

## ORIGINAL ARTICLE

# Sport, free time and hobbies in people with spinal cord injury

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**Study design:** Prospective, multicenter follow-up (F-U) observational study.

**Objectives:** To investigate the changes in participation and sports practice of people after spinal cord injury (SCI) and their impact on perceived quality of life (QoL).

**Methods:** The questionnaire investigated the health status and management of clinical conditions and attendance of social integration, occupation, autonomy, car driving, sentimental relationships and perceived QoL in a SCI population 4 years after the first rehabilitation hospitalization.

**Results:** Respondents were 403, 83.4% male; 39% was tetraplegic. At F-U, 42.1% worked and studied, 42.2% still held their jobs or studies, and 69% drove the car. In all, 77.2% had bowel continence and 40.4% urinary continence. The results showed that for the 68.2% of respondents, the attendance of friends, relatives and colleagues during their free time was the same or increased compared with the time before the injury, whereas 31.8% showed a decrease. The amount of time the 52.1% of respondents left home was the same or increased compared with before the trauma, whereas 50.6% of the respondents said that the time they were engaged in hobbies was either the same or increased.

**Conclusion:** SCI people who perceived their QoL as being higher, and whose attendance, autonomy and time was increased in respect to hobbies, were mainly men with an age range between 36 and 40 years, unmarried, paraplegic and with A–B Asia Score. Regarding the amount of time dedicated to practicing sports, the only difference was the most of that respondents, who indicated a decrease, were women.

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**Keywords:** spinal cord injury; quality of life; sports activities; urinary continence; bowel continence; car driving

## INTRODUCTION

Spinal cord injury (SCI) is a severe disorder associated not only with ongoing medical complications but also with a significant loss of participation.<sup>1</sup> Participation is a relatively new concept that the World Health Organization has defined as the lived experiences of involvement in people's life situations, which can be listed as personal relationships, vocational stability, sports and social involvement, daily life activities, life satisfaction and quality of life (QoL) as a whole.<sup>2–5</sup>

SCI has a tough impact on the social aspect to the point that it slows down working-life, leisure time, sports activities and personal relationships.<sup>6–7</sup> Most of the literature has compared the SCI condition with the general population by highlighting that sexual life, economic well-being, leisure, sports activities and long-term jobs are significantly lower in people with SCI.<sup>8</sup> The new issue is to investigate some of these aspects within the SCI condition by considering the impact of the level of lesion. Physical, attitudinal and psychological obstacles, such as unaffordable equipment, no personal assistance, lack of personal motivation, fear of injury and feeling uncomfortable in socializing with able-bodied individuals, may reduce opportunities for sports activities and decrease the maintenance and growth of relationships after SCI.<sup>9–12</sup>

The correlation among these aspects is not simple to investigate because 'participation' is a complex concept that includes a variety of

outdoor activities, such as 'attendance of friends, relatives or colleagues during free time'; 'changing hobbies'; 'time spent outside the home'; 'practicing sports'; 'changes in vocational situation';<sup>13</sup> and a range of psychological consequences, such as 'involvement in personal relationships'; 'changes in family situation'; 'happiness regarding the quality of sex life'; 'personal autonomy' and 'car driving'.<sup>11</sup>

The purpose of this study was to investigate the changes in participation, aimed at the attendance of friends/relatives/colleagues, car driving, hobby and sports activities of people after SCI and their impact on perceived QoL.

## MATERIALS AND METHODS

Out of 608 first-admission traumatic SCI patients discharged between 1997 and 1999 from 24 Italian centers participating in the previous epidemiological prospective survey by GISEM,<sup>14</sup> 511 were located and included in the GISEM follow-up (F-U) study.<sup>15–16</sup> Subjects with spinal cord lesions due to multiple sclerosis, spinal cord metastasis, degenerative central nervous system diseases and hereditary or congenital diseases were excluded from recruitment.

Demographics (age, gender, marital status) as well as characteristics of the spinal cord lesion were collected at discharge.<sup>17</sup> A 24-item standardized telephone questionnaire with closed questions was administered at F-U, during a single phone call by the same psychologist, in order to avoid the influence of variability among different interviewers. The questionnaire used was the one created by Franceschini for the GISEM F-U<sup>15</sup> study, which investigated the

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health conditions in a SCI population 4 years after the first rehabilitation hospitalization and explored seven main areas: health status and management of clinical conditions, social integration, occupation, autonomy, car driving, sentimental relationships and perceived QoL. Attendance of friends, relatives or colleagues, practice of hobbies, or things of interest, leaving home during free time, sentimental life satisfaction were evaluated by asking the subjects to compare the to-date situation with the time before the injury as same/more or less. Practice of sports activities and car-driving ability were evaluated by taking into account the previous situation as yes/never done versus not anymore. The same for vocational/study occupation explored by two questions asking about the present situation and changes from before.

To permit the administration of questionnaire by phone, the evaluation of perceived QoL was obtained by asking the subjects to rate a self-assessment of their perceived QoL by a numerical rating scale from 0–10 points (poor=0, optimal=10).<sup>13–15</sup> Specifically, we considered the items about social integration, sentimental life and vocational/study situation about the perceived QoL, and how those areas correlated with the attendance of friends/relatives/colleagues, car driving, hobbies and sports activities.

### Statistical analysis

A descriptive analysis was conducted to define the characteristics of the F-U population. Free time, such as the attendance of friends/relatives/colleagues, the usual practice of sports activities and hobbies, and car driving since car driving/possibility to go out of home were considered as a dependent variable and were correlated with the following independent variables: age, gender, marital status, occupation, neurological category, motor completeness of lesion, urinary and bowel continence, car-driving ability and perceived QoL. Chi-square with the calculation of the odds ratio for dycotomic variables will be used to test the significance of categorical covariates. Parametric and non-parametric tests will be used to test the significance of continuous covariates.

## RESULTS

### Descriptive analysis

Out of 511 subjects who were located at F-U, 403 (79%) completed the interview, 72 (14%) abstained from giving their consent, whereas the remaining 36 (7%) had died. We assume that most of the 97 patients lost to F-U had re-located sometime during the observation period, though some may have died (Figure 1).

Respondents were all living at home, 83.4% male and 16.6% female; the mean age was 41.9 years, 61% were paraplegic and 39% were tetraplegic. In all, 51.6% were unmarried, 42.6% married, 3% divorced/separated, 2.7% widowers and 0.2% cohabitant.

At the time of F-U, participants' mean time since discharge was 3.8 years (median 3.8, range 2.7–5.2).

When SCI trauma occurred, 63.9% of participants were either employed or students at the time of F-U, 42.2% still held their job or continued their studies and 69% drove cars. Summary descriptions of all items with a reference to the range are provided in Table 1.

A total of 77.2% of respondents had bowel continence and 40.4% had urinary continence. At discharge, 55.6% reported a motor complete injury (Asia Impairment Scale A and B) and 17.1% recorded the highest degree of physical dependence. The results showed that for 68.2% of respondents, the attendance of friends, relatives and colleagues during their free time was the same or increased compared with the time before the injury, whereas 31.8% reported a decrease. Also, 52.1% of respondents stated that compared with before the trauma, the amount of time they left home was the same or increased and 50.6% of people stated that the time they were engaged in hobbies was the same or increased in respect to the amount of time before the trauma. Data showed that for the 54.5% of respondents the time spent in practicing sports decreased, although the range of activities played out was large: swimming (47.9%), cycling (19.3%), skiing (8.4%), gym (19.3%), basketball (10.9%), tennis (3.4%), table tennis (2.5%),

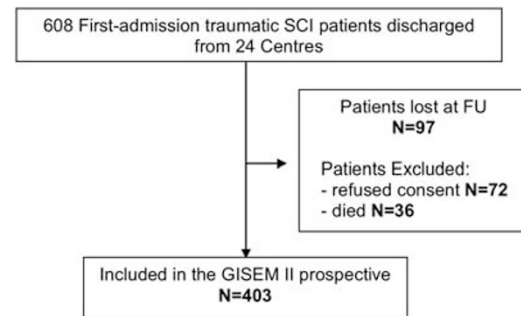


Figure 1 Consort.

Table 1 Socio-demographic and clinical variables of the patients

Variables	N	%	Mean	s.d.	Percentiles		
					25th	50th (Median)	75th
Subject	403						
Age (years)			41.8	16.2	28.8	37.0	56.0
<i>Gender</i>							
Female	67	16.6					
Male	336	83.4					
<i>Marital status</i>							
Single	208	51.6					
Widow	11	2.7					
Married	172	42.6					
Divorced	12	3.0					
<i>Level of lesion</i>							
Para	245	60.8					
Tetra	158	39.2					
<i>ASIA</i>							
A+B	224	55.6					
C+D+E	179	44.4					
<i>Bowel continence</i>							
Yes	311	77.2					
No	92	22.8					
<i>Urinary continence</i>							
Yes	163	40.4					
No	240	59.6					
<i>Car-driving ability</i>							
Yes	278	69.0					
No	125	31.0					
<i>Studying people</i>							
Yes	30	7.4					
No	233	92.6					
<i>Working people</i>							
Yes	140	34.7					
No	263	65.3					
<i>Perceived QoL</i>			5.2	3.4	2.0	5.0	8.0
Vocational situation			6.0	2.69	5.0	7.0	8.0
Sentimental life			7.75	2.25	7.0	8.0	10.0
Social integration			7.97	2.05	7.0	8.0	10.0

Abbreviation: QoL, quality of life.

**Table 2 Outcome variables increased at follow-up (univariable analysis) (*n*=403)<sup>a</sup>**

	Attendance of friends, relatives, colleagues	Hobby	Outdoors mobility	Sport
Increased	68.2%	50.6%	52.1%	45.5%
	<i>Median (increased–decreased), P-value<sup>b</sup></i>			
Age, years	(35.0–43.0), 0.002	(34.0–42.0), 0.001	(32.0–44.0), <0.0001	(31.0–36.0), 0.045
Perceived QoL score	(5.0–7.0), <0.0001	(4.0–7.0), <0.0001	(4.0–7.0), <0.0001	(3.0–6.0), <0.0001
	<i>OR (95% CI), P-value<sup>c</sup></i>			
Level of lesion, para ASIA (Dis.), C+D+E		1.5 (1.1–2.3), 0.042	2.3 (1.5–3.5), <0.0001	2.5 (1.5–4.3), <0.0001 1.9 (1.2–3.1)
Bowel continence, yes	2.2 (1.4–3.6), 0.001	1.6 (1.1–2.6), 0.042	3.0 (1.6–5.0), <0.0001	2.5 (1.4–4.6), 0.003
Car-driving ability, yes	2.0 (1.3–3.2), 0.003	3.9 (2.4–6.2), <0.0001	7.9 (4.7–13.4), <0.0001	11.2 (4.6–27.3), <0.0001
Studying and working people, yes	1.9 (1.2–2.9), 0.005	1.9 (1.3–2.9), 0.001	4.4 (2.9–6.7), <0.0001	2.4 (1.5–4.0), <0.0001

Abbreviations: CI, confidence interval; Dis, discharge; OR, odds ratio.

<sup>a</sup>Only significant values shown.<sup>b</sup>Mann–Whitney tests.<sup>c</sup>Chi-square tests.**Table 3 Correlations among outcome variables and the perceived QoL areas**

	Attendance of friends relatives, colleagues	Hobby	Outdoors mobility	Sport
<i>Vocational/study situation</i>				
<i>r<sub>s</sub></i>	0.346	0.365	0.444	0.394
<i>P</i> -value	<0.0001	<0.0001	<0.0001	<0.0001
<i>N</i>	403	403	403	264
<i>Sentimental life</i>				
<i>r<sub>s</sub></i>	0.011	0.044	0.007	0.008
<i>P</i> -value	0.826	0.379	0.883	0.899
<i>N</i>	400	400	400	264
<i>Social integration</i>				
<i>r<sub>s</sub></i>	0.083	0.118	0.146	0.060
<i>P</i> -value	0.095	0.018	0.003	0.332
<i>N</i>	400	400	400	264

Abbreviation: *r<sub>s</sub>*, Spearman's rank correlation coefficient.

sailing (10.1%), soccer (5.9%), fishing (6.7%), hunting (3.4%) and other sports (18.5%).

### Univariate analysis

Free time, sports, car driving and people's hobbies after SCI were investigated in the data set.

Univariate analysis showed that free time, seen as better attendance of friends, relatives or colleagues, revealed significant correlation with lower age (mean 41.9 ± 16.2 years, *P*=0.002), bowel continence (*P*=0.001), car driving (*P*=0.003) and vocational/study situation (*P*=0.005) (Table 2).

The analysis showed a very significant correlation between hobbies, seen as doing things of the individual's interest, and almost all the independent variable: age (*P*=0.001), car driving ability (*P*<0.0001) and the vocational situation (*P*<0.0001). A significant correlation was also observed between hobbies and a higher score of the social integration area (*P*=0.018) and vocational/study area of perceived QoL (*P*=0.000) and gender (*P*=0.024). A slight correlation was then found with bowel continence (*P*=0.042) and paraplegic level of lesion (*P*=0.042).

Mobility, seen as leaving home, had a very significant correlation with all the variables (*P*<0.0001), except for gender and C–D–E ASIA Impairment Scale. Correlation was found among car driving and the vocational/study area of perceived QoL (*P*<0.0001).

Furthermore, results showed that practice of sports activities was correlated from a significant to a moderate degree with the paraplegic level of lesion (*P*<0.0001), C–D–E ASIA Impairment Scale (*P*=0.012), bowel continence (*P*=0.003), car driving ability (*P*<0.0001), vocational situation (*P*<0.0001) and higher score of the vocational/study area of perceived QoL (*P*<0.0001), whereas there was no correlation with gender, marital status and age.

Nonparametric correlations showed in Table 3 highlighted that the vocational/study situation is the area of perceived QoL to be the most significant on all the items investigated. Also, a slight significance between the social integration area of perceived QoL and the car driving (*P*=0.003) and hobbies (*P*=0.018) emerged.

### Multivariate analysis

In the multivariate analysis (Table 4), the variables that independently correlated with the same or increased attendance of friends, relatives or colleagues were: bowel continence, younger age, vocational/study area of perceived QoL, and to a lesser extent, male gender. Car driving was independently associated with bowel continence, vocational/study area of perceived QoL, younger age, being employed/studying and being divorced. Furthermore, hobbies were independently related to car driving ability, vocational/study area of perceived QoL and younger age, whereas practicing sports was correlated with car driving ability, vocational/study area of perceived QoL and motor incompleteness of the lesion.

### DISCUSSION

SCI places great strain on several areas of the lives of individuals. Relationships within the family, modifications within social roles and interactions, as well as the inevitable adjustment to a changed body take place with consequent changes in the ability to practice activities, move outdoors and deal with other people. This research examined the impact of social factors, such as free time, aimed at the attendance of friends/relatives/colleagues, car driving, sports activities and hobbies in individuals with SCI some time after discharge from rehabilitation. The results looked overall in line with the literature with the exception of the employment rate. Findings about the item on the attendance of friends, relatives and colleagues showed a high signifi-

**Table 4** Multivariate binary logistic regression for (increased=1) in outcome variables at follow-up

	Coefficients	OR (95% CI)	P-value
<i>Attendance of friends/relatives/colleagues</i>			
Intercept	0.865	2.376	0.075
Age (for 1-year increase)	-0.033	0.968 (0.948-0.988)	0.002
Gender (male=1)	0.711	2.037 (1.020-4.065)	0.044
Bowel continence (yes=1)	0.954	2.597 (1.493-4.518)	<0.0001
QoL vocational/study situation	0.205	1.228 (1.108-1.361)	<0.0001
Nagelkerke $R^2=0.138$			
<i>Hobby</i>			
Intercept	-0.068	0.934	0.878
Age (for 1-year increase)	-0.016	0.985 (0.970-0.999)	0.043
Car-driving ability (yes=1)	1.152	3.165 (1.842-5.437)	<0.0001
QoL vocational/study situation	0.251	1.286 (1.164-1.424)	<0.0001
Nagelkerke $R^2=0.117$			
<i>Outdoors mobility</i>			
Intercept	-1.161	0.313	0.054
Age (for 1-year increase)	-0.032	0.968 (0.945-0.992)	0.009
Divorced (yes=1)	-1.806	0.164 (0.029-0.925)	0.041
Bowel continence (yes=1)	1.398	4.045 (2.154-7.596)	<0.0001
Car-driving ability (yes=1)	1.683	5.383 (2.843-10.192)	<0.0001
Studying and working people (yes=1)	0.855	2.352 (1.320-4.191)	0.004
QoL vocational/study situation	0.301	1.352 (1.197-1.527)	<0.0001
Nagelkerke $R^2=0.381$			
<i>Sport</i>			
Intercept	-3.262	0.038	<0.0001
Car-driving ability (yes=1)	2.409	11.124 (3.732-33.160)	<0.0001
QoL vocational/study situation	0.319	1.376 (1.167-1.623)	<0.0001
Nagelkerke $R^2=0.281$			

Abbreviations: CI, confidence interval; OR, odds ratio.

cance with younger age, bowel continence and car driving ability. It is interesting to point out that free time was also linked to a better sentimental perceived QoL and marital status. The fact that 51.7% of the study participants were single leads as to suppose that their perception of QoL at the time of F-U (3.8 years after discharge) depended mainly on their internal resources rather than on the partner's affective, motivational and instrumental support. It is reasonable to think that about 4 years after the injury, SCI people had their self-worth restored to the point that they recognize that the trauma didn't completely change who they were. This awareness may have resulted in an improvement of their well-being. According to the literature, the attendance of friends and relatives allows the SCI individuals to take on new roles and then to realize the importance of relationships. The main effect is the enhancing of social and sentimental perceived QoL.<sup>11</sup>

In agreement with the literature, significant results also emerged about car driving, considered as the frequency with which SCI individuals left home compared with before the trauma. A high significance was recorded between car driving and age, marital status, work, level of injury and bowel/urinary continence. Also, allowing people to actively live in the community linked this item to a better social integration and sentimental area of perceived QoL. As emerged in other studies, car driving ability appeared to be a very important indicator for SCI individuals having work access and being engaged in

social activities.<sup>18</sup> Injured people feel the loss of their independence and freedom and depend on others for the activities of daily life. Being able to drive a car makes it possible for them to gain a sense of autonomy and independence, which are factors deeply linked to a better vocational/study area of perceived QoL, as also showed in literature.<sup>19,20</sup>

Significant results were also found in the area concerning hobbies, in the context of leisure time activities. In previous studies, this area usually overlapped with occupations, or anything people do in their own daily lives. In a meta-synthesis of qualitative findings,<sup>19</sup> people interviewed about this theme talked about going back to school, becoming involved in sports, having a job, being engaged in meaningful recreational occupations. Our study is one of the very few to consider leisure time activities separately from sports and job in order to better analyze the factors that contribute to improving perceived QoL. Our analysis showed an important correlation between hobbies and age, bowel continence, car driving ability and the vocational/study situation. A significant relationship was also observed between hobbies and vocational/study area of perceived QoL and gender.

Furthermore, findings of the item on sports also emerged as significant. The results showed that sports activities were correlated with the level of lesion, ASIA Impairment Scale, bowel and urinary continence, car driving ability and the vocational/study area of perceived QoL. The marks were overall in line with the literature that shows how the participation in sports of SCI people is associated with increased perceived QoL and social integration indicators like work access and car driving ability.<sup>21,22</sup>

Data showed that changes in the attendance of friends/relatives/colleagues, car driving, hobbies and sports activities were overall affected by bowel continence and vocational/study situation. The level of the lesion influenced all the items investigated with the only exception being the attendance of friends/relatives/colleagues, whereas ASIA score impacted only on the sports activities. As far as perceived QoL is considered, the assumption was that it was correlated with some aspects that concur in defining the social area of the complex concept of QoL, such as the items investigated: the attendance of friends/relatives/colleagues, car driving, hobbies and sports activities. In the GISEM F-U study, perceived QoL was investigated by a question that asked the patients to rate the weight of some factors on person's QoL. Specifically, only the sentimental life, social integration and vocational/study areas were considered. The aspect of perceived QoL that most influenced the items analyzed emerged to be the vocational/study situation. Specifically, our study showed that SCI people who perceived their QoL higher, and their attendance, autonomy and time spent in hobbies increased, were mainly men with an age range between 36 and 40 years, unmarried, paraplegic and with A and B Asia Score. Instead, regarding the amount of time dedicated to practicing any sports, the only difference observed was that most respondents, who stated its decrease, were women. Also, as far as perceived QoL is concerned, vocational/study situation emerged as being highly significant in respect to all the items investigated more than the social integration and sentimental life aspects related to perceived QoL. These results could be of particular interest because they show that appropriate rehabilitative recovery should provide a protected access at work and car driving training in order to allow SCI people to get the best level of autonomy and to perceive a better QoL. No data in literature showed the real advantages or limitations in using the additional tools for car driving rehabilitation training versus old rehabilitative approach. Further study can be conducted to evaluate and confirm

if car driving represents an important goal for the rehabilitation programs that need to put SCI people in the condition to achieve their potential.

#### DATA ARCHIVING

There was no data to deposit.

#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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