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Jacobsson, Lars; Lexell, Jan

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ORIGINAL REPORT

LIFE SATISFACTION 6–15 YEARS AFTER A TRAUMATIC BRAIN INJURY

Lars Jacobsson, PhD[1,2] and Jan Lexell, MD, PhD[2,3]

From the [1]Medical Rehabilitation Section, Department of General Medicine, Kalix Hospital, Kalix, [2]Department of Health Sciences, Lund University, [3]Department of Rehabilitation Medicine, and Skåne University Hospital in Lund, Lund, Sweden

Objectives: **To assess satisfaction with life as a whole and 10 domains of life satisfaction in Swedish individuals after a traumatic brain injury, to describe the relationship with demographic, social and injury related variables, and to compare the level of life satisfaction with a Swedish reference sample.**

Subjects: **Fifty-one men and sixteen women, 6–15 years after a traumatic brain injury.**

Methods: **Life Satisfaction Questionnaire (LiSat-11).**

Results: **Many of the participants were, to some degree, satisfied with life as a whole and with all 10 domains of life satisfaction, but significantly less satisfied with life as whole and with 6 of the other 10 domains of life satisfaction in comparison with the Swedish reference sample. The participants' sex, injury severity or years post-injury was not related to any domains in LiSat-11, whereas age at time of injury, marital status and vocational situation were significantly related to a few of the domains.**

Conclusion: **This study shows that life satisfaction can be affected several years after a traumatic brain injury. It appears that individuals who are married or cohabiting and productive had higher life satisfaction. This implies that regaining social participation is an important factor for life satisfaction many years after a traumatic brain injury.**

Key words: long-term outcome; outcome assessment; traumatic brain injury; quality of life; questionnaires.

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Correspondence address: Lars Jacobsson, Department of General Medicine, Kalix Hospital, SE-952 82 Kalix, Sweden. E-mail: lars.jacobsson@nll.se

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INTRODUCTION

Life satisfaction (LS) is a generic concept representing an individual's contentment with life, or referred to as the degree of an individual's subjective appraisal as to whether his or her aspirations or goals and achievements have been accomplished (1, 2). LS is a result of an individual's adaptation process and is often used as an end-point in rehabilitation following diseases or injuries. By comparing LS in individuals with a life-long disability with that of the general population, the impact of the disability on contentment with life could be detected. Such comparisons are desirable, as the level of LS is not necessarily related to the medical condition or the injury severity.

Traumatic brain injury (TBI) is a leading cause of life-long disability and reduced LS. However, the outcome can vary considerably (1) and the level of disability is not linearly related to LS (3). It is well-known that LS is generally lower among individuals with a TBI in the first years after injury (1), but the few published studies on LS several years post-TBI report mixed findings. Some studies found that LS may improve over time (4–6), whereas others reported no discernible difference compared with the general population (3, 7). A population-based study (5) confirmed results from previous studies with a similar design (8), that outcome, including LS, may continue to improve with time, even many years post-injury. Even though some studies have indicated continuous improvement, the LS is generally lower or, at best, equal to the general population (4, 5, 8, 9).

There is a complex relationship between LS and the multiple consequences of a TBI over time after the injury. Factors such as sex, age at time of injury, and limitations in activities of daily living, have been found to be weakly related to LS (10–12). With time, it is also possible that factors other than the TBI itself may become more important for a person's perception of their LS, as one could develop strategies to adjust or adapt to the TBI. In addition, it is known that being married or cohabiting and being productive (working or studying) is associated with higher LS (4, 10). Taken together, our knowledge of LS and the relationship with different factors many years post-TBI is limited, and further studies are therefore needed. In such studies, it is important to compare with data from national reference samples, as diverse cultures and living conditions can influence LS (13, 14).

The aim of this study was to assess satisfaction with life as a whole and with 10 domains of life satisfaction in individuals 6–15 years after a TBI, to describe the relationship with sex, age at time for injury, injury severity, time post-TBI, marital status, and vocational situation, and to compare the levels of life satisfaction with a Swedish reference sample.

METHODS

Participants

Participants were obtained from a sample of 332 individuals with a computed tomography (CT) verified TBI and brain injury symptoms

who had been transferred to the only neurosurgical clinic in the region for neurosurgical care during the period 1 January 1992 to 31 December 2001 (15). From the population of 332 individuals, 106 met the inclusion criteria of being between 18 and 65 years of age at the time of data collection in year 2007 and a total of 88 (83% of the 106 potential participants) volunteered to participate (data on their functioning and disability have been presented previously (16)). Sixty-seven of the 88 individuals were willing and/or able to participate in the present study. Ten of the 21 non-participants were excluded as they were too disabled (e.g. severe cognitive impairments) to complete the self-rated questionnaire and 11 declined to participate. Data on health-related quality of life (using the Short Form 36; SF-36) and life satisfaction (using the Satisfaction with Life Scale; SWLS) have been reported for these 67 individuals (4). At the time of data collection, the 67 participants were also asked to rate their LS using the Life Satisfaction Questionnaire (LiSat-11) (17, 18), which forms the basis for the present study. No significant differences were found between the 67 participants and the 39 (out of 106) and the 21 (out of 88) non-participants, respectively, regarding sex, age at time for injury, injury severity or time post-injury. None of the 67 participants had a clinically verified depression or showed symptoms at the interview of major depression. The study was approved by the Regional Ethical Review Board, Umeå, Sweden (06-013M).

Demographics

Data at the time of injury (sex, age at injury, injury severity and time post-injury) were obtained from the database presented in the first study (15). The injury severity was defined by the Reaction Level Scale scores (RLS 85) at the time of admission to the emergency department, and was transformed into Glasgow Coma Scale scores (GCS) (19). Based on the GCS scores, the individuals were primarily grouped into the 3 commonly used TBI severity groups: mild (GCS 13–15), moderate (GCS 9–12) and severe (GCS 3–8) (20). As previous studies have often combined the moderate and severe TBI into one group, this was also done here to allow for a comparison. Data on their marital status and vocational situation were also collected when the participants responded to LiSat-11. To facilitate the analysis, marital status was dichotomized as: (*i*) single or (*ii*) married/cohabitant, and vocational situation dichotomized as: (*i*) productive (i.e. studying, working full/part time in competitive work, sheltered work or looking for work) or (*ii*) not productive (i.e. full disability pension).

Questionnaire

LiSat-11 assesses global satisfaction with life in 1 item and domain-specific satisfaction in 10 items. In LiSat-11 there are 6 response levels: very satisfied; satisfied; rather satisfied; rather dissatisfied; dissatisfied; and very dissatisfied. LiSat-11, an extension of LiSat-9 (21), has a stable construct, and has been found to be valid for the general population (17, 18). All data were collected by the first author, who had access to the background information, but did not review it before or during the interview. A total of 60 individuals completed the questionnaires themselves, 3 individuals had a close relative present, but completed the questionnaires independently, and 4 individuals had assistance with reading and understanding some of the items in the questionnaires, but then completed them independently.

Statistical analysis

Data are presented as mean, median, standard deviation (SD), minimum and maximum, where appropriate. Relative frequencies were calculated for the 6 response levels for the 11 items of LiSat-11. The 11 items of LiSat-11 were also dichotomized as "satisfied" (very satisfied and satisfied) and "not satisfied" (from rather satisfied to very dissatisfied), in agreement with the developer of LiSat-11 (17). Non-parametric statistics were used to analyse the data, as LiSat-11 is an ordinal scale with 6 categories. Differences in levels of life satisfaction with regard to sex, age at time of injury, injury severity, time post-injury, marital status and vocational situation, were detected and analysed using cross-tabulations and χ^2 tests. These variables were chosen as they have been used in our previous studies and studies by other authors. For reassurance, we also used Spearman's rank correlation to assess possible relationships between these variables, but the results were identical, and only those using cross-tabulation and χ^2 test are therefore presented. The level of LS was compared with the Swedish reference sample (17, 18) using χ^2 tests.

RESULTS

Data on the 67 participants are presented in Table I. The mean time since injury was 10 years (median 9; SD 3; range 6–15 years) and their mean age was 44 years at the time of data collection. A majority (51 participants; 76%) were neurosurgically operated on as a result of their TBI (58% of those with GCS 15, 62% of those with GCS 13–14, 86% of those with GCS 10, and 91% of those with GCS 3–8). All of the participants, except for 4 individuals with partial assistance, lived completely independent in their own house or apartment. Approximately half of the participants were married or cohabitant, the other half single or divorced. Six participants were single and lived with their children and 2 were still living with their parents. Approximately 66% of the participants were still productive, whereas 34% had full disability pension (28% of those with mild TBI and 40% of those with moderate-to-severe TBI).

Approximately half of the 67 individuals (52%) were satisfied to very satisfied with life as a whole, 31% were rather satisfied, and 11% were dissatisfied to very dissatisfied (Table II). The majority (82%) were satisfied with their capability to manage daily activities (ADL). A small proportion of the sample was dissatisfied to very dissatisfied (22% and 10%, respectively) with their somatic and psychological health. The

Table I. *Characteristics of the 67 Swedish individuals 6–15 years after a traumatic brain injury (TBI)*

Characteristics	
Sex, %	
Men	76
Women	24
Age at time of injury, years, mean (SD) [range]	34 (13) [12–56]
Cause, %	
Traffic accidents	43
Falls	27
Other causes[a]	30
Injury severity, *n*	
Mild	32
Moderate-to-severe	35
Marital status at follow-up, *n*	
Married or cohabitant	33
Single or divorced	34
Vocational situation at follow-up[b], *n*	
Productive	44
Not productive	23

[a]Other causes include assaults or suicide attempts and sports and recreational activity.

[b]Vocational situation was defined as: productive (i.e. studying, working full-/part-time in competitive work, sheltered work or looking for work) or not productive (i.e. full disability pension).

Table II. *Percentages of self-reported levels of life satisfaction in the 67 Swedish individuals 6–15 years after a traumatic brain injury (TBI)*

	Very satisfied %	Satisfied %	Rather satisfied %	Rather dissatisfied %	Dissatisfied %	Very dissatisfied %
Life as a whole	18	34	31	6	6	5
Vocation	21	21	18	10	5	25
Economy	16	19	34	10	9	10
Leisure	19	24	27	16	6	8
Contacts	28	30	27	2	9	5
Sexual life	13	33	22	8	6	18
Activities of daily living	60	22	6	5	3	5
Family life[a] ($n=41$)	71	17	7	2	2	–
Partner relationship[b] ($n=35$)	60	29	6	6	–	–
Somatic health	9	33	25	10	9	13
Psychological health	31	37	15	8	5	5

[a]Those who reported having a family.
[b]Those with partner.

majority of the group was satisfied to very satisfied with family life (88%) and with partner relationship (89% of those who had a partner). The vocational situation was rated as satisfied to very satisfied by 42%, whereas 30% was dissatisfied to very dissatisfied with their vocational situation.

Compared with the Swedish reference sample, the 67 individuals reported significantly lower satisfaction with life as a whole, vocation, leisure, ADL, somatic and psychological health, but no difference with regard to economic situation, contacts with friends, sexual life, family life, and partner relationship (Table III). When the sample was divided into 2 groups, significantly lower LS remained for the moderate-to-severe TBI group regarding vocation, ADL and psychological health. The mild TBI group rated their LS significantly lower for life as a whole and somatic health compared with the Swedish reference sample.

There was no significant difference between men and women for any item in the LiSat-11 (Table IV). Age at injury, injury severity (dichotomized as mild and moderate-to-severe TBI) and time post-injury had no significant effect on LS. On the other hand, those who were married/cohabiting, compared with those who were single, were significantly more satisfied with regard to life as a whole and sexual life. Furthermore, those who were working or studying were significantly more satisfied with life as a whole, their leisure, sexual life, ADL, family life, partner relationship and somatic health.

DISCUSSION

In this study, we assessed satisfaction with life as a whole and with 10 domains of LS in individuals 6–15 years after a TBI, and compared the levels of LS with a Swedish reference sample. Many of the individuals were, to some degree, satisfied with life as a whole and with all 10 domains of LiSat-11, but significantly less satisfied with life as whole and with 6 of the other 10 domains of LS in comparison with the Swedish reference sample. Furthermore, satisfaction with life as a whole and the 10 rated domains were not related to the participants' sex, injury severity or years post-injury, whereas age at time of injury, marital status and vocational situation were related to a few of the domains in Li-Sat-11.

Table III. *Comparison between the 67 Swedish individuals 6–15 years after a traumatic brain injury (TBI) and the Swedish reference sample. Values in percentages of very satisfied and satisfied, dichotomized as "satisfied" in agreement with the developer of Life Satisfaction Questionnaire (LiSat-11) (17)*

	Mild TBI %	*p*-value	Moderate-to-severe TBI %	*p*-value	Total %	*p*-value	Swedish reference sample %
Life as a whole	53	0.037	51	0.017	52	0.002	70
Vocation	47		37	0.045	42	0.045	54
Economy	38		34		36		39
Leisure	41		46		43		57
Contacts with friends	50		66		58		65
Sexual life	44		49		46		56
Activities of daily living	91		74	<0.001	82	<0.001	95
Family life[a] ($n=41$)	90		86		88		81
Partner relationship[b] ($n=35$)	87		90		89		82
Somatic health	44	<0.001	40	0.001	42	0.001	77
Psychological health	75		63	0.006	69	0.004	81

[a]Difference compared with the national sample was tested with those individuals who reported to have a family.
[b]Difference compared with the national sample was tested with those 35 individuals who reported to have a partner.
Differences between groups were tested with the χ^2 test.

Table IV. *Differences in self-reported levels of life satisfaction by sex, age at the time for injury, injury severity, marital status, and vocational situation in the 67 Swedish individuals 6–15 years after a traumatic brain injury (TBI). Values in percentages of very satisfied and satisfied, dichotomized as "satisfied" in agreement with the developer of Life Satisfaction Questionnaire (LiSat-11) (17)*

	Sex Men/women (n=51/16) %	Age at time of injury Up to 35/above 35 years (n=34/33) %	Injury severity Mild/moderate-to-severe (n=32/35) %	Years post-injury 6–10/11–15 years (n=43/24) %	Marital status Married or cohabiting/Single (n=34/33) %	Vocational situation Work or study/disability pension (n=44/23) %
Life as a whole	53/50	53/52	53/51	44/67	67/38 (p=0.021)	61/35 (p=0.004)
Vocation	39/50	32/52	47/37	35/54	42/41	50/26
Economy	37/31	24/49 (p=0.035)	38/34	33/42	27/44	36/35
Leisure	47/31	35/52	41/46	37/54	52/35	52/26 (p=0.041)
Contacts with friends	53/75	59/58	50/66	58/58	70/47	64/48
Sexual life	45/50	53/39	44/49	47/46	64/29 (p=0.005)	59/22 (p=0.004)
Activities of daily living	82/81	85/79	91/74	84/79	88/77	96/57 (p<0.001)
Family life[a] (n=41)	87/90 (n=31/10)	85/93 (n=26/15)	90/86 (n=19/22)	88/88 (n=25/16)	88/88 (n=33/8)	94/70 (n=31/10)
Partner relationship[b] (n=35)	85/100 (n=27/8)	86/92 (n=22/13)	85/93 (n=15/20)	91/86 (n=21/14)	88/100 (n=33/2)	89/88 (n=27/8)
Somatic health	35/63	41/42	44/40	35/54	46/38	55/17 (p=0.004)
Psychological health	73/56	62/76	75/63	65/75	79/59	75/57

[a]Forty-one individuals responded to the item "Family life", of those had 8 individuals a family without a spouse.
[b]Those with partner, 2 individuals were not married/cohabiting but had a stable relationship with a partner.
Differences between groups were tested with the χ^2 test.

The lower level of LS compared with the Swedish reference sample indicates, in agreement with previous studies (4, 8, 22), that individuals many years after a TBI have a reduced LS in relation to the general population. The proportion of individuals being satisfied (response levels 5 and 6 on the item "Life as a whole") in the present study is also similar compared with other Swedish studies of people with brain injury or late effects of polio (23–27). A Swedish follow-up study of individuals with mild TBI 10 years post-injury (28) and two population-based studies from Denmark (8) and USA (5) arrived at the same conclusion, that there is very little or no improvement over time in LS.

Some studies have found significantly lower proportions of satisfaction with "Life as a whole" compared with the findings in the present study. One study (29) with a relatively small sample of individuals with severe TBI and non-traumatic subarachnoid haemorrhage, reported that only 30% were satisfied with life as a whole, and that that LS declined between 1 and 5 years for 6 of the 10 participants. Another study reported that 46% were satisfied with life as whole 3 years after a mild TBI (23). In the present study, several domains in LiSat-11 (vocation, leisure, daily activities, somatic health, and psychological health) were significantly lower than the Swedish reference sample. This is also in agreement with previous studies of populations with acquired brain injuries as well as other disabled populations (25, 27, 30, 31).

The proportion being satisfied with life as a whole and the 10 domains in LiSat-11 varies across studies, partly because of the different degree of disability and time since injury or disease onset. For example, Eriksson et al. (30) reported in a follow-up 1–4 years post-injury of 116 individuals with a TBI or subarachnoid haemorrhage significantly lower levels for vocation, contacts with friends, sexual life, partnership, family life, and psychological health compared with the results in the present study. Our results are more in line with results from long-term studies of mild TBI (23, 24), multi-trauma (31), stroke in young ages (26), and individuals with mild disabilities after whiplash injury (32), supporting the contention that the LS is related to the disability severity.

The satisfaction with life as a whole and the 10 domains of LS were not related to the participants' sex, which is in agreement with previous TBI follow-up studies using LiSat-11 (23, 33). However, there were relatively few women in the TBI group in the present study, so the results should be treated with some caution. It is worth mentioning, however, that only 2 items in the LiSat-11 (contact with friends and ADL) were significantly different for men and women in the Swedish reference sample (17), indicating that sex differences in LS are rare.

There was no significant relationship between injury severity and LS (cf. Table IV). One study reported a relationship between milder injury and higher LS (34), whereas other studies have not found any significant relationships (5). When our sample was divided into 2 groups with regard to injury severity (cf. Table III) and compared with the Swedish reference sample, some differences emerged. Those with moderate-to-severe TBI rated lower LS for more items than those with mild TBI. This indicates that injury severity may be a factor that influences LS, and it also reinforces the complexity of assessing LS in a population of individuals with TBI.

It is likely that factors affecting individuals in general, such as social participation, being married or cohabiting, and being employed, are also important after a TBI (10). Thus, it was not surprising to find that individuals in the present study, who were married or cohabiting, and vocationally productive, had significantly higher LS. Similarly, those that were single also rated satisfaction with their sexual life significantly lower. However, in contrast to several previous studies (25, 26, 29–31, 33, 35, 36) that have used LiSat-11, we found no relationship

between satisfaction with family life and partner relationship and the other variables (cf. Table IV).

Those that were vocationally productive, i.e. working or studying part- or full-time, reported significantly higher satisfaction with life as a whole, leisure, sexual life, ADL, family life, partner relationship, and somatic health. This is well in line with other studies and indicates the importance of being productive as a predictor of high LS (4, 30, 33). To be vocationally productive is often described as a highly valued end-point following rehabilitation and is associated with more predictable and stable economy. Furthermore, working or studying enhances opportunities to engage in social interactions and more easily participate in leisure activities. It is therefore not surprising that individuals in the TBI group that were vocationally productive were also significantly more often satisfied with leisure activities. Furthermore, the lower satisfaction with sexual life among those individuals not being vocationally productive may indicate a more socially isolated situation with less opportunity for close relationships.

The relatively few studies that have reported LS several years after TBI have indicated that LS may improve as time goes by (5–9, 28). In the present study, there was no relationship between years post-injury and LS. However, in a previous study (37), based on the same data applying multivariate regression analyses, we did find a weak relationship between years post-injury and improved LS. A study by Johansson & Bernspång (33) investigated the change in LS between a mean of 3 and 6 years after admittance to a rehabilitation programme (a mean of 8 years post-injury) for 36 individuals with acquired brain injury, of whom 24 individuals had a TBI. These authors found lower LS compared with the Swedish reference values (17), but no significant change between the 2 follow-ups.

As LS depends on a variety of factors, it is possible that a single instrument does not capture the full extent of the concept. Interestingly, no study has performed a face-to-face comparison of instruments that assess LS in a group of people with TBI. Such a study could lead to an increased awareness of the concept and the possibility to select appropriate assessment tools for future studies.

Limitations

One limitation of this study is the relatively small and selected sample. We did not study those with mild TBI (without CT findings) and those with severe TBI, who were unable to respond to the questionnaire; thus the results cannot be generalized to all people with a TBI. The variables used to represent injury severity might be more valid if it could have been supplemented with other measures, for example of post-traumatic amnesia. However, the original data from medical records restricted such assessments. In addition, we did not obtain information on recurrent TBI, which would have been of interest to assess with regard to LS. As cognition and cognitive impairments can affect the ability to respond to questionnaires, it is possible that those with a more severe injury may have found it difficult to rate the impact of the TBI on their LS. However, at the time of the interview, none of the participants explicitly expressed concern about rating their LS, but, nevertheless, the overall conclusions should be treated with some caution.

Conclusion

This study shows that LS is affected several years after a TBI, but not related to sex, injury severity or years since injury. Individuals who achieved social participation, as indicated by marriage/cohabitation and vocational productivity, had higher life satisfaction. This implies that regaining social participation is an important factor for LS many years after a TBI.

REFERENCES

1. Dijkers M. Quality of life after traumatic brain injury: a review of research approaches and findings. Arch Phys Med Rehab 2004; 85: S21–S35.
2. Pavot W, Diener E. Review of the Satisfaction With Life Scale. Psychol Assessment 1993; 5: 164–172.
3. Cicerone K, Azulay J. Perceived self-efficacy and life satisfaction after traumatic brain injury. J Head Trauma Rehabil 2007; 22: 257–266.
4. Jacobsson LJ, Westerberg M, Lexell J. Health-related quality-of-life and life satisfaction 6–15 years after traumatic brain injuries in northern Sweden. Brain Inj 2010; 24: 1075–1086.
5. Brown AW, Moessner AM, Mandrekar J, Diehl NN, Leibson CL, Malec JF. A survey of very-long-term outcomes after traumatic brain injury among members of a population-based incident cohort. J Neurotrauma 2011; 28: 167–176.
6. Wood R. Long-term outcome of serious traumatic brain injury. Eur J Anaesthesiol Suppl 2008; 25: 115–122.
7. Bezner J, Hunter D. Wellness perception in persons with traumatic brain injury and its relation to functional independence. Arch Phys Med Rehabil 2001; 82: 787–792.
8. Engberg A, Teasdale T. Psychosocial outcome following traumatic brain injury in adults: a long-term population-based follow-up. Brain Inj 2004; 18: 533–545.
9. Wood R, Rutterford N. Psychosocial adjustment 17 years after severe brain injury. J Neurol Neurosur Psychiatry 2006; 77: 71–73.
10. Corrigan J, Bogner J, Mysiw W, Clinchot D, Fugate L. Life satisfaction after traumatic brain injury. J Head Trauma Rehabil 2001; 16: 543–555.
11. Mailhan L, Azouvi P, Dazord A. Life satisfaction and disability after severe traumatic brain injury. Brain Inj 2005; 19: 227–238.
12. Pierce C, Hanks R. Life Satisfaction After traumatic brain injury and the World Health Organization Model of Disability. Am J Phys Med Rehab 2006; 85: 889–898.
13. Diener E, Suh EM, Smith H, Shao L. National differences in reported subjective well-being: Why do they occur? Soc Indic Res 1995; 34: 7–32.
14. Geyh S, Fellinghauer BA, Kirchberger I, Post MW. Cross-cultural validity of four quality of life scales in persons with spinal cord injury. Health Qual Life Out 2010; 8: 94.
15. Jacobsson L, Westerberg M, Lexell J. Demographics, injury characteristics and outcome of traumatic brain injuries in northern Sweden. Acta Neurol Scand 2007; 116: 300–306.
16. Jacobsson LJ, Westerberg M, Soderberg S, Lexell J. Functioning and disability 6–15 years after traumatic brain injuries in northern Sweden. Acta Neurol Scand 2009; 120: 389–395.
17. Fugl-Meyer A, Melin R, Fugl-Meyer K. Life satisfaction in 18- to 64-year-old Swedes: in relation to gender, age, partner and immigrant status. J Rehabil Med 2002; 34: 239–246.
18. Melin R, Fugl-Meyer KS, Fugl-Meyer AR. Life satisfaction in 18- to 64-year-old Swedes: in relation to education, employment situation, health and physical activity. J Rehabil Med 2003; 35: 84–90.

19. Johnstone A, Lohlun J, Miller J, McIntosh C, Gregori A, Brown R, et al. A comparison of the Glasgow Coma Scale and the Swedish Reaction Level Scale. Brain Inj 1993; 7: 501–506.
20. Teasdale G, Jennett B. Assessment and prognosis of coma after head injury. Acta Neurochir (Wien) 1976; 34: 45–55.
21. Fugl-Meyer A, Bränholm I-B, Fugl-Meyer K. Happiness and domain-specific life satisfaction in adult northern Swedes. Clin Rehabil 1991; 5: 25–33.
22. Bullinger M, Azouvi P, Brooks N, Basso A, Christensen A, Gobiet W, et al. Quality of life in patients with traumatic brain injury-basic issues, assessment and recommendations. Restor Neurol Neuros 2002; 20: 111–124.
23. Stålnacke B. Community integration, social support and life satisfaction in relation to symptoms 3 years after mild traumatic brain injury. Brain Inj 2007; 21: 933–942.
24. Stålnacke BM. Relationship between symptoms and psychological factors five years after whiplash injury. J Rehabil Med 2009; 41: 353–359.
25. Johansson U, Högberg H, Bernspång B. Participation in everyday occupations in a late phase of recovery after brain injury. Scand J Occup Ther 2007; 14: 116–125.
26. Röding J, Glader EL, Malm J, Lindstrom B. Life satisfaction in younger individuals after stroke: different predisposing factors among men and women. J Rehabil Med 2010; 42: 155–161.
27. Larsson Lund M, Lexell J. Life Satisfaction in persons with late effects of polio. Appl Res Qual Life 2011; 6: 71–80.
28. Andersson EE, Bedics BK, Falkmer T. Mild traumatic brain injuries: a 10-year follow-up. J Rehabil Med 2011; 43: 323–329.
29. Sörbo AK, Blomqvist M, Emanuelsson IM, Rydenhag B. Psychosocial adjustment and life satisfaction until 5 years after severe brain damage. Int J Rehabil Res 2009; 32: 139–147.
30. Eriksson G, Kottorp A, Borg J, Tham K. Relationship between occupational gaps in everyday life, depressive mood and life satisfaction after acquired brain injury. J Rehabil Med 2009; 41: 187–194.
31. Anke A, Fugl-Meyer A. Life satisfaction several years after severe multiple trauma. Clin Rehabil 2003; 17: 431–442.
32. Merrick D, Stalnacke BM. Five years post whiplash injury: Symptoms and psychological factors in recovered versus non-recovered. BMC Res Notes 2010; 3: 190.
33. Johansson U, Bernspång B. Life satisfaction related to work reentry after brain injury: a longitudinal study. Brain Injury 2003; 17: 991–1002.
34. Larsson Lund M, Lövgren-Engström AL, Lexell J. Using everyday technology to compensate for difficulties in task performance in daily life: experiences in persons with acquired brain injury and their significant others. Disabil Rehabil Assist Technol 2011; 6: 402–411.
35. Stålnacke B, Björnstig U, Karlsson K, Sojka P. One-year follow-up of mild traumatic brain injury: post-concussion symptoms, disabilities and life satisfaction in relation to serum levels of S-100B and neurone-specific enolase in acute phase. J Rehabil Med 2005; 37: 300–305.
36. Stålnacke B, Elgh E, Sojka P. One-year follow-up of mild traumatic brain injury: cognition, disability and life satisfaction of patients seeking consultation. J Rehabil Med 2007; 39: 405–411.
37. Jacobsson LJ, Westerberg M, Malec JF, Lexell J. Sense of coherence and disability and the relationship with life satisfaction 6–15 years after traumatic brain injury in northern Sweden. Neuropsychol Rehabil 2011; 21: 383–400.