overestimated and that replication of these analyses with data from a new sample might lead to a lower percentage of subjects correctly classified.

Conclusion

The main findings of the present study confirm that a substantial number of individuals with SCI are engaged in homemaking and family activities, as well as in gainful employment and educational training. The results indicated that personal and environmental variables influence the participation in productive activity after SCI. Future research will be necessary to identify other factors that could increase productivity. Personal factors such as self-esteem, motivation, functional independence, vocational interests may influence the ability and willingness to participate in productive activity. Attention should also be paid to environmental factors such as vocational rehabilitation services, financial compensation, physical barriers, access to personal homecare and attitudes (friends, family, employers). Furthermore, it seems likely that interactions between personal and environmental variables will explain further variance in the participation in productive activities of persons following a traumatic SCI.

References

1 Krause JS. Employment after spinal cord injury. *Arch Phys Med Rehabil* 1992; **73:** 163–169.
2 Castle R. An investigation into the employment and occupation of patients with a spinal cord injury. *Paraplegia* 1994; **32:** 182–187.
3 El Ghatit AZ, Hanson RW. Variables associated with obtaining and sustaining employment among spinal cord injured males: a follow-up of 760 veterans. *J Chronic Diseases* 1978; **3:** 363–369.
4 Krause JS, Anson CA. Employment after spinal cord injury: relation to selected participant characteristics. *Arch Phys Med Rehabil* 1996; **77:** 737–743.
5 Stover SL, DeLisa JA, Whiteneck GG. *Spinal cord injury. Clinical outcomes from the model systems*. Gaithersburg, Maryland: Aspen Publishers, inc, 1995.
6 Trieschmann RB. *Spinal cord injuries: psychological, social and vocational rehabilitation*. Second edition. New York, Demos Publications, 1998.
7 Kemp BJ, Vash CL. Productivity after injury in a sample of spinal cord injured persons: a pilot study. *J Chronic Diseases* 1971; **24:** 259–275.
8 DeJong G, Hughes J. Independent living: methodology for measuring long-term outcomes. *Arch Phys Med Rehabil* 1982; **63:** 68–73.
9 DeJong G, Branch LG, Corcoran PJ. Independent living outcomes in spinal cord injury: multivariate analyses. *Arch Phys Med Rehabil* 1984; **65:** 66–73.
10 Boschen KA, Gargano J. Independent living long-term outcome variables in spinal cord injury: a replication of DeJong. *Int J Rehabil Research* 1998; **21:** 285–300.
11 Wallston KA, Wallston BS, DeVellis R. Development of the Multidimensional Health Locus of Control (MHLC) Scales. *Health Education Monographs*. Spring 1978; **6:** 160–170.
12 Scheier MF, Carver CS. Optimism, Coping, and Health: Assessment and Implications of Generalized Outcome Expectancies. *Health Psychology* 1985; **4:** 219–247.
13 Fougeyrollas P, Noreau L, St-Michel G. Measure of the Quality of the Environment. *ICIDH and environmental factors international network* 1997; **9:** 32–39.
14 Noreau L, Shephard RJ. Physical fitness and productive activity of paraplegics. *Sports Med Training Rehab* 1992; **3:** 165–181.
15 Krause JS. The relationship between productivity and adjustment following spinal cord injury. *Rehab Coun Bull* 1990; **33:** 188–199.
16 Richards B. A social and psychological study of 166 spinal cord injured patients from Queensland. *Paraplegia* 1982; **20:** 90–96.
17 Taricco M, Colombo C, Adone R, Chiesa G, Di Carlo S, Borsani M, Castelnuovo E, Ghirardi G, Lascioli R, Liberati A. The social and vocational outcome of spinal cord injury patients. *Paraplegia* 1992; **30:** 214–219.
18 Goldberg RT, Freed MM. Vocational adjustment, interests, work values, and career plans of persons with spinal cord injuries. *Scan J Rehab Med* 1973; **5:** 3–11.