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# THE FUNCTIONAL AUTONOMY MEASUREMENT SYSTEM (SMAF): A CLINICAL-BASED INSTRUMENT FOR MEASURING DISABILITIES AND HANDICAPS IN OLDER PEOPLE

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The SMAF (Functional Autonomy Measurement System) is a 29-item scale developed according to the WHO classification of disabilities. It measures functional ability in 5 areas: activities of daily living (ADL) [7 items], mobility [6 items], communication [3 items], mental functions [5 items] and instrumental activities of daily living (IADL) [8 items]. For each item, the disability is scored on a 5-point scale: 0 (independent), -0.5 (with difficulty), -1 (needs supervision), -2 (needs help), -3 (dependent). Resources available to compensate the disability are also evaluated, and a handicap score is deducted. Stability of the resources is also assessed. A disability score (on -87) can be calculated, together with sub-scores for each dimension. SMAF must be administered by a health professional (nurse or social worker) who scores the subject after obtaining the information, either by questioning the subject and proxies, or by observing and even testing the subject. This instrument was submitted to many validity and reliability studies. It is responsive to interventions, and a change of 5 points or more should be considered the minimal metrically detectable change and clinically significant. Correspondence of the SMAF score with the required nursing-care time and the cost of long-term care, either at home or in different institutional settings, has been established. It has been utilized in many epidemiological and evaluative studies. It is also used in the clinical setting for assessment and follow-up of elderly disabled patients in the institution, in the community and in rehabilitation programs.

*Key words:* Disability, handicap, rating scale, cost of care, nursing time, outcome variable

In order to intervene with the elderly or disabled, we need to improve our knowledge of the subject's condition by going beyond the usual symptomatic, etiological and physiopathological diagnoses and doing a functional diagnosis. This diagnosis provides information on the impact of the disease on how the person functions and guides the clinician or manager in what interventions to focus on, in order to rehabilitate the individual or provide

appropriate care and services to alleviate the disabilities. When this kind of diagnosis can be obtained through the practitioner's clinical evaluation, it is often useful to quantify and standardize it, in order to compare different subjects or the same subject over a period of time, or to summarize the functional status of a group of individuals in a management or research context. The Functional Autonomy Measurement System (*SMAF: Système de mesure de l'autonomie fonctionnelle*) was designed for this purpose. This instrument was developed in 1984 by a team from the Community Health Department at Hôtel-Dieu in Lévis and revised in 1993 by researchers and clinicians at the Sherbrooke University Geriatric Institute, and has been the subject of many validation studies in the past 15 years. This paper presents the conceptual framework that guided its development and summarizes how it is used. It also includes a summary of the studies of its reliability, validity and responsiveness.

## CONCEPTUAL FRAMEWORK AND DEVELOPMENT

The development of the SMAF was based on the concepts of disabilities and handicaps (or disadvantages) described in the World Health Organization's Classification of impairments, disabilities and handicaps.<sup>1,2</sup> This classification is based on a functional concept of disease involving three levels: *impairment*, *disability* and *handicap*. Disability results from an impairment that limits individual functioning or activities. Handicap is more related to social disadvantages resulting from the disability, taking into account the requirements imposed on the individual and the available physical and social resources to alleviate this disability. In this sense,

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handicap represents the *gap* between disabilities and resources.<sup>3</sup>

To generate a handicap measure, the SMAF provides a semi-quantitative assessment of individual disabilities and a clinical assessment of whether the available physical and social resources are adequate to compensate for the disabilities.<sup>4</sup> Disabilities are measured using a scale comprising 29 items covering five basic aspects of functional abilities: activities of daily living (ADL), mobility, communication, mental functions, and instrumental activities of daily living (IADL). These items more or less tally with the WHO's classification of disabilities (Table 1), excluding those items less applicable to the elderly.

A review of the numerous instruments published since the *Index of Activities of Daily Living* proposed by Katz and colleagues in 1963<sup>5</sup> was used to develop the different items.<sup>4,6</sup> The scoring criteria

**Table 1. List of SMAF Items and corresponding sections in WHO classification of disabilities**

| SMAF Items  | WHO Classification Disabilities                  |
|---|--|
| <b>A. Activities of daily living</b>              |  |
| 1. Eating   |  |
| 2. Washing  | Section 30: <i>Personal disabilities</i>         |
| 3. Dressing                                       |  |
| 4. Grooming                                       | Section 60: <i>Dexterity disabilities</i>        |
| 5. Urinary continence                             |  |
| 6. Fecal continence                               |  |
| 7. Using the bathroom                             |  |
| <b>B. Mobility</b>                                |  |
| 1. Transfers                                      |  |
| 2. Walking inside                                 |  |
| 3. Walking outside                                | Section 40: <i>Locomotor disabilities</i>        |
| 4. Putting on prosthesis or orthosis              |  |
| 5. Moving around in a wheelchair                  |  |
| 6. Using the stairs                               |  |
| <b>C. Communication</b>                           |  |
| 1. Seeing   |  |
| 2. Hearing  | Section 20: <i>Communication disabilities</i>    |
| 3. Speaking                                       |  |
| <b>D. Mental functions</b>                        |  |
| 1. Memory   |  |
| 2. Orientation                                    |  |
| 3. Understanding                                  | Section 10: <i>Behavior disabilities</i>         |
| 4. Judgement                                      |  |
| 5. Behavior                                       |  |
| <b>E. Instrumental Activities of Daily Living</b> |  |
| 1. Cleaning the house                             |  |
| 2. Preparing meals                                |  |
| 3. Shopping                                       |  |
| 4. Doing the laundry                              | Section 50: <i>Body disposition disabilities</i> |
| 5. Using the telephone                            |  |
| 6. Using public transportation                    |  |
| 7. Taking medications                             |  |
| 8. Managing the budget                            |  |

for these items were standardized using 4-point scales according to the following general rule:

- Level 0: autonomous
- Level 1: needs supervision or stimulation
- Level 2: needs help
- Level 3: dependent

When the instrument was revised in 1993, an intermediate level (-0.5) was added to most of the items to indicate a function done autonomously but with difficulty. For each item, the general rule for each level is worded precisely and specifically to make scoring easier, avoid interpretation errors and take some particular situations into account. The rater must score the individual's actual performance (what he does), not his potential (what he could or should be able to do). The rater uses all available information to do the rating: questions the subject or his family or close friends, observes the subject and his environment, and even tests the subject. Therefore, he has to use his clinical judgement to synthesize the available information.

It could be claimed that when assessing subjects' actual performance, the SMAF introduces a bias, especially for domestic tasks, related to men of the current generation of elders who do not do some of these functions because their wives do them. Although these disabilities are cultural, they are still real because a man who loses his wife – an important resource – often finds himself with a serious handicap that only institutionalization can compensate for.

In addition, for each item, the assessment scale evaluates if the available physical and social resources compensate for the observed disability. If they do or if no disability is measured for this function, the handicap is zero. If the resources do not completely compensate for the observed disability, the handicap is equal to the disability score. If the disabilities are partially alleviated, this score overestimates the handicap.<sup>7,8</sup> The rater must also indicate what resources are in place and their short-term stability. Figure 1 shows a sample of the scale, based on which a profile of the individual's disabilities and handicaps is obtained. A manual detailing the scoring and administration procedure for the SMAF is available.<sup>9</sup>

**METROLOGICAL STUDIES**

The interrater reliability of the SMAF was first verified in a study of 150 community-dwelling sub-

