

**Research Summary – Hospital Anxiety and Depression Scale (HADS) – Mental Health**

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p><a href="#">Menon et al.</a> 2016</p> <p>Prospective observational study</p> <p>Research hospital in India</p>	<p>N=127 (35F, 92M) Age: 32.71 ±13.08 Time Since Injury (days): 76.22 ± 82.5 Myelopathy patients</p> <p>Admission AIS: AIS A: 58 AIS B: 18 AIS C: 36 AIS D: 11</p> <p>Discharge AIS: AIS A: 47 AIS B: 16 AIS C: 26 AIS D: 34</p>	<p>Change in HADS-depression and change in BI Spearman’s rho: 0.221 (p-0.024, significant) Change in HADS-depression and change in SCIM III Spearman’s rho: 0.290 (p= 0.027, significant)</p>		
<p><a href="#">Munce et al.</a> 2016</p> <p>Online Survey</p>	<p>N=99 Age: 50.5 ± 1.0 Time Since Injury (years): 17.5 ± 12.3</p>	<p>MSES (Moorong Self-Efficacy Scale) <u>Depression</u> portion negatively correlated with MSES (r=-0.560, p&lt; 0.01)</p>		

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
Rick Hansen Institute and an outpatient spinal clinic		<u>Anxiety</u> portion negatively correlated with MSES ( $r=-0.315$ , $p<0.01$ )		
<a href="#">Ebrahimzadeh et al. 2014</a>  Cross sectional design	N=52 (52M) Age: $23.6 \pm 8.2$ War veterans with SCI Time Since Injury: ~30 years ago Paraplegic: 37 Tetraplegic: 6	<u>Depression</u> portion negatively correlated with physical component summary of SF36 ( $r=-0.37$ , $p=0.006$ ) <u>Anxiety</u> portion negatively correlated with mental component summary of SF36 ( $r=-0.44$ , $p=0.001$ )		
Müller et al. 2012  Cross-sectional multicenter study  3 major SCI rehabilitation centers in Switzerland (Paraplegic	N=102 Mean age: $56.5 \pm 16.7$ years 74.5% Male 61.8% Paraplegic 38.2% Tetraplegic 26.5% complete injury, 73.5% incomplete injury		<b>Internal Consistency:</b> Cronbach's alpha: Anxiety subscale: 0.72 Depression subscale: 0.82	

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
Centre, University Clinic Balgrist, Zurich; the Swiss Paraplegic Centre, REHAB Basel; and the Swiss Paraplegic Centre (SPZ), Nottwil)	Time since onset of injury: 43.6±13.5 months			
<p><a href="#">Elfstrom et al.</a> 2007</p> <p>Cross-sectional, questionnaire to investigate the psychometric performance of the Spinal Cord Lesions – Coping strategies Questionnaire (SCL-CQ) in four different countries.</p>	<p>N=355 Male=279 Female=74 Missing=2 Mean age=49 Mean age at lesion=27.8 Austria=44 Germany=172 Switzerland=27 UK=112</p> <p>Level of lesion Cervical=147 Thoracic=155</p>	<p>Pearson’s r correlation of the HADS with SCL Coping Strategy Questionnaire (different construct): Acceptance w/ Anxiety=-0.45 Depression=-0.58</p> <p>Fighting Spirit w/ Anxiety=-0.40 Depression=-0.49</p> <p>All values negative, as expected.</p>		<p><b>Interpretability:</b> See table 1.</p>

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability																		
Austria, Germany, Switzerland and UK.	Lumbar=23 Sacral=1 Missing=29  Complete paraplegia=162 Complete tetraplegia=85 C=Incomplete paraplegia=32 Incomplete tetraplegia=58 Missing=18	All were P<.01																				
<p>Table 1. HADS scores:</p> <table border="1" data-bbox="474 971 1808 1190"> <thead> <tr> <th data-bbox="474 971 678 1008">Sample:</th> <th data-bbox="678 971 1203 1008">HADS-Anxiety mean (SD) score:</th> <th data-bbox="1203 971 1808 1008">HADS-Depression mean (SD) score:</th> </tr> </thead> <tbody> <tr> <td data-bbox="474 1008 678 1045">Austria</td> <td data-bbox="678 1008 1203 1045">5.00 (3.89)</td> <td data-bbox="1203 1008 1808 1045">3.19 (2.98)</td> </tr> <tr> <td data-bbox="474 1045 678 1083">Germany</td> <td data-bbox="678 1045 1203 1083">5.60 (3.16)</td> <td data-bbox="1203 1045 1808 1083">3.43 (2.91)</td> </tr> <tr> <td data-bbox="474 1083 678 1120">Switzerland</td> <td data-bbox="678 1083 1203 1120">5.00 (4.21)</td> <td data-bbox="1203 1083 1808 1120">3.48 (3.37)</td> </tr> <tr> <td data-bbox="474 1120 678 1157">UK</td> <td data-bbox="678 1120 1203 1157">7.19 (4.21)</td> <td data-bbox="1203 1120 1808 1157">5.39 (3.97)</td> </tr> <tr> <td data-bbox="474 1157 678 1190">Total</td> <td data-bbox="678 1157 1203 1190">6.00 (3.79)</td> <td data-bbox="1203 1157 1808 1190">4.06 (3.46)</td> </tr> </tbody> </table>					Sample:	HADS-Anxiety mean (SD) score:	HADS-Depression mean (SD) score:	Austria	5.00 (3.89)	3.19 (2.98)	Germany	5.60 (3.16)	3.43 (2.91)	Switzerland	5.00 (4.21)	3.48 (3.37)	UK	7.19 (4.21)	5.39 (3.97)	Total	6.00 (3.79)	4.06 (3.46)
Sample:	HADS-Anxiety mean (SD) score:	HADS-Depression mean (SD) score:																				
Austria	5.00 (3.89)	3.19 (2.98)																				
Germany	5.60 (3.16)	3.43 (2.91)																				
Switzerland	5.00 (4.21)	3.48 (3.37)																				
UK	7.19 (4.21)	5.39 (3.97)																				
Total	6.00 (3.79)	4.06 (3.46)																				
<a href="#">Woolrich et al.</a> 2006	N=963 (81% male) Mean age 48.1±12.7yrs (range 20-97yrs)	<b>Construct validity.</b> <i>HADS scores were correlated with those</i>	<b>Internal consistency: Cronbach's alpha.</b>	<b>Interpretability:</b> HADS-A: Hospital Anxiety and Depression Scale –																		

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p>Cross-section to evaluate the psychometric properties of the HADS using a large community sample who had recently completed the HADS in a larger study. Because of the constraints of the larger study, full psychometric evaluation could not be directly assessed.</p> <p>Community sample in the UK</p>	<p>Participants of a larger study on the impact of sport and athletic identity in people with SCI. 65.2% paraplegic, 34.8% tetraplegic Mean DOI 19.5±12.26yrs (range 2-56yrs)</p>	<p><i>from the Life Satisfaction Questionnaire (LSQ).</i> LSQ scores were significantly and negatively correlated with the HADS total scores (Pearson's <math>r=-0.585</math>, <math>P&lt;.001</math>) and the anxiety (<math>r=-0.419</math>, <math>P&lt;.001</math>) and depression (<math>r=-0.66</math>, <math>P&lt;.001</math>) subscale scores.</p> <p><b>Factor Analysis.</b> A two-factor solution accounted for 51.2% of the variance (factor 1: 40%; factor 2: 11.2%). All items loaded onto the correct factor, except item 7 ("I can sit at ease and feel relaxed"), which corresponded to the depression, not anxiety, factor;</p>	<p>Anxiety: <math>\alpha=0.85</math> (<math>\alpha=0.86</math> if item 11 was removed, but <math>\alpha</math> was lower if any other item was removed).</p> <p>Depression: <math>\alpha=0.79</math> (<math>\alpha</math> remained the same if item 14 was removed, but was lower if any other item was removed).</p>	<p>Anxiety subscale HADS-D: Hospital Anxiety and Depression Scale – Depression subscale Scores reported below are in the form: mean (SD) See table 1.</p>

<b>Author Year Research Design Setting (country)</b>	<b>Demographics and Injury Characteristics of Sample</b>	<b>Validity</b>	<b>Reliability</b>	<b>Responsiveness Interpretability</b>
		<p>however, item 1 (“I feel tense and wound up”) also loaded onto the depression factor and item 14 (“I can enjoy a good book, radio or TV programme”) loaded onto the depression factor as expected, but at a minimally significant level.</p> <p>Factor analysis was performed separately for males, females, tetraplegics and paraplegics. The two factor solution accounted for the following percentage of the variance: males 51%, females 52.2%, tetraplegics 49% and paraplegics 52.6%. Anxiety accounted for most of the variance for females (41.6%), whereas depression</p>		

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability																								
		accounted for most of the variance for the three other groups (36.3-41.9%). Again, item 1, 7 and 14 showed variable loadings.																										
	<p>Table 1.</p> <table border="1" data-bbox="474 711 1278 997"> <thead> <tr> <th>Sample</th> <th>HADS-A</th> <th>HADS -D</th> <th>HADS-total</th> </tr> </thead> <tbody> <tr> <td>Total</td> <td>6.9 (4.2)</td> <td>5.5 (3.7)</td> <td>12.3 (7.1)</td> </tr> <tr> <td>Male</td> <td>6.7 (4.2)</td> <td>5.5 (3.8)</td> <td>12.1 (7.1)</td> </tr> <tr> <td>Female</td> <td>8.1 (4.2)</td> <td>5.5 (3.7)</td> <td>13.2 (7.2)</td> </tr> <tr> <td>Tetraplegic</td> <td>7.0 (4.0)</td> <td>5.9 (3.5)</td> <td>12.7 (6.6)</td> </tr> <tr> <td>Paraplegic</td> <td>6.9 (4.3)</td> <td>5.4 (3.8)</td> <td>12.1 (7.4)</td> </tr> </tbody> </table>				Sample	HADS-A	HADS -D	HADS-total	Total	6.9 (4.2)	5.5 (3.7)	12.3 (7.1)	Male	6.7 (4.2)	5.5 (3.8)	12.1 (7.1)	Female	8.1 (4.2)	5.5 (3.7)	13.2 (7.2)	Tetraplegic	7.0 (4.0)	5.9 (3.5)	12.7 (6.6)	Paraplegic	6.9 (4.3)	5.4 (3.8)	12.1 (7.4)
Sample	HADS-A	HADS -D	HADS-total																									
Total	6.9 (4.2)	5.5 (3.7)	12.3 (7.1)																									
Male	6.7 (4.2)	5.5 (3.8)	12.1 (7.1)																									
Female	8.1 (4.2)	5.5 (3.7)	13.2 (7.2)																									
Tetraplegic	7.0 (4.0)	5.9 (3.5)	12.7 (6.6)																									
Paraplegic	6.9 (4.3)	5.4 (3.8)	12.1 (7.4)																									
<p><a href="#">Berry &amp; Kennedy</a> 2003</p> <p>Consecutive Series, Psychometric validation study</p>	<p>43 (SCI) in-patients; 38M, 5F; avg. age 42.19±14.6 years</p> <p>Spinal Cord Injury Complete tetraplegia = 13.9%</p>	<p>Needs Assessment Checklist (NAC) and Hospital Anxiety and Depression Scale (HADS) subscale: Psychological Issues (mood subsection) &amp; anxiety (r = -0.709), depression (r = -0.633),</p>	<p><b>Internal consistency:</b> Anxiety: <math>\alpha=0.8463</math> Depression: <math>\alpha=0.8122</math></p>	<p><b>Interpretability:</b> Mean (SD) scores of HADS subscales HADS-Anxiety: 5.14 (4.32) HADS-Depression: 5.51 (4.17)</p>																								

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
National Spinal Cord Injuries Centre, Stroke Mandeville Hospital, UK	Incomplete tetraplegia = 37.2% Complete paraplegia = 23.3% Incomplete paraplegia = 25.6%	and combined scales (r = -0.726) Psychological Issues (Full-Scale) & anxiety (r = -0.501), depression (r = -0.466), and combined scales (r = - 0.523)  All correlations are significant at P≤.01		
<a href="#">Middleton et al.</a> 2003  Descriptive, correlational study, validation study of a new instrument  Moorong Spinal Unit of the Royal Rehabilitation Centre Sydney, Sydney, New	Sample 1: People with SCI living in the community who previously were at in- patient rehabilitation <ul style="list-style-type: none"> <li>- N=36, 28 male</li> <li>- Mean age 36.33 (SD = 9.52)</li> <li>- Mean time post-trauma 11.23 (SD = 9.67) years</li> <li>- 11 paraplegia,</li> </ul>	Spearman correlations of Moorong Self- Efficacy Scale with (Sample 1 only, N=36): <ul style="list-style-type: none"> <li>- HADS anxiety: - 0.58 (P&lt;0.001)</li> <li>- HADS depression: - 0.58 (P&lt;0.001)</li> </ul>		



<b>Author Year Research Design Setting (country)</b>	<b>Demographics and Injury Characteristics of Sample</b>	<b>Validity</b>	<b>Reliability</b>	<b>Responsiveness Interpretability</b>
South Wales, Australia.	25 tetraplegia - 15 incomplete, 21 complete  Sample 2: People who had recently sustained a SCI and were currently enrolled at in-patient rehabilitation - N=31, 23 male - Mean age 31.48 (SD = 10.46) - Mean time post-trauma 2.01 (SD = 2.50) months - 21 paraplegia, 10 tetraplegia - 13 incomplete,			

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
	<p>18 complete Sample 3: People with SCI living in the community who previously were at in-patient rehabilitation</p> <ul style="list-style-type: none"> <li>- N=108, 30 male</li> <li>- Mean age 45.26 (SD = 15.99)</li> <li>- Mean time post-trauma 7.92 (SD = 9.83) years</li> <li>- 66 paraplegia, 42 tetraplegia</li> <li>- 58 incomplete, 49 complete</li> </ul>			
<p><a href="#">Kreuter et al.</a> 1996</p>	<p>SCI n= 75 (64 male, 11 female) Mean age: 33 years (range 19-76)</p>	<p>Pearson's r correlations: <u>Sexual Adjustment (SAS) Scale &amp; HADS:</u></p>		

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
Controlled survey  Postdischarge community setting	Control n= 155 (119 male, 36 female) Mean age: 30 years (range 19-79)  38% tetraplegia Frankel A, B, or C 12% tetraplegia Frankel D 32% paraplegia Frankel A, B, or C 18% paraplegia Frankel D	SCI persons: r= -0.49, (P<.001) Controls: r=-0.29, (P<.001)  <u>Emotional Quality of the Relationship &amp; HADS:</u> SCI persons: r=-0.38 (P<.01) Controls: r=-0.38 (P<.001)		

**Research Summary – Hospital Anxiety and Depression Scale (HADS) – Mental Health - Cross-cultural Validation Studies**

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p><a href="#">Mangold et al.</a> 2024</p> <p>Psychometric study to translate and explore the data completeness, targeting, reliability and aspects of validity of the <b>Swedish version of s-MSES</b></p> <p>Community rehabilitation program</p>	<p><b>N = 92 program participants</b> 58M, 24W Median (IQR) age 47.0 (27.5) years Median (IQR) time since injury 1 (2) years Cause of injury: Traumatic (n = 75), non-traumatic (n = 17) Level of injury: Tetraplegia (n = 48), paraplegia (n = 44) Completeness of injury: Complete (n = 37), incomplete (n = 54) Exclusion criteria: ventilator dependent and full-time wheel power chair users (high level quadriplegics)- results are not generalizable</p>	<p>Statistically significant and negative correlation was found between the s-MSES total score and HADS (<math>r_s = -0.58, p &lt; 0.001</math>), for social function subscale and HADS (<math>r_s = -0.36, p &lt; 0.05</math>), for general subscale and HADS (<math>r_s = -0.53, p &lt; 0.05</math>), and personal function subscale (<math>r_s = 0.41, p &lt; 0.05</math>).</p>		

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
	to more severely injured individuals. <b>N = 42 peer mentors</b> 37M, 11W Median (IQR) age 38.0 (18.25) years Median (IQR) time since injury 10 (9.25) years Cause of injury: Traumatic (n = 37), non-traumatic (n = 5) Level of injury: Tetraplegia (n = 10), paraplegia (n = 32) Completeness of injury: Complete (n = 21), incomplete (n = 20)			
<a href="#">Gounelle et al.</a> 2022  Cross-sectional study to adapt <b>MSES in the French language</b> and	<b>Validity study:</b> N = 201 participants with SCI in the initial phase of in-patient rehabilitation- results cannot be applied to those in later rehabilitation, out-patients, or community dwellers.	<b>Construct validity:</b> Persons with high scores in the Participation Self-Efficacy dimension tend to have a good feeling self-efficacy (GSE Rho = .65, p<0.001) and exhibit less depressive affects		

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p>determine its psychometric proprieties</p> <p>Six Physical Medicine and Rehabilitation centers in France</p>	<p>157M, 44F Mean (SD) age 48 (14) years. Level of injury: Quadriplegia (n = 83), paraplegia (n = 118). Time since injury: &lt; 1 year (n = 52), 1-10 years (n = 58), &gt; 10 years (n = 88). AIS: AIS A (n = 114), AIS B (n = 17), AIS C (n = 29), AIS D (n = 38), AIS E (n = 1). Etiology: Medical (n = 53), traumatic (n = 148).</p>	<p>(HADS-Depression score Rho = 0.62, p&lt;0.001).</p>		
<p><a href="#">Paker et al.</a> 2013</p> <p>Reliability study of <b>Turkish HADS</b></p> <p>An outpatient clinic of a hospital between Jan 1,</p>	<p>N=175, 143 male Mean age 35, SD=13 Mean time since injury = 17mth, SD=33 AIS-A/B/C/D: 81/27/45/22 Paraplegia/Tetraplegia : 131/44 SCI caused by falls: 47.4%; MVA: 36.6%</p>		<p><b>Internal consistency:</b> Cronbach's alpha: Anxiety subscale: 0.90 Depression subscale: 0.77</p>	

Reviewer ID: Jane Hsieh, Tyra Chu, Carlos L. Cano, Elsa Sun

Last updated: August 14th, 2024

<b>Author Year Research Design Setting (country)</b>	<b>Demographics and Injury Characteristics of Sample</b>	<b>Validity</b>	<b>Reliability</b>	<b>Responsiveness Interpretability</b>
2010, and Feb 28, 2011				