

REVIEW

Psychosocial issues in spinal cord injury: a review

MWM Post^{1,2} and CMC van Leeuwen^{1,2}**Study design:** Review.**Objectives:** To review literature on subjective well-being (SWB; mental health and life satisfaction) and on psychological and social support factors associated with these outcomes in people with spinal cord injury (SCI), in order to identify gaps in scientific knowledge and recommend research priorities.**Setting:** Non applicable.**Methods:** Narrative review of the SCI literature on life satisfaction and mental health (depression, anxiety, post-traumatic stress syndrome) outcomes in people with SCI. Further, reviews were performed of the SCI literature on psychological and social support variables associated with SWB and on psychosocial interventions aimed to improve SWB.**Results:** People with SCI experience, on average, higher levels of distress and lower levels of life satisfaction compared with the general population. Individual differences, however, are large, and most people with SCI adapt well to their condition. A set of psychological and social support factors is strongly related to SWB. Intervention studies on cognitive behavioural therapy or coping effectiveness training to improve SWB show promising results, but suffer from methodological weaknesses (for example, lack of randomization and small sample size).**Conclusion:** There is a need for cohort studies with sufficient sample size, which include people early after onset of SCI in order to enhance our understanding of the course of mental health and well-being after SCI. Cohort studies could also identify which people are at risk for long-term impairment of SWB. Finally, intervention studies on psychosocial interventions are needed to identify which interventions may improve SWB of people with SCI.*Spinal Cord* (2012) **50**, 382–389; doi:10.1038/sc.2011.182; published online 24 January 2012**Keywords:** quality of life; psychological factors; spinal cord injuries; social support; adjustment disorders

INTRODUCTION

Because of improvements in medical care, the average life expectancy of people with spinal cord injury (SCI) has considerably increased in recent decades.¹ However, SCI still is a major life event that leads to serious physical disability and secondary medical problems, which impact the quality of life (QoL) of the people involved.^{2,3} SCI is associated with abnormal levels of psychological morbidity,⁴ substance abuse and risk of suicide.⁵ Consequently, psychosocial issues have become more prominent in SCI research in the last few decades.

QoL is a broad and ill-defined concept.⁶ QoL has been taken to be synonymous with health status, physical functioning, perceived health status, subjective health, health perceptions, symptoms, need satisfaction, individual cognition, functional disability, psychiatric disturbance, well-being and, often, several of these at the same time.⁷ Three broad approaches to the operationalization of QoL can be found in the literature: (1) by equating QoL with health, (2) by equating it with subjective well-being (SWB) and (3) by treating QoL as a superordinate construct.⁸ This paper is focused on SWB.

SWB is defined as how people evaluate their own lives.⁹ These evaluations can be more focal (for example, marital satisfaction or satisfaction with one's car) or broader (for example, general life satisfaction or satisfaction with the self). In addition, these evaluations can be cognitive—in terms of satisfaction judgments—or they can be affective (moods and emotions, which are reactions to what is

happening in one's life). Moods and emotions are considered more variable over short periods than life satisfaction.⁹ Mental health, in this manuscript used as a general term covering mood, emotions and distress, and life satisfaction can be considered as two different, but related, SWB outcomes of SCI. Elsewhere we have shown that mental health influences well-being, but not the reverse.¹⁰ This is consistent with theory that SWB is a satisfaction judgment, including judgment of one's mood.⁹

Many rehabilitation clinicians and researchers have been surprised by the results of SWB studies in people with SCI, showing that SWB in this group is better than what is expected for such a serious injury.^{2,11} However, there are large individual differences, and a substantial group experiences persistent low SWB.^{12,13} These differences are not well predicted by the severity of the SCI (level and completeness) and resulting impairments, such as loss of bladder control, spasticity and pain.^{2,13–17} Psychosocial factors must be taken into account to explain differences in SWB.

The aims of this paper are: (1) to review the evidence on levels of SWB in people with SCI, (2) to review the evidence on associations between psychosocial (psychological and social) factors and SWB in people with SCI, (3) to review the evidence on interventions aimed at improving psychosocial functioning in people with SCI and (4) to identify gaps in the scientific understanding of SWB in people with SCI and to make research recommendations.

¹Rudolf Magnus Institute of Neuroscience, University Medical Center Utrecht and Center of Excellence in Rehabilitation Medicine, De Hoogstraat, Utrecht, The Netherlands and

²Swiss Paraplegic Research, Nottwil, Switzerland

Correspondence: Dr MWM Post, Center of Excellence in Rehabilitation Medicine, De Hoogstraat, 3583 TM Utrecht, The Netherlands.

E-mail: m.post@dehoogstraat.nl

Received 26 July 2011; revised 14 November 2011; accepted 27 November 2011; published online 24 January 2012

METHODS

Literature searches were performed in PubMed. For reasons of time and space, studies not addressing psychosocial predictors or SWB outcomes were excluded. In the searches, relevant terms for SWB outcomes were used, for example, life satisfaction, well being, mental health, anxiety, depression, post-traumatic stress syndrome, mood and QoL. Included were studies on SWB outcomes in people with traumatic or non-traumatic SCI, excluding the literature on participation, health-related QoL outcomes, secondary conditions (for example, chronic pain) and concomitant traumatic brain injury. Because of the presence of many papers on mental health, reporting of this was restricted to publications since 2000. The description of psychological factors is based on a recent systematic review covering 48 studies.¹⁸ Social support studies were collected from another recent review.¹⁹ As the focus of this paper is on psychosocial issues, papers on relationships between SWB and disablement factors,¹⁴ secondary condition,²⁰ and environmental factors,²¹ except for social support,^{19,22} have been excluded, as well as papers on the importance of psychosocial factors as predictors of functional outcomes,²³ pain²⁴ and other secondary conditions.^{25,26}

RESULTS

Life satisfaction of people with SCI

Mean life satisfaction scores are instrument dependent and need a reference to reveal meaningful information. Several studies have compared life satisfaction of people with long-standing SCI with that of the general population (Figure 1).^{14,27–44} The differences between mean scores in people with SCI and in the population are expressed as effect sizes.⁴⁵ The mean effect size of all studies in Figure 1 is -0.77 (s.d. 0.55), a strong effect, indicating a substantial lower life satisfaction in people with SCI than in the reference population.

The course of life satisfaction after SCI has rarely been studied. Brickman *et al.*²⁴ compared current life satisfaction early after SCI with a retrospective rating of life satisfaction before SCI on a 1–5 scale and found a large difference: 4.41 before and 2.96 after SCI. Van Koppenhagen *et al.*¹⁴ used a 1–6 scale of life satisfaction and reported a mean 5.3 for life before SCI against 4.3 1 year after SCI. In both the studies, it was, however, commented that the retrospective scores appear too high and probably suffer from a nostalgia effect.

Only five longitudinal studies in the first year after SCI are available. Three of these studies^{46–48} reported a stable course of life satisfaction. The time span of these studies varied between the first 6 months after discharge,⁴⁶ 3–15 months after discharge⁴⁸ and 1 year up to 5 years after SCI,⁴⁷ thereby not covering the period of initial rehabilitation. In a small study by Stensman,⁹ 17 patients were followed from 6 months up to 5 years after SCI, and were asked at each administration for their

overall QoL in the previous 6 months. Mean QoL ratings of most subjects improved between 6 months and 1 year after SCI and remained relatively stable after the first year.⁹ Similarly, a Dutch prospective cohort study⁴⁹ showed that life satisfaction improved during inpatient rehabilitation, especially during the first 3 months of active rehabilitation (which started at a mean time of 2 months after injury), remained stable during the first year after discharge. It thus appears that life satisfaction improves from an initial low level early after SCI, but only to a level substantially below that of the general population.

However, average scores can obscure individual differences. Stensman⁹ found four distinct patterns of life satisfaction early after SCI: low, high, recovery and fluctuating. A larger study¹⁰ using statistical modelling showed five distinct trajectories from the start of active rehabilitation to 5 years after discharge: low life satisfaction scores at each time point (27.2%), high life satisfaction at each time point (16.5%), a recovery trajectory (23.3%), a deterioration trajectory (2.4%) and an intermediate life satisfaction trajectory (30.6%) that included less distinctive or variable patterns of life satisfaction.¹⁰

Satisfaction with different life domains has also been the subject of research. Kemp and Krause³⁰ studied 177 people with SCI using a 1–4 point scale and found highest satisfaction scores with housing (3.5), friendships (3.2), emotional health (3.2) and life as a whole (3.2), and least satisfaction with health (2.4), finances (2.9) and community life (2.9). Van Koppenhagen *et al.*¹⁴ compared five European studies in which the Life Satisfaction Questionnaire (LiSat-9) was used (Table 1).^{14,36,39,42,50} People with SCI were most satisfied with their relationships with partner (4–5.1), family (4.7–5.1), friends (4.5–5.2), and least satisfied with their sexual life (2.7–3.3). Similar results have been reported from a large longitudinal study in the US.⁵¹

Mental health of people with SCI

Conceptual and methodological problems hamper research to mental health of people with SCI.⁵² In the early phase of SCI, it is difficult to distinguish between temporary depressed mood and a persistent adjustment disorder. Questionnaires used to measure mental health disorders have not been developed for use in people with SCI, so that some of the items might reflect physical consequences of SCI instead of mental problems. Further, these questionnaires have been developed to screen for mental health disorders, and a score above a certain cutoff point only indicates a possible or probable mental health disorder. A clinical diagnosis, however, can only be made in a clinical diagnostic interview. The cutoff point of screening measures is determined by not missing people with depression (high sensitivity), so that, consequently, part of the people identified with a possible mental health disorder are not diagnosed as such in a subsequent clinical interview (low specificity). We collected figures on the prevalence of depression, anxiety and post-traumatic stress disorder (PTSD) in people with SCI reported in studies published in 2000 or later (Tables 2, 3 and 4).

Depression has been the subject of many studies, showing a wide range of estimates, from 8.8 up to 60% (Table 2).^{23,43,46,53–70} These estimates are affected by the type of instruments, choice of cutoff point (for example, possible, probable and major) and sample characteristics (gender, age and time after SCI). Craig (2009)⁵ found five studies that applied a structured diagnostic interview during the rehabilitation or hospitalization phase, reporting 20–43% having minor or major depression disorder. No studies were found applying such an interview after completion of rehabilitation.⁵ Studies using the Patient Health Questionnaire (PHQ-9) yielded lower estimates than studies using the Beck Depression Inventory. Despite these differences,

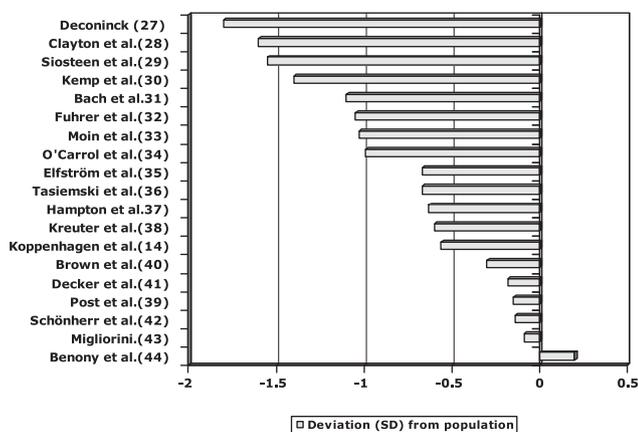


Figure 1 Life satisfaction of people with SCI compared with population figures expressed as standardized differences (effect size).

Table 1 Comparison of LiSat-9 scores after spinal cord injury in five different studies

	The Netherlands ¹⁴ (N=147)		The Netherlands ⁴² (N=57)		The Netherlands ³⁹ (N=318)		Sweden ⁵⁰ (N=192)		UK ³⁶ (N=985)	
	Mean	s.d.	Mean	s.d.	Mean	s.d.	Mean	s.d.	Mean	s.d.
Life as a whole	4.3	1.3	4.6	1.0	4.4	1.2	4.2	1.2	4.2	1.3
Self-care ability	4.2	1.6	4.4	1.4	4.3	1.6	4.0	1.3	4.0	1.7
Leisure situation	4.6	1.2	4.7	1.3	4.4	1.3	4.2	1.3	3.9	1.4
Vocational situation	4.1	1.4	4.3	1.6	3.8	1.7	4.1	1.3	3.7	1.5
Financial situation	4.4	1.4	4.3	1.2	4.1	1.4	4.6	1.2	3.8	1.4
Sexual life	3.3	1.7	3.3	1.6	3.1	1.6	3.0	1.7	2.7	1.8
Partner relationships	5.1	1.2	4.7	1.6	4.9	1.5	4.1	1.7	4.0	2.0
Family life	5.1	1.0	5.1	1.1	4.8	1.2	4.7	1.3	4.8	1.4
Contact friends	5.2	1.0	5.0	1.3	4.7	1.0	4.6	1.4	4.5	1.4

Table 2 Prevalence of depression in persons with spinal cord injury

	Prevalence (%)	Prevalence (%)
<i>Older Adult Health and Mood Questionnaire</i>	Score 6–10 (significant symptomatology)	Score 11–22 (possible MDD)
Krause <i>et al.</i> ⁵³	24	24
Kemp <i>et al.</i> ⁵⁴	20	
<i>Patient Health Questionnaire-9</i>	Score ≥ 10	Probable MDD
Bombardier <i>et al.</i> ⁵⁵	22	11.4
Kalpajian and Albright ⁵⁶	18.5	8.8
Richardson and Richards ⁵⁷	12–21 ^a	
Krause <i>et al.</i> ⁵⁸	19	11.7
Hoffman <i>et al.</i> ⁵⁹	18–21 ^a	
Fann <i>et al.</i> ⁶⁰	23	12
<i>Hospital Anxiety and Depression Scale—Depression score</i>	Possible case (≥ 8)	Probable case (≥ 10)
Woolrich <i>et al.</i> ⁶¹	21	
Kennedy <i>et al.</i> ⁶²	26	
Kennedy <i>et al.</i> ⁶³	16.9–26.3 ^b	
Kennedy <i>et al.</i> ²³	41.7	25.2
<i>Beck Depression Inventory</i>		Clinical range (≥ 14)
Kennedy and Rogers ⁶⁴		25–35 ^c
Kennedy and Rogers ⁴⁶		27–60 ^b
		14–35 ^a
Kennedy and Evans ⁶⁵		37
Beedie and Kennedy ⁶⁶		26–42 ^b
Lude <i>et al.</i> ⁶⁷		17–32 ^d
Pollard and Kennedy ⁶⁸		35–38 ^c
<i>Other measures</i>		
Craig <i>et al.</i> ⁶⁹	POMS	18.2
Migliorini and Tonge ⁴³	DASS-21	37****
Dryden <i>et al.</i> ⁷⁰	ICD-9-CM codes from files	28.9

Abbreviations: DASS-21, Depression Anxiety Stress Scale-21—Depression; ICD-9-CM codes: the International Classification of Diseases, 9th Revision, Clinical Modification; MDD, Major Depressive Disorder; POMS, Profile of Mood States.
^aSeveral measurement occasions after discharge.
^bSeveral measurement occasions during rehabilitation.
^cSeveral measurement occasions during rehabilitation and after discharge.
^dSamples from four different European countries.
 ****Cutoff not reported.

most figures range between 20 and 30%, showing elevated possible/probable depression in people with SCI compared with population figures. However, these figures also show that most people with SCI fall well within the normal range.

Table 3 Prevalence of anxiety in persons with spinal cord injury

	Possible case (≥ 8)
<i>Hospital Anxiety and Depression Scale—Anxiety</i>	
Woolrich <i>et al.</i> ⁶¹	32
Kennedy <i>et al.</i> ⁶²	35
Kennedy <i>et al.</i> ⁶³	13.2–19.7 ^a
<i>State-Trait Anxiety Inventory—State</i>	Clinical range (> 48)
Kennedy and Rogers ⁶⁴	20–35 ^b
Kennedy and Evans ⁶⁵	41.1
<i>Depression Anxiety Stress Scale-21—Anxiety</i>	Cutoff not reported
Migliorini and Tonge ⁴³	30

^aSeveral measurement occasions during rehabilitation.

^bSeveral measurement occasions during rehabilitation and after discharge.

The course of depression after SCI is unclear. One study in inpatient rehabilitation found a decline of depression scores between 6 and 12 weeks after SCI,⁶³ but other studies showed an increase of depression with increased length of rehabilitation,⁶⁴ or did not find any change associated with the duration of inpatient rehabilitation.⁷¹ The latter study, however, did show decreased depressed mood with decreasing time remaining until discharge.⁷¹ A longitudinal study from the SCI Model Systems⁵⁹ revealed similar proportions of people with probable major depressive disorder at 1 year after injury (20.6%) and at 5 years after injury (18.1%), although there was considerable individual change in depression status over time. A cross-sectional SCI Model Systems study⁵⁷ reported similar percentages of 20.7 at 1 year and 17.6 at 5 years after injury, but lower percentages of 12.1 at 15 years and 12.3 at 25 years after injury, suggesting a decrease of depressive symptoms over many years.

Anxiety has been examined in six studies (Table 3).^{43,61–65} Proportions with clinically significant symptoms range from 13.2 up to 40%. Kennedy *et al.*,^{63,64} used longitudinal designs during and after initial inpatient rehabilitation, and did not find a consistent course of anxiety over time.

PTSD was examined in 10 studies (Table 4).^{43,58,65,67,72–78} Estimates of the prevalence of PTSD vary widely, from 7.1 up to 61.8%. The highest estimate, however, probably results from using the subscale cutoff point for the total score.⁷² Most studies showed lower prevalence (7.1–26.6%). The one longitudinal study showed no association between PTSD and time after SCI, but this study was small and suffered from substantial loss to follow-up.⁷⁸

Psychological factors associated with SWB after SCI

A recent review¹⁸ of psychological factors associated with mental health and life satisfaction after SCI included 48 studies, and their

Table 4 Prevalence of PTSD in persons with spinal cord injury

Study	Cutoff prevalence (%)
<i>Impact of Events Scale</i>	≥20
Hatcher <i>et al.</i> ⁷²	61.8
Kennedy and Evans ⁶⁵	IES-I: 20 IES-A: 22.4
Lude <i>et al.</i> ⁶⁷	IES-I: 7.1–15.3 ^a IES-A: 8.6–18.8 ^a
<i>Impact of Events Scale-Revised</i>	
Migliorini and Tonge ⁴³	8.4
<i>Posttraumatic Stress Disorder Checklist</i>	
Chung <i>et al.</i> ⁷³	44 Full blown 42 Partial
<i>Posttraumatic Diagnostic Scale</i>	
Agar <i>et al.</i> ⁷⁴	24
Boyer <i>et al.</i> ⁷⁵	25.4 PTSD 20.9 Partial PTSD
<i>Purdue Posttraumatic Stress Disorder Scale—Revised</i>	
Krause <i>et al.</i> ⁵⁸	7.2
<i>Clinician Administered PTSD Scale</i>	Moderate threshold
Radnitz <i>et al.</i> ⁷⁶	26.6 Lifetime 16.1 Current
<i>Havard Trauma Questionnaire</i>	
Nielsen <i>et al.</i> ⁷⁷	7.1 Case 10.7 Partial case
Nielsen <i>et al.</i> ⁷⁸	18.4–22.5 Case ^b

Abbreviation: PTSD, post-traumatic stress disorder.

^aSamples from four different European countries.

^bDifferent measurement occasions during in-patient rehabilitation and after discharge.

results are summarized here. Psychological variables were classified as consistent determinants if all bivariate associations reported were statistically significant and if most of these associations were moderate (0.3–0.5) or stronger. Variables were classified as inconsistent determinants if only some of the associations were statistically significant or if most significant associations were weak. Variables were classified as unrelated to mental health and life satisfaction if all, or nearly all, associations were nonsignificant.

Factors consistently associated with SWB were as follows: perceived control in life (range of correlations 0.49–0.69), experienced sense of coherence (0.32–0.76), endorsed positive factors such as hope (0.27–0.64) and purpose in life (0.50–0.71), reported feelings of self-worth such as self-efficacy (0.23–0.62) and self-esteem (0.33–0.73), reported positive (0.42–0.52) and negative (0.35–0.73) affect, and reported posttraumatic cognitions (0.35–0.66).

Factors inconsistently related to SWB included appraisals (17 out of 21 (17/21) correlations were statistically significant and 13 correlations were > 0.30), subscales of locus of control (6/15, 2 > 0.30), attribution of blame (8/19; 2 > 0.30), spirituality (3/12; 3 > 0.30), personality characteristics (5/15; 3 > 0.30), emotion-focused coping styles (30/51; 20 > 0.30) and passive coping styles (31/57; 27 > 0.30). Of all the attribution of blame variables, self-blame and perceived avoidability of the SCI were most frequently, but weakly, associated with SWB. For spirituality, research has focused more on religious than existential aspects, yet existential spirituality was strongly associated with SWB in one study. Personality variables were only examined in two studies, and only neuroticism and extraversion were associated with SWB.

Factors not associated with SWB included several coping variables. Although acceptance was a consistent determinant of SWB, the majority of emotion-focused coping styles were not associated with SWB. Of the passive coping styles, only helplessness was consistently related to SWB. Although behavioural disengagement, denial, avoidance and social reliance were moderately to strongly related to SWB in some studies, they were not consistently related to SWB across studies. Few significant associations (12/57; 9 > 0.30) between active problem-focused coping and SWB outcomes were found. An explanation for the lack of associations between active coping and SWB might be that in situations where goals are blocked, such as is the case with an SCI, adjusting personal preferences and goals to situational changes is more effective and more positively related to adjustment than actively adjusting life circumstances to one's personal preferences.⁷⁹

Social support factors associated with SWB after SCI

Social support is defined as an exchange of resources between individuals intended to enhance the well-being of the recipient.⁸⁰ It conveys the information of being loved, cared for, esteemed, valued and of belonging.⁸¹ Different dimensions of social support are type, source, and qualifier. Types of social support are instrumental (for example, tangible assistance), emotional (for example, exchange with a close friend) and informational (for example, advice from a peer). Sources of social support can be family members, in particular the spouse, and friends and acquaintances, and others. Support by professionals is also included in some social support measures.⁸² Social support can be described from a quantitative (for example, network size) or qualitative (for example, satisfaction with support) perspective.

Marriage is a major source of support and well-being.⁸³ Unfortunately, US figures showed that the majority of people with SCI (54.2%) are single at discharge from rehabilitation, and divorce rates in people with SCI are higher compared with the population of the same age and gender.⁸⁴ Another SCI Model Systems study showed that the proportion of married people with SCI varied from 31% at 5 years post SCI to 43% at 25 years post SCI.⁸⁵ Kreuter *et al.*³⁸ reported 37.7% married or cohabiting people with SCI in Sweden. Estimates of married or cohabiting people with SCI in the Netherlands are much higher, from 56.3%¹³ up to 65.9%.⁸⁶

A recent review identified no less than 58 studies about social support and SCI.¹⁹ Seven studies reported 10 out of 17 associations between social support and life satisfaction to be significant (10/17; 8 > 0.30). Further, 14 studies reported 48 out of 60 associations between social support and mental health problems to be significant (48/60; 31 < -0.30).¹⁹ Satisfaction with social support was more strongly related to mental health (range -0.19 to -0.59) than the reported quantity of support (0.04 to -0.30).^{64,66,74,87,88} Three studies using the Social Provisions Scale found the scale Reassurance of Worth and Social Integration to be most strongly (-0.23 to -0.39) related to mental health^{89–91}. Emotion-focused support was more strongly related to life satisfaction (0.11–0.34) than problem-focused support (-0.09 to 0.11).⁸²

Psychosocial interventions to enhance SWB after SCI

Psychological interventions for treatment of depression following SCI have been targeted at coping with pain or pain cognitions, or both.^{52,92} Cognitive behavioural therapy (CBT) incorporates a variety of techniques to facilitate emotional and behavioural change on the part of the person.⁹² CBT can include addressing 'irrational' or negative thoughts, increasing opportunities for participating in rewarding activities and instruction in relaxation. Issues of

Table 5 Studies evaluating interventions to enhance mental health of persons with spinal cord injury

Author	Study design	Type of intervention	Size	Change of depression	Treatment effect
Dorstyn <i>et al.</i> ⁹³	CT	Individual CBT, fortnightly sessions of 30–60 min	Intervention: 11 Control: 13 (without distress)	Decrease (NS) No change	Not tested
Craig <i>et al.</i> ⁹⁴	CT	CBT in small groups, 10 weeks, 1.5–2 h a week	Intervention: 28 Control: 41 (not treated with CBT)	Decrease Decrease	NS Significant in subgroup
King and Kennedy ⁹⁵	CT	CET in small groups, 7 sessions twice a week for 60–75 min	Intervention: 19 Control: 19 (historic controls)	Decrease No change	Significant over-all
Kennedy <i>et al.</i> ⁹⁶	CT	CET in small groups, 7 sessions twice a week for 60–75 min	Intervention: 45 Control: 40 (historic controls)	Decrease No change	NS ($P=0.058$)
Dutchnick <i>et al.</i> ⁹⁷	RCT	CET versus supportive group therapy in weekly sessions	Intervention: 16 Control: 17	Decrease Decrease	NS
Kemp <i>et al.</i> ⁵⁴	CT	CBT combined with medication	Intervention: 28 Control: 15 (declined treatment)	Decrease No change	Not tested

Abbreviations: CBT, cognitive behavioural therapy; CET, coping effectiveness training; CT, controlled trial; NS, nonsignificant; RCT, randomized controlled trial.

assertiveness, social skills and discussions of sexuality have also been included. Employing a group setting to provide CBT can also be a cost-effective opportunity for peer support, practice of social skills and the opportunity for gaining additional viewpoints.⁵² We found six psychological intervention studies primarily aimed at improving mental health of people with SCI (Table 5).^{54,93–97} The study design of most studies was weak; only one was a randomized controlled trial.⁹⁷ Other studies used people as controls who were treated in earlier years or elsewhere,^{94–96} who were not eligible for the intervention⁹³ or who declined the intervention.⁵⁴ A significant treatment effect (interaction between group and time) was demonstrated by only one study evaluating coping effectiveness training (CET).⁹⁵ However, the subsequent larger study with the same design and intervention found only a borderline treatment effect.⁹⁶ On the positive side, all studies showed a significant decrease of depressive symptoms during the intervention, although this effect was not always maintained at follow-up.⁹³ In one study,⁹⁴ subgroup analyses showed that for people with baseline levels of depression in the clinical range, the CBT group improved more than the control group, suggesting that CBT might be more effective in people with more severe mental health disorders.

Only one study examined possible mechanisms of treatment.⁹⁶ Decrease of anxiety and depression but no change of coping strategies were found after CET. The authors hypothesized that their intervention might have worked by changing participants' negative appraisals of the implications of SCI, increasing the perceived manageability of its consequences, thereby improving mood.⁹⁶

One randomized controlled trial provided supportive group therapy (SGT) to the comparison group.⁹⁷ SGT consisted of minimally structured, emotion-focused SGT sessions. Sixty-minute sessions were provided weekly, and members were encouraged to attend until discharged. SGT sessions emphasized sharing of experiences and information surrounding injury-related topics, exploration of emotional and cognitive reactions, and the opportunity for support and education from peers and psychologists. SGT may be equally effective in reducing depression and anxiety as CET.⁹⁷

DISCUSSION

The present paper reviewed the literature on SWB and the relationships between psychological and social support factors and SWB in people with SCI in order to identify gaps in scientific knowledge and recommend research priorities. The results clearly showed that the

prevalence of depression, anxiety and PTSD is elevated in people with chronic SCI, and that their average life satisfaction is substantially below that of the general population. These findings confirm and expand on earlier results,¹⁴ and underscores the importance of studying SWB as a long-term outcome of SCI⁸⁵ and as an outcome of intervention studies.⁹⁸

In this review, a large variation in SWB results between studies has been found. The factors contributing to this variation are unclear, but probably include variation in measures, in/exclusion criteria, setting and reference populations. The large majority of published studies are from the United States, Canada and Northern and Western Europe. There is a lack of studies providing information on people with SCI elsewhere in the world, as SWB results may not generalize to other countries and cultures. Even fewer studies have compared samples across countries.^{99,100} It is recommended to perform SWB studies in countries currently not well represented in this review and to perform comparisons between countries and cultures.

With respect to the course of life satisfaction after SCI, the results showed that at group level, life satisfaction improves from a low level early after SCI, and that there is no substantial decrease of life satisfaction at long-term follow-up.^{51,86} Distinct trajectories in the course of life satisfaction have been identified using two simple life satisfaction questions,¹³ suggesting the possibility of systematic screening on the risk of long-term adjustment problems. However, few other studies into life satisfaction in an in-patient setting have been performed to date, and this finding needs empirical confirmation.

Conflicting findings have been reported in the few studies on the course of mental health in initial inpatient rehabilitation. One factor that might explain these inconsistencies is length of stay; longer stays^{63,64} are more likely to be associated with change in mental health in either direction compared with shorter stays.⁷¹ Further, time can be included in the analysis in different ways. A study showed no association between time after admission and depressed mood, but did show an association between duration until discharge and depressed mood.⁷¹ Finally, results can be influenced by selective drop out: in the study showing increase of depression with longer duration of rehabilitation,⁶⁴ the sample size decreased with each subsequent administration. Likely, people staying longer in the rehabilitation hospital are the people who suffer from more severe injuries and more and more severe complications. Therefore, composition of the sample instead of duration of rehabilitation might explain the

increase in depression scores with longer duration of rehabilitation in this group.

There is considerable evidence on the role of psychological factors in SWB. Perceived control, resilience, sense of coherence, self-worth, hope and purpose in life are consistently associated with QoL after SCI. These findings suggest the potential of positive psychology interventions aimed at strengthening internal resources of people with SCI.¹⁰¹

Interestingly, one of the most popular topics among psychologists, coping behaviours, showed much less consistent results, warranting further study. Psychological terminology is inconsistent, especially with respect to coping and appraisals.¹⁸ A second limitation is the conceptual proximity between dependent and independent variables. Other limitations concern the wide variety of questionnaires used and the overrepresentation of small studies and of studies with a cross-sectional design.¹⁸ Longitudinal studies with sufficient sample size, harmonizing the use of measures, and more clearly specified and operationalized constructs are needed. More research is also needed to measure psychological and social factors early after SCI to test the predictive value of these factors for long-term adjustment, and to better understand which people are resilient to a SCI and which people are not. With respect to this last point, it might also be useful to test how different psychosocial factors are related to each other by making use of structural equation models.¹⁰²

Little is known about the contribution of psychological support for people with SCI, and instruments to describe this support have only recently been introduced.¹⁰³ Resources to provide psychological support are limited in most settings, so that it is important to document its contents and outcomes, including longitudinal studies using qualitative or observational designs. Promising results were reported with respect to intervention studies, but the effectiveness of psychological interventions has not been established to date. The available studies used small samples, usually lacked patient randomization and showed inconsistent results. The recent review on the effectiveness of CBT by the Spinal Cord Injury Rehabilitation Evidence (SCIRE) team, however, came to a more positive conclusion.⁹² That review included three studies that were excluded in the current review, among which the only study providing level 1 evidence,¹⁰⁴ because these studies either included people with various chronic conditions,¹⁰⁵ were targeted at caregivers of people with SCI,¹⁰⁴ or the data overlapped with those in a later publication.^{94,106} A second difference is that the SCIRE review focused more on the size of treatment effects in the intervention groups than on statistical significance between intervention and control groups.⁹²

All intervention studies found sought to minimize distress (depression and anxiety) and none targeted life satisfaction. Only one study included a social support intervention, which showed similar effectiveness like the CET intervention. A further intervention study that targeted patients and caregivers also showed effectiveness.^{104,107} A variety of intervention studies are, therefore, needed to identify optimal psychological support for people with SCI. In particular, studies are needed in the chronic phase of SCI, studies that target to strengthen personal resources of people with SCI¹⁰¹ and studies that target to support the family of people with SCI.¹⁰⁷

CONCLUSION

There is a need for cohort studies with sufficient sample size, which include people early after onset of SCI and assess physical and psychosocial factors to enhance our understanding of the course of SWB and its predictors after SCI. This would enable the identification of people who are at risk of long-term impairment of SWB. Finally,

psychosocial intervention studies are needed to identify which interventions may improve SWB of people with SCI.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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