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Social skills: A resource for more social support, lower depression levels, higher quality of life and participation in individuals with spinal cord injury?

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Running head:

Social skills in spinal cord injury

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Conflict of interest

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit on the authors or on any organization with which the authors are associated.

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ABSTRACT

OBJECTIVE: To examine the relevance of social skills and their different dimensions (i.e. expressivity, sensitivity and control) in relation to social support, depression, participation and quality of life (QoL) in individuals with spinal cord injury (SCI).

DESIGN: Cross-sectional data collection within Swiss Spinal Cord Injury Cohort (SwiSCI).

SETTING: Community-based.

PARTICIPANTS: A total of 503 individuals with SCI.

INTERVENTIONS: Not applicable.

MAIN OUTCOME MEASURES: Depression, participation and QoL were measured using the Hospital Anxiety and Depression Scale (HADS), the Utrecht Scale for Evaluation of Rehabilitation-Participation (USER-Participation) and 5 selected items of the World Health Organization Quality of Life Scale (WHOQOL-BREF). The Social Skills Inventory (SSI), and the Social Support Questionnaire (SSQ6) were used to assess social skills (expressivity, sensitivity, control) and social support.

RESULTS: Structural equation modeling was conducted. In model 1 (chi-square 27.81, df=19, p=.087, RMSEA=.033, 90% CI=.000–.052) social skills as a latent variable was related to social support (β=.31/R^2=.10), depression (β=-.31/Total R^2=.42) and QoL (β=.46/R^2=.25). Social support partially mediated the effect of social skills on QoL (indirect effect: β=.04, p=.02) but not on depression or participation. In model 2 (chi-square of 27.96, df=19, p=.084, RMSEA=.031, 90%CI=.000–.053) the social skills dimension expressivity showed a path coefficient of β=.20 to social

support and β=.18 to QoL. Sensitivity showed a negative path coefficient to QoL (β=-.15) and control a path coefficient of β=-.15 to depression and β=.24 to QoL.

CONCLUSIONS: Social skills are a resource related to more social support, lower depression scores and higher QoL.

Keywords: spinal cord injury, social skills, social support, depression, participation, quality of life

List of abbreviation:

SCI: Spinal cord injury

QoL: Quality of life

SwiSCI: Swiss Spinal Cord Injury Cohort Study

SSI: Social Skills Inventory

SSIE: Social skills expressivity

SSIS: Social skills sensitivity

SSIC: Social skills control

SSQ6: Social Support Questionnaire

SSQN: Number of social support providers

SSQS: Satisfaction with social support

HADS-D: Hospital Anxiety and Depression Scale

WHOQOL-BREF: World Health Organization Quality of Life Scale ()

SEM: Structural equation modeling

FIML: Full information maximum likelihood

RMSEA: Root mean square error of approximation

CI: Confidence interval

INTRODUCTION

Along with physical impairments, spinal cord injury (SCI) is associated with an increased risk for psychological morbidity,[1-3] restricted participation in social life[4, 5] and lower quality of life (QoL).[6, 7] Social support acts as an important resource to address these challenges.[8]

Social support is defined as an exchange of resources between individuals intended to enhance the well-being of the recipient.[9] It acts as a buffer to protect people against negative effects of stress.[10] Different types (i.e. instrumental, informational, emotional) of social support from different sources (e.g. family, friends) and perspectives (i.e. quantity and quality) can be distinguished.[11-14] A systematic literature review in SCI shows that social support is related to better physical (e.g., lower frequency of urinary tract infections or pressure ulcers) and mental health (e.g., lower symptoms of depression or anxiety), lower pain, effective coping, better adjustment to disability and higher life satisfaction and QoL.[15]

According to the behavioural theory by Lewinsohn, the possession and demonstration of good social skills should bring about positive social consequences.[16] In other words, people can use their social skills (internal resource) to seek for social support (external resource). Social skills are defined as the ability to interact with other people in a way that is both appropriate and effective.[17] This includes skills in encoding (i.e. expressivity) and decoding (i.e. sensitivity) of information in social situations and the regulation of emotion and control of social situations (i.e. control) in a non-verbal and verbal way. Expressivity means to accurately express felt emotional states and the ability to engage others in social interaction. Sensitivity refers to being empathic and to understand norms governing appropriate social behaviour. Control skills relate to social adeptness and tact and

include the appropriate regulation of emotional expressions, skills in social role-playing and social self-presentation.[18] In SCI, social skills (i.e. social problem-solving skills) are found to be related to lower symptoms of depression and lower frequency of urinary tract infections.[15]

Studies in the general population confirm that social skills positively correlate with perceived social support.[19-22] Other studies show that social support mediates the relationship between social skills and depression,[22] psychological well-being[21] and life satisfaction.[20] However, research about the relation between social skills and social support in SCI is limited.[15] One study in SCI indicates that individuals with higher social skills (i.e. assertiveness) are more depressed under condition of higher informational support.[23] Studies on social skills and social support could provide information about the potential usefulness of strengthening these resources as part of the rehabilitation program and community services, with the goal to enhance mental health, the level of participation and QoL of individuals living with SCI.

The objective of this study is to examine the relevance of social skills and their different dimensions (i.e. expressivity, sensitivity and control) in relation to social support, depression, participation and QoL in individuals with SCI. The specific aims are (1) to test the following hypotheses: a) higher levels of social skills relate to higher levels of social support, b) the relationship between social skills and depression, participation and QoL is mediated by social support, and (2) to explore the specific social skills dimensions expressivity, sensitivity and control in how they relate to social support, depression, participation and QoL.

METHODS

Design

A cross-sectional observational study, nested in the Swiss Spinal Cord Injury Cohort Study (SwiSCI), was conducted. SwiSCI is a prospective cohort study that aims to contribute to a comprehensive understanding of the lived experience of individuals with SCI living in Switzerland. It consists of three data collection pathways: (1) a retrospective data collection based on existing medical records of specialized SCI rehabilitation centers; (2) a community survey of individuals living with SCI; and (3) an inception cohort study of newly injured persons. The current study is embedded in pathway 2. The design of SwiSCI is reported in more details elsewhere.[24]

Participants

SwiSCI includes individuals aged 16 years or older with permanent residence in Switzerland and with traumatic or non-traumatic SCI. Persons with congenital conditions including spina bifida, new SCI in the context of palliative (end-of-life) care, neurodegenerative disorders including multiple sclerosis and amyotrophic lateral sclerosis, and Guillain-Barré syndrome are excluded.

Medical records of four SCI rehabilitation centers in Switzerland and the member lists of SCI associations were screened for eligible participants. All participants signed an informed consent form. SwiSCI adheres to applicable national and international standards for research in humans and was approved by ethical committees.

Procedures

Study participants completed self-report questionnaires sent by postal mail (an online survey option was available). First, information about SwiSCI, an informed consent

form and a brief questionnaire about sociodemographics and lesion-related characteristics were sent to the eligible participants. Persons who returned the first questionnaire and agreed to participate in SwiSCI were eligible for further participation. They were sent a second questionnaire on health problems, functioning and well-being. To reduce burden for participants, respondents of the second questionnaire were randomly assigned to one of 3 modules (i.e. 1) Health services module, 2) Work and employment module, and 3) Health behavior and personal factors module) for a third questionnaire. Thereby, 38% of the respondents were randomly assigned to the current study (i.e. Health behavior and personal factors module). A slightly higher percentage than one third was allocated to the current study to assure a large enough sample to adequately test the study hypotheses. Randomization was controlling for gender, age, and level of injury (para- vs. tetraplegia).

Instruments

Social skills. The short form of the Social Skills Inventory (SSI)[18] was applied to measure social skills. The SSI consists of an Expressivity (SSIE), Sensitivity (SSIS) and Control (SSIC) subscale (30 items in total). The SSI has shown good content validity and acceptable internal consistency in the general population.[18] In the present study, internal consistency of the SSI was acceptable (Cronbach's α of SSI total score =.80; SSIE=.73; SSIS=.71; SSIC=.70).

Social support. The Short Form Social Support Questionnaire (SSQ6)[14] includes 6 items and measures the number of social support providers (SSQN) and satisfaction with social support (SSQS). SSQ scores have shown high test-retest reliability, high

147 internal consistency and confirmed construct validity in the general population,[14] and
148 are frequently used in SCI.[15]
149 ***Depression***. The 7 items of the depression subscale of the Hospital Anxiety and
150 Depression Scale (HADS-D)[25] was used as a measure of depression. The HADS-D
151 has been found to be reliable and valid in assessing the symptom severity of
152 depression in somatic, psychiatric, primary care and general populations. It has been
153 evaluated as psychometrically robust in a SCI population.[26] In this study, Cronbach's
154 α was good (.84).
155 ***Participation***. Participation was measured with the Restrictions subscale of the
156 Utrecht Scale for Evaluation of Rehabilitation-Participation (USER-Participation).[27]
157 The 11 items measure participation restrictions experienced in vocational, leisure and
158 social activities as a result of the person's health or disability. Higher scores in this
159 measure indicate less restriction or more participation. The USER-Participation has
160 shown satisfactory validity, test-retest reliability, and responsiveness in rehabilitation
161 settings.[27-29] Cronbach's α in this study was good (.85).
162 ***Quality of life***. Five selected items of the World Health Organization Quality of Life
163 Scale (WHOQOL-BREF) were used to assess QoL.[30, 31] They cover overall QoL,
164 satisfaction with health, daily activities, relationships, and living conditions.
165 Psychometric properties in a SCI population were satisfactory,[31] in this study,
166 Cronbach's α was acceptable (.80).
167 Multiple language versions of the above listed questionnaires (i.e., German, French,
168 and Italian) were used.
169
170 **Structural equation modeling**

To address the study aims, structural equation modeling (SEM) was performed using the free statistics environment "R" version 3.0.1[32] and its "lavaan" package.[33] SEM combines two statistical techniques: factor analysis and path analysis. In factor analysis, unobserved latent constructs are inferred from intercorrelations among measured variables (measurement model, e.g., for social skills). The path analysis depicts the relationships among the latent constructs (structural model, e.g., relation between social skills and social support).[34]

Full information maximum likelihood (FIML) estimation was used.[35] To account for non-normal distribution of data, bootstrapping standard errors (1000 draws) and Yuan-Bentler scaled chi-square tests were requested.[36]

To test the study hypotheses, two models were specified: Model 1 (Figure 1) incorporates total social skills as one latent variable and estimates its relation to social support and the outcomes depression, participation, and QoL; Model 2 (Figure 2) includes the three dimensions (expressivity, sensitivity, control) of the social skills construct separately as observed variables, and estimates their relations to social support and the outcomes depression, participation, and QoL. For both models, total social support was measured by the product of the number of social support providers and the satisfaction with social support. Participation, depression and QoL were measured by item parcels. These are sum scores of subsets of a scale's items that incorporate measurement errors into the model to reduce bias of the parameter estimates.[37] We constructed homogenous and/or domain representative item parcels.[37] Considering participation, the first participation parcel consisted of five items from the Restriction subscale of the USER-Participation questionnaire asking about restriction in work, household, mobility, physical activity and going out. The second participation parcel included six items from the same questionnaire asking

about restriction in leisure activities, social interaction with intimate partner, family and friends. For depression, the first depression parcel included three items from the HADS-D asking about enjoying things like in the past, seeing the funny side of life and being cheerful. The second depression parcel included four items from the HADS-D that ask about the extent of feeling slowed down, having lost interest in one's appearance and being optimistic and enjoying things in the present. For QoL, the WHOQOL item measuring overall QoL constituted one item parcel, the four specific WHOQOL items asking about satisfaction in specific life domains constituted the other parcel.

Model fit was determined according to the chi-square test. A non-significant chi-square ($p > .05$) indicates that the hypothesized model does not deviate significantly from the empirically observed relationships in the data. In addition, the root mean square error of approximation (RMSEA), which takes sample size and model complexity into account, was used to assess model fit. A RMSEA < .06 (90% confidence interval CI) was taken as indication of good model fit.[38] As incremental measures of fit (relative to the independence model), Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI; also called Non-Normed Fit Index NNFI) were used with values > .95 commonly regarded as indicating good fit.[38, 39] Standardized Root Mean Square Residual (SRMR) assesses the average discrepancy between empirical and model-implied covariances, with values close to 0 indicating good fit. Standardized path coefficients (β) were obtained. Values greater than .50 indicate a large effect, values around .30 a medium effect and values around .10 a small effect.[40] Model modification was considered based on examination of standardized residuals >2, which indicate differences between model and data. Mediation was

220 assessed by testing the significance of indirect effects, which are effects of social
221 skills via social support on the outcomes depression, participation, and QoL.
222 Model 1 and 2 were evaluated regarding the power to detect model misspecification
223 in terms of RMSEA.[41] and the power to test parameters, such as path coefficients, by
224 means of a post-hoc Monte Carlo power analysis applying the R package simsem.[42]

RESULTS

Response rate was 61.4% (N=3'021) to the first questionnaire, 82.6% (n=1'532) to the second and 86.9% (n=506) to the third questionnaire of the present study. Three persons did not fill in all the questionnaires, hence were not included in the analyses (final n=503). Table 1 shows that participants were mainly male, had a mean age of 55 years, and had on average been living 19 years with paraplegia (66%) or tetraplegia (31%). Table 2 lists the mean, score range, and the number of missing values for each measurement instrument. Total social skills correlated with total social support (r=.27), lower depression (r=-.38), less participation restriction (r=.14) and greater QoL (r=.24) (Table 3). Total social support correlated with lower depression (r=-.29) and greater QoL (r=.26).

Specific aim 1 of the study is addressed in model 1 (Figure 1) which depicts the relationships between total social skills as a latent variable, social support as possible mediating variable, and the outcomes depression, participation, and QoL. The measurement model of total social skills in model 1 did not fit and was changed, based on non-significant path coefficient, by removing sensitivity. In addition, the paths from depression and participation to QoL were reversed based on examination of standardized residuals. After this modification the model fitted with a non-significant chi-square of 27.81, df=19, p .087, and a RMSEA of .030 (90%CI=.000–.052), CFI=.994, TLI=.989, SRMR=.021.

With regards to hypothesis 1a, a standardized path coefficient of .31 between social skills as a latent variable and social support was found in model 1 ($p<.001$). Social skills explained 10% of the variance in social support.

Testing hypothesis 1b showed that total social support only partially mediated the relationship between social skills and QoL (indirect effect: $\beta=.04$, $p=.02$). However,

social support did not mediate the relationship between social skills and depression (indirect effect: β=-.01, p=.59) and social skills and participation (indirect effect: β=-.04, p=.06).

Also a direct association of social skills with QoL was apparent (β=.46, p<.001) and social skills as a latent variable was found to be directly related to depression (β=-.31, p<.001). However, the direct association of social skills on participation was not significant (β=.07).

The path coefficients from social support to QoL (β= .14, p=.02) as well as to participation (β=-.13, p=.03) were significant. A non-significant path coefficient from social support to depression was found (β=-.02). Together, all predictors in the model explained 42% of the variance in depression, 25% of the variance in QoL and 8% of the variance in participation.Model 2 (figure 2) addresses specific aim 2 and includes the social skills domains expressivity, sensitivity, and control and their relation to social support (possible mediator) and depression, participation, and QoL.

The second model fits well, with a non-significant chi-square of 27.96, df=19, p=.084, and a RMSEA of .031 (90%CI=.000–.053), CFI=.9994, TLI=.987, SRMR.

In model 2, expressivity was related to social support (β=.20, p<.001). The path coefficients from sensitivity (β=.06) and control (β=.07) to social support were not significant.

The social skills dimension control was inversely related to depression (β=-.15, p< .001). Control (β=.24, p<.001) as well as expressivity (β=.18, p<.001) were directly related to QoL. Sensitivity was inversely related to QoL (β=-.16, p=.002). Social support partially mediated only the relationship between the social skills dimension expressivity and QoL (indirect effect β=.04, p=.01).

The power to detect model misspecification in terms of RMSEA was good, varying between .82 and .87 for both models. For all path coefficients that turned out significant, the average power to detect nonzero parameters was .721 in model 1 and .744 in model 2.

DISCUSSION

This study examined the relevance of social skills and their different dimensions (i.e. expressivity, sensitivity and control) in relation to social support, depression, participation and QoL in individuals with SCI. The findings indicate that social skills can be seen as a resource for individuals with SCI, being related to more social support, less depressive symptoms and higher QoL. More specifically, being expressive in social situations can be linked to more social support and higher levels of QoL, and being in control over situations can be associated with lower levels of depressive symptoms. In contrast, being sensitive in social situations seems to be negatively related to QoL. The association of social skills on QoL was found to be partially mediated by social support.

A medium association between total social skills and social support was found, which supports hypothesis 1a that higher levels of social skills relate to more social support. This finding is supported by research in the general population. [19-22] However, in this study, only the subscale expressivity was significantly related to social support and total social skills explained only a small amount of variance in social support. For individuals with SCI, receiving social support could depend on other factors which have not been assessed in this study, for example, secure attachments formed in childhood as a basis of an adult's ability to form socially supportive relationships.[43] Hypothesis 1b was partly supported by the study findings. Social support partially mediated the relationship between social skills on the one hand and QoL on the other, which is consistent with findings from the general population.[21, 44] However, social support did not mediate the relation between social skills and depression. Instead, medium direct associations between social skills and depression were found. This finding is consistent with studies supporting the behavioral theories of

depression, which specify social skills deficits as a risk factor for depression[22] and possessing adequate social skills as a protective factor against psychological morbidity.[45] In this study, especially, adequate emotional regulation (being in control) as a specific social skill dimension was found in to be important in relation to lower levels of depressive symptoms.

Total social skills showed, in addition to a mediated relation via social support, also a medium direct relation to QoL, which is in line with findings from the general population.[21, 44] High levels of social skills are linked to active interaction and frequently investing in social relations. Positive experiences with these social relations provide a sense of satisfaction with social relationships and contribute to QoL.[21, 46, 47] Skills in expressivity, in specific, might contribute to the achievement of interpersonal goals and winning the praise and admiration of others. However, the present findings also showed that being sensitive in social situations seems to be negatively related to QoL in persons with SCI. Persons with a disability and high scores in sensitivity might more likely detect negative signals, e.g. in relation with negative attitudes, prejudice and discrimination against individuals with disabilities, in specific in cases of little social support.

Social skills are not directly related to participation, which is surprising, as some associations were expected at least affecting participation in social activities. However, questions assessing participation restrictions ask about to what extent the SCI limits daily life. SCI in in this sense might “overrule” effectiveness and appropriateness of social interactions.

Social support showed a small association with QoL, a small negative association with participation and no relation to depression. In SCI, lower life satisfaction has been found to be related to higher instrumental and informational support, higher

emotion-oriented support from friends and lower from family.[48] Another study showed that instrumental support and positive social interaction support predicted satisfaction with participation, while informational, emotional and affectionate support did not.[49] In addition, individuals who have fewer relationships in which other persons provided more help were more likely to be mobile, productive and interested in leisure activities.[50] Findings about the relationship between social support and depression are inconsistent with studies that link depression with a lack of social support and others indicate that social support implies a source of stress and deteriorates mental health.[51] In other words, the different dimensions of social support (i.e. type, and source) seem to have different effects on a person's QoL, participation restrictions and depressive symptoms. Future studies are necessary to disentangle effects of social support dimensions on well-being outcomes.

Finally, testing the model revealed an association of QoL with depression and participation. Research found reciprocal relationships between these outcomes, indicating that individuals with high levels of depressive symptoms perceived their QoL as poor,[52] but also that poor QoL (low satisfaction with health, daily activities, relationships, or living conditions) can lead to elevated risk of developing depressive symptoms.[53] With regards to participation, low QoL (low satisfaction with health, daily activities or living conditions) is linked to inactivity and low levels of participation,[54] but low levels of participation (restrictions in vocational, leisure and social activities) can also be linked to lower QoL.[55] Longitudinal studies can clarify the causal relation between these outcomes. For example, a recent longitudinal study suggests that depression predicts quality of life in individuals with SCI.[56]

Study limitations

Conclusions about causality in cross-sectional studies cannot be drawn. Longitudinal data is needed to approach causality. Interpretation of the current findings is constrained by self-report measurements as they yield incomplete measures. Social skills, for example, can also be assessed through behavioral assessment. The findings are based on a self-selected community sample of a Swiss population of individuals with SCI and are not necessarily generalizable to the entire SCI population. Finally, our SEM approach was to some extent data-driven and exploratory, so the models need to be cross-validated to enhance generalizability of the results. In particular, our model fit was significant only after modification indices were applied that may not be theoretically or conceptually consistent with the broader body of research on QoL. Given the limitations of our cross-sectional study design, additional research is needed to test and confirm the directionality of these relationships.

Clinical Implications

This study suggests that strengthening social skills and fostering interactions with social relations can support individuals with SCI to enhance their QoL and reduce depressive symptoms. Social skills training can be offered by psychologists at the rehabilitation centers. It aims at a realistic preparation of the patient to a life after discharge. Goals of these trainings are to increase the capacity to act, to expand the use of social skills and decrease feelings of helplessness in social situations, which are more difficult or at least changed due to SCI, but also to strengthen the belief in one's own social skills, which would prevent the patient from self-depreciation and withdrawal.[57] According to the findings of this study, such social skills training may focus on being expressive and having emotional control in social situations. Training

in expressivity could include learning to be “effective”, which means to be able to inform others about one’s emotional state and personal needs (e.g. to ask for help). Training in control may focus on the “appropriateness”, which implies learning to regulate emotions, to promote skills in self-presentation and adjustment to certain social situations (e.g. to approach people who are not familiar with SCI).

Social skills training has shown its effectiveness in the general population [58], with children and adolescents [59], in relation to mental [60, 61] and physical health [62-64]. In SCI, two intervention trials with small sample sizes report on the effectiveness of social skills training [65, 66]. In addition, intervention studies in social skills have also reported improvements in social support ratings [67].

CONCLUSIONS

This study showed that social skills are a resource related to more social support, lower depression scores and higher QoL. Longitudinal studies are necessary to clarify causality and to better inform the development of effective social skills training for individuals with a physical disability.

FIGURES

Figure 1: Structural equation model 1: Relationships between social skills, social support and depression, participation and QoL.

Square: Observed construct; Oval: latent construct; Bold line: significant path; Fine line: non-significant path: Dotted line: Path included in the original model.

Figure 2: Structural equation model 2: Relationships between social skills dimensions (expressivity, sensitivity control) social support and depression, participation and QoL.

Square: Observed construct; Oval: latent construct; Bold line: significant path; Fine line: non-significant path: Dotted line: Path included in the original model.

TABLES

Table 1: Descriptive characteristics of study participants (N=503).

Table 2: Descriptive characteristics of social skills, social support and the outcomes depression, participation and quality of life.

Table 3: Pearson correlation between social skills (expressivity, sensitivity, control), social support, depression, participation and QoL. Sum scores of the scales/subscales were used to compute correlations.

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Table 1: Descriptive characteristics of study participants (N=503)

	N	%
Gender		
Male	361	71.8
Female	140	27.8
Missing	2	0.4
Marital status		
Single (never married)	155	30.8
Married	250	49.7
Widowed	69	13.7
Divorced	22	4.4
Reg. Partnership	2	0.4
Missing	5	1.0
Age, mean in years (range)	54.57 (19-92)	
Missing	2	0.4
Education, mean in years (range)	13.8 (2-25)	
Missing	11	2.2
Time since injury, mean in years (range)	19 (1,3-62.3)	
Missing	12	3.6
Level of lesion		
Paraplegia	332	66.0
Tetraplegia	154	30.6
Missing	17	3.4
Completeness of lesion		
Complete	221	44.0
Incomplete	274	54.5
Missing	8	1.5
Cause of injury		
Traumatic	391	77.7
Non-traumatic	80	15.9
Unspecified	28	5.6
Missing	4	0.8

Table 2: Descriptive characteristics of social skills, social support and the outcomes depression, participation and quality of life.

Variable	Measure	Range	Mean (SD)	Missing n (%)[a]
Social Skills (Total score)	SSI	59 - 134	92.65 (11.88)	46 (9.1)
Expressivity (SSIE)	SSI	11 - 50	30.54 (5.87)	25 (5.0)
Emotional Expressivity (SSIEE)	SSI	6 - 25	15.95 (2.81)	22 (4.4)
Social Expressivity (SSISE)	SSI	5 - 25	14.62 (4.39)	16 (3.2)
Sensitivity (SSIS)	SSI	10 - 46	28.65 (5.49)	30 (6.0)
Emotional Sensitivity (SSIES)	SSI	5 - 25	15.23 (3.57)	25 (5.0)
Social Sensitivity (SSISS)	SSI	5 - 25	13.44 (3.67)	18 (3.6)
Control (SSIC)	SSI	15 - 48	33.61 (5.33)	26 (5.2)
Emotional Control (SSIEC)	SSI	6 - 25	16.76 (3.17)	20 (4.0)
Social Control (SSISC)	SSI	6 - 25	16.87 (3.45)	18 (3.6)
Social Support (Total)[b]	SSQ		594.61 (388.05)[b]	
Number of support persons (SSQN)	SSQ	0 - 54	17.58 (17.48)[c]	45 (8.9)
Satisfaction with support (SSQS)	SSQ	6 - 36	31.84 (5.70)	93 (18.5)
Depression	HADS-D	0 - 20	4.54 (3.87)	10 (2.0)
Participation	USER-P	0 - 100	70.01 (21.58)	2 (0.4)
Quality of life	WHOQOL-BREF	5 - 25	18.84 (3.45)	27 (5.4)

Abbreviation: SD: Standard deviation; SSI: Social Skills Inventory; SSQ: Social Support Questionnaire; HADS: Hospital Anxiety and Depression Scale; USER-P: Restrictions subscale of the Utrecht Scale for Evaluation of Rehabilitation-Participation; WHOQOL-BREF: Five selected items of the World Health Organization Quality of Life Scale

a: Values are n(%). Missing n total score, i.e. if there is one item missing, the total score could not be calculated and is therefore missing. Little MCAR's test was significant (p<.001), indicating that data was not missing completely at random (MCAR). After additional analyses of the pattern of missing data, the data was treated as Missing at Random (MAR).

b: Total score of SSQ refers to the product of Social Support Number and Social Support Satisfaction.

c: 3 (2 – 4) support persons per participant and question.

Table 3: Pearson correlation between social skills (expressivity, sensitivity, control), social support, depression, participation and QoL. Sum scores of the scales/subscales were used to compute correlations. Sum scores of the scales/subscales were used to compute correlations.

		SSIE	**SSIS**	**SSIC**	**Total SSk**	**SSQN**	**SSQS**	**Total SSup**	**HADS**	**USER-P**	**WHOQOL**
Social Skills	Expressivity (SSIE)										
	Sensitivity (SSIS)	.26**									
	Control (SSIC)	.41**	.08*								
	Social skills (Total SSk)	.80**	.63**	.69**							
Social support	Number (SSQN)	.26**	.15**	.16**	.28**						
	Satisfaction (SSQS)	.08	.01	.13*	.10*	.29**					
	Social support (Total SSup)	.26**	.13*	.16**	.27**	.97**	.47**				
Outcomes	Depression (HADS)	-.36**	-.02	-.41**	-.38**	-.25**	-.27**	-.29**			
	Participation (USER-P)	.18**	-.03	.16**	.14**	.07	.00	.04	-.32**		
	QoL (WHOQOL)	.27**	-.09*	.34**	.24**	.22**	.29**	.26**	-.68**	.44**	
Gender		-0.2	.14**	-.08	.03	.12*	.11*	.12*	-.01	-.09	.00
Age		-.16**	-.07	-.13**	-.16**	-.17**	-.02	-.14**	.15**	-.17**	-.07
Education (years)		.08	.09	.16**	.16**	.13**	.03	.13**	-.04	.10**	.04
Time since injury (months)		.07	.00	.13**	.10*	-.02	.03	.02	-.20**	-.02	.19**

Abbreviation: SSIE: Social Skills Expressivity; SSIS: Social Skills Sensitivity; SSIC: Social Skills Control; SSQ: Social Support Questionnaire; HADS: Hospital Anxiety and Depression Scale; USER-P: Restrictions subscale of the Utrecht Scale for Evaluation of Rehabilitation-Participation; WHOQOL-BREF: Five selected items of the World Health Organization Quality of Life Scale

**. Correlation is significant at the 0.01 level

*. Correlation is significant at the 0.05 level