The use of the functional independence measure in elderly

O emprego da medida de independência funcional em idosos

El uso de la medida de independencia funcional en ancianos

Dâmarys Kohlbeck de Melo Neu Ribeiro[a]
Maria Helena Lenardt[a]
Tânia Maria Lourenço[a]
Susanne Elero Betiolli[a]
Marcia Daniele Seima[a]
Carlos Alberto Guimarães[a]

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ABSTRACT

Objectives: To analyze in scientific publications how the Functional Independence Measure (FIM) has been employed to evaluate the elderly.

Methods: Integrative review of periodical publications between 2011 and 2015, available online in full-text in Portuguese, English and Spanish.

Results: 129 articles were found; after the application of the criteria, they resulted in 21. The studies were categorized into two groups: A) follow or compare scores in FIM (cohort studies, case-control, clinical trials), focusing on rehabilitation, evaluation of programs and changes in the functional level after procedures/interventions; and B) measure/associate the functionality of the elderly (cross-sectional studies), focused on evaluation protocols in elderly health and associations to the caregiver burden, hospital stay, balance, satisfaction with life, cognition and clinical/socio-demographic aspects.

Conclusion: The FIM was used in several scenarios of healthcare for the elderly, particularly in rehabilitation and outpatient clinics or health centers.

Keywords: Geriatric nursing. Elderly. Health of the elderly. Daily activities.

RESUMO

Objetivos: Analisar em publicações científicas como a Medida de Independência Funcional (MIF) tem sido empregada para avaliar idosos.

Métodos: Revisão integrativa de publicações periódicas entre os anos de 2011 e 2015, disponíveis online com texto completo em português, inglês e espanhol.

Resultados: Foram encontrados 129 artigos e, após a aplicação de critérios, resultaram em 21. Os estudos foram categorizados em dois grupos: A) acompanhar ou comparar pontos na MIF (estudos de coorte, caso controle, ensaios clínicos), centrando na reabilitação, avaliação de programas e alterações no nível funcional após procedimentos/intervenções; e B) mensurar/associar a funcionalidade dos idosos (estudos transversais), com foco em protocolos de avaliação da saúde do idoso e associações à sobrecarga do cuidador, tempo de internação, equilíbrio, satisfação com a vida, cognição e aspectos clínicos/sociodemográficos.

Conclusão: Empregou-se a MIF em diversos cenários de atenção à saúde do idoso, com destaque para reabilitação e ambulatórios ou centros de saúde.

Palavras-chave: Enfermagem geriátrica. Idoso. Saúde do idoso. Atividades cotidianas.

RESUMEN

Objetivos: Analizar en las publicaciones científicas cómo la medida de la independencia funcional (MIF) ha sido utilizada para evaluar a los ancianos.

Métodos: Revisión integradora de las publicaciones periódicas entre los años 2011 y 2015, disponibles en línea, en texto completo, escritas en portugués, inglés o español.

Resultados: Se encontraron 129 artículos, y después de la aplicación ciertos criterios, el resultado fue 21. Los estudios fueron separados en dos grupos: a) supervisar o comparar los puntajes de MIF (estudios de cohortes, casos y controles, estudios clínicos), se centrando en la rehabilitación, la evaluación de programas y variaciones en el nivel funcional después de los procedimientos o intervenciones; y B) medir o asociar la funcionalidad de los ancianos (estudios transversales), enfocándose en los protocolos de evaluación de la salud de los ancianos y asociaciones de sobrecarga del cuidador, duración de la estancia, equilibrio, satisfacción con la vida, cognición y aspectos clínicos-demográficos.

Conclusión: Se utilizó el MIF en varios escenarios del cuidado de la salud de los ancianos, en particular clínicas de rehabilitación y ambulatorios o centros de salud.

Palabras clave: Enfermería geriátrica. Anciano. Salud del anciano. Actividades cotidianas.

[a] Universidade Federal do Paraná (UFPR). Grupo Multiprofissional de Pesquisa sobre Idosos – GMPI, Curitiba, Paraná, Brasil.

INTRODUCTION

The implications of the increasing numbers of elderly people in all the social spheres have been globally discussed, especially in relation to the increasing human longevity. According to the World Health Organization[1], there is a need for a change in perceptions of health and aging, and to that end, the advanced age should not be synonymous with dependency. This perspective is justified in the attempt to maximize the functional capacity of aging people, so that the health demands of an aging population are as small as possible.

Functionality is seen as the main focus in the healthcare of elderly people[2-4], since it broadens the conception of health-disease evaluation and gives particularity to the healthcare. Especially for the elderly over 80 years old, who usually present chronic diseases, which does not mean limitation and dependence for daily activities.

Several instruments have been used to evaluate the functionality of the elderly, and this diversity also occurs in scientific research. One of the most used instruments, according to national and international literature review[5], is the Functional Independence Measure - FIM. It is composed of 18 items, with a total score ranging from 18 to 126, and it allows quantifying the demand for help from third parties that a person needs to perform their daily life activities. The evaluated items include activities of self-care, sphincter control, locomotion, mobility/transfer, and social cognition. For each evaluated activity, the score ranges from 1 - totally dependent, to 7 - totally independent[6-7].

The FIM emerged in the mid-1980s with the goal of forming a single North American database with assessments and evolutions of patients in rehabilitation[6]. Subsequently, it was translated into several languages[8-9] and validated for the elderly[10]. In the national scenario, the FIM was translated and validated for use in Brazil[11] and it is recommended by the Ministry of Health[12] to evaluate the functionality of the elderly in Primary Care.

In view of the above, the present integrative review aims at analyzing in scientific publications how the Functional Independence Measure (FIM) has been used to evaluate the elderly.

METHOD

This is an integrative review delineated by the following steps: 1. identification of the problem and the objective of the review; 2. stage of search in the literature; 3. evaluation of the data; 4. analysis of the data to order, codify, categorize and synthesize the findings; 5. presentation of the revision/synthesis of knowledge[13].

The search for scientific publications was carried out in SciELO (Scientific Electronic Library Online), Cochrane Library, and PubMed (National Institutes of Health Search) databases, from July to September of 2015.

The search strategy used in the PubMed database was based on the use of the term "Functional Independence Measure". "Free full text" options have been applied to the Text availability field, "published in the last 5 years" in the Publication dates field, "humans" in the Species field, and "80 and over: 80+ years" in the Ages field. We have found 58 articles in the primary search phase.

In the SciELO database, the term "Functionality" was used in the field "All indexes", the descriptor "Elderly" in the "Subject" field, and in the "Year of publication" field, the years 2011 to 2015 have been searched. For the year 2015 the result was 10 publications; in 2014 and 2013 there were 17 for each year; in 2012 the total was 9 articles; and in 2011, 13 publications were counted. Thus, the search in this database resulted in 66 scientific articles.

The search for articles in the Cochrane database was done through the VHL - Virtual Health Library, using the term "functional independence measure" in the field "title, abstract, subject", selecting the "all literature in evidence". Five scientific articles were obtained.

In spite of the particularities that each database requires and makes available to search for articles, in all of the bases, recent publications, from 2011 to 2015, with full texts and free access were searched. After the initial search, the selection of the articles was applied according to the inclusion criteria: to be available in free access online with full text; to be written in Portuguese, English or Spanish.

Publications that were repeated between the databases searched were excluded, the participants were not exclusively elderly, and they did not use the FIM instrument, prior to 2010.

RESULTS

In the initial search, 129 articles were found, and after applying the inclusion and selection criteria, 21 publications were analyzed. The search and selection scheme of articles is simplified in Figure 1.

It is observed in Figure 1, that 67 articles were excluded because they did not use the FIM in the study; 30 were not elderly, as participants in the sample; 5 were found to be repeated between the databases; 3 did not display the full text in open access; 2 showed full version only available in Japanese; and 1 was prior to 2010. In total, 108 scientific articles were excluded.

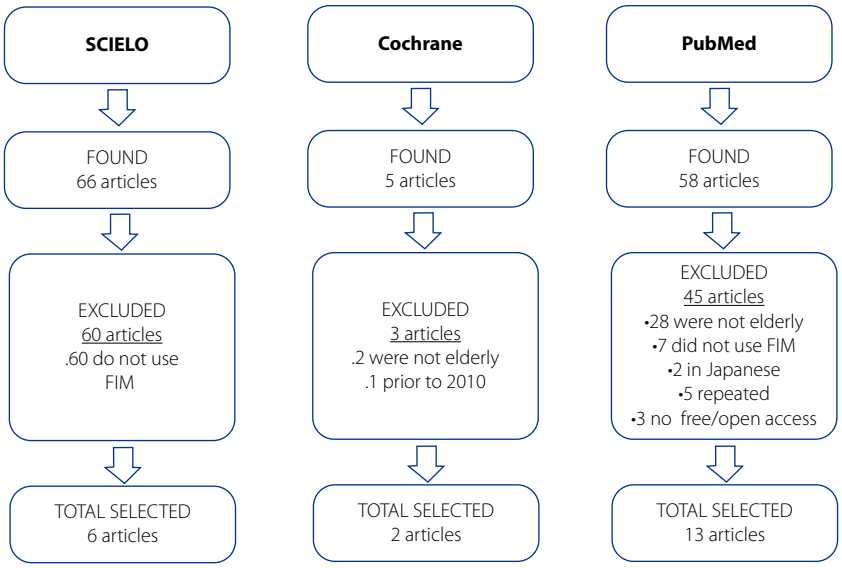
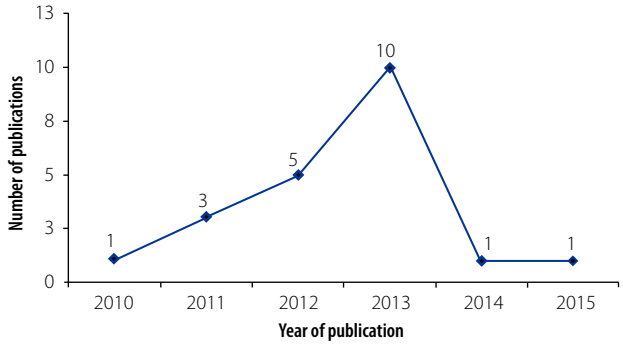


Figure 1 - Scheme of search and selection of articles
Source: Research data, 2016.

Graph 1 represents the year of publication and the quantitative of the selected scientific papers.



Graph 1 - Selected articles by year of publication
Source: Research data, 2016.

Regarding the country of origin of the selected publications, 11 were Brazilian, and 2 articles were from Serbia, Australia and the United States, as well as Finland, Canada, Japan and Chile had one (1) article each. It should be highlighted that, among the national publications, 10 were cross-sectional studies and only one (1) was an observational cohort study.

For the analysis of the selected scientific publications, a synthesis sheet was prepared on the relevant information in each publication. All the selected articles were read in full and, during the readings, the objective and method of the research, the information about the population and location of the study, the purpose of the use of the FIM in the research, and the results obtained were highlighted. The highlights were then systematically organized in the spreadsheet elaborated by the author, which allowed to categorize the publications into two distinct groups (A and B).

Group A was composed of eight cohort studies, case-control and clinical trials in which FIM was applied more than once with the same patients for the purpose of follow-up and/or comparison between the scores. Most of these publications addressed the theme of rehabilitation, program evaluation, and changes in the functional status following procedures or interventions.

In group B, 12 cross-sectional studies were performed and the FIM was used to measure the functionality of the elderly as part of an elderly health assessment protocol or, in addition, to the caregiver overload, length of hospital stay, balance, satisfaction with life, cognition, and other clinical and sociodemographic aspects.

One of the selected articles[14] could not be included in any of the groups, because it is a study protocol, published without results, in the project format. This is a randomized clinical trial aimed at determining the efficacy of a plan for the discontinuation of occupational therapy in reducing functional difficulties for elderly rehabilitation patients in four hospitals in Australia. For this investigation, the FIM will be used only in the selection of the participants, who will be excluded from the study if they score below 5 in the item "locomotion" of the FIM.

DISCUSSION

Group A

Some of the studies classified in this group used the FIM scores as a yardstick to evaluate rehabilitation servi-

ces. A randomized controlled clinical trial aimed at evaluating the cost-effectiveness of a geriatric rehabilitation program[15]. 741 elderly people enrolled in 7 rehabilitation centers in Finland, 376 in the intervention group and 365 in the control group participated in this study. The authors used the Functional Independence Measure to assess the functionality of the elderly in both groups at admission, during follow-up, and after 12 months. It was observed that the FIM score decreased by 3.41 points in the intervention group and 4.35 points in the control group. The researchers concluded that the rehabilitation program was not cost-effective compared to the standard treatment, since the cost-effectiveness for FIM did not present clinically significant change and the rehabilitation was more expensive than the standard treatment.

A similar research was conducted[16] with 560 elderly Australians, whose objective was to explore the effect of different functional levels on the admission, type of impairments and cognitive abilities under the rehabilitation outcomes in the elderly. The researchers applied the FIM at the time of patients' admission, at discharge, and 6 months after the discharge. Patients were classified into 6 groups, according to the main cause of disability: AVE, hip fracture, joint replacement, lower limb amputation, other orthopedic causes and other rehabilitations. The efficiency of the rehabilitation was measured by the increase in the FIM scores during hospitalization for rehabilitation, with a global average increase of 6.7 points per week. The authors concluded that the functional evaluation at admission had a strong predictive value for functional status at discharge, 6 months after discharge, and for the length of hospital stay in elderly patients admitted to rehabilitation centers.

Another study that sought to evaluate a rehabilitation program was carried out in Canada[17], in which 149 elderly people in recovery after hip fracture participated. A "patient-centered rehabilitation model including people with cognitive impairment" was developed, and the hypothesis tested was that this model would result in increased patient mobility and a greater likelihood of returning to the pre-fracture state when compared to usual care. It is a case-control study, in which the group with usual care included 76 elderly, and the intervention group consisted of 73 patients. All the elderly were evaluated[17] through the application of the Motor domain of the FIM (FIMm), at the admission and discharge of the patients, and the difference between the FIMm scores obtained was analyzed as functional gain. The results revealed that there was no significant difference between the groups; the elderly (both groups) had functional gains. However, gains were lower for patients with cognitive impairment, and the elderly in the intervention group were more likely to return home after discharge than patients who received the usual care.

Another study[18], still in the context of rehabilitation, investigated the relationship between cortisol levels during the day and the functional difference between the admission and the discharge in the elderly hospitalized for rehabilitation in California-USA. The functional evaluation also occurred only through the motor domain of the Functional Independence Measure (FIMm) and the difference in FIMm scores between the admission and the discharge (FIMm difference = FIMm discharge score - FIMm admission score). Bivariate correlation analysis revealed that the difference in the FIMm was negatively associated with comorbidities. Participants with fewer comorbidities showed greater improvement in functionality and were associated with several cortisol indices, suggesting that salivary cortisol testing may be a useful biological marker for the identification of patients who are "at risk" of lower benefits from rehabilitation services and may require additional assistance or intervention during their hospitalization.

An equivalent research[19] was conducted in Hong Kong, with the objective of investigating the clinical, nutritional and rehabilitative effects of oral nutritional supplementation in patients hospitalized for rehabilitation. It was a randomized double-blind clinical trial with patients allocated to the control group who received a usual diet and in the intervention group who received supplementation. Among the parameters used to reach the proposed goal was the Functional Independence Measure of the elderly at admission, discharge and four weeks after discharge. The results showed that there was no statistically significant difference between the two groups in the motor subscale and in the total FIM throughout the three evaluations. However, although the functional and mobility benefits have not been demonstrated, the other clinical results were favorable and led the authors to recommend oral nutritional supplementation for geriatric patients after hip fracture in order to reduce complications.

Another issue that emerged among the studies classified in Group A was the evaluation of the functionality before and after a surgical procedure. It is evidenced the Brazilian study[20] that sought to identify variations in functional capacity in the elderly submitted to myocardial revascularization surgery. 33 elderly patients participated in this study, who were evaluated through the FIM and Katz and Lawton's scales preoperatively, at the discharge and 1 month after the discharge. The authors observed a significant change over time, that is, there was a significant decline from the preoperative to hospital discharge and from the pre-admission to one month after the discharge, and

a significant increase in the hospital discharge up to one month after the discharge.

Similar methodology was used in the Serbian study, which evaluated the functional recovery of 203 elderly patients after hip fracture[21]. Evaluations were performed at three times: admission to the hospital (Period 1), hospital discharge (Period 2) and 3 months after the discharge (Period 3). The authors categorized the elderly into three age groups: Group65-74, Group75-84 and Group +85 and in two groups, according to degree of severity. In the group of patients with the same degree of severity, there was an increase in the FIM values in periods 2 and 3 in both genders, and in the first two age groups. The most significant improvement in the FIM was obtained in female elderly in the first and third age groups and with a higher degree of severity.

The last article classified in Group A tested the hypothesis: the functional level, at discharge, is a predictor of mortality one year after hip fracture[22]. This is a prospective observational cohort study involving 228 elderly people admitted after a hip fracture in an orthopedic hospital in Serbia. The pre-fracture FIM scores, at the admission and discharge, as well as other clinical factors such as the American Society of Anesthesiologists (ASA), and the length of stay were evaluated in multiple linear regression analysis to determine the relationship between the functional level and mortality. The results revealed that the functional level at discharge is the main determinant of long-term mortality in patients with hip fracture, and that a lower functional level at discharge is a reflection of the fragility and a consequence of a more low recovery. The authors conclude that the FIM motor score at discharge is a reliable indicator of mortality and may be recommended for clinical use.

Group B

Most of the publications categorized in this group are national (n=10), and applied the Functional Independence Measure relating to: 1) other scales of evaluation of the elderly, 2) clinical conditions such as falls, chronic diseases and Alzheimer's and 3) satisfaction with life.

Three studies used the Zarit scale, aiming to relate the caregiver's overload to the functional level of the elderly[23-25]. The study[24] that aimed to evaluate the overload of the informal caregivers of the elderly with stroke was performed with 62 elderly and their respective informal caregivers, who were recruited at the Emergency Unit of the Hospital das Clínicas of the Medical School of Ribeirão Preto (SP/BR), and the data collection took place in the elderly's home. The results revealed that "functional independence of the elderly, both in the motor and cognitive domains, showed a negative correlation with the level of caregiver overload, suggesting that higher levels of overload are associated with more dependent elderly."[24:189].

Similar results were found in the other two studies that associated the functionality of the elderly with the caregiver overload[23,25]. In the research carried out in a city in the north of the state of Paraná (BR)[25], most of the participating caregivers reported moderate overload, and it was found that the men presented a greater chance of lower overload compared to the women. The authors also concluded that lower overloads were identified in caregivers responsible for the care of elderly people with lower levels of dependence, reinforcing that the functional disability of the elderly was an important predictor of overload in the caregiver.

An epidemiological research with 574 elderly people in the urban community of Ribeirão Preto (SP/BR)[23], aimed to identify the functional dependence of the elderly and the caregiver overload. The average FIM observed was 113.9 (± 20.6), with 15.7% of the elderly identified as dependent. A linear regression analysis was performed, with the total score of the Zarit Overload Scale and as a variable predictor the Global FIM of the elderly. The results showed a statistically significant correlation and they indicate that the dependence of the elderly is a possible risk factor for the caregiver overload. In this way, the more dependent the elderly, the greater the chance of overloading the caregiver.

The research[26] developed in the home environment with Brazilian elderly patients estimated the prevalence of falls and its relation with functional capacity in 240 elderly people. The results showed that there is a correlation between the age and the FIM in the group of elderly patients who suffered falls, indicating that the increase in age is correlated with the decrease in FIM. The authors state that the fall causes a decrease in the functional capacity of the elderly, making them more dependent on the performance of the activities.

Another similar study carried out in Brazil aimed to study the correlation between the body balance and the functional capacity of the elderly with chronic peripheral vestibulopathies and to compare the risk of falls and the occurrence of falls with the functional capacity of these individuals[27]. 50 elderly patients diagnosed with chronic peripheral vestibular dysfunction, submitted to the specific evaluation for balance (DGI), and FIM were enrolled. The authors requested that during the evaluation the patient should demonstrate each task, so that the scores were defined according to the actual capacity of the individual. It was verified[27] that there was a statistically significant positive correlation between the total DGI score and all the FIM domains, thus independence for gait and balance are

inherent factors of good functional capacity. Another result was the statistically significant difference between the DGI categories for all the FIM domains, that is, the elderly with the highest risk of falling had lower scores in the FIM Total domain. The authors concluded that "the better the body balance, the better the functional capacity of the elderly with chronic peripheral vestibular dysfunction, and the greater the impairment of functional capacity, the greater the risk of these individuals falling."[27:797].

Researchers[28] described the functional performance and presence of chronic diseases and injuries in 164 Brazilian elderly people living in five Long Stay Institutions in the city of Recife (BR). For the functional evaluation, the authors used FIM, and complemented the evaluation of instrumental activities of daily living with the Lawton and Brody scale. The categorization was established according to the score obtained in the FIM, being 18 points complete dependence for the ADL; from 19 to 60 points modified dependency; from 61 to 103 points modified dependency; from 104 to 126 points complete or modified independence. The results revealed only 30% of the elderly with complete or modified independence, 70% with some degree of dependence. The most involved tasks in the motor domain were the use of stairs, the bath, and the diuresis control. In the cognitive domain, the lowest scores were for social interaction and problem solving.

A study conducted in the interior of São Paulo (BR) verified the influence of the cognitive performance of the elderly with Alzheimer's Disease (AD) on the development of activities of the daily routine, according to the Functional Independence Measure[29]. The study was conducted in a neurology outpatient clinic of a teaching hospital in Ribeirão Preto, the participants were 67 elderly people with AD, of which 31 (46.3%) had severe dementia, 15 (22.4%) had moderate dementia, and 21 (31.3%) had mild dementia. It was observed that 82% of the elderly had low cognitive performance, the total average of the FIM for the elderly with cognitive deficit was 63.2 and for the elderly who did not present cognitive deficit was 107.7 points. A strong correlation ($r=869$, $p<0.01$) was found between the cognitive performance according to MEEM and the FIM functionality. The elderly with cognitive deficits had a higher level of difficulty in the activities of urine control, bathing, personal hygiene, dressing, toilet use, problem solving and memory.

An investigation[30] conducted with 125 elderly Brazilians in a geriatric outpatient clinic in Campinas (SP/BR) verified the relationship between life satisfaction, functional independence and lower limb performance (muscle strength, walking speed and balance). There was no significant relationship between the FIM results and life satisfaction. The authors justify that the FIM allows the self-report and the overvaluation of performance. In spite of the results found and the justification of the authors, it is valid to consider that the FIM is an instrument that evaluates the functional performance, not the physical capacity, so that it measures how much and what the individual actually does, not how much he/she is able to do.

Another FIM application observed in the selected national studies was as an evaluation tool included in a protocol, or multidimensional evaluation of the elderly[31-32]. The research aimed at identifying demographic and socioeconomic differentials related to the health status of older adults living in two cities in different regions of Brazil, the FIM was present among the data collection instruments[32]. 117 elderly people residing in Caxias do Sul (RS/Brazil) and 155 in Ribeirão Preto (SP / Brazil) have participated in the research. The results showed better functional performance among the elderly from 80 to 84 years old in both cities. In the comparative analysis among the cities, the elderly from Caxias do Sul presented a lower level of functional independence than those from Ribeirão Preto.

In another study, the authors[31] compared the capacity and performance to perform the Basic Daily Life Activities (BDLA) in dependent elderly people, assisted by the reference center of the elderly, Minas Gerais (BR). The FIM was applied in 109 elderly people, of whom 60 were classified as dependents for having scored between 5 and 1 on at least one of the following motor tasks: feeding, personal hygiene, bathing, dressing the upper body, dressing the lower part of the body, use of the toilet, transfers or locomotion. These 60 elderly individuals considered as dependent continued the study and had their activities and participation classified according to the International Classification of Functionality - ICF. The results revealed that in the comparison between the performance and the ability of the elderly to perform tasks, the greatest differences found are the worst performed tasks. That is, their capacity is underutilized in their daily environment in tasks: problem solving, daily routine, activities involving most personal care actions, as well as community, social and civic life.

Among the international publications selected in this group, researchers[33] examined the trends and associations between the length of hospital stay and functional outcomes on the discharge in beneficiaries of a health system treated in inpatient rehabilitation centers after a stroke. A database with information from patients from all the states of the United States of America, District of Colombia and Puerto Rico has been used. Elderly patients aged 65 years old or older were admitted to inpatient rehabilitation centers after a stroke between January of 2002 and June

of 2007. The FIM scores obtained at the discharge, the discharge destiny, and the length of stay of 371,211 elderly were analyzed in 1,649 centers. There was a significant association between the hospitalization period and the FIM scores at the discharge, for each day in the hospital there was an increase of 0.5 points in the total FIM. Another significant association showed that the longer the hospitalization time, the lower the chances of being discharged to the community.

This study aimed to evaluate the functional status of moderately and severely dependent elderly people belonging to the Family Health Center in the city of Talca, Chile[34]. The total of 55 elderly people were evaluated using the Katz, FIM, Barthel Index and other assessment instruments such as the Mini Mental State Examination and the Zarit Scale. The total average FIM was 55.4 ± 28.6, in the motor FIM it was 34.1 ± 19.6, and 21.3 ± 10.7 in the cognitive FIM. The results show that the majority of elderly people with moderate and severe dependence have motor and cognitive alterations and need the help of caregivers.

It is possible to observe that the studies in Group B, mostly national, presented as a methodological design the cross-sectional design, while international studies in Group A used different methodological strategies and research designs, which allows more accurate and relevant results regarding the relations of cause and effect. This finding makes it possible to infer the need for advancement in the national studies regarding the use of the FIM, especially revealing the deficit of prospective and segment studies, and the modality proposed in this evaluation instrument.

CONCLUSION

The FIM has been used in different scenarios of healthcare for the elderly, with emphasis on rehabilitation among international studies, and in outpatient clinics or health centers in national studies. It was evidenced the use of the instrument in the follow-up of patients, as well as for evaluations in cross-sectional research. The Functional Independence Measure has good acceptance in the scientific community to measure the degree of dependency of the elderly and to quantify the demand for care that they can present.

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Corresponding author:
Dâmarys Kohlbeck de Melo Neu Ribeiro.
E-mail: damy_neu@yahoo.com.br

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