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A proposal for a Programme for power mobility devices (PMD) selection and driving skills training

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Introduction

The identification of a power mobility device (PMD; e.g. power wheelchairs, scooter, balancing wheelchair) is a complex process which requires validated strategies. However, in the Italian context, this process is rarely supported by validated instruments. One of the main barriers to the introduction of validated measures in clinical settings is the possibility to include them in well consolidated practices which are difficult to change. For this reason, too often – and in most clinical contexts – the identification and selection of the most adequate PMD depends almost exclusively on the expertise of the single operator/service. Increasingly, professionals in the field of rehabilitation are requested to employ validated tools in any phase of the service delivery process,¹ from the identification and selection of the device to the evaluation of the outcomes of the intervention.

The current research was conducted at the Regional Centre for Assistive Technology (Centro Regionale Ausili [CRA]) in Bologna, Italy. The objective of the research was to identify a set of internationally validated instruments and a training circuit with a view to develop a structured and validated PMD assessment and training Programme. To develop the Programme, three studies were conducted from October 2012 to October 2013. In detail, the studies were aimed at:

- study #1: identifying a validated tool for assessing the user's driving skills and identify training needs for using a PMD;
- study #2: identifying the elements necessary for building a circuit for conducting a PMD training;
- study #3: identifying a measure for evaluating the outcomes of the PMD.

Materials and methods

The three studies followed the same 2-step methodology. In the first step, for each study a systematic review of the literature was conducted using the PubMed database employing specific inclusion/exclusion criteria for the selection of the titles, abstract and full-texts. In the second step, the results of each systematic review were discussed by a group of rehabilitation professionals (n=4; 1 physiotherapist, 1 occupational therapist, 1 social educator, 1 psychologist) and 1 PMD user. The aim of the discussion groups was to select the most adequate tools for the CRA purposes and design the circuit for the PMD training.

The tools identified and selected in studies #1 and #3 were adapted and translated into Italian through two forward and one backward independent translations and followed the international recommended guidelines.² Once translated, the selected tools were pilot tested. In study #1, two researchers scored independently the selected tools with 14 cases. Agreement between researchers was employed as a measure of reliability using weighted kappas. Kappa values greater than 0.80 were considered almost perfect, 0.61–0.80 substantial, 0.41–0.60 moderate, 0.21–0.40 fair and <0.20 poor. The tool was considered reliable if all the kappas fell into the range of 0.40–0.60.

In study #3, 15 users were recruited and asked to complete the selected tool. Face validation was assessed by asking the users “Do you think that this tool is suitable for exploring the impact of your PMD on your participation?”. Convergent validation was also evaluated to assess whether the construct behind the Italian version of the selected tool correlates with a well-validated tool assessing, partly, the same construct. To this end, respondents were asked to answer both to the selected tool and to the 8 questions of the

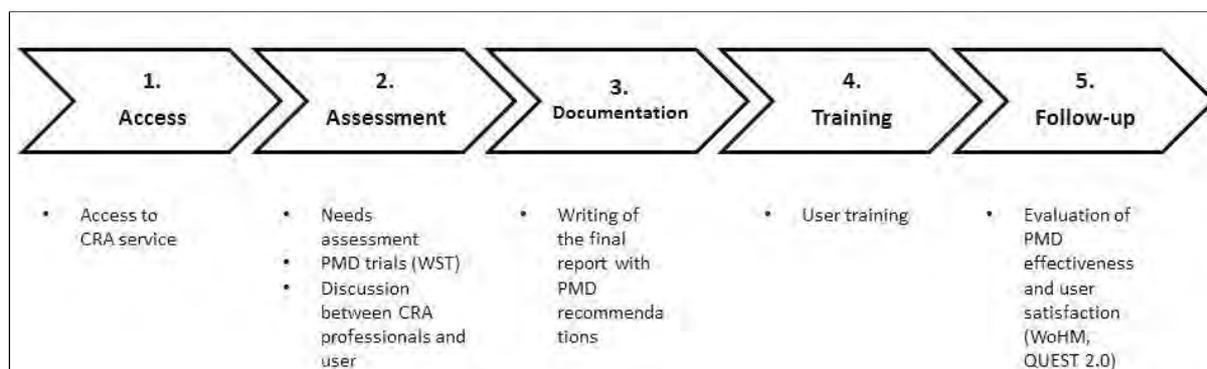


Figure 1. – PMD assessment and training Programme.

Table I. – WST v. 4.2 Form Powered Wheelchairs Operated by Their Users - Italian Translation (see [HYPER-LINK "http://www.ausilioteca.org/ricerca/strumenti"](http://www.ausilioteca.org/ricerca/strumenti) <http://www.ausilioteca.org/ricerca/strumenti> to request the Italian version of the form).

Individual skill	Abilità individuale
1 Moves controller/tiller away and back	Sposti il comando di guida in avanti e indietro e infine lo rilasci
2 Turns controller on and off	Accenda e spenga la carrozzina
3 Selects drive modes and speeds	Selezioni le diverse modalità (profili) di guida e le varie velocità possibili
4 Operates body positioning options	Utilizzi i comandi per variare la postura
5 Disengages and engages motors	Inserisca e disinserisca i motori (alternativo all'item seguente)
5a	Dia le istruzioni per inserire e disinserire i motori
6 Operates battery charger	Colleghi la carrozzina al caricabatterie (alternativo all'item seguente)
6a	Dia le istruzioni per collegare la carrozzina al caricabatterie
7 Rolls forwards (10 m)	Si sposti in avanti per 10 mt
8 Rolls backwards (2 m)	Si sposti indietro per 2 mt
9 Turns while moving forwards (90°)	Esegua una svolta di 90° mentre sta andando avanti
10 Turns while moving backwards (90°)	Esegua una svolta di 90° mentre sta andando indietro
11 Turns in place (180°)	Giri di 180° sul posto
12 Maneuvers sideways (0.5 m)	Si sposti lateralmente di 50 cm (con manovre combinate)
13 Gets through hinged door	Varchi una porta a battente (in entrambe le direzioni)
14 Reaches high object (1.5 m)	Raggiunga un oggetto a 1,5 mt di altezza
15 Picks object up from floor	Raccolga/raggiunga un oggetto da terra (es. quaderno ad anelle)
16 Relieves weight from buttocks (3 sec)	Sollevi il peso dal sedile per 3 secondi (anche un lato per volta)
17 Transfer to and from bench	Si trasferisca su una panca e ritorni sulla carrozzina
18 Rolls 100 m	Si sposti in avanti per 100 mt
19 Avoids moving obstacles	Eviti degli ostacoli in movimento (es. percorso a zig zag)
20 Ascends 5° incline	Salga su una superficie con una pendenza di 5° (circa 8%)
21 Descends 5° incline	Scenda da una superficie con una pendenza di 5° (circa 8%)
22 Ascends 10° incline	Salga su una superficie con una pendenza di 10° (circa 17%)
23 Descends 10° incline	Scenda da una superficie con una pendenza di 10° (circa 17%)
24 Rolls across side-slope (5°)	Avanzi su una superficie inclinata lateralmente di 5° (circa 8%)
25 Rolls on soft surface (2 m)	Avanzi 2 mt su una superficie cedevole (es. prato)
26 Gets over gap (15 cm)	Superi un avvallamento di 15 cm (es. buca o canalina)
27 Gets over threshold (2 cm)	Superi una soglia di 2 cm
28 Ascends low curb (5 cm)	Salga uno scalino di 5 cm
29 Descends low curb (5 cm)	Scenda da uno scalino di 5 cm
30 Gets from ground into wheelchair	Partendo da terra salga sulla carrozzina

Italian version of the QUEST 2.0³ on a scale from 1.00 ('not at all satisfied') to 5.00 ('very satisfied'). The QUEST 2.0 addresses the user's satisfaction with the AT device according to different dimensions rela-

ted to satisfaction (Comfort, Weight, Durability, Adjustments, Simplicity of Use, Dimensions, Effectiveness, Safety). A Spearman correlation was calculated between each item of the QUEST 2.0 and the

subscales of the selected tool. The level of significance was set at 1%.

Results

In the first study, the Wheelchair Skill Test (WST)⁴ was identified, translated into Italian and adapted to the CRA service process (Table I). Results from pilot-tests showed a good agreement between professionals with weighted kappas ranging from 0.6 to 1.

In the second study, the elements necessary for the development of the training circuit were identified among those cited in the existing literature reviewed. The WST was employed as a guide for the selection of the physical components and the design of the training circuit so to create a sort of continuity between the assessment and training phases. In addition, on the basis of the results of the literature review, since the Italian traffic regulation considers the users of PMD as pedestrians, it was designed a second training circuit recreating a real pedestrian environment (e.g. zebra crossing, traffic lights).

In the third study, the Wheelchair Outcome Measure (WhOM)⁵ was identified, translated into Italian and adapted to the CRA service process. The WhOM is a two part questionnaire. The first part consists of a semi-structured interview and the second part consists of structured questions (for more details see: "<http://millerresearch.osot.ubc.ca/resources/mobility-outcome-tools/>" "<http://millerresearch.osot.ubc.ca/resources/mobility-outcome-tools/>"). In the first part, the client identifies participation goals both in the home (question 1) and in the community (or outside the home) (question 2). The client then rates perceived 'importance' of this goal and 'satisfaction' with their current performance of this activity on a 10-point scale. In the second part, the client answers three questions and the results are recorded on the scoring sheet.

From the analysis of the respondents' opinions, the Italian version of the WhOM resulted clear and suitable for assessing the impact of the PMD on user's participation. From convergent validity analyses, it resulted a strong correlation between WhOM question 2 and "efficacy" as assessed by the QUEST 2.0 ($\rho=0.57$; $p<0.001$), and between the second part of the WhOM and the "comfort" as assessed by the QUEST 2.0 ($\rho=0.89$; $p<0.001$).

Discussion and conclusion

The three studies represent an important step in the development and definition of a PMD assessment and training Programme to be implemented in routine clinical activities at CRA (Figure 1). The Programme will be further tested in the future for validity and reliability in order to assess its efficacy in helping professionals selecting the most adequate PMD for users with disabilities and conduct specific PMD training. In conclusion, the Programme is intended to improve the current selection and training practices of the Local Health Authority (ASL) in Bologna.

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