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The Moorong Self Efficacy Scale: translation, cultural adaptation, and validation in Italian; cross sectional study, in people with spinal cord injury

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STUDY DESIGN: Psychometric study, transverse study.
OBJECTIVE: To evaluate the psychometric properties of the Moorong Self Efficacy Scale (MSES) in the Italian population with Spinal Cord Injury (SCI).
PARTICIPANTS: 65 people with SCI.
SETTING: The Italian version of the MSES (MSES-IT) was administered to the participants recruited by two Italian Spinal Units.
METHODS: MSES assesses confidence in the performance of daily activities. The original scale was translated from English into Italian using international guidelines. MSES-IT's internal consistency and inter-rater reliability were examined through the Cronbach alpha and intraclass correlation coefficient (ICC), respectively. Its concurrent validity was assessed using Pearson's correlation coefficients with the Italian version of the Spinal Cord Independence Measure-Self Reported (SCIM-SR) and the Italian version of the Quality-of-Life Assessment Questionnaire (SF-36).
RESULTS: The MSES-IT was administered to 65 subjects. Cronbach's alpha for the MSES-IT was 0.87, and the test-retest reliability (ICC) was 0.99 (95% Confidence Interval). The validity analysis showed significant moderate correlations ($0.30 < \rho < 0.44$) between the MSES-IT and the following components of SF-36: Role limitations physical health; Role limitations emotional problems; Emotional well-being; General health. However, no correlations emerged between MSES-IT and SCIM-SR.
CONCLUSIONS: This study showed strong values of Cronbach's alpha and ICC of MSES-IT that make it a useful clinical and research tool. Rehabilitation can improve quality of life by targeting low-efficacy factors in people with spinal cord injury, which is possible because an individual's self-efficacy related to SCI can help determine participation in daily activities and social activities, work, and other life events.

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INTRODUCTION

Spinal cord injury (SCI) is often a sudden, unexpected, and traumatic life-changing event that requires complex, long-standing rehabilitation to support the individual's physical and psychosocial well-being. It is a condition that can have a profound impact on independence and lifestyle, linked to the loss of motor and sensory function [1]. According to estimates, 85,000 people live with an SCI in Italy: the incidence is calculated in about 2500 new cases/year [2]. SCI has a negative influence on the physical and psychological aspects of health and quality of life. Whether of traumatic or non-traumatic origin, SCI will always be a life-changing condition, but it must not limit the possibilities of a full and satisfactory life for individuals [3].

Self-efficacy is a key cognitive process identified in 1997 by social psychologist Albert Bandura. It refers to personal judgment about our efficacy, ability to manage events and organizing and executing actions necessary to produce objective data. All this influences choices, aspirations, levels of effort, perseverance, resilience, vulnerability to stress, and the quality of an individual's performance [4]. The sense of self-efficacy also acts on the determination and choice of personal objectives. With low perceived controllability, the aspirations and goals they inspire diminished. Although self-esteem, the concept of self, the locus of control, and competence have often been assimilated to self-esteem, self-efficacy does not correspond to a hypothetical provision or a general sense of control or competence [5]. The various beliefs of efficacy are relevant to specific activities and reflect affective-cognitive processes that select the actions to be carried out to achieve the expected results [6]. If the perception of having such convictions diminishes, attitudes of renunciation prevail, with the constant call for help and what is instead in our field of feasibility. Self-efficacy is linked to the awareness of where,

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how much, and how we can do it alone (autonomy and independence). The true meaning of self-efficacy is to understand and want the help necessary to carry out a project, but with the awareness of where the boundary of their autonomous capacities is and where it is necessary to seek help, reaching independence anyway.

According to Bandura [4], perceived self-efficacy refers to the need for people to control their daily lives. Therefore, analyzing self-efficacy within a rehabilitation program can allow to improve independence and quality of life [7].

Measuring self-efficacy in rehabilitation can help identify areas of low self-efficacy in an individual, which can then be improved. Self-efficacy has been identified as an important element of assessment in several areas of rehabilitation. Several studies have also demonstrated that treatments based on motivation and safety, have shown better results on self-efficacy than standard interventions in arthritis [8, 9], in pathological heart disease [10, 11], in severe kidney disease [12], in tumors [13, 14], in general exercise [15, 16], and in anxiety [17].

Identifying a tool that can quantify self-efficacy can be useful to define a rehabilitation project. The Moorong Self-efficacy Scale (MSES) measures a person's self-efficacy and is a 16-item self-administered questionnaire found to have acceptable reliability and validity, it is composed by two subscales measuring daily activities (items 1, 2, 3, 5, 6, 8, 11, 13, 16) and social functioning (items 4, 7, 9, 10, 12, 14, 15) [18]. Currently, the literature provides us with the validation of the tool in American [19, 20] and Persian [21]. There is also a study that shows the validation of an self-efficacy scale for adolescents with SCI [22]. It is based on previous works that link self-efficacy with unique aspects of spinal cord rehabilitation with adults, developing a teenage version of MSES. The original MSES scale is marked by adding all 16 elements on a 7-point Likert scale ranging from 1 (very uncertain) to 7 (very certain). The highest scores on the MSES suggest high auto-efficacy or stronger beliefs in people able to control their behavior and results, such as personal hygiene, home participation, maintaining relationships, and access to community and recreational activities [18].

The study aims to translate and culturally adapt the MSES in Italian and to measure its reliability and validity in individuals with a spinal injury.

METHODS AND MATERIALS

Participants

For this study, 65 individuals with SCI were recruited to three rehabilitation centers by convenience sampling method. The sample was selected in accordance with these inclusion criteria:

- C2 to L5 SCI
- Over 18 years of age
- ASIA A B C D
- Understanding and communicating with the Italian language.

Therefore, individuals under 18 years of age as well as those with a lack of knowledge of the Italian language were excluded from the study.

All eligible participants were informed about aim and procedure of the study, those interested in participating signed an informed consent before inclusion. Ethics committee approval was not required for this study, this research involve secondary use of clinical data which is provided without any identifier or group of identifiers which would allow attribution of private information to an individual.

Translation and cultural adaptation

After receiving the approval of the developers of the original instrument, Moorong Self-Efficacy scale was translated from English to Italian using the "Translation and Cultural Adaptation of Patient Reported Outcomes Measures–Principles of Good Practice" guidelines [23].

Table 1. Demographic characteristics of the 65 participants.

	Mean	Std. Deviation
Age	55.4	14.3
Years from injury	26	20.3
	Frequency	Percent
Gender		
F	24	36.9
Lesion level		
Not answered	11	16.9
C3-C7	1	1.5
C6-C7	5	7.6
C7-T1	1	1.5
T2-T4	7	10.7
T4-T6	7	10.7
T7-T10	18	27.6
T12	9	13.8
T12-L1	1	1.5
L1-S1	5	7.6
AIS		
	17	26.1
A	41	63.1
B	3	4.6
D	4	6.1

AIS Asia Impairment Scale.

Procedures

The original version of MSES was translated into Italian by a panel of two native English speakers and one Italian clinical psychologist familiar with English. These individuals produced three independent translations. An Italian independent native speaker who had not been involved in any of the forward translations synthesized the translations' results. Three Italian translators then translated the questionnaire back into the original language without having seen the original version. The back-translated version of the instrument was compared with the original. This version has been submitted to the developers of the instrument and approved by them. In order to adapt the translated version to Italian culture, two Italian rehabilitation professionals (an occupational therapist and a physiotherapist) and one clinical psychologist, reviewed the first translated version and then reworded and reformulated some items to minimize any differences from the original version. The expert committee's role is to consolidate all the questionnaire versions and develop what would be considered the final version of the questionnaire for field testing. The MSES-IT questionnaire was administered to the participants who signed informed consent [24, 25] and the quality of life assessment questionnaire (SF-36), and the Italian version of the Spinal Cord Injury Independence Measure III Self-Reported (SCIM-SR).

Statistical analysis

Internal consistency was calculated by analyzing the responses that individuals have given for each item and calculating the 'Cronbach's alpha' coefficient to evaluate the interrelation of the elements and the scale's internal consistency (it should be at least 0.7). The COSMIN checklist was used to evaluate the interrelation of the elements and the scale's internal consistency [26–30].

To evaluate the test-retest reliability, the MSES-IT was self-administered twice to the participants by the same rater. The time interval for test-retest studies needs to be sufficiently short to support the assumption that the patients remain stable and sufficiently long to prevent recall. A time interval of 7–8 days is considered appropriate for the current population. Test-retest reliability was calculated using intraclass correlation coefficient (ICC). An ICC value of 0.70 is considered acceptable.

The MSES-IT, the Italian version of the SCIM, and the Italian version of the 36-Item Short Form Survey (SF-36) were administered together. Concurrent

Table 2. Internal consistency: Cronbach's alpha values and Cronbach's alpha if item deleted for the Moorong Self Efficacy Scale for the total scale and for subscales.

SCALE		Daily activites subscale		Social functioning subscale	
	Cronbach's alpha if item deleted		Cronbach's alpha if item deleted		Cronbach's alpha if item deleted
ITEM 1	0.87	ITEM 1	0.78	ITEM 4	0.75
ITEM 2	0.86	ITEM 2	0.77	ITEM 7	0.70
ITEM 3	0.87	ITEM 3	0.81	ITEM 9	0.70
ITEM 4	0.87	ITEM 5	0.76	ITEM 10	0.70
ITEM 5	0.85	ITEM 6	0.79	ITEM 12	0.65
ITEM 6	0.87	ITEM 8	0.77	ITEM 14	0.72
ITEM 7	0.86	ITEM 11	0.77	ITEM 15	0.64
ITEM 8	0.86	ITEM 13	0.79		Cronbach's alpha
ITEM 9	0.86	ITEM 16	0.77	Total subscale	0.73
ITEM 10	0.86		Cronbach's alpha		
ITEM 11	0.85	Total subscale	0.80		
ITEM 12	0.85				
ITEM 13	0.86				
ITEM 14	0.87				
ITEM 15	0.85				
ITEM 16	0.85				
Cronbach's alpha					
Total	0.87				

Item 1 = personal hygiene; Item 2 = bowel accidents; Item 3 = household participation; Item 4 = family relationships; Item 5 = getting out of the house; Item 6 = sexual relationship; Item 7 = friends; Item 8 = leisure; Item 9 = maintaining contacts; Item 10 = unexpected problems; Item 11 = work; Item 12 = accomplishing things; Item 13 = persistence in learning things; Item 14 = meeting people; Item 15 = good health; Item 16 = fulfilling lifestyle.

Table 3. Stability: intraclass correlation coefficint between test-retest after 1 week of the Moorong Self Efficacy Scale.

	Test		Retest		Intraclass correlation	95% confidence interval	
	Mean	Std. Deviation	Mean	Std. Deviation		Lower bound	Upper bound
Total daily activities	54.92	7.74	54.39	8.30	0.99	0.98	0.99
Total social functioning	43.59	5.21	43.67	5.04	0.96	0.93	0.98
Total MSES-IT	98.51	12.41	98.06	12.72	0.99	0.98	0.99

validity was assessed by Pearson correlation coefficient. All statistical analyses were performed using IBM-SPSS version 23.00 (Armonk, NY). The COSMIN checklist was used for the scale's psychometric properties.

Construct validity was calculated by analyzing the individuals' total scores in the different questionnaires and calculating Pearson correlation coefficient (ρ).

The following values were considered in the interpretation of the results: 0 indicates no linear relationship; +1/−1 indicates a perfect positive/negative linear relationship; a value > 0.70 = strong correlation, $0.30 < \rho <$ 0.70 = moderate correlation, and $\rho < 0.30$ = weak correlation.

RESULTS

Participants

Participants were recruited from January 2020, through the two Spinal Units in Italy, and through an online questionnaire through Google docs©.

The MSES-IT (Appendix 1) module was administered to 65 adults with SCI. Of the 65, 41 men and 24 women participated with a mean standard deviation (SD) age of 55.4 14.3 years. The majority of people with SCI had paraplegia (71.9% with paraplegia, 10.6% with tetraplegia), but 60.7% were rated as having complete injuries based on the ASIA Impairment Scale standards for classification of SCI. The mean standard deviation (SD) time since injury was 26 20.3 years. The demographic characteristics of the subjects are summarized in Table 1. All patients were informed about the study, and their interest in taking part was recorded. Patients who entered the study gave their consent before inclusion [24, 25].

Participants were asked to complete the Short Form Health Survey–36 (SF-36) and MSES-IT, and SCIM-SR.

Reliability

Table 2 reports the results of the analysis for the internal consistency of the scale.

The result values of the MSES-IT satisfy the criterion regarding the total scale (left 0.87) and in the analysis of the responses provided to the items that contribute to evaluating the two subscales (0.80 for the daily activities subscale and 0.73 for the social functioning).

Finally, this analysis allows us to define the relation of each item to the construct. The columns show the values that the total alpha would assume if we deleted that item. Each item is important because in eliminating anyone, the alpha value would decrease, except for item 3 in the daily activity's subscale and item 4 for the social functioning subscale. However, even if according to our results the value would slightly increase, this result should be confirmed with a larger population.

Table 4. Construct validity: Pearson's correlation coefficient between the Moorong Self Efficacy Scale (MSES), the Short Form Survey (SF-12) and the Spinal Cord Injury Measure-Self Reported (SCIM-SR).

	SF-36									SCIM-SR		
	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6	Component 7	Component 8	Component 9	Self-care	Respiration and sphincter	Mobility
Daily activities	0.11	0.32[a]	0.40[b]	0.28[a]	0.38[b]	0.19	0.12	0.45[b]	0.06	0.31	0.15	0.17
Social functioning	0.06	0.27[a]	0.34[b]	0.16	0.30[a]	0.16	0.16	0.38[b]	0.02	0.32	0.26	0.14
Total	0.01	0.32[a]	0.41[b]	0.24	0.36[b]	0.19	0.14	0.44[b]	0.05	0.32	0.20	0.16

Component 1 = physical functioning; Component 2 = role limitations physical health; Component 3 = role limitations emotional problems; Component 4 = energy/fatigue; Component 5 = emotional well-being; Component 6 = social functioning; Component 7 = pain; Component 8 = general health; Component 9 = health change.
SF-36 Short Form Health Survey–36, *SCIM-SR* Spinal Cord Independence Measure III-Self Report.
[a]Correlation is significant at the 0.05 level (2-tailed).
[b]Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows the results of the analysis for the test-retest reliability of the scale, all items showed an ICC value >0.7.

Validity

From the analysis of the validity calculated with the Pearson correlation coefficient, it emerged that there are correlations between the MSES-IT and the SF-36. Particularly, MSES-IT total score and subscales showed a moderate correlation ($0.30 < \rho < 0.44$) with the following components of SF-36: Role limitations physical health; Role limitations emotional problems; Emotional well-being; General health. However, no correlations emerged between MSES-IT and SCIM-SR (Table 4).

DISCUSSION

The study's purpose was to measure the reliability and validity of the Italian version of the Moorong scale of self-efficacy (MSES-IT) for Italian people with SCI. It has been demonstrated that MSES-IT has acceptable internal consistency and reliability. It also showed positive and significant correlations with the Italian versions of SF-36. The analysis of the validity of construct shows a significant correlation of MSES-IT with the domains of SF-36 scale with regard to role limitations due to physical and emotional health problems. There is also a strong correlation between the domain of emotional well-being and the general state of health. This result seems to confirm studies already conducted on the correlation between self-efficacy and mood disorders, such as depression, stress, and anxiety. In fact, spinal cord injuries are burdened by psychological complications due to the loss of function, the loss of social and working status, and the decrease in future expectations. The incidence of psychological complications provides us with relevant data in which anxiety and depression are considered nearly inevitable consequences of SCI. From the phase of a traumatic shock to the final phase of therapeutic treatment and socio-familiar reintegration, the person lives psychological alterations of various types. Emotional well-being plays a key role in each person's life and ensures a more satisfying lifestyle. Therefore, it seems necessary to monitor the association of self-efficacy with the emotional state of the person with spinal injury.

On the contrary, what can be deduced from the validity analysis is a not statistically significant correlation with the SCIM SR scale ($p > 0.05$), which probably reflects the fact that MSES-IT not only focuses on body functions and the performance of daily life activities but addresses a much more representative range of lifestyle behaviors. Therefore, there is no certainty that there is a correlation between the autonomy of the person and the feeling functionally self-efficacy. A person may be functionally autonomous in certain activities but may not perform them safely alone (autonomy and independence). Self-efficacy makes it possible to reach an awareness of one's limits in the activity's conduct and allows the person to achieve independence, identifying those activities that require assistance. There is a lack of correlation between the SCIM SR scale and the MSES-IT in the literature to reinforce these claims. We can therefore say that within an occupational therapy intervention, it is necessary to monitor self-efficacy through a valid tool such as MSES-IT, but this does not exclude the importance of evaluating at the same time the autonomy of the person through the SCIM-SR scale.

CONCLUSIONS

To conclude, the MSES, translated and culturally adapted, proved to be a valid scale, reliable, for measuring the self-efficacy in people with SCI. This work has led to validate a tool for Italian professionals to evaluate and record an important and necessary factor such as self-efficacy, in rehabilitation programs for spinal injuries. Health professionals, especially occupational therapists, can use a method to measure a psychological variable that affects

many aspects of daily life and needs to be monitored, to improve the participation in the occupations of the person and aim to achieve the best degree of autonomy. This method also allows researchers to deepen an important aspect in future research.

DATA AVAILABILITY

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

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AUTHOR CONTRIBUTIONS

AS was responsible for review and critique of the statistical analysis and review and critique of the manuscript. MMA was responsible for organization of the research project and review and critique of the statistical analysis. IR was responsible for execution of the research project. GS was responsible for organization of the research project, writing of the first draft and review and critique of the manuscript. MT was responsible for conception of the research project, design of the statistical analysis and writing of the first draw of the manuscript. JCB was responsible for execution of the research project. GG was responsible for conception of the research project and design and execution of the statistical analysis. AB was responsible for conception of the research project, design of the statistical analysis and review and critique of manuscript.

COMPETING INTERESTS

The authors declare no competing interests.

ETHICS STATEMENT

Authors certify that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during the course of this research. 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. Informed consent was obtained from all participants for being included in the study. Institutional Review Board approval was not required because the administration of these tool was part of the usual process of assessment of these individuals in clinical practice, the research involved the analysis of data collected such that individual subjects cannot be identified in any way.

ADDITIONAL INFORMATION

Supplementary information The online version contains supplementary material available at https://doi.org/10.1038/s41394-022-00492-z.

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