

The Italian Version of the Coma Recovery Scale for Pediatrics (CRS-P)

Monica Beschi¹, Sandra Strazzer^{2*}, Katia Colombo² and Cristina Reverberi³

¹Department of Rehabilitation, Private Hospital City of Rovigo, 45100 Rovigo, Italy

²Department of Acquired Brain Injury, Scientific Institute IRCCS E. Medea, 23842 Bosisio Parini, Italy

³Department of Health Professions, AUSL-IRCCS Reggio Emilia, Reggio Emilia, Italy

Abstract

Coma Recovery Scale for Pediatrics (CRS-P) is a modified version of Coma Recovery Scale-Revised (CRS-R). This tool allows to analyse subjects' behavioural responses and it also enables to diagnose Coma, Vegetative State, MCS and E-MCS in paediatrics. It is an ordinal scale, which counts 29 items divided in 6 subscales. CRS-R is a gold standard for the assessment of adults with DOC, and it's also recommended for children, following the American guidelines. We undertook the translation and cultural adaptation of the CRS-P to have an adapted Italian version of this scale, to be tested on Italian children. To pursue the purpose of the project CRS-P was converted into Italian by two independent translators and was also culturally adapted. We found conceptual, semantic and content correspondence between the original version and the preliminary version of the instrument in Italian. The CRS-P version in the target language can be tested on Italian children, and then validated.

Keywords: CRS-P • Children • Disorder of consciousness • Assessment • Rehabilitation

Introduction

Disorders of Consciousness (DOC) include Coma, Vegetative State (VS) and Minimally Conscious State (MCS) [1,2]. Although these disorders are clearly distinct, the recovery of consciousness is recognized as occurring along a clinical continuum that covers a wide range of consciousness gradations, ranging from coma to the restoration of full consciousness. The study of DOC has had an important evolution in the last 20 years with a classification into precise stages [3,4] that helps clinicians in the choices to be made and in prognostic indications and has allowed the formulation of both American and European Guidelines for patient adults [5,6]. The Coma Recovery Scale Revised (CRS-R), in this scenario, is the gold standard for the bedside evaluation of adults with DOC [7]. For pediatric DOC there is still a long way to go, the data is still limited and for this reason no indications can be given and it is premature to write guidelines [8]. American guidelines recommend the use of the CRS-R also for children in the absence of specific scales and significant evidence [5]. Different scales are used in children, although the CRS-R is the most used [8], while others are the Level of Cognitive Functioning Assessment Scale (LOCFAS) [9,10], Western Neurosensory Stimulation Profile [11], and the rappaport Coma near Coma Scale (CNCS) [12–14]. The greatest difficulties in the assessment are for younger children (infants and preschool age), where the skills acquired by the child are few and some items of the CRS-R scale cannot be used due to a lack of competence with respect to the child's development.

When using neurobehavioral assessment tools designed and validated on adult cohorts with very young children, some children in MCS may be inaccurately classified due to limited language development and sensorimotor limitations [8]. In this context CRS-P [15] was proposed and its basic

psychometrics properties has been studied on a group of typically developing children aged 1 to 5.

Coma recovery scale for pediatrics

Coma Recovery Scale for Pediatrics is a modified version of Coma Recovery Scale-Revised. This tool allows to analyse subjects' behavioural responses and it also enables to diagnose Coma, Vegetative State, MCS and E-MCS in pediatrics. It is an ordinal scale, which counts 29 items, that are hierarchically organised in 6 subscales.

- Auditory: score from 0 to 4
- Visual: score from 0 to 5
- Motor: score from 0 to 6
- Oromotor/verbal: score from 0 to 3
- Communication: score from 0 to 2
- Arousal: score from 0 to 3

CRS-P tests the patient's ability to answer correctly to stimuli presented in a standardized manner. The scale has a hierarchic structure. The lowest items on each subscale represent reflexive reaction, while the highest reveal cognitive mediated activities. If there is no answer to a stimulus the examiner moves to the next one, until he obtains a classifiable response. The total score is acquired by summing up each score obtained, and it can vary from 0 to 23. The diagnosis is not referred to the total score, but it considers the scores achieved by the patient in every subscale. To diagnose Vegetative State, the patient has to obtain.

- Score ≤ 2 on the auditory, motor and oromotor-verbal subscale
- Score ≤ 1 on the visual subscale
- Score = 0 on communication subscale

Instead, a MCS diagnosis is indicated by:

- A score between 3-4 on the auditory subscale
- A score between 2-5 on the visual subscale
- A score between 3-5 on the motor subscale
- Score = 3 on the oromotor-verbal subscale
- Score = 1 on the communication subscale

***Address for Correspondence:** Sandra Strazzer, Department of Acquired Brain Injury, Scientific Institute IRCCS E. Medea, 23842 Bosisio Parini, Italy, Tel: +393343160284; E-mail: sandra.strazzer@lanostrafamiglia.it

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If a patient is attributed a score of 6 on the motor subscale and a score of 2 on the communication subscale it indicates emergence from the MCS. This project comes from the will and the need to introduce in Italy a standardised tool which permits to evaluate children with DOC's behaviour and to give them an appropriate diagnosis. Moreover, having this type of instrument helps achieving more information about the child and its disorder of consciousness. It also helps to define a more accurate prognosis, to project a personalised treatment program for the patient, and to contribute increasing data about children with DOC by using tools which are use internationally.

The aim of this study is to achieve a translation and a cultural adaptation in Italian of the Coma Recovery Scale for Pediatrics [15,16].

Materials and Methods

The process refers to 2010 Sousa VD and Rojjanasrirat W guidelines for the translation, adaptation and validation of instruments or scales [17] and to World Health Organization's (WHO) recommendations [18]. The recommended methodological approach is defined "symmetrical category". It has the purpose of obtaining a tool in the target language (Italian) which could be compared to the instrument in the original language (English), considering the cultural differences of meanings, concepts and contents.

Translation and cultural adaptation

To translate and adapt the scale were followed the steps of Sousa VD and Rojjanasrirat W methodological approach [17].

- Translation of the original instrument (English) into the target language (Italian) by two independent translators, whose mother language is Italian and have a good knowledge of culture and the language of the original tool. They also must have different backgrounds. The first one must be a professional in health care field, while the other one must be familiar with the target language without any knowledge of medical terms.
- Comparison of the two translations and creation of a preliminary synthesis in the target language (Synthesis I). To compare and sum up the two translations in the target language (Italian) we referred to WHO recommendations. These provide for the participation of a panel of experts to identify and solve potential discrepancies, ambiguities, inappropriate expressions or concepts, also suggesting alternatives and making changes. The panel of experts included a professional and the field, who is also a methodologist, and a student. Each of them with its specific and linguistic knowledge. This produces the first preliminary version of the tool in Italian language. During this step, it was also made a cultural and linguistic adaptation of the scale.
- Blind back-translation of the first preliminary version of the translated instrument. The first provisional version of CRS-P translated back in the original language of the tool by two independent translators with the same characteristics and qualifications of the translators of Step 2. In this stage though must be translators mother language must be English and must not be aware of the original version of the scale, so it is a blind translation. This process generates two back-translations in the original language.
- Comparison of the two back-translations and creation of a synthesis of the instrument in the original language (Synthesis II). To synthesize the two back-translations the panel of expert of Step 2 was gathered. Ambiguities e discrepancies were discussed and solved by finding an agreement between the members of the group. The synthesis produced by this process was sent to the author, to involve her in the discussion and to ask her opinion about the equivalence between the result of the synthesis of the back-translations and the original tool.

This methodological approach permits to establish a conceptual, semantic and content conformity between the original version in English and the temporary version in the target language (Italian). Besides the translation, it was necessary to culturally adapt the scale. Particularly, the communication

subscale and the oromotor/verbal subscale were modified. In the first one, a linguistic adaptation to Score 3 "response" section was made, due to the substantial differences existing between Italian and English syllabic structure and, consequently, in the stages of linguistic development. Especially, the objects the child has to name were changed to have disyllabic words with the structure C-V-C-V, which are the first words appearing in children's vocabulary. To find the right words to insert into the subscale, the appendix of Italian MacArthur bates "Primo Vocabolario del Bambino" were consulted [19]. We choose the words: dog, ball e apple (in Italian: cane, palla, mela), which replaced the original subscale expected words. In CRS-P English version of communication subscale, authors suggest showing children an illustrated book and to ask them yes/no questions (which are in the Communication Assessment Protocol) about the portrayed pictures. So, basing on the Communication Assessment Protocol, we created an illustrated book (see: Supplementary Materials).

Results

At the end of the translation process, the CRS-P synthesis obtained from the two back-translations was sent to the author, to ask her opinion about the equivalence between the translation we got and the original scale. The author brought some changes to the linguistic structure which didn't result significant to the Italian provisory version of CRS-P. She then modified the cultural adjustment made to Score 3 "response" section, reinstating what was in the original version of the scale. The adopted methodological approach allowed establishing conceptual, semantic and content correspondence between the original version and the preliminary version of the instrument in the target language.

Discussion

The process followed and described in this project involved the translation and the cultural adaptation of the Italian scale. The cultural adjustment realised are about the oromotor/verbal subscale visual set. The changes produced concern specifically the objects (and consequently the words) the child has to name. Moreover, the book planned to test children's communication skills in the original CRS-P was replaced. The new book has a different story from the one told in the US book, but contains the same subjects present in the Communication Assessment Protocol: situational orientation of the original scale (the book for the Communication Assessment Protocol is in Supplementary material). Once the translation and adaptation process were concluded, we obtained the preliminary version of Italian CRS-P.

Conclusion

The scale, which was tested on some children to evaluate whether it was comprehensible to the subjects, is now ready to be validated and to study the basic psychometric properties of this version.

Supplementary Materials

Book for the Communication Assessment Protocol.

Author Contributions

Conceptualization, R.C. and B.M.; Methodology, R.C.; Validation, C.K. and S.S.; Investigation, M.B.; Writing – Original Draft Preparation and book realization B.M.; Writing – Review & Editing, S.S.; Visualization, C.K.; Supervision, R.C.; Funding Acquisition, S.S."

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Conflict of Interest

The authors declare no conflict of interest.

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