

RELIABILITY AND VALIDITY OF PSYCHOSOCIAL IMPACT OF ASSISTIVE DEVICES SCALE IN SPINAL CORD INJURY

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Abstract:

Objective: Psychosocial Impact of Assistive Devices scale designed to assess the effects of assistive device on functional independence, well-being and quality of life. The objective of this study is to find the test-retest reliability and construct validity in individuals with spinal cord injury.

Study Design: Methodological design

Setting: ISIC Institute of Rehabilitation Sciences

Method: A convenient sample of twenty-seven spinal cord injury subjects was recruited after being assessed for inclusion and exclusion criteria. A duly signed consent was taken prior to the study and demographic data of the subject was collected. Subjects completed Psychosocial Impact of Assistive Devices Scale (PIADS) at baseline and three scales (PIADS, QUEST and Bofi-SCI) were administered again after a week interval.

Results: The result for test-retest reliability showed a strong positive correlation with ICC=0.9 **. Construct validity was also assessed and moderately strong negative correlation was found between PIADS and QUEST (r= -0.6 *) and weak negative correlation was found between PIADS and Bofi-SCI (r=0.1)

Conclusion: PIADS is a highly reliable and valid tool to assess the effect of assistive device on quality of life in individuals with spinal cord injury.

Keywords: Spinal Cord Injury, assistive device, quality of life, reliability, validity

1. Introduction:

The spinal cord injury is a condition that affects nearly one out of every 1000 people each year and represents one of the leading causes of disability worldwide.¹ It affects all aspects of subject's life including the physical, behavioural, psychological and social functioning.²

Anxiety and depression have a considerable impact on functioning in daily activities. Severe depressive episodes can cause health problems such as loss of weight, social problems such as loss of job and financial problems. Depressed spinal cord injury subjects spend more hours in bed, less time out the house need more medical attention and nursing than non-depressed spinal cord injury patients.³ Spinal cord injury often affects a person's ability to perform critical activities of daily living and can negatively affect his or her quality of life.

Technological advances of the last two decades have favored the increasing use of assistive technology devices by people living with impairments.⁴ Assistive technology aims to augment function for individuals with disability to increase their ability to perform activities of daily living and interact with environment.⁵ A great number of assistive devices are available to help overcome or bypass the effect of high spinal cord lesions. From functional point of view the device themselves fall into one or more of four categories: mobility (wheelchairs), manipulation (page turner, robotic arms), communication (keyboard emulators, voice processors) and control of environment.⁶ Assistive technology often available at modest cost, can help individuals with spinal cord injury to compensate for functional limitations, overcome barriers to employability, enhance technical capacities and computer utilization and improve ability to compete for gainful employment and enhance their quality of life.⁷ Experiences of individuals with disabilities in using assistive devices has been relatively neglected and only a small body of knowledge exists, concerning the personal meaning assigned to such devices in daily living. They serve to resolve deficiencies and they also highlight the deficiency.⁸

To obtain a clearer understanding of psychosocial factors faced by subjects after spinal cord injury and to better assess the impact on assistive device on quality of life, a standardized assessment tool is essential.¹⁰ A number of generic and disease-specific "quality of life" measurement scale that are available cannot be used because they are designed to assess health status or change in health status, and not the impact attributable to any particular form of intervention. In any event assistive technology is meant to achieve different quality of life outcomes than surgery, physical therapy and pharmaceutical treatments.¹¹

Psychosocial Impact of Assistive Devices Scale is a 26-item self-report questionnaire which assesses the effects of assistive device use on functional independence, well-being and quality of life. It is divided into three sub-scales: Competence (12 items), Adaptability (6 items) and Self-esteem (8 items). The scale is 7 point ordinal scale. The questionnaire generally takes 5-10 minutes to complete. The PIADS is a sensitive measure of the impact of a wide range of assistive devices, in people who have various forms of disability and medical condition.¹² The PIADS may also be used to assess a respondent's expectations of device impact (i.e., anticipated impact, prior to using the device).¹¹ There are 5 background forms designed to help put PIADS scores in context of assistive device related clinical and technical information. There are forms for each of the following types of device: Environment Control Units (ECU); Mechanical Ventilators; Voice Output Communication Aids (VOCA); and Wheelchairs; Writing Aids.¹¹ The goal of this study is to find out the reliability and validity of Psychosocial Impact of Assistive Devices Scale in subjects with spinal cord injury.

2. Methods:

A methodological research design is to be used in this study. From a convenient sampling method, twenty seven subjects with spinal cord injury who met inclusion criteria and were willing to provide their informed consent were recruited from the Indian Spinal Injuries Centre, VasantKunj, New Delhi. This study was approved by the institute's Research Review and Ethical Committee. The inclusion criteria to select the subjects with spinal cord injury, Age 18-65 years⁸, Subjects with traumatic or Non-traumatic SCI⁵, ASIA- A/B/C/D⁸, Subjects using any one of the assistive devices evaluated in PIADS, Those who understand English and willing to participate and give informed consent.

Subjects diagnosed with any psychiatric illness and traumatic brain injury⁸, any cardiac or medical illness which may impact outcome of PIADS, and any cognitive impairment which can hamper implementation of PIADS were excluded. The demographic data of the subjects were collected.

Table 5.1: Demographic Details of Sample (n= 27)

Variables	Mean ± SD		
Age	31.15 ± 10.03		
Time since injury (months)	10.56 ± 6.90		
Gender		Frequency	Percentage (%)
	Male	18	66.67
	Female	9	33.33
Cause of Injury			
	Traumatic	20	74.07
	Non- Traumatic	7	25.93
ASIA			
	A	5	18.52
	B	11	40.74
	C	9	33.33
	D	2	7.41
Type of Injury			
	Complete	16	59.26
	Incomplete	11	40.74

Test-retest reliability:

It was calculated using Pearson correlation. The total score for test 1 and 2 for 26 items were correlated. Using SPSS version 22 data analysis was done and it shows a significant and strong positive correlation with ICC= 0.957 was found between PIADS scale administration across a week's time interval.

Table 5.2 Intraclass Correlation Coefficient of PIADS scale

Variable	ICC
T1 Vs T2	0.957**
Variable	ICC
T1 Vs T2	0.957**

Construct validity:

A significant and moderately strong correlation of -0.357 was found between PIADS scale and QUEST scale. The results were not significant and showed weak correlation of 0.176 was found between PIADS scale and Bofi-SCI scale.

Table 5.3 Construct Validity (n=27)

Scales	Quest	Bofi-Scale
Psychosocial Impact of Assistive Devices Scale (PIADS)		
Pearson correlation	r= -.357**	r = 0.176
P value	p<0.001	p =0.401

4. Discussion:

The objective of the study was to do the reliability and validity analysis of the PIADS scale to check whether the scale is reliable and valid in individuals with spinal cord injury.

Test-retest reliability of PIADS total score was established (ICC= 0.957) in individuals with spinal cord injury and the results obtained from the original version of PIADS that has been tested on individuals with disabilities and it reported excellent internal consistency (ICC= 0.95) Jutai et al.¹¹

In this study we examined the correlation between Quebec User Evaluation of Satisfaction with Assistive Devices and PIADS scale and it showed moderate negative correlation between two measures of assistive devices. The negative correlation suggest that participants who reported the most problematic impact of assistive device (most negative score) also tended to report greater impact of assistive devices psychosocially. In some previous researches we found construct validity was examined using a Principal Component Analysis of the data .the results yielded three subscales, accounting for 61.1% of the total variance. The pearson correlation coefficients were significant at the 0.05 level between the PIADS scale.²¹

The divergent validity of PIADS scale has been established in this study by evaluating correlation between PIADS and Bofi-SCI. In this study, we found no significant correlation between these two measures. This lack of relationship suggested that scales of different constructs has been used and Bofi-SCI that is used to study the body illusions and images after SCI cannot capture the impact of assistive devices on quality of life on individuals with SCI.

There is limited research exists on the role of psychosocial factors in the perception of assistive technology. Most of the psychosocial research related to assistive technology focus on perceived psychological factors severity and interference with physical activities There are various self reported measures of assistive technology available that show impact of assistive devices in individuals with disability but no scale has been validated to assess the beneficial and problematic effect of assistive devices in individuals with spinal cord injury.

This study was conducted to find the reliability and validity of PIADS scale in individuals with SCI. The utility of the PIADS is that it can predict at a significant statistical level the retention or abandonment of assistive devices, resulting saving the time and stress in individuals with SCI has been studied in this study.

Clinical Implications:

PIADS will help to measure the psychosocial impact of assistive devices. We can evaluate psychosocial factors of affecting use of assistive devices that will enable us take measure to improve level of acceptance and learning how to use the device to improve quality of life. This study helps to provide the reliability and validity analysis of PIADS scale in individuals with spinal cord injury.

As it is a self reported measure of impact of assistive devices, it will also help the subjects to better understand the psychosocial factors that might determine device adoption and retention and discontinuance outcomes.

With the psychometric properties of the scale, now this scale can be easily used in clinical settings. This instrument will support both clinical practice and research purposes.

Limitations of the study:

1. Convenience sample was used.
2. The study is limited to subjects who comprehend English language only.

Future recommendations:

1. Other psychometric properties of the scale (criterion validity, inter and intra rater reliability can be establish)
2. Future studies must focus to evaluate the concurrent validity.
3. Future studies must also focus on convergent validity evaluation of PIADS using other assistive technology scales that has been validated in assessing quality of life in SCI.

Conclusions:

PIADS scale was originally developed for individuals who have physical and sensory disabilities. This study showed that this scale has very good test-retest reliability and strong correlation with other measure of assistive technology. This study also showed that PIADS scale showed a strong correlation and good consistency across a period of time thus making it a reliable tool. Thus the result of the data analysis of the study justified the hypothesis.

The PIADS is a self-reported scale for impact of assistive technology that measure both positive and negative effect of assistive technology on functional independence, well being and quality of life. It addresses various areas of self-esteem, adaptability and competence which is essential to better understand the psychosocial factors that might determine device adoption, retention and abandonment and it is also help clinicians to devise appropriate plan of intervention and provide an insight to patient about the impact of assistive technology on their life.

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