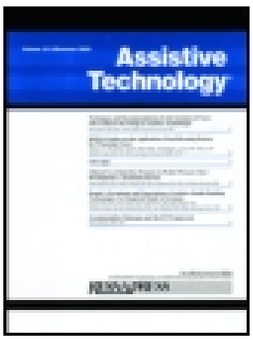

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The Psychosocial Impact of Assistive Device Scale: Italian validation in a cohort of nonambulant people with neuromotor disorders

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Abstract

The importance of adaptive seating system on body structure and function is widely accepted, but its impact on psychosocial aspects needs more consideration by health professionals. This article describes the Italian validation of the Psychosocial Impact of Assistive Device Scale (IT-PIADS) for non-ambulant people with neuromotor disorders.

Once agreement has been given by the original authors, the scale was translated and adapted to the Italian culture. The IT-PIADS was administered to different wheelchairs users with heterogeneous diagnosis. The internal consistency and test-retest reliability were examined. Its concurrent validity was evaluated with the Italian version of the WheelCon-M-SF.

The IT-PIADS was administered to 87 subjects. Cronbach's α was 0.92 ($p < 0.05$), and the testretest reliability (ICC) for competence, adaptability and self-esteem subscales were 0.96, 0.90, 0.93 respectively. The Pearson correlation coefficient of the IT-PIADS with the WheelCon-M-I-SF scores showed significant data for competence and adaptability subscales.

Psychosocial perception on assistive devices can be reliably measure. The IT-PIADS showed good psychometric properties and it is possible to confirm its validity for clinical and research purposes. Nevertheless, before using this measure with greater confidence, further psychometric properties tests of the IT-PIADS are recommended.

Keywords: psychosocial, assistive technology, outcome measure (health assessment), validation, Italian, PIADS

Assistive devices and technology (ADT) is any form of external tool specially designed and produced or generally available, whose primary purpose is to maintain or improve an individual's functioning and independence, to facilitate participation, and to enhance overall well-being (WHO, 2014). Even though the effectiveness of ADT is widely accepted, around the world a high rate of non-use is registered (Cruz, Emmel, Manzini, & Braga Mendes, 2016; Wessels, Dijcks, Soede, Gelderblom, & De Witte 2003). Instruments and tools help to analyse

factors and to identify potential policies and actions that can improve the accessibility and optimal use of assistive products (WHO, 2017).

Although a number of tools are available, Italian language assessment tools for measuring impact of assistive technology are needed. In Italy 17.9% the people who need ADT declared they do not use them (Federici, Meloni, & Borsci, 2016); abandonment may be due to assignment of inappropriate devices or failure to meet user needs and expectations (Federici, & Borsci, 2016, Federici, & Borsci, 2011). Therefore, a holistic approach is necessarily required in assessing the impact of ADT and psychosocial aspects need more consideration by health professionals. Investigating the psychosocial perception of the ADT users could clarify the reasons why different assistive technologies are abandoned and reduce the risk of inappropriate prescriptions in order to optimize resources of the Italian National Health System.

Therefore, intercepting psychosocial aspects seems crucial to affect the quality of life (QoL) of ADT users, but worldwide these perspectives can differ from each other; consequently it is important to consider also the social and cultural factors of the context where the assessment tool is going to be performed.

The importance of adapting instruments to current research settings is widely documented in international literature (Maher, Latimer, & Costa 2007; Gjersing, Caplehorn, & Clausen 2010) and there is agreement that it is inappropriate to simply translate and use a questionnaire in another linguistic context (Wang, Lee, & Fetzer,2006). The reasons may be different: 1) this allows to fully understand cultural peculiarities of a specific community; 2) the use of validated and cross-cultural adapted instruments increases the certainty with which the instruments

accurately reflect what they are supposed to measure (Laake, Benestad, & Olsen, 2007); 3) it enables comparisons of results across different studies both nationally and internationally (Laake et al, 2007).

The Psychosocial Impact of Assistive Device Scale (PIADS) is a 26-item, self-report questionnaire to assess the effects of an assistive device on functional independence, well-being, and quality of life (Day, 1996). The PIADS is capable of predicting device retention and abandonment (Day, Jutai, Woolrich, & Strong, 2001) in virtue of its ability to intercept also the psychosocial aspects that may influence people's quality of life when using an ADT. A factor analysis divided the PIADS in subscale: 1) Competence (12 items), measures feelings of competence and efficacy; 2) Adaptability (6 items), indicates a willingness to try out new things and to take risks; 3) Self-esteem (8 items), indicates feelings of emotional health and happiness; (Jutai & Day, 2002). The PIADS is validated in different countries such as Canada (Demers, Monette, Descent, Jutai & Wolfson, 2002), Korea (Chae & Jo, 2014), China (Hsieh & Lenker, 2006); it has also followed a cross-cultural adaptation in Puerto Rican ADT users (Orellano & Jutai, 2013 Orellano-Colón, Jutai, Santiago, Torres, Benítez, & Torres, 2016).

The PIADS is a reliable, valid, and responsive measure, with good clinical utility across several populations of device users (Jutai et al, 2002). The assessment tool has a surprisingly good agreement between user self-report and caregiver report of device impact on the user (Jutai, Woolrich, Campbell, Gryfe, & Day, 2000); so it is possible to use the PIADS in developmental disabilities or in other conditions which require a high care-giver support.

Considering the usefulness of the PIADS and its importance in clinical practice, the

purpose of the present study is to cross-cultural adapt and validate the Italian version of the PIADS in a population of ADT users.

Method

To investigate the psychometric properties in the Italian version of the PIADS (IT-PIADS), a cross-sectional study was designed. Once agreement has been given by the original authors, the research protocol was drafted as recommended by international guidelines (Wild et al, 2005). The institutional review board approved the study.

Participants

The pre-established sample size was determined by analysing others validation studies (sample size range 45 – 83 individuals). Therefore a non-probability convenience sample of minimum 70 people were set up. Considering the objective of the present research, both non-ambulant adults and children with neuromotor disorders were included in the cohort. Most common neurological disabilities requiring mobility with ADT were analysed, so patients with stroke, spinal cord injury, Parkinson diseases, cerebral palsy and traumatic brain injury were included. All the participants had to respect the following criteria: have aforementioned neuromotor disorders, age range 6 - 65 years, using the wheelchair in their everyday life activities. Being able to understand instructions in Italian was clinically determined. Moreover, patients, who needed supervision or were unable to follow the instructions recommended by the original study, could be helped or

substituted by their caregivers or guardians in compiling the IT-PIADS. Instead patients with other medical complication (e.g. orthopaedic surgery) were excluded.

Data collection measure

A questionnaire was designed to describe socio-demographic information of the study sample; the data collected regarded age, sex, education level, diagnosis.

To measure concurrent validity of the IT-PIADS, the Italian version of the Wheelchair Use Confidence Scale short form (WheelCon-M-I short form) (Berardi A, et al 2017) was used. The WheelCon-M short form, a 21-item self-report questionnaire, measures the patient's confidence in managing the wheelchair in the physical and social environment. Each item is scored using a 10-point Likert scale ranging from"0"(not confident) to"10"(completely confident) (Rushton, Miller, Lee Kirby, Eng, & Yip, 2011). The WheelCon-M short form resulted to be reliable and a valid tool to assess self-confidence in different wheelchair users (Sakakibara, Miller, & Rushton, 2015; Sakakibara, Miller, Souza, Nikolova, & Best, 2013)

Procedures and data analysis

First the researchers (an occupational therapist, a physical therapist, a neurologist and a physician specialized in rehabilitative medicine) assessed the participants according to the mentioned inclusion criteria. Then, in a synchronized individual face-to-face meeting, the same participants were given a detailed explanation of the study and the consent form to be signed (Galeoto, De Santis, Marcolini, Cinelli & Cecchi, 2016; Galeoto, Mollica, Astorino, & Cecchi,

2015). Finally, all participants were asked to complete a socio-demographic questionnaire followed by the administration of the WheelCon-M-I short form (Berardi et al, 2017) (only for adults because no validation study involved developmental disabilities) and the IT-PIADS, as recommended by the PIADS manual (Day, & Jutai, 2003).

Translation and Cultural Adaptation. The original version of the PIADS was forward-translated into Italian by two health professionals (an occupational therapist and a physician specialised in rehabilitative medicine). Then bilingual experts together (a neurologist, a biomedical engineer, a physiotherapist and an occupational therapist) identified and resolved an inadequate or inappropriate translation by comparing the translated version of the PIADS with the original; the result was a preliminary draft of the scale in the target language. Afterwards, an independent translator whose mother tongue is English translated-back the document. The back-translated version was compared with the original. Finally, in order to optimize the cultural adaptation, the expert panel synthetized the results into a pre-final Italian version of the PIADS (IT-PIADS).

Pilot testing phase. The pre-final version of the IT-PIADS was preliminary applied to 20 adult patients to evaluate cross-cultural validity. To be sure that no clinical changes had occurred, a repetitive administration of the scale was performed in a ranging period of six to eight days. To achieve cross cultural equivalence between the original and the Italian version of the PIADS, semantic domain was analyzed according to participants' recommendations.

Validity and reliability tests phase. To assess intra-rater reliability the same patients were evaluated twice throughout 7-14 days. As recommended by the original, French and

Korean versions the reliability was investigated to adult patients. The intraclass correlation coefficient (ICC) was used to assess test–retest reliability; the scale was considered as stable at the test-retest for ICC >0.70. (Nunually, 1994)

The internal consistency was used to assess the homogeneity of the scale and the interrelatedness of the items. The research group, decided to investigate the internal consistency on the whole study sample. The α coefficient should be at least 0.70. In fact, according to international literature (DeVellis, 1991), values can be interpreted as follows: 0.70–0.79, respectable, 0.80–0.90, very good; a values greater than 0.90 indicate excellent internal consistency.

The concurrent validity (Pearson's Correlation) was evaluated comparing the IT-PIADS score with the values of the Italian version of the Wheelchair Use Confidence Scale short form (WheelCon-M-I short form) (Berardi et al, 2017). This assessment tool does not tap the self-esteem at all, so the concurrent validity of the self-esteem part of the scale has not been investigated.

Considering that no studies explore wheelchair confidence in developmental disabilities, the research group decided to investigate concurrent validity only on adults.

All statistical analysis were carried out by using Statistical Package for Social Sciences.

Results

Between March and September 2017, the participants were recruited from Bambino Gesù Children's Hospital and Policlinico Umberto I University Hospital in Rome. The IT-PIADS was administered to 87 people; the WheelCon-M-I short form was used to assess 28 people of the sample.

Translation and cultural adaptation phase

After the forward and backward translation and the consensus of the expert panel, the translated version of the IT-PIADS was formed. From the analysis of the report it was possible drawing-up the pre-final version of the IT-PIADS.

Pilot testing phase

The prefinal version of the IT-PIADS was administered to 20 adult individuals in March 2017. On the basis of the analysis obtained from the preliminary application, some items were modified to improve comprehensibility and applicability. For example, the word "independence" in Italian is commonly translated as "indipendenza". In Italian, this word also means being economically independent. Participants suggest to translate it with the synonymous "autonomia" which best represents the concept of "Not dependent on, or not always needing help from someone or something" as reported in the manual. Moreover, the semantical equivalence was obtained by modifying grammatical structure of some items; for example "embarrassed" was

first translated with “imbarazzo”. Participants suggest to use the synonymous “disagio” (because more courteous) and to add the substantive “sensazione”. Therefore, for a better comprehension, item 21 was changed to “sensazione di disagio” (feeling embarrassed). From the participants’ observation it was possible to improve the comprehension of the instrument. This led to the latest Italian version of IT-PIADS applied to the entire study population.

Participants

87 subjects (41 F – 46 M) were included in the cross-sectional study. The characteristics are summarized in Table 1.

[INSERT Table 1. Characteristic of the sample]

Validity and reliability tests phase

The Cronbach’s α for the IT-PIADS was 0.92 ($p < 0.01$). The internal consistency showed significant results: item-item correlation was significant with a p value < 0.05, as well as the item-total correlation, as reported in Table 2.

[INSERT Table 2. Item total statistics]

The test-retest reliability was evaluated on 28 subjects. The IT-PIADS showed an ICC of 0.96, 0.90 and 0.93 in Competence, Adaptability and Self-esteem subscales respectively. ICC values are reported in Table 3.

[INSERT Table 3. Test-retest reliability]

The Pearson correlation coefficient of the IT-PIADS and the WheelCon-M-I short form showed significant values for Competence ($p<0.05$) and Adaptability Subscales ($p<0.01$). The results are summarized in Table 4.

[INSERT Table 4. Pearson Correlation Coefficient]

Discussions

The purpose of the present study was to develop the Italian version of the PIADS and to evaluate its reliability and validity. The article also reported the cross-cultural adaptation of the IT-PIADS, that was performed as the original version of the assessment tool.

The original version of the PIADS was translated and culturally adapted into Italian according to international guidelines (Wild et al, 2005). Equivalence between the IT-PIADS with the original version was investigated on semantical domain. Participants' observation allowed to gain cross-cultural validity and proved to be strictly related to the meaning of the original items. This resulted in the final version of the IT-PIADS (see Appendix 1).

Participants of the study were non-ambulant people with neuromotor disorders using an assistive mobility devices (wheelchair). The sample showed heterogeneous characteristics in terms of age and diagnosis, nevertheless the finding demonstrated good psychometric properties of the IT-PIADS.

The test-retest correlation showed significant value for competence (0.96), adaptability (0.90) and self-esteem (0.93) subscales, in line with the original (Day, 1996; Jutai et al, 2002), and also with the Korean (Chae et al, 2014), Chinese (Hsieh et al, 2006) and Canadian (Demers et al 2002) version. This value confirmed a high stability of the scale with a range of good to excellent reliability.

The overall Cronbach's α value of 0.92 is an excellent index of internal consistency and it is comparable to the Chinese (0.95), Korean (0.94), French-Canadian (0.94) and the original (0.95) versions. This finding demonstrates an excellent correlation of the items and high homogeneity of the scale.

The Pearson's Correlation Coefficient of the IT-PIADS demonstrated good concurrent validity. In particular physical subscale of the WheelCon-M-I short form (Berardi et al, 2017) had good correlation with competence and adaptability subscales of the IT-PIADS with a $p<0.005$ and $p<0.001$, respectively. The environment subscale had good correlation with the adaptability subscale of the IT-PIADS for a $p<0.05$. Both Competence and Adaptability sub-scales of IT-PIADS showed a correlation with the overall value of the WheelCon-M-I short form with a $p<0.005$ and $p<0.001$, respectively.

Conclusion

Based on our finding, it is possible to state the IT-PIADS showed good psychometric properties and its usefulness in clinical and research practice. Nevertheless, the present study has some limitations: the heterogeneity and the relative small sample size did not permit to stratify

according to specific diagnoses and to evaluate the differences between the participants. Although the objective of the study was to validate the Italian version of the PIADS in a population of wheelchair users, it would be useful to understand which item is more relevant based on needs and proper characteristics of the patients. In fact, it is possible that psycho-social aspect can differ according to age and lifestyles of the ADT users and consequentially there is the possibility that some items in the scale might work differently across subgroups. Therefore, before using this measure with greater confidence, further psychometric properties tests of the IT-PIADS are recommended.

Disclosure of statement. The authors declare that they have no conflict of interest.

Statement of Human and Animal Rights: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of informed Consent. Informed consent was obtained by all the participants included in the study.

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IT-PIADS: PSYCHOSOCIAL IMPACT OF ASSISTIVE DEVICES SCALE

Cognome: _____ Nome: _____ Genere: □M □ F Diagnosi: _____ Data di Nascita: __ / __ / ____ Ausilio: _____

Il modulo seguente è stato compilato a: □ Domicilio □ Ospedale / Clinica □ Altro _____

Il modulo seguente è stato compilato da: □ il paziente, senza alcun aiuto □ Il paziente, con supporto del caregiver □ il caregiver in sostituzione del paziente □ Altro _____

Ogni voce che segue, descrive come l'utilizzo di un ausilio può influenzare la vita di una persona. Alcune di queste affermazioni potranno sembrare inusuali, ma è importante che Lei risponda ad ognuna delle 26 domande. Per ogni domanda, barri la casella più appropriata indicando quanto l'utilizzo dell'ausilio ha influenzato la Sua quotidianità.

Ha diminuito			Non ha influito	Ha aumentato		
molto	abbastanza	poco		poco	abbastanza	molto
-3	-2	-1	0	+1	+2	+3

1) Competenza □ □ □ □ □ □ □

2) Felicità □ □ □ □ □ □ □

3) Autonomia □ □ □ □ □ □ □

4) Adeguatezza □ □ □ □ □ □ □

5) Confusione □ □ □ □ □ □ □

6) Efficienza □ □ □ □ □ □ □

7) Autostima □ □ □ □ □ □ □

8) Produttività □ □ □ □ □ □ □

9) Sicurezza □ □ □ □ □ □ □

10) Insoddisfazione □ □ □ □ □ □ □

11) Sensazione di Utilità □ □ □ □ □ □ □

12) Fiducia in sé stesso □ □ □ □ □ □ □

13) Abilità □ □ □ □ □ □ □

14) Destrezza □ □ □ □ □ □ □

15) Benessere □ □ □ □ □ □ □

16) Capacità □ □ □ □ □ □ □

17) Qualità di Vita □ □ □ □ □ □ □

18) Prestazione □ □ □ □ □ □ □

19) Sensazione di potere □ □ □ □ □ □ □

20) Sensazione di controllo □ □ □ □ □ □ □

21) Sensazione di disagio □ □ □ □ □ □ □

22) Inclinazione al cambiamento □ □ □ □ □ □ □

23) Partecipazione □ □ □ □ □ □ □

24) Entusiasmo nel provare nuove cose □ □ □ □ □ □ □

25) Capacità di adattarsi alle attività di vita quotidiana □ □ □ □ □ □ □

26) Capacità di cogliere nuove opportunità □ □ □ □ □ □ □

Table 1. Characteristic of the sample

Age (mean ± SD years)	33.25 ±24.16
Gender	n (%)
Female	41 (47.1)
Male	46 (52.9)
Diagnosis	n (%)
Stroke	5 (5.7)
Spinal Cord Injury	25 (28.7)
Parkinson Disease	4 (4.6)
Children with Cerebral Palsy	38 (43.8)
Pediatric Traumatic Brain Injury	15 (17.2)
Education n (%)	n (%)

Primary School	16 (18.4)
Secondary School	37 (42.5)
High School	25 (28.8)
University	9 (10.3)
Form filled out by n (%)	n (%)
Patient	53 (60.9)
Parent / caregiver	34 (39.1)

Table 2. Item-Total Statistics

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1	31,10	275,675	,567	,912
Q2	31,10	281,117	,490	,913
Q3	31,09	279,503	,534	,912
Q4	31,06	279,125	,679	,910
Q5	32,61	303,729	,015	,920
Q6	31,23	281,714	,642	,910
Q7	31,59	279,385	,570	,911
Q8	31,30	271,514	,708	,909

Q9	31,11	279,405	,605	,911
Q10	32,66	307,856	-,090	,923
Q11	30,89	286,987	,443	,914
Q12	31,38	280,331	,544	,912
Q13	31,18	278,780	,693	,909
Q14	31,23	281,598	,638	,910
Q15	31,43	280,945	,503	,913
Q16	31,16	282,276	,684	,910
Q17	30,71	287,509	,511	,913
Q18	30,95	276,882	,746	,909
Q19	31,28	278,388	,665	,910

Q20	31,25	278,912	,649	,910
Q21	32,28	295,714	,179	,919
Q22	31,61	289,101	,398	,914
Q23	30,86	279,376	,632	,910
Q24	31,03	280,755	,560	,912
Q25	30,84	288,276	,514	,913
Q26	31,15	283,850	,601	,911

Table.3 Test-retest reliability

Subscales	Intraclass correlation	Lower Bound	Upper Bound
Competence	0.96	0.90	0.98
Adaptability	0.90	0.78	0.95
Self-esteem	0.93	0.85	0.97
Total	0.91	0.87	0.95

Table 4 Pearson Correlation Coefficient

	Competence	Adaptability
WheelCom Physical	,343*	,463**
WheelCom Environment	,280	,406*
WheelCom Total	,343*	,472**

** Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).