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Original article

Construction and feasibility study of the SOFMER Activity Score (SAS), a new assessment of physical and cognitive activity

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ABSTRACT

Objectives: For hospitalizations in rehabilitation centers (RCs) in France, the quantification of healthcare givers' activity is based on the dependency of the patients, defined as a total or partial inability to perform activities required for daily living without help. The tools currently used to quantify dependency are not sufficiently precise. Here we describe the construction of a new tool, the SOFMER Activity Score (SAS scoring), which allows for a good description of the level of activity of patients hospitalized in RCs, and a feasibility study of the tool.

Methods: After a study group proposed the first version of the SAS, the validity of its content was studied by the Delphi consensus method: 26 physicians or healthcare professionals known for their expertise in PMR responded to the first round. The feasibility study was prospective and involved multi-site professionals. Data related to the SAS determined by a multidisciplinary team were collected and compared to the *Activité de la Vie Quotidienne* (AVQ) scale, which is administered to all patients and included in medical and administrative data.

Results: We included 81 patients in the feasibility study. The mean (SD) time to obtain the SAS was 4.5 (3.3) min. For 97.5% of scorings, the participating professionals judged that the SAS was compatible or fairly compatible with clinical practice. The internal structure of the SAS scale seemed better than that of the AVQ scale, for which the present study confirmed a floor effect for all items.

Conclusions: The SAS allows for measuring the level of physical and cognitive activity of a patient hospitalized in an RC. If validation studies for the SAS, exploring its reliability, construct validity or criterion validity, confirm the tool's good metrological qualities, the SAS will allow for a good quantification of the burden of care.

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1. Introduction

The dependency of a person is defined as their total or partial inability to perform activities required for daily living without help due to activity limitations in the normal environment. The consequence is a restriction in participation, in terms of the International Classification of Functioning, Disability and Health (ICF) [1].

For hospitalizations in rehabilitation centers (RCs), given the pathologies of patients and lengths of hospitalization, the dependence of the patient must take into account both motor and cognitive aspects when quantifying the activity of the healthcare staff. The limitations of the patient's activity affect the provision of care (basic or relational) by nursing staff and the performance of reeducation and rehabilitation activities by therapists (modification of the installation time in the reeducation room, fatigability, behavioral disorders, etc.). Cognitive dependence should not be disregarded because it can be a care burden for healthcare professionals, at least as important as physical dependence. Therefore, dependence in all its aspects should be accounted for when quantifying the medical and paramedical activity of a department. The relation between dependence and burden of care must be explored because although they are obviously linked, they are not equivalent. For example, the burden of care could be lighter if a patient has to be totally washed as compared with a patient who has to be stimulated during the washing.

In physical and rehabilitation medicine (PRM), in which the evaluation is central and dependence a priority for action for therapeutic interventions, many validated scales are used to assess the dependence of patients. Some of these, such as the Barthel Index [2], validated for patients with neurological post-stroke, or the Instrumental Activities of Daily Living [3] mainly used in geriatric RCs, are more specific to a particular population. The Functional Independence Measure (FIM) [4], with its pediatric version, the WeeFIM [5], is more often used in RCs. It has good metrological qualities and allows for measuring both the level of physical and cognitive activity. It consists of a rater-administered assessment of performance (measurement of what the patient actually does, as opposed to measurement of abilities exploring the maximum that the patient can do) investigating 6 domains divided into 13 items for motricity and 5 items for cognition. Each item is rated on 7 levels, based on the need for technical help, monitoring or required help [4,6–9]. Although the FIM is adapted for several diseases [5,6,8,10], it has limitations for low back pain, shoulder disorders [4], as well as vascular and respiratory diseases [11]. Because of the length of time required to administer the scale in French (from 30 to 45 min) [12], its routine use is difficult for quantifying the dependency of each hospitalized patient.

In France, as part of the collection of medical and administrative data for patients (*Programme de médicalisation des systèmes d'information* [PMSI]) [13], dependence has been assessed in RCs since 1997 by use of a French scale, the *Activité de la Vie Quotidienne* (AVQ), composed of 6 items (4 physical items and 2 cognitive items). However, this scale has never been validated [14] and many practitioners criticize particularly the lack of standardized guidance, a suspected large floor effect, the under-evaluation of the cognitive dependence, and the unsuitability or even unusability in some populations, especially pediatrics.

Given the limitations of existing scales, in 2015, the French society for PRM (SOFMER) proposed to create and validate a new classification of activity measurement based on the ICF model, the SOFMER Activity Score (SAS). The SAS was to be easy to use, allow for rapid generation of a score and be adapted for use during a multidisciplinary review meeting, while avoiding a floor effect and providing a good and reproducible description of the physical and cognitive dependence of pediatric and adult patients hospitalized in RCs. If the SAS showed good metrological properties and was able to quantify the burden of care well, it could be used for clinical practice and could better identify the resources required for hospital care in a medical or economic approach.

Here, we present the construction of the SAS, an analysis of the validity of the content, and the results of a feasibility study, which is a preliminary step before validation studies.

2. Materials and methods

The different development stages of the SAS are described in Fig. 1.

2.1. Construction of the first version of the SAS

An exhaustive review of the literature related to the different tools used for evaluating the dependence of hospitalized patients was performed. A working group consisting of 4 PMR physicians, 2 healthcare managers, 1 childcare assistant, 1 physiotherapist, 1 senior hospital technician and 1 clinical research associate was involved in developing the first version of the SAS (called SAS_V1) during 2 meetings between May and June 2015. Two members of the group had purely pediatric experience and 6 had experience with adults and/or geriatrics. The years of experience ranged from 6 to 25 (mean 13.7).

The different scoring fields (headings and descriptions of the activity fields) were adapted from the ICF activity fields, with a proposition of 4 fields for physical activities (''Hygiene, dressing'', ''Mobility'', ''Feeding'', ''Elimination'') and 4 fields for cognitive activities (''Communication'', ''Memory, learning'', ''Relationships with others'', ''Judgment, initiative and control of activity'').

For each of the activity fields, the working group proposed a 5-level classification system for the activities (Level 1: ''Activity possible without help'', Level 2: ''Activity possible with technical help and/or adjustment but without human help'', Level 3: ''Activity possible with human help'', Level 4: ''Activity possible with continuous human help'', Level 5: ''Activity impossible regardless of help'').

To help with the scoring, a section ''Introduction and instructions for the user'' specifies the scoring methods, and clinical thumbnail images were proposed to illustrate the practical use of the scoring.

The scoring was tested by members of the working group on 33 patients hospitalized in RCs to perform an experimental study.

2.2. Analysis of the validity of the content: Delphi method

To analyze the validity of the content of the proposed SAS_V1, the Delphi method [15–17] was used via email. This stage allowed for collecting the opinion and comments of several French PMR experts concerning the relevance of the scoring's content, particularly the relevance of the fields selected and their scoring procedure.

Overall, 32 physicians or healthcare professionals known for their expertise in PMR and not having participated in the first phase of the study, were invited to participate; 26 responded to the first round of Delphi (10 PRM physicians, 3 geriatricians, 3 pediatricians, 2 Department of Medical Information doctors, 2 hospital directors, 1 general practitioner, 2 heads of physiotherapy, 2 occupational therapists and 1 director of the department of nursing). Eight participants had expertise in pediatrics, 20 in adult patients and 8 in geriatrics; 10 experts practiced in a public establishment and 16 in a private establishment. Their experience in the field of PMR ranged from 2 to 35 years (mean [SD] 19.9 [10.3] years).

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