

Research Summary – Impact on Participation and Autonomy Questionnaire (IPAQ) – Community Reintegration

| Author Year Research Design Setting (country) | Demographics and Injury Characteristics of Sample | Validity | Reliability | Responsiveness Interpretability |
|--|---|--|-------------|---|
| <p>Noonan et al. 2010a <i>“Comparing the validity...”</i></p> <p>Retrospective review with follow up</p> <p>Vancouver General Hospital Spine Program between 2000 and 2005</p> | <p>N=545 participants Age range: 21-90y Mean (SD) age: 51.1 (16.6)</p> <p>N=145 SCI participants 79 men mean (SD) age: 48.7 (17.4)</p> <p>For the overall (N=545) group with spinal conditions, subgroups are: SCI (n=145) Spinal column fracture (n=187) Spinal degenerative disease (n=213)</p> <p>For the 145 SCI participants, there were: 42 AIS A</p> | <p>Relationships between the participation domains and other study variables were hypothesized to assess known-group validity. The study variables assessed were motor score (SCI group), traumatic vs non-traumatic injury (SCI group), level of spinal injury, presence of back pain, age and gender. The known-group validity indices (number of hypotheses supported/ number of hypotheses tested) was 95% (20/21)</p> <p>Item intra-domain correlation range (the correlation between</p> | | <p>Floor/ceiling effect: Ceiling effects for the IPAQ subscales in people with spinal conditions (details above). % patients with best possible score: Autonomy Indoors = 49.5% Family Role = 29.4% Autonomy Outdoors = 31.0% Social life and relationships = 41.1% Work and Education = 38.2%</p> <p>Interpretability: Overall mean(SD) IPAQ Subscale scores in people with spinal conditions (details above):</p> |

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| | 15 AIS B 18 AIS C 24 AIS D | the item and the total score of that domain): Autonomy Indoors: 0.73-0.88 Family Role: 0.66-0.87 Autonomy outdoors: 0.84-0.89 Social life & relationships: 0.60-0.83 Work & Education: 0.81-0.92 Item inter-domain correlation range (the correlation between the item and the other 4 domains): Autonomy Indoors: 0.52-0.71 Family Role: 0.55-0.80 Autonomy outdoors: 0.65-0.80 Social life & relationships: 0.45-0.70 | | Autonomy Indoors: 0.55 (0.77) Family Role: 0.99 (0.97) Autonomy Outdoors: 1.14 (1.14) Social life and relationships: 0.62 (0.70) Work and Education: 0.99 (1.12) SEM IPAQ subscale scores: Autonomy Indoors: 0.25 Family Role: 0.30 Autonomy Outdoors: 0.42 Social life and relationships: 0.28 Work and Education: 0.35 MDC IPAQ subscale scores: |

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| | | Work & Education: 0.61-0.80 | | Autonomy Indoors: 0.70 Family Role: 0.83 Autonomy Outdoors: 1.18 Social life and relationships: 0.76 Work and Education: 0.96 |
| <p>Noonan et al. 2010b <i>“Comparing the reliability...”</i></p> <p>Retrospective review</p> <p>Vancouver General Hospital Spine Program between 2000 and 2005</p> | <p>N=545 participants Age range: 21-90y Mean (SD) age: 51.1 (16.6)</p> <p>N=145 SCI participants 79 men mean (SD) age: 48.7 (17.4)</p> <p>For the overall (N=545) group, subgroups are: SCI (n=145) Spinal column fracture (n=187)</p> | | <p>Internal consistency: Cronbach’s alpha for: Autonomy Indoors: 0.94 Family Role: 0.95 Autonomy Outdoors: 0.95 Social life and relationships: 0.90 Work and Education: 0.96</p> <p>Test-retest, Inter- rater, Intra-rater: 10-day interval test- retest ICC for:</p> | |

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| | <p>Spinal degenerative disease (n=213)</p> <p>For the 145 SCI participants, there were:</p> <p>42 AIS A 15 AIS B 18 AIS C 24 AIS D</p> | | <p>Autonomy Indoors: 0.84 Family Role: 0.88 Autonomy Outdoors: 0.85 Social life and relationships: 0.83 Work and Education: 0.86</p> | |
| <p>Lund et al. 2007 <i>"Impact on Participation..."</i></p> <p>Cross sectional, to evaluate aspects of internal scale validity, in terms of unidimensionality, reliability of the Swedish version of the IPA by using the</p> | <p>N = 161 Male = 101 Female = 60</p> <p>Mean Age = 52</p> <p>Paraplegia = 100 Tetraplegia = 61</p> | <p>"The combined results of the goodness-of-fit evaluation and the principal component analysis revealed that the IPA-S when used to evaluate persons with SCI, is comprised of 2 unidimensional scales (perceived participation scale and problems with participation scale). The final perceived participation scale (after removal of the misfitting items) had</p> | | <p>Floor/ceiling effect: Notable floor (12 persons) and ceiling (15 persons) effects in the problems with participation scale - in accordance with this, the test information function and SEs for persons indicated insufficient sensitivity. Low sensitivity was not apparent with the perceived participation scale – slight ceiling effects were noted with 6</p> |

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| <p>Rasch rating scale analysis.</p> <p>Participants were identified from a database at a SCI rehab unit in Sweden.</p> | | <p>27 items and the final perceived problems with participation scale had 6 items.” (p.161)</p> <p>The hierarchy of items can also be considered to support the construct validity of the scale.</p> | | <p>persons. In contrast the perceived problems scale may only be sensitive enough to identify those with and without perceived problems (or with mild vs. severe problems)</p> <p>Note: 161 participants so this doesn't really meet our qualification for ceiling/floor effects - >20% subjects have the highest or lowest score</p> |
| <p>Sibley et al. 2006</p> <p>A validation study of an English version of the IPA. Cross-sectional with a test-</p> | <p>N = 213 (SCI = 42, MS = 60, Rheumatoid arthritis = 51, General practice = 60) Male = 89 Female = 124 Median age = 54</p> | <p>Confirmatory Factor Analysis: expectations were tested with respect to the number of factors (5 – autonomy indoors, family role, autonomy outdoors, social life and relationships, work and education),</p> | <p>Internal consistency: Cronbach's α for: Indoor Autonomy = 0.94 Family Role = 0.90 Outdoor Autonomy = 0.91</p> | <p>Interpretability: SCI sample (Outpatients): median (IQR) score</p> |

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| <p>retest subsample.</p> <p>Outpatients clinics and people's homes. In the UK.</p> | <p>Those with SCI: n = 42 Median age = 44</p> | <p>which items reflect the given factors, and whether these factors are correlated. Chi-square = 14.51, P=.01 Root-mean-square error of approximation = 0.10 Normed Fit Index = 0.98; Comparative Fit Index = 0.99</p> <p>Correlations between the IPAQ and other instruments (Note: on the IPAQ higher scores denote poorer autonomy):</p> <p>IPAQ Autonomy Indoors with London Handicap Scale's: Mobility (M) = -0.63; Physical Independence (PI) = -</p> | <p>Social life and relationships = 0.86 Work and education = 0.90</p> <p>Item to total correlations: Indoor Autonomy range = 0.73 – 0.89 Family role range = 0.73 – 0.84 (except item 4a = 0.34) Outdoor Autonomy range = 0.69 – 0.83 Social life and relationships range = 0.52 – 0.76 Work and education range = 0.52 – 0.77</p> <p>Test-retest, inter-rater, intra-rater: For all items, weighted kappa statistics were greater than 0.60, range was 0.64 – 0.92.</p> | |

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| | | <p>0.68; Occupation (Oc) = -0.60; Social integration (SI) = -0.52; Orientation (O) = -0.33; Economic self-sufficiency (Ess) = -0.31.</p> <p>IPAQ Autonomy Indoors with Functional Limitations Profile's:</p> <p>Household Management (HM) = 0.63; Social Integration (SI) = 0.62</p> <p>Emotion (E) = 0.43</p> <p>IPAQ Autonomy Indoors with SF-36's:</p> <p>Physical Health Component (PHC) = -0.57; Mental Health Component (MHC) = -0.43</p> <p>IPAQ Family Role with London Handicap Scale's:</p> | <p>At the subscale level, 2-wk interval test-retest ICC for:</p> <p>Indoor Autonomy = 0.95</p> <p>Family role = 0.97</p> <p>Outdoor Autonomy = 0.97</p> <p>Social life and relationships = 0.94</p> <p>Work and education = 0.91</p> | |

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| | | <p>M = -0.59; PI = -0.64; Occ = -0.70; SI = -0.63; O = -0.38; Ess = -0.37.</p> <p>IPAQ Family Role with Functional Limitations Profile's: HM = 0.62; SI = 0.66; E = 0.50</p> <p>IPA Family Role with SF-36's: PHC = -0.68; MHC = - 0.42</p> <p>IPAQ Autonomy Outdoors with London Handicap Scale's: M = -0.68; PI = -0.69; Occ = -0.74; SI = -0.62; O = -0.29; Ess = -0.33.</p> <p>IPAQ Autonomy Outdoors with Functional Limitations Profile's: HM = 0.65; SI = 0.66; E = 0.45</p> | | |

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| | | <p>IPAQ Autonomy Outdoors with SF-36's: PHC = -0.65; MHC = -0.45.</p> <p>IPAQ Social Life and Relationships with London Handicap Scale's: M = -0.48; PI = -0.50; Occ = -0.51; SI = -0.58; O = -0.32; Ess = -0.38.</p> <p>IPAQ Social Life and Relationships with Functional Limitations Profile's: HM = 0.46; SI = 0.53; E = 0.45</p> <p>IPAQ Social Life and Relationships with SF-36's: PHC = -0.46; MHC = -0.43.</p> <p>IPAQ Work and Education with</p> | | |

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|---|--|--|-------------|------------------------------------|--------------|---------------------|---|------------------|----------------|----|-------------|----------------|----|-------------------|----------------|----|-----------------------------|----------------|----|------------------|----------------|----|
| | | London Handicap Scale's: M = -0.50; PI = -0.43; Occ = -0.51; SI = -0.41; O = -0.19; Ess = -0.38. IPAQ Work and Education with Functional Limitations Profile's: HM = 0.50; SI = 0.42; E = 0.44 IPAQ Work and Education with SF-36's: PHC = -0.49; MHC = -0.40. | | | | | | | | | | | | | | | | | | | | |
| | Table 1. <table border="1" data-bbox="474 1057 1205 1422"> <thead> <tr> <th data-bbox="474 1057 732 1094">IPAQ domain:</th> <th data-bbox="732 1057 1094 1094">Median (IQR) score:</th> <th data-bbox="1094 1057 1205 1094">N</th> </tr> </thead> <tbody> <tr> <td data-bbox="474 1094 732 1167">Autonomy indoors</td> <td data-bbox="732 1094 1094 1167">0.29 (0.1-1.2)</td> <td data-bbox="1094 1094 1205 1167">42</td> </tr> <tr> <td data-bbox="474 1167 732 1205">Family role</td> <td data-bbox="732 1167 1094 1205">1.14 (0.6-1.6)</td> <td data-bbox="1094 1167 1205 1205">41</td> </tr> <tr> <td data-bbox="474 1205 732 1278">Autonomy outdoors</td> <td data-bbox="732 1205 1094 1278">1.20 (0.7-2.0)</td> <td data-bbox="1094 1205 1205 1278">42</td> </tr> <tr> <td data-bbox="474 1278 732 1351">Social life & relationships</td> <td data-bbox="732 1278 1094 1351">0.58 (0.2-1.2)</td> <td data-bbox="1094 1278 1205 1351">42</td> </tr> <tr> <td data-bbox="474 1351 732 1422">Work & Education</td> <td data-bbox="732 1351 1094 1422">0.92 (0.4-1.8)</td> <td data-bbox="1094 1351 1205 1422">16</td> </tr> </tbody> </table> | | | | IPAQ domain: | Median (IQR) score: | N | Autonomy indoors | 0.29 (0.1-1.2) | 42 | Family role | 1.14 (0.6-1.6) | 41 | Autonomy outdoors | 1.20 (0.7-2.0) | 42 | Social life & relationships | 0.58 (0.2-1.2) | 42 | Work & Education | 0.92 (0.4-1.8) | 16 |
| IPAQ domain: | Median (IQR) score: | N | | | | | | | | | | | | | | | | | | | | |
| Autonomy indoors | 0.29 (0.1-1.2) | 42 | | | | | | | | | | | | | | | | | | | | |
| Family role | 1.14 (0.6-1.6) | 41 | | | | | | | | | | | | | | | | | | | | |
| Autonomy outdoors | 1.20 (0.7-2.0) | 42 | | | | | | | | | | | | | | | | | | | | |
| Social life & relationships | 0.58 (0.2-1.2) | 42 | | | | | | | | | | | | | | | | | | | | |
| Work & Education | 0.92 (0.4-1.8) | 16 | | | | | | | | | | | | | | | | | | | | |

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| <p>Lund et al. 2005</p> <p>Cross-sectional</p> <p>Not specified</p> | <p>N=161 (63 male, 37 female) Mean age=52±18.2 years</p> <p>62% Paraplegia 38% Tetraplegia</p> | <p>Perceived Participation in Domain & Perceived problems with participation in items:</p> <p>Autonomy Indoors: r=0.34-0.59 (P=.01) Family Role: r=0.31-0.65 (P=.01) Autonomy Outdoors: r=0.33-0.69 (P=.01) Social Relationships: r=0.24-0.51 (P=.01) Work and Education: r=0.16-0.71 (P=.01, except Mobility, Self-Care, Family Role and Social Relations, P=.05)</p> | <p>Separation reliability was evaluated in terms of whether the items separated persons into distinct levels of participation. For perceived participation scale, the person separation index was 4.14 (separation reliability = 0.94), indicating that the distribution of persons could be separated into 5 statistically distinct levels. For perceived problems scale, the separation of the persons was 2.13 (separation reliability = 0.82). This indicated that the person distribution</p> | |

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| | | | could be separated into at least 3 statistically distinct strata. | |
| <p>Cardol et al. 2001</p> <p>Cross-sectional with a test-retest subsample</p> <p>2 rehabilitation centers and the rehabilitation department of an academic hospital</p> | <p>N=126 (48 male, 78 female) Mean age=52.6±13.4 years</p> <p>N=75 for test-retest</p> <p>31 Neuromuscular disease, 25 Rheumatoid arthritis, 22 Fibromyalgia, 27 Stroke, 21 SCI</p> | <p>Varimax rotation with a four-factor solution showed the factors could best be interpreted according to the following domains of participation: autonomy indoors, family role, autonomy outdoors and social relations. With this factor solution, 67% of the total variance could be explained, with 43% explained by autonomy indoors. The instrument was updated to represent these results, while adding “work and educational opportunities” as a fifth domain.</p> | <p>Internal consistency: Autonomy indoors: $\alpha=0.91$ Family role: $\alpha=0.90$ Autonomy outdoors: $\alpha=0.81$ Social relations: $\alpha=0.86$ Work & educational opportunities: $\alpha=0.91$</p> <p>Test-retest, Inter-rater, Intra-rater: Weighted kappa (K_w) Perceived participation score $K_w = 0.56-0.90$ Problem-experience score $K_w = 0.59-0.87$</p> | |

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| | | <p><i>Correlations (Pearson's product-moment) of the IPAQ with instruments measuring a similar construct:</i></p> <p>IPAQ & London Handicap Scale (LHS): IPAQ Social relations domain & LHS Social Integration domain: $r=-0.51$</p> <p>IPAQ Autonomy Outdoors domain & LHS Social Integration domain: $r=-0.57$</p> <p>Correlations between autonomy indoors, autonomy outdoors and family role (IPAQ) & mobility, occupation and physical independence (LHS) range from $r=-0.42$ to -0.57.</p> | <p>Autonomy Indoors: ICC=0.87</p> <p>Family Role: ICC=0.83</p> <p>Autonomy Outdoors: ICC=0.91</p> <p>Social Relations: ICC=0.89</p> | |

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| | | <p>Correlations between autonomy indoors, family role and autonomy outdoors (IPAQ) and physical domain of SF-36 range from $r=-0.43$ to -0.51.</p> <p><i>Correlations of the IPAQ with other instruments measuring different constructs:</i></p> <p>Correlations between all domains of IPAQ and domains orientation and economic self-sufficiency range from $r=-0.1$ to -0.29.</p> <p>Social Relations (IPAQ) & Physical Domain SF-36: $r=-0.26$</p> | | |

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| | | Social Relations (IPAQ) & Physical Domain SIP: r=0.16 | | |
| <p data-bbox="239 824 415 889">Cardol et al. 1999</p> <p data-bbox="212 943 441 976">Cross-sectional</p> <p data-bbox="243 1027 409 1125">Outpatient clinic of a hospital</p> | <p data-bbox="474 532 772 675">N=100 (43 male, 57 female) Mean age=47.9±14.6 years</p> <p data-bbox="474 727 804 967">28 Neuromuscular disease, 4 MS, 2 AIDS, 6 Diabetes mellitus, 3 SCI, 30 Traumatic hand injury, 10 Rheumatic disorder, 4 Stroke, 13 Other</p> | <p data-bbox="835 532 1171 954">Items of the IPAQ were reviewed by experts from various fields: rehab medicine, rehab research, social medicine, clinical epidemiology, MS patient organization, and consumers of rehabilitation treatment with varying disabilities.</p> <p data-bbox="835 1006 1163 1421">Factor analysis with a four-factor solution showed the scale structure could be best interpreted according to the following dimensions: social relationships, autonomy in self-care, mobility and leisure, and family role. This factor solution</p> | <p data-bbox="1197 532 1491 828">Internal consistency: Social relationships: $\alpha=0.86$ Self-care and appearance: $\alpha=0.87$ Family role: $\alpha=0.84$ Mobility: $\alpha=0.86$</p> | |

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| | | explained 68% of the total variance, with 33% being explained by social relationships. | | |

Research Summary – Impact on Participation and Autonomy Questionnaire (IPAQ) – Community Reintegration - Cross-cultural Validation Studies

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| <p>Suttiwong et al. 2013</p> <p>Validation of Thai version of IPAQ.</p> <p>Cross-sectional with a test- retest subsample.</p> <p>Thai community</p> | <p>N=139, 110M 29F Mean age 34.2±8.4 Mean time after injury 10.6±7.1yrs 49 quadriplegia, 90 paraplegia 137 (or more) were traumatic SCIs Wheelchair as primary mobility tool</p> | <p>Spearman’s r of IPAQ (Thai) subdomains with WHOQOL-BREF (Thai) subscales (N=30): IPAQ Autonomy indoors: -0.56~-0.30 IPAQ Family role: - 0.36~-0.55 IPAQ Autonomy outdoors: -0.49~-0.65 IPAQ Social life and relationships: -0.33~- 0.40 IPAQ Work and education: -0.33~-0.37</p> | <p>Internal consistency: Cronbach’s alpha (N=139): Total score: 0.95 Subdomains: 0.86- 0.80</p> <p>Test-retest, Inter- rater, Intra-rater: 2-wk interval test- retest ICC (N=30): Total score: 0.93 Subdomains: 0.74- 0.92</p> | |