





Development and content validation of a self-reported functional mobility assessment instrument for older adult patients

Eric Alencar Lessa^{1,2} 

Carine Freitas e Silva¹ 

Lilian Ramine Ramos de Souza Matos^{1,2} 

Francis Trombini-Souza^{1,3} 

Abstract

Objective: To develop and validate the content of the Composite Score for Mobility (COSMO) for assessing self-reported functional mobility in older adults postoperatively after hip fracture. **Methods:** A methodological study was carried out involving an expert panel of 30 healthcare professionals with experience treating older patients hospitalized after hip fracture surgery and a user panel of 30 older patients hospitalized after hip fracture surgery. The COSMO was developed as a patient-reported outcome measure (PROM) instrument. Content validity was evaluated by applying the Delphi technique to the panel of judges, and a content validity index (CVI) was determined for each instrument item. **Results:** The CVI for the 45 questions answered by the expert judges on the relevance and scope of the COSMO was 100% on 31 questions, 96.7% on 11 questions, 93.3% on one question, and 90% on two questions. Of the 85 questions on the scope, relevance, and understanding of COSMO answered by the 30 user judges, a CVI of 100% was attained for 83 questions and 93.3% on two questions. **Conclusions:** The COSMO is a relevant, comprehensive, understandable and valid instrument for assessing self-reported functional mobility in older adult inpatients after hip fracture surgery.

Keywords: Validation Study. Geriatric Assessment. Hip Fractures.

¹ Universidade de Pernambuco (UPE), Programa de Pós-Graduação em Reabilitação e Desempenho Funcional (PPGRDF). Petrolina, PE, Brasil.

² Hospital Universitário da Universidade Federal do Vale do São Francisco (UNIVASF). Petrolina, PE, Brasil.

³ Universidade de Pernambuco (UPE), Curso de Fisioterapia. Petrolina, PE, Brasil.

There was no funding for the execution of this work.

The authors declare that there is no conflict in the conception of this work.

Correspondence
Francis Trombini-Souza
francis.trombini@upe.br

Received: November 11, 2023
Approved: June 21, 2024

INTRODUCTION

Hip fractures pose a major challenge for public health worldwide^{1,2} given their negative impact on mobility, psychosocial factors and quality of life (QoL) in older adults³. This type of fracture can compromise patient gait and lead to potentially fatal complications, such as pneumonia, thromboembolic disease or rhabdomyolysis, particularly in patients who experience long periods of immobility⁴.

Validated accurate tools that help define the physical rehabilitation process of patients postoperatively after hip fracture are essential⁵. However, assessing the physical status of patients postoperatively does not suffice⁶, since pre-surgical physical-functional independence has a major influence on functional outcome and the post-operative recovery process². Moreover, instruments based on patient performance and on health professional judgments fail to capture the subjective experience of these patients. By contrast, Patient-Reported Outcome Measures (PROMs) can detect subjective perceptions of these individuals⁷ and allow shared decision-making that enables patients to be more actively involved in the rehabilitation process⁸.

One way of determining the validity of an instrument is by content validation, which ensures the research tool captures the phenomenon of interest accurately and comprehensively, while guaranteeing the reliability and validity of results obtained from questionnaires. Content validation also ensures the instrument is both understandable and suitable for the target audience. The content validation stage is fundamental to guarantee that the instrument in question is able to provide accurate predictions in studies of prognostic validity⁹.

Additionally, instruments measuring physical-functional characteristics during the time period between fracture and surgery can be used to produce a score reflecting self-reported mobility. This type of tool can also improve communication among professionals involved in physical-functional recovery, with self-reported disabilities having a bearing on shared decision-making.

At the time of writing, no instruments of this kind assessing both pre and post-operative functional

mobility based on self-reports of older patients undergoing surgery for hip fractures were available. Developing and investigating the content validity of a self-report functional assessment tool for older adults hospitalized after hip surgery can be valuable for clinical practice. Therefore, the objective of the present study was to develop and validate the content of the Composite Score for Mobility (COSMO) tool for assessing self-reported functional mobility in older adults after surgery for hip fracture.

METHODS

This methodological quali-quantitative study was conducted at the orthopedics ward of the Teaching Hospital of the Universidade Federal do Vale do São Francisco (HU-UNIVASF), administrated by the Empresa Brasileira de Serviços Hospitalares (EBSERH). The study was performed in accordance with resolutions 466/2012 e 510/2016 of the National Health Board and with the precepts of the Declaration of Helsinki, and approved by the Research Ethics Committee of the Amaury de Medeiros Integrated Health Center (CISAM-UPE) (Permit number 4.673.367). All participants signed the Free and Informed Consent Form previously approved by the local Research Ethics Committee.

The expert panel included health professionals with at least 5 years of clinical practice involving older adult patients hospitalized after surgery for hip fracture. Respondents who failed to complete 100% of the electronic questionnaire were excluded.

Eligibility criteria for inclusion in the user panel were older adults aged ≥ 60 years, of both sexes, and hospitalized in the orthopedic clinical ward of the HU-UNIVASF with a diagnosis of hip fracture. Exclusion criteria were patients with >4 years of formal education scoring ≤ 24 points on the Mini-Mental State Exam (MMSE) or those with <4 years of formal education scoring 18 points on the MMSE¹⁰. Patients with clinically-diagnosed Alzheimer Disease, senile dementia or dementia with Lewy bodies, hearing loss or aphasia, were also excluded. The performance of users regarding postural balance, gait and muscle strength of lower limbs was assessed using the Brazilian Short

Physical Performance Battery (SPPB), adapted transculturally for older adults¹¹.

The COSMO was developed in accordance with the Consensus-based Standards for selecting health Measurement Instruments (COSMIN)^{12,13}. Firstly, a review of the relevant literature was carried out to define which items to consider for developing this instrument. Two existing instruments for assessing functional mobility were considered: the de Morton Mobility Index (DEMMI)¹⁴, transculturally adapted for Brazilian Portuguese¹⁵, and the New Mobility Score for Predicting Mortality after Hip Fracture¹⁶, used for assessing prior functional mobility of patients.

The first part of the COSMO, containing 8 items, should be answered for the period 1 week prior to the fracture. To this end, patients were asked to describe difficulties a week before the fracture for: 1) going from a lying to sitting position; 2) going from a sitting to lying position; 3) standing from a sitting position; 4) sitting from a standing position; 5) walking to the restroom (around 5 meters from start point); 6) walking around the house or condominium; 7) going out to stroll in their street; and 8) going out to do the shopping.

The second part of the instrument pertains to the post-operative stage and contains 5 items. These items must be assessed daily (preferably at the same time of day) throughout the hospital stay after surgery. This functional information yields a final COSMO score. In this second part of the questionnaire, patients were probed about their current difficulties performing the following tasks:

1) going from lying to sitting position; 2) going from sitting to lying position; 3) standing from sitting position; 4) sitting from standing position; and 5) walking to restroom (around 5 meters from start point). The degree of difficulty self-reported by the patient should be classified as: none (when patient can perform the activity independently); 2) moderate (when the patient can perform the

activity with the assistance of another person, or the aid of crutches, walker or wheelchair); 3) intense (when patient can perform the activity with great difficulty i.e., only with the assistance of 2 or more people); and 4) very intense (when patient cannot perform the activity).

Scores for the questions from the first and second parts of the COSMO range from 3 to 0 in descending order representing the sequence between “none” and “very intense”, respectively. Points are summed after completion of the first two parts of the instrument.

The third part of the COSMO involves calculating mobility scores. The partial score is first calculated by adding the “before fracture” and “post-operative” sections together. Subsequently, the number of days the patient was hospitalized prior to undergoing surgery is deducted from the value of the partial score, yielding an absolute final score. The absolute final score is then divided by 39 if the patient was discharged on the 1st post-operative day (POD), by 54 if discharged on the 2nd POD, or by 69 if discharged on the 3rd POD. This allows the relative final score on the COSMO to be calculated.

The maximum score on the first part of the COSMO is 24 points. The scores on the second part are calculated as follows: The maximum score on the 1st, 2nd and 3rd POD are 15, 30 and 45 points, respectively. Also, the number of days the patient was hospitalized from date of admission to day of surgery must be calculated.

The final score on the COSMO is calculated according to the following steps: 1st – Points for functional difficulty before fracture and after surgery are summed; 2nd – Number of days patient was hospitalized is deducted (from date of hospital admission to date of surgery); 3rd – Relative score on COSMO is calculated.

The original version of the instrument in Brazilian Portuguese is shown in Chart 1.

Chart 1. Original Brazilian version of Composite Score for Mobility (COSMO). Petrolina, Pernambuco state, 2024.

Composite Score for Mobility – COSMO (pre and post-hip fracture)					
One week before the fracture, what difficulties did you have performing the following tasks:					
Task	None (Could / Can perform independently)	Moderate (Could / Can perform with help of person, crutch, walker or wheelchair)	Intense (Could / Can perform with great difficulty, i.e., with aid of 2 or more people)	Very intense (Could not/ cannot perform at all)	
Go from lying to sitting position	3	2	1	0	
Go from sitting to lying position	3	2	1	0	
Stand from sitting position	3	2	1	0	
Sit from standing position	3	2	1	0	
Walk to restroom (around 5 meters)	3	2	1	0	
Walk around house or condominium	3	2	1	0	
Go out for walk in own street	3	2	1	0	
Go out shopping	3	2	1	0	
Total score before hospitalization (0-24)					
At the moment, what difficulties do you have performing the following tasks:					
Go from lying to sitting position	1st POD	3	2	1	0
	2nd POD	3	2	1	0
	3rd POD	3	2	1	0
Go from sitting to lying position	1st POD	3	2	1	0
	2nd POD	3	2	1	0
	3rd POD	3	2	1	0
Stand from sitting position	1st POD	3	2	1	0
	2nd POD	3	2	1	0
	3rd POD	3	2	1	0
Sit from standing position	1st POD	3	2	1	0
	2nd POD	3	2	1	0
	3rd POD	3	2	1	0
Walk to restroom (around 5 meters)	1st POD	3	2	1	0
	2nd POD	3	2	1	0
	3rd POD	3	2	1	0
Total score after surgery (0-45)					
Partial composite score for mobility (0-69)					
Number of days patient was hospitalized before surgery (deduct from partial score for mobility)					
Final composite score for mobility					
Relative composite score for mobility: Final score divided by 39 (1st POD) or 54 (2nd POD) or 69 (3rd POD)					

POD: Post-operative day

Two panels of judges were used in the study to contend validity of COSMO: one comprising experts and the other with users (patients). Interviews were based on a questionnaire containing questions for each domain of the COSMO.

The expert panel was made up of physiotherapists, nurses, orthopedic doctors and occupational therapists chosen based on the importance and diversity of perception of these professions regarding what is relevant or otherwise during the process of self-reported evaluation of this type of patient. These professionals were recruited in a non-probabilistic manner via letter of invitation, followed by the Free and Informed Consent Form, sent via e-mail, instant messaging apps and social networks, between June and September 2021.

The content validity of the COSMO was tested using the Delphi technique, based on data obtained from a panel of 30 expert judges¹⁷. The Delphi method is a powerful quali-quantitative investigation technique that enables the opinion of geographically distal experts to be pooled¹⁸.

After signing the consent form, all of the 30 experts answered a structured questionnaire via Google Forms containing 45 questions on the scope and relevance of the COSMO items. The response options for the questions were: 1) Fully agree; 2) Agree; 3) Neither agree, nor disagree; 4) Disagree; and 5) Totally disagree.

The user panel was made up of patients recruited between September and December 2021 after hospital admission for hip fracture surgery. The patients were asked to perform the specific activities contained in the COSMO. The patients then reported the degree of difficulty performing each task.

After application of the COSMO, users completed a questionnaire based on a paper and pencil interview containing 85 questions on the relevance, comprehensibility and score of the items in the preliminary version of the COSMO. This questionnaire consisted of response options on a Likert-type scale, similar to that used with the panel of experts. The questionnaire was applied by the same physiotherapist (E.A.L) with over 8

years of experience in assessments and therapeutic interventions involving older adult patients hospitalized in an orthopedic clinic for post-operative rehabilitation of hip fractures.

The items from the qualitative analysis were read out aloud by the researcher. Users were then asked to explain what they understood by each item in their own words. If the level of understanding of the COSMO was unsatisfactory, the item was explained and flagged for reworking to improve its comprehension.

For statistical analysis, continuous variables were expressed as mean and standard deviation, whereas categorical variables were expressed as summary measures of absolute and relative frequency. Content validity was rated using the Delphi technique applied qualitatively to the panels of judges. The content validity index (CVI)¹⁹ was subsequently used to quantitatively analyze agreement between the judges. A level of agreement between judges of 85% was adopted as the criterion for good content validity of the instrument devised¹².

The CVI was calculated using the mean number of valid responses²⁰ obtained by panels of experts and users, as shown in Equation 1.

$$CVI = \frac{\text{Number of "1" or "2" responses}}{\text{Total responses}} \quad (\text{Equation 1})$$

DATA AVAILABILITY

The anonymized dataset underpinning the results of the present study are available on Figshare using the digital object identifier (DOI): <https://doi.org/10.6084/m9.figshare.25726710.v2>.

RESULTS

Experts were predominantly female, aged 30-39 years, physiotherapists practicing in Pernambuco state, had graduated as professionals 11 years ago or earlier, had over 8 years of experience treating older adult inpatients with hip fractures in hospital wards, and held specialist qualifications (*lato sensu*) (Table 1).

Table 1. Sociodemographic and professional characteristics of participants on expert panel (N=30). Petrolina, Pernambuco state, 2021.

Variables	n (%)
Sex	
Female	21 (70.0)
Male	9 (30.0)
Age group (years)	
30–39	21 (70.0)
40–49	8 (26.7)
50–59	1 (3.3)
Profession	
Physiotherapist	13 (43.3)
Nurse	9 (30.0)
Occupational therapist	4 (13.3)
Orthopedic doctor	4 (13.3)
Qualifications	
Specialization (<i>lato sensu</i>)	20 (66.6)
Masters	4 (13.3)
Reading for Masters	4 (13.3)
Reading for Doctorate	1 (3.3)
Post-Doctorate	1 (3.3)
Place of professional practice	
Hospital	23 (76.6)
Higher education institute (teacher)	2 (6.7)
Hospital and higher education institute (teacher)	5 (16.7)
State of professional practice	
Pernambuco	18 (60.0)
Alagoas	11 (36.7)
Maranhão	1 (3.3)
Time since graduating and experience (years)	mean (standard deviation)
Graduation	11.2 (4.3)
Experience treating older adult inpatients with hip fracture in hospital wards (years)	8.1 (3.2)

The data in Table 2 shows that over half of the user panel participants (patients) were female and most aged 60–69 years. Almost half of the participants of this panel had no formal education, while the other half reported having incomplete primary education.

The results in Table 3 show that the majority of the sample were able to walk independently and had good cognitive performance, as measured by the MMSE. Femoral neck fractures and falls from height predominated among these participants. Final score on the COSMO obtained by patients was just over 50%.

Respondents who failed to complete 100% of the pen and paper questionnaire were excluded from the user panel.

As shown in Table 4, for the total 45 questions answered in the first round of analysis by the 30 expert judges on the relevance and scope of the COSMO, a CVI of 100% agreement was attained for most questions and CVI of around 90% for two questions. This percentage CVI was the lowest obtained by the analysis for the expert panel. Thus, no changes to the questions from the questionnaire were

necessary, since the minimum level of quantitative and qualitative agreement (80%) was reached in the first round of analysis.

Also, as shown in Table 4, of the total of 85 questions on scope, relevance and comprehension of the COSMO answered by the 30 judges on the user panel, a CVI of 100% was obtained on more than 80 questions and CVI of over 90% on 2 questions. None of the CVIs among participants in the user panel were below 93.3%. This lower agreement

(93.3%) occurred for questions 27 (“Considering the timepoint one week before the fracture, there is no end of key concepts”) and 45 (“Considering the post-surgical timepoint, there is no end of key concepts”).

The CVIs calculated for each item of the instrument, applied to the expert and user panels, can be found in the tables of Supplementary Material 1 and 2, respectively, available from <https://doi.org/10.6084/m9.figshare.25726710.v2>.

Table 2. Sociodemographic characteristics of participants on user panel. (N=30). Petrolina, Pernambuco state, 2021.

Variables	n (%) or mean (standard deviation)
Sex	
Female	17 (56.7)
Male	13 (43.3)
Age group (years)	n (%)
60–69	17 (56.7)
70–79	6 (20.0)
80–89	7 (23.3)
≥ 90	0 (0.0)
Marital status	
Married	19 (63.3)
Widowed	4 (13.3)
Single	4 (13.3)
Divorced/separated	2 (6.7)
Education	
Illiterate	14 (46.7)
Incomplete primary	14 (46.7)
Complete primary	2 (6.6)

Table 3. Clinical and functional characteristics of participants on user panel. (N=30). Petrolina, Pernambuco state, 2021.

Variables	n (%) or mean (standard deviation)
Cognitive function	mean (standard deviation)
Mini-mental state exam	24.3 (3.9)
Overall physical functioning before fracture	n (%)
Able to walk independently	24 (80.0)
Able to walk only with help of devices or people	6 (20.0)

to be continued

Continuation of Table 3

Variables	n (%) or mean (standard deviation)
Functional performance on COSMO	mean (standard deviation)
Score before fracture (0-24)	23.0 (2.0)
Score after surgery (0-45)	18.2 (9.4)
Partial score (0-69)	40.6 (9.1)
Length of hospital stay (days)	10.7 (6.5)
Final COSMO score	29.8 (11.8)
Relative COSMO score (0-100%)	55.2 (22.0)
Functional performance on SPPB	median (Q1 – Q3)
Balance	0 (0.0 – 1.8)
Chair sit-to-stand	0 (0.0 – 0.0)
Gait	0 (0.0 – 0.0)
Total SPPB	0 (0.0 – 2.0)
Site of hip fracture	n (%)
Femoral neck	17 (56.6)
Intertrochanteric	12 (40.0)
Subtrochanteric	01 (3.3)
Type of fall	n (%)
From height	27 (90.0)
From stairs or steps	02 (6.6)
Others	02 (3.3)

COSMO: Composite Score for Mobility; SPPB: Short Physical Performance Battery; Q1 and Q3: Quartiles 1 and 3.

Table 4. Content validity index based on judgment of panel of experts (N=30) and users (N=30). Petrolina, Pernambuco state, 2021.

Variables	n (%)
Total questions on relevance and scope of COSMO (expert panel; n=30)	45 (100.0)
Percentage CVI obtained from experts	
100.0%	31 (68.9)
96.7%	11 (24.4)
93.3%	1 (2.2)
90.0%	2 (4.4)
<89.0%	0 (0.0)
Total questions on scope, relevance and comprehension of COSMO (user panel; n=30)	85 (100.0)
Percentage CVI obtained from users	
100.0%	83 (97.6)
93.3%	2 (2.4)
<93.3%	0 (0.0)

COSMO: Composite Score for Mobility; CVI: Content validity index.

DISCUSSION

The objective of the present study was to develop and validate the content of the Composite Score for Mobility (COSMO) for assessing self-reported functional mobility in older adult inpatients after surgery for hip fracture. The main results of the study reveal that the content of the COSMO exhibited over 96% scope and relevance on more than 90% (42/45) of the items, as rated by the expert panel. Analysis of the user (patient) perceptions showed that the scope, relevance and comprehension of the instrument yielded 100% content validity for 97% (83/85) of the items. Given that none of the questions had an CVI below the 85% agreement threshold established in this study¹², no changes were made to the final version of the instrument.

Different measures of outcomes assessed and reported by physicians (Clinician Reported Outcome Measures, CROMs) (or other health professionals) and outcomes reported by patients about their perceptions (Patient Reported Outcome Measures, PROMs) are routinely employed to monitor the effects of treatment and post-operative performance results²¹. However, it is important to note that only a moderate association exists between results of PROMs and CROMs, demonstrating that these two types of measure provide different clinical information on the functional status of patients²². While the PROM provides information on the experience related to task execution, CROM type instruments yield information about ability for task completion²³.

Of a total 11 instruments identified in a systematic review for assessing mobility of hospitalized older adults, none were of the PROM type or evaluated functional status before hip fracture²⁴. Such instruments capture the subjective perception of these individuals⁷ and enable shared decision-making that helps patients play a more active role in the rehabilitation process⁸. This kind of instrument can be used to improve perioperative care, by accounting for pre-operative functional impairments, as well as post-operative follow-up²⁵. Against this backdrop, the present study results confirming the content validity of the COSMO reveal this to be a promising approach for self-reported functional assessment of this clinical goal. The fact that patients do not need

to perform any physical-functional test at the post-fracture and post-surgical stages renders COSMO a safe instrument for obtaining data on physical-functional mobility in the hospital setting.

Also, it is noteworthy that surgery wait times after hip fracture can impact 30 and 90-day survival rates²⁶. Older patients appear to be at greater risk of death due to surgical delays than younger patients. Hence, two patients with the same pre-fracture functioning may have very different prognoses at hospital discharge, depending on the length of time awaiting surgery and length of post-operative hospital stay²⁶. Therefore, the COSMO was devised to provide a cumulative composite tool for assessing functional status before surgery and during hospital stays pre and postoperatively. PROM-type instruments can be used to improve pre-operative care by providing an assessment of pre-operative functional impairments and post-operative follow-up of patients²⁵. Taken together, these attributes render the COSMO a promising self-report functional assessment for use in routine clinical practice of hospitals.

Another strength of the study was the diversity of the professionals on the expert panel. The physiotherapists, for example, were directly involved with patients from pre-operative rehabilitation through to discharge²⁷. The nurses play an important role in changing decubitus, mobility for washing, and changing clothes or diapers²⁸. Orthopedic doctors are responsible for surgical treatment and therefore engage in shared decision-making on subsequent therapeutic approaches to improve the physical mobility of these patients²⁹. Occupational therapists are responsible, among other duties, for assessing the functional independence of these patients³⁰.

The lowest level of agreement among the experts was 90% (for question 45). The first expert (nurse) in disagreement cited that the concepts described in this instrument did not rule out the possibilities of other key concepts, while the second expert (occupational therapist) was unable to expand on their reasoning for disagreement with this specific question. Among the 30 user judges, the lowest level of agreement was 93.3%, obtained for question numbers 27 and 45, reported by 2 users. One of the users cited that questions on post-stroke complications should have been included, while the other stated there should

have been a question asking whether the patient had Parkinson's disease. These suggestions were not incorporated into the final version of the COSMO because the aim of the study was to determine difficulties experienced by patients for performing functional mobility activities after surgery for hip fracture, irrespective of pre-existing health conditions. Thus, given the high level of agreement found in the study, no further adaptations to the final COSMO version were necessary.

To the best of our knowledge, the methodological procedures of this study allowed the development and content validation of the first Brazilian PROM-type instrument for functional assessment based on self-reporting of older adult inpatients after surgery for hip fracture in a hospital setting. The content validation process entailed critical examination of the basic structure of the instrument by patients as well as experts, based on a review of the procedures used for developing the questionnaire and of the applicability to the phenomenon of research interest³¹.

However, assessment of the reliability of the COSMO was not possible due to the dynamic of the hospital where patients were assessed. Typically, patients are discharged by the 2nd POD, largely to reduce the risk of nosocomial infections in the hospital environment. According to COSMIN guidelines^{12,32}, the time interval between measurements should be sufficiently long to prevent memory bias regarding previous scores as they relate to intra-examiner reliability, yet sufficiently short so as to ensure patients do not present changes in the construct being measured³². Consequently, the test of repeatability of data obtained by the COSMO was not possible because of the hospital discharge dynamic recommended for this type of patient. The second limitation of this study and, hence, of the COSMO tool, is that all PROM-type instruments require unimpaired cognitive functioning of participants¹². Therefore, application of COSMO should be limited to cognitively-healthy older adults.

This study was limited to verifying the content validity of the COSMO. Content validity assures the instrument is understandable and suitable for the target audience⁹. Thus, it is important to reiterate that content validation is a key step, for example, in studies of prognostic validity⁹. While content validation is

fundamental, other measures for assessing the validity and reliability of the COSMO are now warranted.

CONCLUSION

The COSMO proved a relevant, comprehensive, understandable instrument with valid content for assessing functional mobility self-reported by older adult inpatients during the hospital stay after surgery for hip fracture. The functional mobility results obtained by COSMO can help inform decision-making by health professionals during hospital discharge of older adults after surgery for hip fracture, and also aid physical rehabilitation professionals in the hospital setting. A special feature of the COSMO is that it can be used to evaluate, in a composite cumulative manner, functional status before fracture and surgery, as well as physical-functional performance after surgery, taking account of the length of hospital stay pre and postoperatively.

AUTHORSHIP

- Eric A. Lessa – study conception and design, data analysis and interpretation, writing of article and approval of version for publication.
- Carine F. Silva – writing and critical review of article and approval of version for publication.
- Lilian R. R. S. Matos – writing and critical review of article and approval of version for publication.
- Francis Trombini-Souza – study conception and design, data analysis and interpretation, writing of article and approval of version for publication.

ACKNOWLEDGMENTS

The authors extend their thanks to the University Hospital of the Universidade Federal do Vale do São Francisco (HU - UNIVASF), administrated by the Empresa Brasileira de Serviços Hospitalares (EBSERH), for providing the infrastructure and operational logistics required to conduct this study.

Edited by: Larissa Neves Quadros

REFERENCES

- Guerra MTE, Vargas MWA, Galia CR. Baixos níveis séricos de vitamina D aumentam significativamente o risco de morte em idosos com fraturas de quadril: coorte prospectiva. *Rev Col Bras Cir* 2022;49. Available from: <https://doi.org/10.1590/0100-6991e-20223054>
- Guerra MTE, Viana RD, Feil L, Feron ET, Maboni J, Vargas AS-G. One-year mortality of elderly patients with hip fracture surgically treated at a hospital in Southern Brazil. *Rev Bras Ortop.* 2017;52:17-23. Available from: <https://doi.org/10.1016/j.rboe.2016.11.006>
- Konstantinos IA, Andreas R, Sokratis EV, Konstantinos NM. Quality of life and psychological consequences in elderly patients after a hip fracture: a review. *Clin Interv Aging.* 2018;(24)13:143-150. Available from: <https://doi.org/10.2147/CIA.S150067>
- Rocha KNS, Delicato LS, de Oliveira NHG, et al. Princípios gerais de gerenciamento de fraturas: Complicações precoces e tardias. *Braz J Health Rev.* 2022;5(1):304-314. Available from: <https://doi.org/10.34119/bjhrv5n1-027>
- Neto F, Lopes M, de Oliveira F, de Vasconcelos Alves F, Melo M, de Souza C. Translation and transcultural adaptation of the Hip Fracture Recovery Score assessment tool. *Rev Bras Ortop.* May-Jun 2016;51(3):353-65. Available from: <https://doi.org/10.1016/j.rboe.2015.08.020>
- Lee KJ, Um SH, Kim YH. Postoperative Rehabilitation after Hip Fracture: A Literature Review. *Hip Pelvis.* Sep 2020;32(3):125-131. Available from: <https://doi.org/10.5371/hp.2020.32.3.125>
- Carrozzino D, Patierno C, Guidi J, et al. Clinimetric criteria for patient-reported outcome measures. *Psychother Psychosom.* 2021;90(4):222-232. Available from: <https://doi.org/10.1159/000516599>
- Hoffmann T, Bakhit M, Michaleff Z. Shared decision making and physical therapy: What, when, how, and why? *Braz J Phys Ther.* 2022;26:100382. Available from: <https://doi.org/10.1016/j.bjpt.2021.100382>
- Terwee CB, Bot SD, de Boer MR, et al. Quality criteria were proposed for measurement properties of health status questionnaires. *J Clin Epidemiol.* Jan 2007;60(1):34-42. Available from: <https://doi.org/10.1016/j.jclinepi.2006.03.012>
- Bertolucci PHF, Brucki SMD, Campacci SR, Julian Y. O mini-exame do estado mental em uma população geral: impacto da escolaridade. *Arquivos de neuro-psiquiatria.* 1994;52(1):7. Available from: <https://doi.org/10.1590/S0004-282X1994000100001>
- NAKANO, MM. Versão brasileira da Short Physical Performance Battery SPPB: adaptação cultural e estudo da confiabilidade. 2007. Dissertação (mestrado) - Universidade Estadual de Campinas, Faculdade de Educação, Campinas, SP. Available from: <https://hdl.handle.net/20.500.12733/1604495>
- Terwee CB, Prinsen C, Chiarotto A, et al. COSMIN methodology for assessing the content validity of PROMs—user manual. *Qual Life Res.* 2018;27:1159–1170. Available from: <https://doi.org/10.1007/s11136-018-1829-0>
- Terwee CB, Prinsen CAC, Chiarotto A, et al. COSMIN methodology for evaluating the content validity of patient-reported outcome measures: a Delphi study. *Qual Life Res.* May 2018;27(5):1159-1170. Available from: <https://doi.org/10.1007/s11136-018-1829-0>
- de Morton N, Davidson M, Keating J. The de Morton Mobility Index (DEMMI): an essential health index for an ageing world. *Health Qual Life Outcomes.* Aug 19 2008;6:63. Available from: <https://doi.org/10.1186/1477-7525-6-63>
- Silva VZM, Lima AS, Alves HNS, Pires-Neto R, Denehy L, Parry SM. Versão Brasileira do teste da Função Física em Unidades de Terapia Intensiva e do De Morton Mobility Index: tradução e adaptação transcultural e propriedades clinimétricas. *J Bras Pneumol* 2020;46. Available from: <https://doi.org/10.36416/1806-3756/e20180366>
- Parker M, Palmer C. A new mobility score for predicting mortality after hip fracture. *J Bone Joint Surg Br.* Sep 1993;75(5):797-8. Available from: <https://doi.org/10.1302/0301-620X.75B5.8376443>
- Mokkink LB, De Vet HC, Prinsen CA, et al. COSMIN risk of bias checklist for systematic reviews of patient-reported outcome measures. *Qual Life Res.* 2018;27(5):1171-1179. Available from: <https://doi.org/10.1007/s11136-017-1765-4>
- Marques J, de Freitas D. The delphi method: characterization and potentialities for educational research. *Pro-Posições.* 2018;29(2):389. Available from: <https://doi.org/10.1590/1980-6248-2015-0140>
- Shrotryia VK, Dhanda U. Content Validity of Assessment Instrument for Employee Engagement. *SAGE Open.* 2019;9(1). Available from: <https://doi.org/10.1177/2158244018821751>
- Júnior VAC, Neto SS, Cabral DS, Chermont AG, dos Santos Trindade CBJR, Criação e validação de aplicativo para avaliação de dor infantil. *Res Soc Dev.* 2021;10(10):e529101017721-e529101017721. Available from: <https://dx.doi.org/10.33448/rsd-v10i10.17721>

21. Bily W, Jauker J, Nics H, Grote V, Pirchl M, Fischer MJ. Associations between Patient-Reported and Clinician-Reported Outcome Measures in Patients after Traumatic Injuries of the Lower Limb. *Int J Environ Res Public Health*. Mar 7 2022;19(5). Available from: <https://doi.org/10.3390/ijerph19053140>
22. Maly MR, Costigan PA, Olney SJ. Determinants of self-report outcome measures in people with knee osteoarthritis. *Arch Phys Med Rehabil*. Jan 2006;87(1):96-104. Available from: <https://doi.org/10.1016/j.apmr.2005.08.110>
23. Stratford PW, Kennedy D, Pagura SM, Gollish JD. The relationship between self-report and performance-related measures: questioning the content validity of timed tests. *Arthritis Rheum*. Aug 15 2003;49(4):535-40. Available from: <https://doi.org/10.1002/art.11196>
24. Menezes KQRS, Auger C, Menezes WRS, Guerra RO. Instruments to evaluate mobility capacity of older adults during hospitalization: A systematic review. *Arch Gerontol Geriatr*. Sep 2017;72:67-79. Available from: <https://doi.org/10.1016/j.archger.2017.05.009>
25. Kim S, Duncan PW, Groban L, Segal H, Abbott RM, Williamson JD. Development and Implementation of a Tool to Assess Patient-Reported Outcome Measures (PROM) in Preoperative Setting. *Glob J Perioper Med*. 2017;1:017-21. Available from: <https://doi.org/10.17352/gjpm.000005>
26. Beaupre LA, Khong H, Smith C, et al. The impact of time to surgery after hip fracture on mortality at 30- and 90-days: Does a single benchmark apply to all? *Injury*. Apr 2019;50(4):950-955. Available from: <https://doi.org/10.1016/j.injury.2019.03.031>
27. Hartman J, Duttine A. Rehabilitation 2030: a collective call that requires individual action. *Braz J Phys Ther*. 2022;26(2). Available from: <https://doi.org/10.1016/j.bjpt.2021.06.004>
28. Soares AB, Silva AM, da Silva GD, et al. A assistência de enfermagem ao paciente submetido à artroplastia total de quadril e a importância dos cuidados no período pós-operatório. *Rev Recien*. 2013;3(7):11-18. Available from: 10.24276/rrecien2177-157X.2013.3.7.11-18
29. Luthi F, Pereira LC, Jolles BM. Os 12 pontos-chave da reabilitação após artroplastia total do joelho. *Rev Soc Bras Clin Med*. 2015;13(4):303-309. Available from: <http://files.bvs.br/upload/S/1679-1010/2015/v13n4/a5192.pdf>
30. Loureiro HA, Silva KL, Braga MAF. A prática da terapia ocupacional junto ao idoso com alterações ortopédicas em um hospital de urgência e emergência. *Rev Ter Ocup Univ São Paulo*. 2019;30(1):53-61. Available from: <https://doi.org/10.11606/issn.2238-6149.v30i1p53-61>
31. Venancio SI, Bortoli MC, Frias PG, Giugliani ER, Alves CRL, Santos MO. Development and validation of an instrument for monitoring child development indicators. *J Pediatr (Rio J)*. 2020;96:778-789. Available from: <https://doi.org/10.1016/j.jped.2019.10.008>
32. Mokkink LB, Boers M, van der Vleuten C, et al. COSMIN Risk of Bias tool to assess the quality of studies on reliability and measurement error of outcome measurement instrument. *BMC Med Res Methodol*. 2020. Available from: <https://doi.org/10.1186/s12874-020-01179-5>