

## Instruments for evaluation of the risk of prolongation of hospitalization

Instrumentos de avaliação do risco de prolongamento de internação hospitalar

Instrumentos de evaluación del riesgo de prolongar la internación hospitalaria

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### Keywords

Risk assessment; Length of stay; Patient discharge;  
Review literature as topic

### Descritores

Medição de risco; Tempo de internação; Alta do  
paciente; Literatura de revisão como assunto

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Medición de riesgo; Tiempo de internación; Alta del  
paciente; Literatura de revisión como asunto

### Submitted

October 29, 2018

### Accepted

March 7, 2019

### Abstract

**Objective:** To map the existence of instruments for evaluation of the risk of prolonged hospitalization time with hospital discharge delay of the patient.

**Methods:** It was conducted a scoping review of the literature in accordance with suggested by the Joanna Briggs Institute. It was carried out research on the electronic platform Ebscohost: Medline, Cinahl, MedicLatina, Cochrane Data Base of Systematic Reviews; PubMed, in repositories (RIMAS, RIAP, RIUIS, RCAAP and Veritati) and Google Scholar. The bibliographic references of the selected documents were consulted.

**Results:** From the research carried out, 7 articles were selected for analysis, which included 4 instruments: Patient Status of Continence, Ambulation, Age, Social Background and Thought Processes; 4-Score, Blaylock Risk Assessment Screen and The Multidisciplinary Record.

**Conclusion:** The risk of prolonged hospitalization time with hospital discharge delay can be evaluated using 4 types of instruments. This assessment focuses mainly on the patient's cognitive function, age, reliance on daily living activities, mobility and social support, and is committed to an early and preventive discharge planning.

### Resumo

**Objetivo:** Mapear a existência de instrumentos para avaliação do risco de prolongamento do tempo de internação com retardo da alta hospitalar do paciente.

**Métodos:** Efetuada revisão da literatura do tipo scoping de acordo com o proposto pela Joanna Briggs Institute. Efetuada pesquisa na plataforma eletrônica da Ebscohost: Medline, Cinahl, MedicLatina, Cochrane Data Base of Systematic Reviews; na PubMed, em repositórios (RIMAS, RIAP, RIUIS, RCAAP e Veritati) e no Google Scholar. Consultadas as referências bibliográficas dos documentos selecionados.

**Resultados:** Da pesquisa efetuada selecionaram-se 7 artigos para análise, que abordavam 4 instrumentos: *Patient Status of Continence, Ambulation, Age, Social Background and Thought Processes; 4-Score, Blaylock Risk Assessment Screen e The Multidisciplinary Record.*

**Conclusão:** O risco de prolongamento do tempo de internação com retardo da alta hospitalar pode ser avaliado através de 4 tipos de instrumentos. Esta avaliação foca-se principalmente na função cognitiva do paciente, na sua idade, no seu nível de dependência nas atividades de vida diárias, na sua mobilidade e apoio social de que dispõe, apostando-se num planeamento de alta precoce e preventivo.

### Resumen

**Objetivo:** Mapear la existencia de instrumentos para evaluar el riesgo de prolongar el tiempo de internación con retraso de alta hospitalaria del paciente.

**Métodos:** Se llevó a cabo una revisión bibliográfica tipo scoping de acuerdo con lo propuesto por el Joanna Briggs Institute. Se realizó una investigación en la plataforma electrónica de Ebscohost: Medline, Cinahl, MedicLatina, Cochrane Data Base of Systematic Reviews; en PubMed, en repositórios (RIMAS, RIAP, RIUIS, RCAAP y Veritati) y en Google Scholar. Se consultaron las referencias bibliográficas de los documentos seleccionados.

**Resultados:** De la investigación llevada a cabo, se seleccionaron siete artículos para analizar, que abordaban cuatro instrumentos: *Patient Status of Continence, Ambulation, Age, Social Background and Thought Processes; 4-Score, Blaylock Risk Assessment Screen y The Multidisciplinary Record.*

**Conclusión:** El riesgo de prolongar el tiempo de internación con retraso de alta hospitalaria puede evaluarse a través de cuatro tipos de instrumentos. Esta evaluación se centra principalmente en la función cognitiva del paciente, en su edad, su nivel de dependencia de las actividades de vida diarias, su movilidad y apoyo social que dispone; y se apuesta a una planificación de alta precoz y preventiva.

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### DOI

http://dx.doi.org/10.1590/1982-  
0194201900032



### How to cite:

Modas DA, Nunes EM. Instruments for evaluation of the risk of prolongation of hospitalization. Acta Paul Enferm. 2019;32(2):237-45.

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Conflicts of interest: nothing to declare.

## Introduction

The length of hospital stay consists of the total number of days that the patient remains hospitalized in a service of a health establishment.<sup>(1)</sup> Hospital discharge is the patient's departure from the hospital, who has been in the institution for at least one night. The hospital discharge rate represents the number of patients who left the hospital after receiving proper health care that is inherent to their clinical situation, for each 100,000 inhabitants.<sup>(2)</sup> Portugal represents the country of the European Union with the lowest hospital discharge rate, being the third country with the longest hospitalization time.

In certain situations, after being discharged, the patient remains in the institution, prolonging hospitalization time with hospital discharge delay. This hospital stay may be due to a number of factors, from lack of vacancy in nursing homes or continued care, such as family or financial issues.<sup>(3)</sup>

Staying at the institution bring consequences for the health and well-being of the person, increasing the risk of associated morbidity and mortality, given the increased risk of malnutrition, depression, falls, confusional states, infections and complications iatrogenic, mobility decrease and greater level of dependency.<sup>(4)</sup> Institutionally, the effects are associated costs and profitability, comprising human and material resources, increasing the waiting lists.<sup>(4,5)</sup> To extend the length of stay of a patient implies that bed occupation by a person who is not currently in need of acute care, making it impossible the admission of new patients, keeping costs for the institution, with a lower turnover of patients, delaying the resolution of acute problems, occurring the called bed blocking.<sup>(5)</sup> These aspects are consistent with World Health Report, which states the hospital care, especially hospitalization and its length, corresponding to two thirds of total expenditure in health of the Government.<sup>(6)</sup> This scenario may be seen worldwide. Studies performed in hospitals in Canada found that 27-66% of hospitalization time was considered inappropriate.<sup>(7)</sup> In Brazil, in two hospitals from Belo Horizonte, the time of hospitalization was prolonged in 60% and 58% of the patients admitted to medical clinic wards, corre-

sponding to an occupancy rate of 23% and 28%, respectively.<sup>(8)</sup>

Thus, it is fundamental to identify the causes for this prolongation of hospitalization time, suggesting decisive strategies. For this identification it is necessary to implement risk assessment instruments, identifying the actual and potential problems of these patients, as well as their needs. In this sense, it was initially investigated the existence of literature reviews or protocols on this subject, using the site of Joanna Briggs Institute, and no registration was obtained. It was not identified literature review on instruments for evaluation of patients at risk of prolonged hospitalization time with hospital discharge delay, so it was carried out a scoping review to map the real evidence on this issue. By gathering this documentation, it becomes possible to adapt instruments or create new ones for implementation in different realities.

## Methods

Using the methodology of Joanna Briggs Institute, and based on the mnemonic population - concept - context (PCC),<sup>(9)</sup> this literature review started with the question of revision: what existing evaluation instruments for identification of patients at risk of prolonged hospitalization time with hospital discharge delay?

As previously mentioned, an initial research was carried out on the site of the Joanna Briggs Institute, aiming to identify publications of current reviews on this theme, and no results were obtained.

The inclusion criteria included studies that address evaluation instruments for the identification of patients at risk of prolonged hospitalization time, comprising patients of all age, groups hospitalized in an acute and/or chronic situation in different medical specialties. Primary studies and reviews, qualitative and quantitative studies, with abstract and full text available were included in the Portuguese, Spanish and English languages. No temporal or geographical limit was defined in order to obtain the maximum of existing evidence.

Regarding the research strategy, it was investigated the databases of Ebscohost's electronic platform: Medline with full text, Cinahl with full text, MedicLatina, Cochrane Data Base of Systematic Reviews; and PubMed. To complement this analysis, we searched repositories, such as the Repository of Measurement and Health Assessment Instruments (RIMAS – *Repositório de Instrumentos de Medição e Avaliação em Saúde*), Repository of Psychosocial Assessment Instruments (RIAP – *Repositório de Instrumentos de Avaliação Psicossocial*), Repository of Instruments of the Health Research Unit (RIUIS – *Repositório de Instrumentos da Unidade de Investigação em Saúde*), Scientific Open Access Repository of Portugal (RCAAP – *Repositório Científico de Acesso Aberto de Portugal*) and Veritati - Institutional Repository of the *Universidade Católica Portuguesa*; and Google Scholar. Then, the bibliographic references of the selected documents were consulted.

The PubMed database resulted in the following search syntax:

(((((("Risk Management"[Mesh]) OR "Risk Assessment"[Mesh]) OR "Health Status Indicators"[Mesh]) OR "Risk Adjustment"[Mesh]) OR Risk Identification) OR Risk Detection)) AND (((("Patient Discharge"[Mesh]) OR "Patient Discharge Summaries"[Mesh]) OR Transfer, Discharge) OR Hospital Discharge) OR Discharge Planning)) AND ((Delay) OR Length of Delay)

Similar syntaxes were used for the remaining databases. The research in the literature took place in April of 2018.

Once the studies were identified in the databases, two reviewers started selecting articles independently. Any disagreement between the two was discussed for unanimous final decision, in order to reduce the risk of bias.

After completing this process, the corpus of the analysis was obtained, collecting the following data: identification of the article - title, author, year of publication, country; objective, participants - population, sample size; methodological characteristics, results obtained - evaluation instruments for identification of patients at risk of prolonged hospitalization time; limitations and key findings relevant to the review.

Regarding the presentation of the results, it is described different evaluation instruments of identified risks, and it is carried out a descriptive and comparative analysis of the results with a narrative synthesis.

## Results

Of the 188 total results obtained, 12 were duplicates, resulting 182 for selection by title. After this screening, 19 were chosen to read the abstract, and 4 final articles were analyzed. From the consultation of the bibliographic references, 3 documents were selected for revision, thus, a total of 7 final articles to be included in the review (Figure 1).

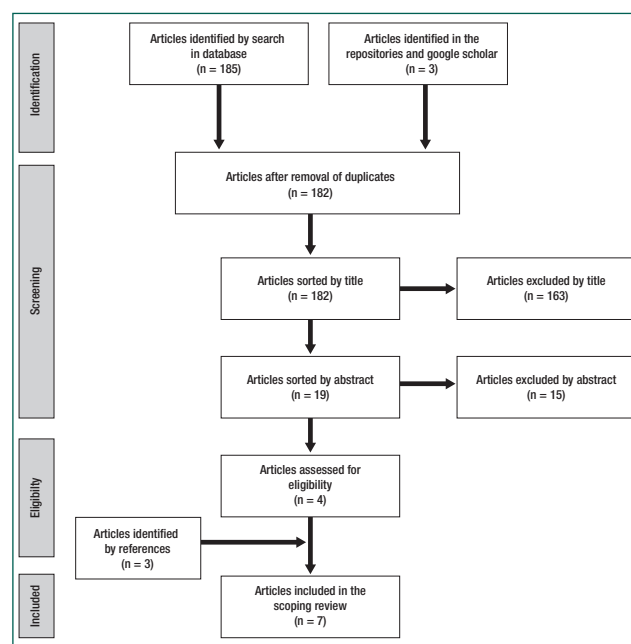


Figure 1. Prism of studies selection

From the analysis of the 7 articles resulted 4 instruments: Patient Status of Continence, Ambulation, Age, Social Background and Thought Processes (CAAST);<sup>(10)</sup> 4-Score,<sup>(11)</sup> Blaylock Risk Assessment Screening Score (BRASS)<sup>(12)</sup> and The Multidisciplinary Record.<sup>(13)</sup>

These instruments were developed in the 70's<sup>(10,11)</sup> and 90's<sup>(12)</sup> and in the year 2000,<sup>(13)</sup> the first three in the United States of America<sup>(10-12)</sup> and

the last one in Denmark,<sup>(13)</sup> focusing on adult and elderly patient.

The CAAST instrument and the 4-Score identify patients at risk of prolonged hospitalization for social causes.<sup>(10,11)</sup> The BRASS instrument identifies three levels of risk of prolonged hospitalization and the need for planning of certain features at the discharge.<sup>(12)</sup> The Multidisciplinary Record features an interdisciplinary methodology of discharge problems prevention, which evaluate different parameters for setting intervention goals.<sup>(13)</sup> Other authors use different scales, such as the Barthel scale for evaluation of the functional dependency level, aiming to predict the length of hospitalization by obtaining indicators of risk of extension of this time.

Following, each of these instruments was addressed in more details.

## Discussion

Prolonged hospitalization is a risk for the patient, and it is important to develop methodologies that prevent this problem.<sup>(4)</sup>

From the results obtained, the CAAST consists of an instrument that evaluates five parameters of the patient's condition, which were identified as obstacles to a discharge in the appropriate time. These criteria are the level of continence (bladder and bowel), walking ability, age, social support (intended destination after discharge, i.e., domicile or providing care institutions) and cognitive function (communication and orientation ability). Each item is evaluated between 0-2, being the degree of increasing severity in this categorization. It results in a final score between 0 (no risk of prolonged hospitalization time) and 10 (high risk of prolonged hospitalization time).<sup>(10)</sup>

This instrument aims at a quick identification at the time of admission of patients considered to be at risk of having discharge problems. In view of high final scores, this instrument alerts to the need to request the intervention of the social worker, in order to find a proper post-discharge destination as soon as possible.<sup>(10)</sup>

This instrument was tested in a hospital in New York with 107 medical service patients within the first 24 hours after admission. Once the medical problem of that patient was resolved, any extra day was considered a social day, a non-clinical reason. In this study, it was observed that high CAAST rates were related to a higher mortality rate and social days of hospitalization. Thirty nine per cent of the hospitalization time of the sample considered to be at high risk corresponded to the demand for proper social provision for hospital discharge.<sup>(10)</sup>

As a limitation to be pointed out in this instrument, the social day was defined by the doctor responsible for each patient, that is, in the personal clinical judgment, which objectively could vary from professional to professional, assuming the risk of each evaluation to be subjective. The authors themselves also acknowledge that more variables should be attached to this assessment.<sup>(10)</sup>

These researchers continued to focus on this problem and adapted the instrument CAAST to factors that considered to predict prolonged hospitalization due to social reasons: age, daily life activities, change in post-discharge destination, cognitive function and ambulation, arising the instrument 4-Score.<sup>(11)</sup>

To test the instrument 4-Score a study was carried out in the same hospital, among 256 patients. From this study came the final version of the 4-Score that allowed to predict social hospitalizations, by obtaining positive answers to the following questions: age equal or higher than 80 years? Will the patient move to a new home after discharge? Does the patient present any level of disorientation? If so, is this disorientation chronic? If no, no value was given. Before a positive answer was assigned 1 value. The item disorientation was the only one to which 2 values were attributed in case of chronic disorientation, varying the score between 0-2 in cognitive function, with final values ranging from 0-4.<sup>(11)</sup>

Of the results obtained in this investigation there was a total of 2963 days of hospitalization, of which 20% were social days, experienced by 44 patients. In this study it was verified that patients with



lower scores experience fewer situations of social days or with shorter duration. It was also concluded that the index is associated with mortality and total hospitalization time. Patients with scores equal to or higher than 2 have a 46% probability of having a social hospitalization.<sup>(11)</sup>

By grouping patients from the two studies and applying the 4-Score, 56 patients had a score equal to or higher than 2 at admission, suffering on average 1 week of social hospitalization, which represents an average cost of \$1400 per person. The 307 patients who had a score lower than 2 had on average only 1 day of social hospitalization.<sup>(11)</sup>

This instrument worth while because it can be applied immediately to the emergency service, alerting the professional at an early stage for risk situations, and initiating early discharge planning.<sup>(11)</sup>

Compared with the instrument CAAST, the 4-Score is simpler and more accurate in predicting social admissions. However, researchers recognize the need to test this instrument in different hospital clinical contexts, adapting it according to the non-clinical reasons for the delay of discharge of each service.<sup>(11)</sup>

In 1992, another group of researchers developed an instrument for admission evaluation that helped identify patients at risk for long-term admissions, called BRASS.<sup>(12)</sup>

This instrument was initially developed with a focus on patients aged 65 years or older or those who could suffer prolonged hospitalization time, and based on their needs. The instrument is fulfilled by the nurse at the time of data collection and contains 10 items: age, housing situation and supports, functional status, cognitive function, behavior pattern, mobility, sensory deficits, previous hospitalizations or urgency, active medical problems and amount of medication to take at the time.<sup>(12)</sup> The total final score obtained can range from 0-40.<sup>(14)</sup> The higher the final score obtained, the greater the probability of complications during discharge and increase in length of hospital stay. According to the final classification patients are categorized into 3 groups. Final scores between 0-10 indicate low risk of problems in discharge, total scores between 11-20 are con-

sidered medium risk and alert to the possibility of problems at discharge, which requires a discharge planning; and scores above 20 suggest complex problems, which requires a discharge planning, and the patient is considered to be at high risk, at risk of the post-discharge destination not being the home. In light of the above, all evaluations with scores above 10 should be referenced to the management team of discharges or responsible coordinator.<sup>(12)</sup>

The authors performed a study with 206 patients obtaining scores varying between 0-28, with a significant relation between higher scores and older age and more days of prolonged hospitalization time. These aspects support the validity of the instrument.<sup>(12)</sup>

Then, this instrument was adapted to the Dutch language, and was applied to 503 elderly patients. The final BRASS score ranged from 1-31, on an average of 9-16. Of the patients analyzed, 69.6% were considered low risk, 21.3% medium risk and 9.1% high risk. This study allowed us to conclude that the BRASS index is a good predictor of patients who do not go home after discharge, since patients with high risk scores tend to present more problems after discharge, and there are reports of greater difficulties in self-care and mobility.<sup>(14)</sup>

Another study performed with 241 patients submitted to orthopedic surgery found that high BRASS values were associated with older patients with longer hospitalization time.<sup>(15)</sup> It is important to identify the levels of fragility of the elderly patient, in order to reduce the risks to which they are exposed.<sup>(16)</sup>

According to the same study, it was found that patients undergoing knee and hip arthroplasty, with BRASS equal to or higher than 8, are likely to remain in the hospital for at least 5 days. Through this pre-operative evaluation it may be possible to delay the surgery until the post-discharge situation is resolved, providing the necessary care, maximizing the efficiency of the use of hospital resources. The researchers concluded that BRASS is a useful instrument in predicting the time of hospitalization of patients undergoing elective orthopedic surgery.<sup>(15)</sup>

In conclusion, BRASS helps to identify patients who need a complex discharge planning, being a reliable instrument that the nurse can use. Since this evaluation is carried out in an initial phase of the patient's hospitalization, it can help nurses to plan hospital care and home return,<sup>(12)</sup> ensuring continuity of care after hospitalization, contributing to the hospital audit department, for the nursing professional category and for patient satisfaction.<sup>(17)</sup> To emphasize the use of this tool in medical, surgical and intensive care patients.

However, the utility of the BRASS index in the clinical context was considered limited, given the low sensitivity of the instrument, being a promising tool in the discharge planning, but that needs to be improved.<sup>(14)</sup> According to its creators, it is necessary to evaluate the effectiveness of the information provided by BRASS.<sup>(12)</sup>

Another instrument developed in the year 2000 corresponds to a methodology of multidisciplinary collaboration at hospital discharge implemented in a Danish hospital called Preventive Discharge. This project aims to make the patient the main actor in his or her preparation on home return. Developing a common vision of the various health professionals would be possible to identify preventive interventions, promoting holistic care, based on health promotion and preventive practice.<sup>(13)</sup>

Based on the problems identified at the time of hospital admission, preventive measures are developed, ensuring that at discharge, the patient is able to perform daily life activities and functions either independently or through his or her help network. In this sense, two intervention tools were developed: the Multidisciplinary Record, an instrument that gathers multidisciplinary information about the patient, identifying areas that require professional intervention in order to prevent problems; and My Admission and Discharge, a patient diary, to record their expectations regarding admission and discharge.<sup>(13)</sup>

The Multidisciplinary Record rates 18 items for bedding, dressing/undressing, getting up, sitting, walking at home and on the street, going up stairs, eating, drinking, going to toilet, sanitizing themselves, bathing, intestinal and urinary control,

ability to mentally apprehend the situation, be oriented in time, space and place and in the therapeutic management. Each item is evaluated on a scale between 0-3, reflecting the level of independence of the patient; where 0 means total dependence, 1 partial dependence, 2 able to do, but with the help of a device and 3 independent.<sup>(13)</sup>

With the implementation of the My Admission and Discharge diary, communication between professionals was improved, enabling continuity of care, based on the records of the patient's episode of illness. The Multidisciplinary Record allowed to identify the difficulties to face aiming to achieve better results in the treatment and rehabilitation care for the patient.<sup>(13)</sup>

However, the authors of this instrument points out some limitations of it, such as constant changes of health professionals, together with their lack of experience in developing qualitative research oriented for the process, as well as the results reached during the research are not always possible to be measured in quantitative terms.<sup>(13)</sup>

In addition to the instruments presented, in another study with orthopedic patients, it was possible to identify some evaluation scales that may help the initial evaluation. They are: Barthel scale for assessing the functional dependency level, Charlson Comorbidity Index for calculating the range of comorbidities of the individual, and the Hodkinson Abbreviated Mental Test for cognitive function assessment.<sup>(4)</sup>

From this study, 50 of the 453 patients were hospitalized for more than 28 days. These were mostly elderly patients, 78% of them with morbidities, of which 40% presented three or more associated pathologies. Only 12% of the patients evaluated did not present any alteration of their cognitive function.<sup>(4)</sup> The presence of morbidities represents a risk to the health of the person, making it possible to develop incapacities and consequent diminution of the longevity.<sup>(18)</sup>

From this analysis it was concluded that the main factors related to the prolongation of hospitalization time were social issues in 66% of the patients, highlighting the lack of caretaker and safety at patient's home and the lack of vacan-

cy in homes; and the infectious process sepsis by 28%.<sup>(4)</sup> This last factor corresponds to an important population health problem. According to a Brazilian study carried out in a geriatric ward, the diagnosis for risk of infection was identified in 100% of this population. This is because hospitalization predisposes the elderly to cross-infection, in addition to the invasive procedures to which they are exposed, being high the risk of acquiring infections.<sup>(19)</sup>

There are several principles to take into consideration at hospital discharge, such as holism and patient-centered care, interdisciplinary approach, prevention, patient evolution and evidence-based practice.<sup>(14)</sup>

In a general analysis of the different instruments, ensure that there are common features in the evaluation, pointing out cognitive function, level of reliance on daily living activities and mobility. Age and social support are evaluated on the BRASS scale, 4-Score and CAAST. It was concluded that these instruments focus mostly on the patient's capacity for self-care, on their age and associated pathologies. The chart below summarizes the main features of each instrument (Chart 1).

Deepening the research regarding the professionals' use of these instruments, it was verified that the BRASS is the most used by the institutions in the different countries today. In addition to the applicability and studies already mentioned, in Holland, it was observed verified its use in hospitals from Italy<sup>(20,21)</sup> and Canada,<sup>(22)</sup> as well as in patients hospitalized in Intensive Care Units.<sup>(23)</sup> The use of these instruments in Italian hospitals make it possible to gather data important to calculate risks of prolonged hospitalization, preventing or decreasing problems after discharge, as well as hospital mortality.<sup>(21)</sup>

After completing this review, the authors are aware of some possible limitations. The research protocol established, with the presented descriptors, led to a set of results that can delimit the research field, suppressing some studies relevant to this analysis, resulting from other research definitions. In order to overcome this possible limitation, the authors consulted the bibliographic references

**Chart 1.** Summary of main features of instrument

INSTRUMENTS	CAAST	4-SCORE	BRASS	MULTI. RECORD
Focus	Social causes	Social causes	Complex identification of the need for discharge planning.	Multidisciplinary methodology of preventive discharge.
Number of evaluation parameters	5 Parameters	4 Parameters	10 Parameters	2 tools: Multidisciplinary Record - 18 parameters; My Admission and Discharge
Final score	0-10	0-4	0-40	0-54
Evaluation time	Evaluation at admission	Evaluation on urgency	Evaluation at admission	Evaluation at admission
Conclusions	High scores require social worker intervention.  Index regarding mortality and social days of hospitalization.	Lower scores experience fewer or shorter situations of social days.  Index regarding mortality and total time of hospitalization.	High scores regarding age and days of prolonged time of hospitalization.  Predictor index of patients that does not go home after discharge.	Improvement of communication among professionals.  Identification of the difficulties to face aiming to achieve better results in the treatment and rehabilitation care.
Limitations	Evaluation of social days subjective.  Need to attach more variables.	To test the instrument in different clinical contexts.	Low sensitivity.  Evaluation of the effectiveness of obtained information.	Change of professionals and lack of experience of qualitative research oriented for the process.  Non-measurable results.

of the documents selected, aiming to comprehend more relevant literature for this analysis.

## Conclusion

The state-of-the-art proves to have 4 instruments for evaluation of the risk of prolonged hospitalization time: CAAST, 4-Score, BRASS and The Multidisciplinary Record. The instrument CAAST and the 4-Score focus extension of hospitalization by social causes; the BRASS identifies three levels of prolonged hospitalization risk and points out the importance of discharge planning; and the Multidisciplinary Record presents an interdisciplinary methodology of preventive discharge. To this end, all of them focus on the evaluation of cognitive function, level of reliance on daily living activities and mobility. Age and social support are evaluated on the BRASS scale, 4-Score and

CAAST. In general, it is concluded that these instruments focus mostly on the patient's capacity for self-care, also based on their age and associated pathologies. In this way, it is intended to reduce cases of prolonged hospitalization time, concomitantly with associated costs and risks to the patient's health and well-being, by promoting preventive, person-centered and evidence-based care. As it has been verified to be a topic little researched in the last years, and given its relevance today, it is suggested further investigation, with new research protocols for the possible inclusion of new studies and identification of other instruments. Knowing and relating the causes regarding prolonged time of hospitalization with different existing instruments to assess this risk, make it possible to build or adapt tools for different existing realities. Investing in a preventive methodology of this issue led to care improvement, providing good health care to the population, in a timely manner, minimizing problematic situations.

## Acknowledgements

The authors would like to thank the *Universidade Católica Portuguesa* – Institute of Health Science of Lisbon, Portugal for funding the submission of the article entitled “Instruments for evaluation of the risk of prolongation of hospitalization” to the *Acta Paulista de Enfermagem*.

## References

1. Brasil. Diário da República. Portaria no. 207/2017 de 11 de julho [Internet]. 2017 [citado 2018 Jul 17]; Diário da República n.º 132/2017, Série I de 2017-07-11. Disponível em: <https://dre.pt/home/-/dre/107669157/details/maximized>
2. Organization for Economic Co-operation and Development (OECD). Hospital discharge rates [indicator]. Paris: OECD; 2017. [Internet]. <https://doi.org/10.1787/5880c955->
3. Bryan K, Gage H, Gilbert K. Delayed transfers of older people from hospital: causes and policy implications. *Health Policy*. 2006;76(2):194–201.
4. Rambani R, Okafor B. Evaluation of Factors Delaying Discharge in Acute Orthopedic Wards: a Prospective Study. *Eur J Trauma Emerg Surg*. 2008;34(1):24–8.
5. Majeed MU, Williams DT, Pollock R, Amir F, Liam M, Foong KS, et al. Delay in discharge and its impact on unnecessary hospital bed occupancy. *BMC Health Serv Res*. 2012;12(1):410–6.
6. Evans DB, Elovainio R, Humphreys G, Chisholm D, Kutzin J, Russell S, et al. Relatório Mundial da Saúde – financiamento dos sistemas de saúde: o caminho para a cobertura universal. Lisboa: Comunidade dos Países de Língua Portuguesa. [Internet]. 2011. [citado 2019 Jan 22]. Disponível em: [https://www.cplp.org/Admin/Public/Download.aspx?file=Files%2FFiler%2F1\\_CPLP%2FSaude%2FRelat%C3%B3rio-Mundial-de-Saude-Financiamento-Sistemas-Saude.pdf](https://www.cplp.org/Admin/Public/Download.aspx?file=Files%2FFiler%2F1_CPLP%2FSaude%2FRelat%C3%B3rio-Mundial-de-Saude-Financiamento-Sistemas-Saude.pdf)
7. DeCoster C, Roos NP, Carrière KC, Peterson S. Inappropriate hospital use by patients receiving care for medical conditions: targeting utilization review. *CMAJ*. 1997;157(7):889–96.
8. Silva SA, Valácio RA, Botelho FC, Amaral CF. Fatores de atraso na alta hospitalar em hospitais de ensino. *Rev Saúde Pública*. 2014;48(2):314–21.
9. Peters MD, Godfrey C, McInerney P, Baldini Soares C, Khalil H, Parker D. Scoping reviews. In: Aromataris E, Munn Z, editors. *Joanna Briggs Institute Reviewer's Manual*. The Joanna Briggs Institute; 2017. Chapter 11.
10. Glass RI, Weiner MS. Seeking a social disposition for the medical patient: CAAST, a simple and objective clinical index. *Med Care*. 1976;14(7):637–41.
11. Glass RI, Mulvihill MN, Smith H Jr, Peto R, Bucheister D, Stoll BJ. The 4 score: an index for predicting a patient's non-medical hospital days. *Am J Public Health*. 1977;67(8):751–5.
12. Blaylock A, Cason CL. Discharge planning predicting patients' needs. *J Gerontol Nurs*. 1992;18(7):5–10.
13. Olsen L, Wagner L. From vision to reality: how to actualize the vision of discharging patients from a hospital, with an increased focus on prevention. *Int Nurs Rev*. 2000;47(3):142–56.
14. Mistiaen P, Duijnhouwer E, Prins-Hoekstra A, Ros W, Blaylock A. Predictive validity of the BRASS index in screening patients with post-discharge problems. *Blaylock Risk Assessment Screening Score*. *J Adv Nurs*. 1999;30(5):1050–6.
15. Cunic D, Lacombe S, Mohajer K, Grant H, Wood G. Can the Blaylock Risk Assessment Screening Score (BRASS) predict length of hospital stay and need for comprehensive discharge planning for patients following hip and knee replacement surgery? Predicting arthroplasty planning and stay using the BRASS. *Can J Surg*. 2014;57(6):391–7.
16. Borges C, Silva M, Clares J, Bessa M, Freitas M. Avaliação da fragilidade de idosos institucionalizados. *Acta Paul Enferm*. 2013;26(4):318–22.
17. Pompeo D, Pinto M, Cesarino C, Araújo R, Poletti N. Atuação do enfermeiro na alta hospitalar: reflexões a partir dos relatos de pacientes. *Acta Paul Enferm*. 2007;20(3):345–50.
18. Rodrigues R, Scudeller P, Pedrazzi E, Schiavetto F, Lange C. Morbidade e sua interferência na capacidade funcional de idosos. *Acta Paul Enferm*. 2008;21(4):643–8.
19. Sakano L, Yoshitome A. Diagnósticos e intervenções de enfermagem em idosos hospitalizados. *Acta Paul Enferm*. 2007;20(4):495–8.
20. Cammilletti V, Forino F, Palombi M, Donati D, Tartaglino D, Di Muzio M. BRASS score and complex discharge: a pilot study. *Acta Biomed*. 2018;88(4):414–25.
21. Dal Molin A, Gatta C, Derossi V, Guazzini A, Cocchieri A, Vellone E, et al. Hospital discharge: results from an Italian multicenter prospective study using Blaylock Risk Assessment Screening Score. *Int J Nurs Knowl*. 2014;25(1):14–21.



22. Hodgins MJ, Logan SM, Fraser JM, Buck DM, Stack BD. Clinical utility of scores on the Blaylock Risk Assessment Screen (BRASS): an analysis of administrative data. *Appl Nurs Res.* 2018;41:36–40.
23. Chaboyer W, Kendall E, Foster M. Use of the 'BRASS' to identify ICU patients who may have complex hospital discharge planning needs. *Nurs Crit Care.* 2002;7(4):171–5.