Quality of Life in and After Spinal Cord Injury Rehabilitation: A Longitudinal Multicenter Study

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Purpose: To investigate the changes in quality of life (QOL) in persons with spinal cord injury (SCI) and their close persons during the first 2 years post injury. **Method:** Longitudinal, multiple sample, multiple wave panel design. Data included 292 patients recruited from Austrian, British, German, Irish, and Swiss specialist SCI rehabilitation centers and 55 of their close persons. Questionnaire booklets were administered at 6 weeks, 12 weeks, 1 year, and 2 years after injury to both samples. **Results:** Study 1 investigated the WHOQOL-BREF domains in individuals with SCI and found differences mostly in the physical domain indicating that QOL increases for persons with SCI from onset. An effect of the culture was observed in the psychological and environmental domains with higher QOL scores in the German-speaking sample. Study 2 compared individuals with SCI to their close persons and found differences in the physical, environmental, and social domains over time. The scores on the psychological dimension did not significantly differ between the persons with SCI and their close persons over time. **Conclusion:** QOL measured by the WHOQOL-BREF shows that QOL changes during rehabilitation and after discharge. Apart from the physical dimension, the persons with SCI and their close persons seem to experience a similar change in QOL. Further longitudinal research is suggested to clarify the mutual adjustment process of people with SCI and their close persons and to explore cultural differences in QOL between English- and German-speaking countries. **Key words:** close persons, quality of life, rehabilitation, spinal cord injury

A spinal cord injury (SCI) is a highly disruptive event in the life of an individual and requires a considerable coping process. Shortly after the injury, all attention is put into stabilizing the patient and from that moment the individual has to cope with challenges at physical, social, environmental, and psychological levels.

The institutionalized context of the rehabilitation provides a largely standardized supportive setting that helps the person with SCI to become acquainted with the recently acquired disability. The health care professionals in collaboration with the patients and their close persons, that is, relatives or significant others, work together to prepare the transition back to everyday life.

One expectation of rehabilitation is that the person with SCI will regain a satisfactory level of

well-being and fulfill his or her aims in life. Many factors may facilitate the retrieval of a good quality of life (QOL). Some aspects of SCI are permanent or only susceptible to small changes (eg, the paralysis and other irrevocable neurological problems related to the injury), but many others (eg, psychological and social aspects) can be more or less actively influenced by the person with SCI.

A number of recent studies regarding QOL in SCI emphasize that QOL is not strongly affected by physical variables.¹⁻⁴ Age³⁻⁷ and gender^{1,2-4,7} are also weakly related to the QOL of the persons with SCI. Physical health aspects that can explain differences in QOL are pain^{1,6,8-11} or secondary conditions such as pressure sores and dysreflexia.^{4,6,11}

Psychological resources are strong predictors of life satisfaction and well-being. Psychological

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resources are personal traits and characteristics that might influence the way a person perceives and manages challenges. Positive affect,^{3,11} high self-efficacy,^{1,6,9,11} optimism,⁶ hope,^{3,11} and sense of coherence^{11,12} have proven to be positively associated with better QOL. More dynamic psychological processes such as appraisals or coping strategies used by the persons with SCI have also significantly contributed to predicting QOL over time.¹³

Studies reporting on how the environment affects perceived QOL in persons with SCI are less frequent, despite a probable relation between mobility impairments and the advantages that a well-designed, obstacle-free, secure, and friendly environment might convey to persons with SCI.¹⁴⁻¹⁶

A supportive familial environment⁶ and friends¹⁷ are important. Close persons of individuals with SCI have to adjust to the new situation, such as accepting a partner with altered needs with different degrees of daily care. Close persons of persons with SCI reported that becoming a caregiver is difficult and often dramatically life changing.¹⁸ Weitzenkamp¹⁹ reports high levels of depression in spousal caregivers, with sometimes higher rates of depression than partners with SCI. He also compared caregivers of persons with SCI with non-caregiving spouses, and found that caregivers showed higher levels of depression and emotional and physical stress.

Familial caregivers hold a central position in the life of persons with SCI. Their health and QOL affects the health and well-being of the persons with SCI; life with SCI involves a systemic adjustment process. Ploypetch⁵ indicated that the participants' perceived QOL was affected more if the caregiver was a member of the participants' family rather than a health professional. Lucke²⁰ showed that the level of QOL in persons with SCI and their caregiving spouses may vary significantly over time, with a drop at 3 months post injury and an increase in QOL in the following 6 months. As a consequence, QOL has to be seen as dynamic, reflecting the adjustment to changes occurring over time in individuals and their environment. Some longitudinal studies of persons with SCI and their QOL have been conducted,²¹⁻²³ but longitudinal studies involving the close persons of individuals with SCI remain scarce in the literature.²⁰

The present report shows the changes in QOL during the first 2 years post injury in individuals with SCI and their close persons from 5 European countries. The first aim is to describe the physical, social, environmental, and psychological QOL in persons with SCI in relation to injury and sociodemographic variables.

Hypothesis 1: It is expected that QOL in persons with SCI is quite high, especially after 2 years.

Second, the experienced QOL of the individuals with SCI and their close persons are compared at 6 weeks, 12 weeks, 1 year, and 2 years post injury.

Hypothesis 2: We expected that the scores of the physical QOL domain would be lower in the persons with SCI compared to the noninjured close persons. No significant differences were expected between the scores of the psychological domain.

Method

Design

Questionnaires were administered as soon as possible after the onset of SCI (ie, at 6 weeks) and were repeated at 12 weeks, 1 year, and 2 years.¹² Data of persons with SCI were collected in Austrian, British, German, Irish, and Swiss SCI rehabilitation centers. Data from close persons of people with SCI were also included, but they were collected only in the German-speaking countries (Austria, Germany, and Switzerland). The close persons consisted of life partners, spouses, or significant others who were closely connected and important to the people with SCI. Each country collected the data for one or more centers and entered the data into a standardized SPSS template.²⁴ Ethical approval for this study was obtained from each center's local research ethics committee, and participants provided consent.

This investigation consists of 2 longitudinal studies with 4 time points at 6 weeks, 12 weeks, 1 year, and 2 years after injury. The first study refers only to the QOL of the SCI sample and strives to provide a comprehensive overview of the physical, social, psychological, and environmental domains of the WHOQOL-BREF among subgroups of persons with SCI, namely gender (male vs female), culture (German vs English), lesion

Table 1. Number of participants included in each study for each time point

Participants		Study 1				Study 2			
		TP1	TP2	TP3	TP4	TP1	TP2	TP3	TP4
SCI	German	132	120	89	60	132	120	89	60
	English	103	119	68	58	NA	NA	NA	NA
Close persons of SCI	German	NA	NA	NA	NA	44	38	26	15
	English	NA	NA	NA	NA	NA	NA	NA	NA

Note: NA = not applicable; TP = time point; TP1 = 6 weeks; TP2 = 12 weeks; TP3 = 1 year, TP4 = 2 years.

level (paraplegia vs tetraplegia), completeness of injury, and etiology (traumatic vs nontraumatic). The second study compares the QOL of the close persons to their SCI counterparts for the 4 domains of the WHOQOL-BREF in a longitudinal perspective.

Participants

All data included in the current report are part of a joint longitudinal European study examining appraisals, coping strategies, and adjustment of persons with SCI during the first 2 years post injury.¹²

Two hundred and ninety-two individuals with SCI completed the questionnaires. English- and German-speaking countries were involved in this study. The German-speaking regions included Austria ($n = 10$), Germany ($n = 105$), and Switzerland ($n = 42$); the English-speaking regions were Ireland ($n = 35$) and the United Kingdom ($n = 100$). Close persons of SCI participants ($n = 55$) were recruited in specialist centers of the German-speaking region.

Table 1 shows the sample sizes at each time point for the English- and German-speaking regions at 6 weeks, 12 weeks, 1 year, and 2 years post injury. It also indicates which samples were involved in each of the studies. The sample sizes varied among the 4 time points and each of the participating regions. The English-speaking centers had more participants for the second time point, because the Irish patients entered the study then. Details regarding data collection, response rates, and the questionnaires applied in this

longitudinal European study are made available in Kennedy et al.^{12,13,25}

Materials

The WHOQOL-BREF²⁶ is a 26-item, cross-culturally valid QOL questionnaire with 4 QOL domains: physical health, psychological health, social relationships, and environment. Higher scores on each domain indicate a greater perceived QOL in that area. Cronbach's alpha for the whole WHOQOL for all time points and the 2 groups of participants (ie, the persons with SCI and the close persons of people with SCI) is good and varies between 0.829 and 0.966. The psychometric soundness for use in the SCI population has been confirmed.²⁷

Data analysis

Statistical data analyses were performed with the R 2.13.2 statistical software²⁸ and SPSS, the Statistical Package for Social Sciences.²⁴ Both analyses consisted of mixed regression models controlling for the repeated testing of individuals over time by introducing a random intercept per person.²⁹ The random intercepts allow a person to be shifted upwards (or downwards) if a particularly strong effect in either side is observed, hence accounting for the dependence of repeated measurements of the same person. QQ-plot analysis of residuals did not show any major departures from normality, hence the model assumptions are fulfilled. As the same explanatory variables were included repeatedly to predict the

4 domains of the WHOQOL-BREF, their P values were Bonferroni corrected and deemed significant if $P < .0125$.

Quality of Life in Persons with SCI

Study 1 describes the responses of the participants with SCI in the 4 WHOQOL-BREF domains and compares the ratings across injury-related (lesion completeness and level; traumatic vs nontraumatic injury) and sociodemographic (gender, culture, and age) variables and for the measurement time point.

Sample and method

Table 2 gives an overview of the physical, social, environmental, and psychological WHOQOL-BREF domain ratings at 6 weeks, 12 weeks, 1 year, and 2 years post injury and depicts nonsignificant and significant differences within subgroups of the SCI sample ($P < .0125$) on personal variables such as age, gender, and culture (English- vs German-speaking patient samples) and injury-related variables such as lesion completeness, injury level, and cause of injury (traumatic vs nontraumatic) as well as the effect of the measurement time point. Additionally, **Table 2** shows the results of the multicollinearity and the normality testing with the variance inflation factor, the Kolmogorov-Smirnov test, and the percentage of explained variance.

Results

The analysis across subgroups of the SCI sample showed some highly significant differences in their expected QOL scores on the domains. The results are depicted in **Table 2**. The physical QOL domain shows a clear effect of the lesion level and the lesion type as well as a highly significant effect of the time, indicating an important positive change of the reported physical QOL from 6 weeks to 2 years after injury. Persons with a higher injury level and individuals with a complete injury reported lower physical QOL. Characteristics of the injury do not seem to impact the other dimensions of QOL. Apart from culture, which affects the

psychological and environmental QOL (with lower values in the English-speaking SCI sample), no other sociodemographic variables affected the reported QOL significantly. Time is an important predictor for these 3 QOL dimensions. The change between 6 weeks and 12 weeks in the psychological QOL and the significant increase in social and environmental QOL after 1 and 2 years post injury support the general improvement of the QOL in persons with SCI. The reported findings are highly significant. Furthermore, the predictors explain an substantial percentage of the variance in the WHOQOL-BREF domains.

Quality of Life in Persons with SCI and Their Close Persons

Study 2 compares the reported physical, social, psychological, and environmental QOL of the SCI sample and their close persons at 6 weeks, 12 weeks, 1 year, and 2 years post injury.

Sample and method

The 4 domains of the WHOQOL-BREF scale were analyzed with a mixed-model approach that included as predictors the measurement time points, the status of the participants (ie, persons with SCI or close persons), and the interaction of the time points and the status of the persons. The significance of the effect of the interaction term was assessed with a likelihood ratio test comparing the model with a main effect only model.

Results

The analysis of the SCI groups and the group of close persons showed some highly significant differences but also similarities when the QOL domains were compared. The results are depicted in **Table 3**. **Figure 1** illustrates the changes of the means over time for the participants with SCI, their close persons, and the general population for each domain of the WHOQOL-BREF. The WHOQOL-BREF scores for the general population are given by Skevington et al.³⁰ Weighted scores using the norm values for Germany and the United Kingdom were calculated to provide a reference. This allows our

Table 2. Mixed-model regression controlling for repeated measurement predicting the WHOQOL-BREF score for 4 WHOQOL domains with measurement time point, culture (German vs English), gender, completeness of injury, lesion level, SCI etiology, and age

	Physical QOL					Psychological QOL				
	Coef.	SE	Std. Coef.	t	P	Coef.	SE	Std. Coef.	t	P
Intercept	50.029	5.058	9.891	9.891	<.001*	55.286	5.865	9.426	9.426	<.001*
Twelve weeks post injury	9.114	1.196	7.622	7.622	<.001*	3.253	1.144	2.843	2.843	.005*
One year post injury	11.933	1.371	8.706	8.706	<.001*	-0.261	1.318	-0.198	-0.198	.843
Two years post injury	10.147	1.776	5.712	5.712	<.001*	-1.171	1.707	-0.686	-0.686	.493
Culture (German)	3.109	1.816	1.712	1.712	.088	7.049	2.114	3.334	3.334	.001*
Gender (male)	-0.449	2.234	-0.201	-0.201	.841	4.653	2.604	1.787	1.787	.075
Completeness (complete)	-4.991	1.855	-2.691	-2.691	.008*	-2.977	2.160	-1.379	-1.379	.169
Lesion level (paraplegia)	7.434	1.852	4.014	4.014	<.001*	3.740	2.158	1.733	1.733	.084
Etiology (traumatic)	1.463	3.396	0.431	0.431	.667	3.261	3.957	0.824	0.824	.411
Age	-0.220	0.064	-3.450	-3.450	.001*	-0.154	0.074	-2.077	-2.077	.039
Non-VIF	100%					100%				
R ²	70.48%					78.05%				
Kolmogorov-Smirnov	0.037	0.021				0.035	0.034			
	Social QOL					Environmental QOL				
	Coef.	SE	Std. Coef.	t	P	Coef.	SE	Std. Coef.	t	P
Intercept	67.297	4.959	13.571	13.571	<.001*	59.833	4.610	12.979	12.979	<.001*
Twelve weeks post injury	-0.226	1.260	-0.179	-0.179	.858	1.721	1.086	1.584	1.584	.114
One year post injury	-6.105	1.442	-4.233	-4.233	<.001*	3.635	1.243	2.923	2.923	.004*
Two years post injury	-10.863	1.867	-5.819	-5.819	<.001*	4.291	1.422	3.017	3.017	.003*
Culture (German)	3.525	1.776	1.984	1.984	.048	4.534	1.656	2.738	2.738	.007*
Gender (male)	-0.818	2.192	-0.373	-0.373	.709	3.478	2.039	1.706	1.706	.089
Completeness (complete)	-2.711	1.814	-1.495	-1.495	.136	-1.521	1.697	-0.896	-0.896	.371
Lesion level (paraplegia)	0.646	1.810	0.357	0.357	.721	1.600	1.695	0.944	0.944	.346
Etiology (traumatic)	0.620	3.318	0.187	0.187	.852	0.234	3.091	0.076	0.076	.940
Age	-0.065	0.062	-1.040	-1.040	.299	-0.076	0.058	-1.299	-1.299	.195
Non-VIF	100%					100%				
R ²	65.25%					68.20%				
Kolmogorov-Smirnov	0.027	0.255				0.036	0.022			

Note: Non-VIF = % of non multicollinear variables; QOL = quality of life; VIF = variance inflation factor.

*Statistically significant.

Table 3. Mixed-model regression controlling for repeated measurement predicting the WHOQOL-BREF score for 4 WHOQOL domains with measurement time point, status of the participant (SCI patient or close person), and the interaction of the 2

	Physical QOL				Psychological QOL					
	Coef.	SE	Std. Coef.	t	P	Coef.	SE	Std. Coef.	t	P
Intercept	76.40	2.66	28.73	28.73	<.001*	66.58	2.68	24.81	24.81	<.001*
Twelve weeks post injury	-0.48	2.47	-0.19	-0.19	.85	2.50	2.43	1.03	1.03	.31
One year post injury	5.44	2.82	1.93	1.93	.05	6.30	2.77	2.27	2.27	.02
Two years post injury	1.60	3.58	0.45	0.45	.65	6.87	3.55	1.93	1.93	.05
Status (SCI)	-30.45	3.05	-9.97	-9.97	<.001*	-3.49	3.09	-1.13	-1.13	.26
Twelve weeks post injury x Status (SCI)	9.82	2.84	3.45	3.45	<.001*	-0.20	2.81	-0.07	-0.07	.94
One year post injury x Status (SCI)	10.26	3.23	3.18	3.18	<.001*	-4.86	3.19	-1.52	-1.52	.13
Two years post injury x Status (SCI)	15.40	4.03	3.82	3.82	<.001*	-1.69	4.00	-0.42	-0.42	.67
R^2	83.60%					79.97%				
Likelihood ratio	20.819	<0.001				2.811	0.422			
	Social QOL				Environmental QOL					
	Coef.	SE	Std. Coef.	t	P	Coef.	SE	Std. Coef.	t	P
Intercept	76.23	2.39	31.88	31.88	<.001*	70.06	2.27	30.89	30.89	<.001*
Twelve weeks post injury	-4.03	2.61	-1.54	-1.54	.12	1.95	2.29	0.85	0.85	.39
One year post injury	-7.28	2.98	-2.45	-2.45	.01*	5.99	2.60	2.30	2.30	.02
Two years post injury	-7.21	3.70	-1.95	-1.95	.05*	10.31	3.28	3.14	3.14	<.001*
Status (SCI)	-9.91	2.76	-3.58	-3.58	<.001*	-6.97	2.61	-2.68	-2.68	.01*
Twelve weeks post injury x Status (SCI)	2.22	3.02	0.73	0.73	.46	-0.80	2.64	-0.30	-0.30	.76
One year post injury x Status (SCI)	3.81	3.42	1.11	1.11	.27	0.93	2.98	0.31	0.31	.76
Two years post injury x Status (SCI)	1.78	4.19	0.42	0.42	.67	-0.26	3.69	-0.07	-0.07	.94
R^2	69.71%					74.66%				
Likelihood ratio	1.337	0.72				0.368	0.95			

Note: The model is compared with a model with main effects only using the likelihood ratio test to determine whether the added value is significant. QOL = quality of life.

*Statistically significant.

Figure 1. Mean WHOQOL-BREF scores for each domain at 6 weeks, 12 weeks, 1 year, and 2 years post injury for the participants with spinal cord injury (SCI) and the close persons, with the mean values in the general population as a reference.

empirical data to be compared with the general population.

The participants with SCI reported lower or nearly equal QOL at 6 weeks, 12 weeks, 1 year, and 2 years post injury on all WHOQOL-BREF domains compared to their close persons. The differences were significant for the physical, social, and environmental QOL.

When controlling for the effect of time, only the differences of the physical QOL remained significant. The analysis of the physical QOL clearly indicates that the lesion impacts the QOL of the persons with SCI. Considering the psychological QOL, the differences between the close persons and the persons with SCI are not significant. When observing the psychological QOL in **Figure 1** and

the standardized coefficients of time and status interaction, we can observe a higher discrepancy between the SCI sample and their close persons after 1 year that disappears after 2 years.

The social and environmental QOL dimensions of the WHOQOL-BREF confirm the findings of the psychological dimension in the sense that there are no significant interaction effects of time and status; the persons with SCI and their close persons report almost similar changes of their QOL in the first 2 years. Time of measurement explains the differences of the reported QOL scores especially after discharge and significantly 2 years after the injury. Whereas the QOL diminishes for the social dimension, starting with quite high values for the close persons with similar levels of social QOL as in the general population³⁰ after 2 years (**Figure 1**), the environmental QOL increases significantly during the first 2 years post injury. The environmental domain (mean) presents highly content participants of the SCI³¹ and close persons group in comparison to the general population.

All 4 mixed models contributed highly to explaining the variance in the WHOQOL-BREF, from 69.71% for the social domain to 83.60%, with 2 covariates and their interaction, namely the status of the study participants (persons with SCI or close persons), the measurement time point, and the interaction between them.

Discussion

This article describes the physical, social, environmental, and psychological WHOQOL-BREF domains of the SCI sample for injury-related and sociodemographic variables as well as the effect of time to determine differences between and changes in the QOL in the subgroups of the SCI sample at 6 weeks, 12 weeks, 1 year, and 2 years post injury.

Unsurprisingly, the injury affects perceived physical QOL. But after discharge and reintegration into normal life, physical QOL improves continuously. The results also show significant differences from a cultural perspective (German- vs English-speaking patient samples) with regard to the psychological and social QOL.

There were no differences between socio-demographic and injury-related variables on the reported psychological, social, and environmental QOL. These findings are in line with previous investigations,³²⁻³⁴ confirming that the physical components of QOL become less important in the long-term adjustment. Level of injury only makes a difference at the beginning of the rehabilitation process. Consequently, as shown in previous analyses of the entire European longitudinal study,³²⁻³⁴ the physical components of QOL become less important in the long-term adjustment. QOL measured with the WHOQOL depends on factors other than the level of injury and sociodemographic characteristics.^{12,35}

This article also describes the QOL of the persons with SCI and their close persons, taking into account the time points of the measurement at 6 weeks, 12 weeks, 1 year, and 2 years post injury. When comparing the QOL of persons with SCI to the QOL of their close persons over 2 years, we find a lower physical QOL for the persons with SCI that improves steadily with the adjustment process. The differences in reported physical QOL diminish over time, with a significant increase in the reported physical QOL of the patients with SCI. Although the level of reported QOL differs for the physical domain, the psychological, social, and environmental domains do not reveal any significant differences between the persons with SCI and their close relatives. Also after 2 years, the physical component of QOL of the persons with SCI is not significantly lower when compared to the level of physical QOL of the close persons. This may be connected to the rehabilitation efforts and the adjustment process after discharge in combination with environmental aspects such as adapted accommodations. The analysis of the WHOQOL scores over 2 years after the injury shows that the needs of the persons with SCI change. The first year after injury is the most difficult time, with the lowest psychological QOL reported by the persons with SCI.²⁶ Two years post injury, the psychological QOL has improved to such a point that the psychological QOL of the persons with SCI and their close persons approximates that in the general population. It is probable that the existing social network

reacts supportively and helps the persons with SCI and their close persons to cope successfully with the altered situation.³⁶ This could explain the significantly high social QOL observed in the sample of close persons. This effect normalizes after 12 weeks.

The environment appears as most relevant at 12 weeks up to 1 year after the injury when the person with SCI has to cope with the daily activities in the rehabilitation center and after discharge at home and in the community. Even more remarkable is the positive course of the close persons and the individuals with SCI regarding the WHOQOL-BREF environmental domain over the 2 years. The needs for adequate equipment and accommodations are very well addressed in this sample. This is in line with previous findings of Kennedy et al³⁷ in which accommodation was the best addressed need out of 18 needs. In the participating countries, adjustment of building obstacles, removal of barriers, and the creation of a quality living environment promoting independence are also important rehabilitation goals. Previous analyses of this sample have shown that the persons with SCI have the ability to address their needs and are active and well-adjusted after 2 years.^{12,13}

In summary, people with SCI in this study are very satisfied with their environment. The material aspects are sufficiently addressed, whereas psychological aspects such as coping strategies and appraisals may profit from tailored interventions to enhance QOL, especially in a long-term perspective.¹³ The level of injury has an impact on QOL only at the beginning of rehabilitation as shown by the lower physical QOL scores. There are cultural differences regarding the perceived psychological and social QOL in patients with SCI, especially after discharge, with higher reported QOL in individuals from the German-speaking region. These findings correspond with the studies of Lude et al,^{37,38} which provided evidence for cultural differences in QOL between the German- and English-speaking samples. Unfortunately, the reasons for the observed cultural difference cannot be identified.

Some limitations may affect the validity of the findings of this investigation and have to be taken into account. First, the sample sizes diminish

from 6 weeks to 2 years. After 1 year 60% of the initial sample and after 2 years 38.8% of the initial sample were still participating in the study. This may impair the validity of the findings. There are 2 reasons for the attrition: Some participants moved after discharge to other cities and the new address was not communicated. Some participants simply refused to participate again. Twelve months to 1 year and 1 year to 2 years represent rather long intervals for follow-up. A further limitation is the social dimension of the WHOQOL questionnaire, which consists of 2 items related to social aspects, such as friendship and personal relationships, and a third question about sexual life, which might be irrelevant at least during the rehabilitation (ie, the first months after the injury).

Until now, only a few longitudinal studies of QOL of persons with SCI have been conducted.^{11,22,39} This study describes the QOL domains on 4 dimensions over a period of 2 years after the injury and includes a parallel investigation of the close persons. In future studies, the analysis of the QOL of the SCI sample and their close persons could also be performed for subgroups (eg, age, duration of partnership) and SCI characteristics such as type and level of injury. Finally, it would be interesting to compare the QOL of close persons of people with SCI to the QOL of close persons of people with other disabilities to determine the impact of the specific disability on relationships.

Conclusion

The studies presented in this article investigated the QOL in people with SCI and their close persons over a period of 2 years. QOL as measured by the WHOQOL-BREF changes during rehabilitation and after discharge. Apart from the physical dimension, the persons with SCI and their close persons seem to experience a similar change in QOL. There was evidence for cultural differences in QOL between the German- and English-speaking samples. The reasons for the cultural differences could not be identified. Further investigations are necessary to explore such differences.

We suggest further research concerning the interplay between QOL of persons with SCI and

their close persons to better understand this influence and to estimate the effect of the close persons as mediators between the rehabilitation team and the patients and as life's companions after rehabilitation.

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