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Application of the Full Outline of Unresponsiveness scale in the assessment of the level of consciousness: integrative review

Aplicação da escala Full Outline of Unresponsiveness *na avaliação do nível de consciência: revisão integrativa*

Aplicación de la escala Full Outline of Unresponsiveness *en la evaluación del nivel de conciencia: revisión integradora*

Abstract

Objective: to identify in the scientific literature evidence on the application of the Full Outline of UnResponsiveness scale in the assessment of the level of consciousness of adult and older patients in hospital settings. **Method:** integrative review, carried out in the following sources: Latin American and Caribbean Health Sciences Literature, US National Library of Medicine National Institutes Database Search of Health, Scopus, Cumulative Index to Nursing and Allied Health Literature, Web of Science, Embase. Rayyan was used for content selection and analysis. **Results:** 937 studies were identified, of which 23 comprised the final sample. Two categories were listed: potentialities and limitations of the Full Outline of UnResponsiveness scale. **Conclusion:** The aforementioned scale has been shown to be applicable in adult and older patients with altered level of consciousness, for presenting interobserver reliability, evaluating the respiratory pattern and brainstem reflexes and for predicting unfavorable outcomes such as death.
Keywords: Adult; older adult; Disorders of Consciousness; Hospitals.

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Resumo

Objetivo: identificar na literatura científica evidências sobre a aplicação da escala Full Outline of UnResponsiveness na avaliação do nível de consciência de pacientes adultos e idosos em ambiente hospitalar. **Método:** revisão integrativa, realizada nas fontes: Literatura Latino Americana e do Caribe em Ciências da Saúde, US National Library of Medicine National Institutes Database Search of Health, Scopus, Cumulative Index to Nursing and Allied Health Literature, Web of Science, Embase. Utilizou-se o Rayyan para seleção e análise de conteúdo. **Resultados:** identificaram-se 937 estudos, dos quais 23 compuseram a amostra final. Elencaram-se duas categorias: potencialidades e limitações da escala Full Outline of UnResponsiveness. **Conclusão:** A escala mencionada demonstrou ser aplicável em pacientes adultos e idosos com alteração do nível de consciência, por apresentar confiabilidade interobservador, avaliar o padrão respiratório e reflexos do tronco encefálico e por prever desfechos desfavoráveis como o óbito.
Descritores: Adulto; Idoso; Transtornos da Consciência; Hospitais.

Resumen

Objetivo: identificar en la literatura científica evidencia sobre la aplicación de la escala Full Outline of UnResponsiveness en la evaluación del nivel de conciencia de pacientes adultos y ancianos en el ambiente hospitalario. **Método:** revisión integradora, realizada en las bases de datos: Literatura Latinoamericana y del Caribe en Ciencias de la Salud, US National Library of Medicine database, Scopus, Cumulative Index to Nursing and Allied Health Literature, Web of Science y Embase. Se utilizó Rayyan en la selección y análisis de contenido. **Resultados:** se identificaron 937 estudios, de los cuales 23 compusieron la muestra final. Se establecieron dos categorías: potencialidades y limitaciones de la escala Full Outline of UnResponsiveness. **Conclusión:** la escala mostró ser útil para aplicarse a pacientes adultos y ancianos con alteración del nivel de conciencia por presentar la fiabilidad interevaluador, evaluar el patrón respiratorio y los reflejos del tronco cerebral y por estimar los desenlaces desfavorables como la muerte.
Descriptores: Adulto; Anciano; Trastornos de la Conciencia; Hospitales.

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INTRODUCTION

The growing need for effective and reliable health care has prompted researchers to develop scales for the clinical assessment of patients in order to identify, measure and assess clinical conditions with greater precision, in order to assist in conducting the clinical judgment of professionals based on consistent and reliable scientific evidence[1].

The assessment scales are important tools to identify early changes of subjective and objective order, as they allow monitoring the health-disease status and facilitate the implementation of care in a safe and effective way[1].

The use of clinical assessment scales allows us to carefully analyze changes resulting from the pathological condition, providing reliable information attributed from the patients' response, resulting in benefits that allow us to assess their clinical evolution and therapeutic response. Therefore, the use of developed, validated and appropriate scales allow the professional the applicability of this instrument, with support in the safety of the patients and the team[2].

In the clinical practice of nurses and other health professionals, especially those who care for critically ill patients, the assessment scales are able to objectively identify important physical-psychic and spiritual changes and monitor the evolution of the patient's state[3]. Clinical assessment through validated scales allows evidence-based decision making, which subsidizes the planning and organization of care effectively[3]. The application of clinical assessment scales plays a fundamental role in clinical practice, as it allows the identification of signs and symptoms of the patient early, allowing rapid intervention[4].

Patient care should include the assessment of neurological status, which includes assessing level of consciousness, presence of reflexes, motor function, reaction and pupillary diameter; this assessment serves as an important indicator of severity[5].

The literature presents numerous scales considered of easy and rapid application in the assessment of the neurological condition of the patients in various spheres of the in-hospital environment[5]. In 2005, the Full Outline of UnResponsiveness (FOUR) scale was developed and published, with important results. This scale has become popular, especially for the assessment of the level of consciousness of critically ill patients diagnosed with traumatic brain injury, stroke, acute myocardial infarction (AMI), brain tumor, epilepsy, cerebral hemorrhage, among other acute traumatic injuries[5-6]. Based on scientific evidence, the FOUR scale is easy to memorize, fast and simple to apply, comprising an assessment that involves four components: ocular response, motor response, brainstem reflexes and respiratory pattern[5-6].

In the use of the scale, the four domains that are part of the assessment are answered by five items that correspond to the score from zero to four[6]. At the end of the assessment, the maximum value of 16 points is added; the highest scores indicate a good level of consciousness, and the lowest ones indicate important changes in the patient's consciousness[6].

In short, even in view of the relevance of the applicability of the FOUR scale, the scientific evidence available in the national literature that proves its effectiveness is still incipient, so there is a need to explore the theme to provide data and its application in the Brazilian context in a reliable way, guaranteeing the health professionals an improvement in their care[5]. In view of the above, the question is: "What is the scientific evidence present in the literature on the application of the FOUR scale in the assessment of the level of consciousness of adult and older patients in a hospital environment?". Thus, the objective was to identify in the scientific literature evidence on the application of the Full Outline of UnResponsiveness scale in the assessment of the level of consciousness of adult and older patients in the hospital environment.

METHOD

This is an integrative review supported by the Statement for Reporting Systematic Reviews and Meta-Analyses of Studies (PRISMA),

a theoretical-methodological framework composed of a list of 27 items and a four-stages flowchart, which show the quality of review studies[7].

For the preparation of the review, six stages were carried out: (1) identification of the theme and selection of the hypothesis or research question for the preparation of the integrative review; (2) establishment of criteria for inclusion and exclusion of studies, sampling or search in the literature; (3) definition of the information to be extracted from the selected studies, followed by categorization of the studies; (4) assessment of the studies included in the integrative review; (5) interpretation of the results and (6) presentation of the review and synthesis of knowledge[8].

In the first stage, the theme that addressed the application of the Full Outline of UnResponsiveness scale in the assessment of the level of consciousness of adult and older patients was established, formulating the research question supported by the Population, Interest, and Context (PICo) strategy[9], in which "P" (population) refers to adult and older patients; the letter "I" (interest) represents the identification of scientific evidence on studies that applied the Full Outline of UnResponsiveness scale; and "Co" (context), configures the hospital environment. Based on this, the research question that guides this study is defined as "What is the scientific evidence present in the literature on the application of the FOUR scale in the assessment of the level of consciousness of adult and older patients in a hospital environment?"

In the second stage, the inclusion criteria were determined: primary studies that answered the research question, published from 2005, the year of creation of the FOUR scale, and without language delimitation. Studies of the type review, theses, dissertations, opinion articles, comments, essays, previous notes, manuals, books, book chapters, obituaries and articles that did not show the application of the FOUR scale in the assessment of the level of consciousness of adult and older patients in an in-hospital environment were excluded.

The following sources of information were used: US National Library of Medicine Databases (PubMed/Medline), Latin American and Caribbean Health Sciences Literature (LILACS), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, Embase and SciVerse Scopus.

The search for studies took place in October 2021 through the health descriptors available on the Health Sciences Descriptors (DeCS) portal at the Virtual Health Library (VHL) and through the controlled descriptors of the Medical Subject Headings, identified with the respective search strategy, specific to each database listed, validated by a librarian.

For PubMed®, we adopted the controlled descriptors, in the English language, identified in the Medical Subjects Headings (MeSH): Adult; Aged; Conscience; Hospitals and the keywords: Full Outline of UnResponsiveness and FOUR. The strategy was: (Adult OR Adults OR Aged OR Older AND Conscience OR Consciences OR Consciousness AND Hospitals OR Hospital AND (Full Outline of UnResponsiveness) OR (FOUR)).

In SCOPUS, we used the controlled descriptors, in the English language, identified in the Medical Subjects Headings (MeSH): Adult; Aged; Conscience; Hospitals and the keywords: Full Outline of UnResponsiveness and Score. The following strategy was followed: TITLE-ABS-KEY ((Adult AND Aged AND Score AND "Full Outline of UnResponsiveness" AND "Intensive Care Units")).

In CINAHL, the controlled descriptors were identified in Titles/Subjects, in the English language: Adult; Aged; Conscience; Hospitals and the keywords: Full Outline of UnResponsiveness and FOUR. The strategy was: (Adult OR Adults OR Aged OR Older AND Conscience OR Consciences OR Consciousness AND Hospitals OR Hospital AND (Full Outline of UnResponsiveness) OR (FOUR)).

In the Web of Science, the descriptors in the English language were adopted: Adult; Aged; Conscience; Hospitals and the keywords: Full Outline of UnResponsiveness and FOUR. The strategy was: TS=(Adult OR Adults OR Aged OR Elderly AND Conscience OR Consciences

OR Consciousness AND Hospitals OR Hospital AND (Full Outline of UnResponsiveness) OR (FOUR)).

In LILACS, the controlled descriptors were present in the Health Sciences Descriptors (DeCS) in Portuguese, English and Spanish. The English version was used: Adult; Aged; Conscience; Hospitals and the keywords: Full Outline of UnResponsiveness and FOUR. The following strategies were used: Adulto OR Adultos OR Adult OR Adults OR Idoso OR Idosos OR (Pessoa Idosa) OR (Pessoa de Idade) OR (Pessoas Idosas) OR (Pessoas de Idade) OR (População Idosa) OR Aged OR Elderly OR Anciano OR (Adulto Mayor) OR Ancianos OR (Persona Mayor) OR (Persona de Edad) OR (Personas Mayores) OR (Personas de Edad) AND Consciência OR Conscience OR Consciences OR Consciousness AND Hospitais OR (Centro Hospitalar) OR (Centros Hospitalares) OR Hospital OR Nosocômio OR Nosocômios OR Hospitals OR Hospital AND (Full Outline of UnResponsiveness) OR (FOUR)).

In EMBASE, the controlled descriptors in the English language were: Adult; Aged; Conscience; Hospitals and the keywords: Full Outline of UnResponsiveness and FOUR. The strategy was: Adult OR Adults OR Aged OR Older AND Conscience OR Consciences OR Consciousness AND Hospitals OR Hospital AND (Full Outline of UnResponsiveness) OR (FOUR)). The keyword "Full Outline of UnResponsiveness" was adopted for all sources of information, with the intention of directing the search specifically to the intended object of study.

The documents identified in the search were exported from the sources of information to a free, single version web review program called Rayyan Qatar Computing Research Institute (Rayyan QCRI), available at the link: https://rayyan.qcri.org, able to exclude duplicate articles, facilitate initial screening, blind the auxiliary researcher and incorporate a high level of usability and effectiveness into the study selection process [10].

Afterwards, the studies were selected in Rayyan, *a priori*, by reading titles and abstracts by two independent researchers. Among the researchers, 36 articles presented divergence of selection, sent to a third researcher, responsible for deciding whether or not to include them in the sample.

Subsequently, the selected articles were read in full and the final sample was defined. It should be noted that a search was carried out in the reference list of the studies that made up the sample, in order to verify the possibility of new inclusions; however, no new articles were inserted.

In the third stage, the information pertinent to the research question was extracted through a validated instrument [11], considering the criteria: author, year of publication, country of origin, objective, type of study, results/conclusions. Finally, the level of evidence of the studies was classified.

To classify the level of evidence of the selected studies, the categories of the Agency for Healthcare Research and Quality (AHRQ) were used, which cover six levels: level 1: meta-analysis of multiple controlled and randomized clinical trials; level 2: individual studies with an experimental design; level 3: quasi-experimental studies; level 4: descriptive (non-experimental) studies or qualitative approach; level 5: case or experience reports; level 6: expert opinions [12].

The fourth stage of the research protocol addressed the analysis and categorization of findings, through Thematic Analysis [13], fulfilling three stages: pre-analysis, evidenced by the fluctuating reading of evidence and organization of convergent information and the exploration of the material, with grouping of convergences and treatment of data, listing the categories. Then the fifth and sixth stages were completed, performing the interpretation of the results and synthesis of knowledge.

RESULTS

At first, 937 studies were identified, of which 23 composed the final sample of this research. The selection process was shown in Figure 1, below.

Figure 1 – Flowchart for the identification, selection and inclusion of studies, prepared based on the recommendation Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA).
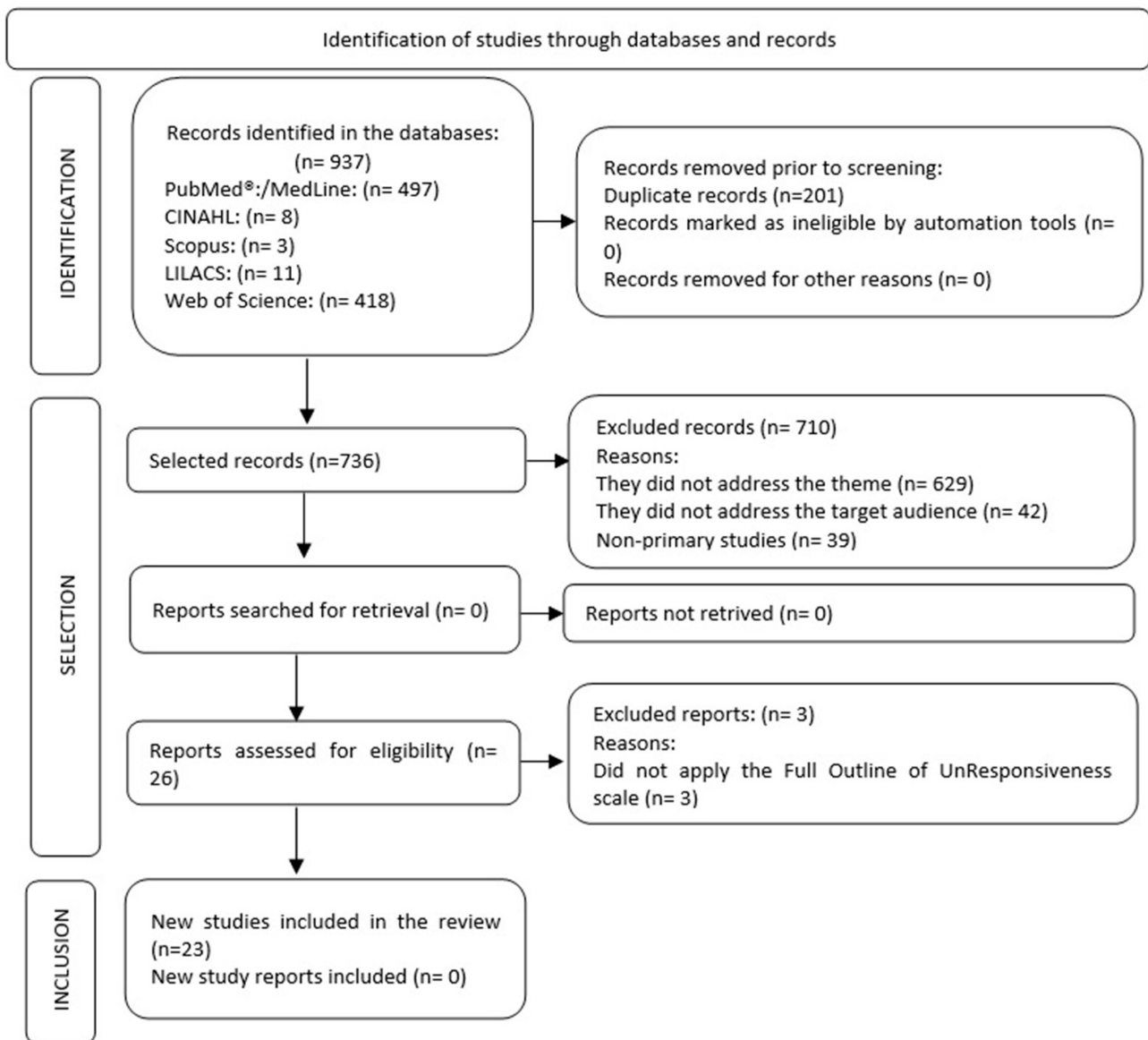
Note: US National Library of Medicine National Institutes Database Search of Health (Medline/PubMed®), Latin American and Caribbean Health Sciences Literature (LILACS), Cumulative Index to Nursing and Allied Health Literature (CINAHL).

Source: Page et al., 2020[7].

Next, the studies included in the sample were characterized according to authorship, year of publication, origin of publication, objective, type of study, level of evidence and results/conclusions.

All mapped studies are international, and most are from 2020[14-17]; the North American scientific production[6,17-23] stands out, as well as that supported by observational studies with evidence level 4[14-17,19,22-33], as shown in the following Table 1.

The findings mapped through this integrative review allowed the structuring of two categories: (1) potentialities of the FOUR scale and (2) limitations of the FOUR scale.

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Table 1 – Characterization of the studies that made up the sample of this integrative review. Uberaba (MG), Brazil, 2022.

AUTHOR, YEAR AND ORIGIN	OBJECTIVE	TYPE OF STUDY AND LEVEL OF EVIDENCE (LE)	MAIN RESULTS AND CONCLUSION
Mbonde et al., 2021[24] Africa	To determine the prognostic utility of the FOUR and GCS scales in mortality.	Observational study. LE 4	A total of 230 patients participated in the study. The FOUR scale and the 24-hour and 48-hour GCS are predictive of mortality in Ugandan patients with central nervous system infections and metabolic encephalopathy, but not in those with stroke.
Fisher et al., 2020[14] Switzerland	To compare the interobserver reliability between neurologists and intensive care unit staff.	Observational study. LE 4	There were 437 assessments, the FOUR scale performed better than the GCS for the exact agreement between the evaluators, but not for the most clinically relevant agreement within the range of +/- 1 point.
Abdallah et al., 2020[15] Africa	To compare the predictive properties of the FOUR scale and those of the GCS scale among hospitalized patients with reduced level of consciousness.	Observational study. LE 4	Sample with 359 patients. The FOUR score is comparable to the GCS score in predicting mortality in Uganda. The findings support the introduction of the FOUR scale in guiding the management of patients with a reduced level of consciousness in sub-Saharan Africa.
Khoshfetrat et al., 2020[16] Iran	To compare the ability of the GCS and FOUR scales to assess the level of consciousness and dysfunction in patients with traumatic brain injury.	Observational study. LE 4	One hundred and two (102) patients were assessed. The mean scores of the FOUR, GCS and Karnofsky scales were significantly higher in survivors and in patients with neurological deficits than in non-surviving patients. FOUR and GCS showed a strong positive correlation in the assessment of outcomes and both also showed a high correlation with APACHE II.
Olsen et al., 2020[17] USA	To compare the FOUR and GCS scales.	Observational study. LE 4	The FOUR scale performs better than the GCS for ICU mortality prognosis, probably because the respiratory reflex and brainstem components of the FOUR scale better reflect morbidity than the verbal part of the GCS.
Oh et al., 2019[25] Korea	To examine the construct validity and reliability of the FOUR scale in patients with spontaneous subarachnoid hemorrhage.	Observational study. LE: 4	The FOUR scale is valid and reliable for assessing consciousness in spontaneous subarachnoid hemorrhage. It is believed that the use of this tool can help prevent negative consequences resulting from impaired consciousness and improve the outcomes of patients with spontaneous subarachnoid hemorrhage.
Bayraktar et al., 2019[26] Turkey	To assess reliability by comparing the FOUR and GCS scales.	Observational study. LE: 4	There were no significant differences between the FOUR scale and the GCS applied by the two evaluators. The mortality rate among patients with low scores on FOUR and GCS was higher than among those with high scores. Considering that the FOUR score allows a more detailed neurological assessment than the GCS, it is evident that the FOUR is more useful for patients who are unconscious or dependent on mechanical ventilation.
Ghelichkhani et al., 2018[27] Iran	To compare the FOUR and GCS scales in predicting unfavorable outcomes of trauma patients.	Observational study. LE: 4	The results show that the GCS and FOUR scales have the same value in predicting unfavorable outcomes of traumatized patients. Both tools had high efficiency in predicting the outcome at the time of hospital discharge.
Baratloo et al., 2017[28] Iran	To assess the ability to predict the outcome of patients with head trauma based on the FOUR scale at admission to the emergency room.	Observational study. LE: 4	Fifty-two patients with a mean age of 32.67 ± 15.20 years were assessed. The FOUR scale is applicable for predicting the likely outcome of death in patients with head trauma.

AUTHOR, YEAR AND ORIGIN	OBJECTIVE	TYPE OF STUDY AND LEVEL OF EVIDENCE (LE)	MAIN RESULTS AND CONCLUSION
Adcock et al., 2017[18] USA	To measure the reliability of robotic telemedicine assessment using the FOUR and GCS scales in comatose patients.	Randomized trial LE(2)	One hundred individuals were assessed. Differences between total, bedside and remote GCS scores and FOUR scores were small. The results suggest that the level of consciousness can be reliably assessed using existing robotic telemedicine technology. Telemedicine could be adopted to help assess critically ill patients in neurologically underserved areas.
Khanal et al., 2016[19] USA	To compare the FOUR and GCS scales.	Observational study. LE: 4	Patient mortality was significantly higher when the GCS and FOUR scales had a mean score <6.5. Discrimination was fair for both scores, but the FOUR score was higher than the GCS. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy were also better for the FOUR scale compared to GCS. A good correlation was observed between the two scores.
McNett; Amato; Philippbar, 2016[20] USA	To compare the predictive capacity of the FOUR and GCS scales in patients with brain injury.	Prospective cohort study. LE 4	The sample size was 107 patients. The FOUR and GCS scales were associated with long-term outcomes and both tools had good predictive power.
Okasha et al., 2014[33] Egypt	To compare the performance of the FOUR and GCS scales in predicting the results of traumatic brain injury.	Prospective cohort study. LE 4	The FOUR scale was superior to GCS scale in predicting hospital mortality in patients with TBI. There was no difference between the two scores in the prediction of unfavorable outcome, endotracheal intubation and ICU stay.
McNett et al., 2014[21] USA	To compare the FOUR and GCS scales.	Prospective cohort study. LE 4	The scales were applied to 136 patients. FOUR is equivalent to GCS in terms of predictive ability for unfavorable prognoses.
Chen; Grothe, Schaller, 2013[34] Germany	To validate the FOUR scale in neurosurgical patients.	Methodological study. LE: 6	One hundred and one (101) patients were included (mean age =64 years, SD=36.1 years). The FOUR scale was more robust than the GCS scale in predicting mortality after 30 days in neurosurgical patients with severe impairment of consciousness.
Gujjar et al., 2013[29] Oman	Examine the interobserver reliability of the FOUR and GCS scales.	Observational study. LE: 4	One hundred patients (age 62 ± 17 years) participated. Interobserver reliability and predictability of unfavorable outcomes for the FOUR scale were equivalent to GCS scale. This study supports the use of the FOUR scale to assess altered mental status in wards.
Sadaka; Patel; Lakshamanan, 2012[22] USA	To determine whether the FOUR scale is an accurate predictor of outcome in patients with traumatic brain injury.	Observational study. LE: 4	The FOUR scale is an accurate predictor of outcome in patients with traumatic brain injury. It has a broad assessment and can be applied in patients with endotracheal tube.
Kramer et al., 2012[23] USA	To examine the reliability between evaluators of the FOUR scale in five intensive care units.	Multicenter observational study LE: 4	A total of 907 critically ill adult patients. The FOUR scale showed excellent agreement between the evaluators in general and in each of the five hospitals. This demonstrates that the FOUR scale can be reliably used in critically ill patients.
Akavipat et al., 2011[30] Thailand	Identify the diagnostic properties of the FOUR scale.	Observational study. LE: 4	The total FOUR score showed satisfactory prognostic value to predict the outcome. The cutoff points for poor outcome and hospital mortality are 14 and 10, respectively.
Bruno et al., 2011[31] Belgium	To compare the FOUR and GCS scales in intensive care unit patients who were admitted in a comatose state.	Observational study. LE: 4	The FOUR scale is a valid tool with good interobserver reliability, comparable to GCS in predicting unfavorable outcomes. It offers the advantage of being applicable in patients with endotracheal tube and identifying non-verbal signs of consciousness, evaluating visual search.

(Continues)

AUTHOR, YEAR AND ORIGIN	OBJECTIVE	TYPE OF STUDY AND LEVEL OF EVIDENCE (LE)	MAIN RESULTS AND CONCLUSION
Idrovo et al., 2010[35] Spain	To study the interobserver variability of the FOUR score in patients with acute stroke.	Methodological study. LE: 6	Seventy five paired assessments were analyzed in 60 patients (41 brain infarctions, 15 brain hemorrhages and 4 transient ischemic attacks). The FOUR scale is a reliable scale for assessing the level of consciousness in patients with acute stroke.
Eken et al., 2009[32] Turkey	To compare the FOUR and the GCS scales in the emergency scenario.	Observational study. LE: 4	The study included 185 patients. The FOUR scale is not higher than the GCS scale. However, the combination of the ocular and motor components of the FOUR scale is a valuable tool that can be used instead of the GCS.
Wijdicks et al., 2005[6] United States	To validate the FOUR scale.	Methodological study. LE: 6	The FOUR scale presents good to excellent agreement among the evaluators and provides greater neurological details than the GCS, for evaluating brainstem reflexes and respiratory patterns. The probability of in-hospital mortality was higher for the lowest total score FOUR compared to the lowest total score GCS.

Note: FOUR: Full Outline of UnResponsiveness; GCS: Glasgow Coma Scale; TBI: Traumatic Brain Injury; stroke: Stroke.

Source: Prepared by the authors, 2022.

The first category considered the potentialities of applying the FOUR scale in adult and older patients in different contexts, namely: (1) it is more robust in predicting mortality when compared to other instruments[6,16-17,19-20,22,24,28,30,32,34]; (2) it presents good interobserver reliability[6,14,18-19,23,25,29,31,35]; (3) it provides a broad assessment by verifying the respiratory pattern and brainstem reflexes[6,14,17,22,25-26,28,34]; (4) it is applicable to patients using an endotracheal tube [20,22,26,30-31,34]; (5) it is considered to be of simple application[18,22-23,25-26,30,34]; (6) it provides standardized assessment of the level of consciousness[16,25,34]; (7) it presents good sensitivity and specificity[19,30]; (8) it is considered to be easy to memorize[22,32]; (9) it identifies non-verbal signals[31]; (10) it presents positive predictive value, negative predictive value and accuracy[19].

Then, the second category, named "limitations of the FOUR scale", addressed the limitations mapped in the selected literature about the FOUR scale, namely: (1) compared to the ECG, it does not present a difference in predicting unfavorable prognoses, such as permanence in the intensive care unit (ICU) and endotracheal intubation[15,21,27,29,31-33]; (2) it presents limitations in the assessment of pupillary response to light in patients with ocular pathologies[28]; (3) it presents a risk of bias in the evaluation of patients using sedatives[28].

DISCUSSION

At the national level, it is notorious to observe a scarce overview of studies that point out the potentialities and weaknesses of the FOUR scale, referring to its use in the hospital environment in adults and the older people, so that it is possible to explore information that supports a safe care practice [15].

Thus, with this integrative review, it was possible to know the scenario of application of the FOUR scale in the assessment of the level of consciousness of adult and older patients in the hospital environment, highlighting the potentialities and limitations of use of this scale, not yet highlighted by the national literature, which confers novelty and advancement in research, teaching and health care.

The FOUR scale has stood out among the constructs already existing in the literature for its potentialities, especially with regard to its robustness in predicting mortality when compared to other instruments[6,16-17,19-20,22,24,28,30,32,34]. The use of the FOUR scale in clinical practice has demonstrated a fast and reliable prognosis in patients who have suffered severe neurological impairment, specifically with regard to the prediction of mortality[14,23,26,35]. International studies highlight that the correlation between its effectiveness

and that of the other scales of assessment of the level of consciousness has presented reliable results that are justified from its peculiarities of the evaluative criteria [6,32,34].

A validation study of the FOUR scale in neurosurgical patients showed that this scale is designated as an assessment method of the level of consciousness that has demonstrated important results in the prognostic prediction of clinically severe patients with neurological diagnosis [34]. Research complements that the prognosis of the critically ill patient can be understood from a neurological screening with greater precision; therefore, the FOUR scale score has presented significant and superior results in predicting hospital mortality when compared to other scales, which facilitates the course of treatment, care assistance and clinical monitoring [30,34].

Also, a study carried out in Germany reports that safety in the prognosis of critically ill patients, as well as neurosurgical and neuro critical patients, increases their potential for acceptance in use in different care sectors [34]. In clinical practice, the use of reliable methods is essential – to ensure this reliability, it is necessary to carry out intervention studies that measure this indicator [36].

In addition to considering it a robust scale, most studies have shown that the FOUR scale has good interobserver reliability [6,14,18-19,23,25,29,31,35]. Studies that tested the FOUR scale demonstrate that this tool has high interobserver reliability, which can be attributed to the ease of adherence and correct use of the instrument – because it is a fast, simple and understandable scale –, as well as to the accuracy of the components assessed by the scale [25,31]. Research indicates that interobserver reliability requires professional training so that there is correct interpretation of the instruments, specific and detailed knowledge of what is being assessed and how it will be performed, and, thus, quality results [36].

Thus, it is considered that the use of robust and reliable scales allows to offer the health professionals an instrument to support prevention and health promotion, since it allows a

standardized and specific assessment for each condition [16]. The studies addressed, for the most part, present positive results regarding the use of the scale in the prevention of complications, since early intervention allows to avoid the clinical deterioration of the patients [30-31].

In addition to the above, it was evidenced that the FOUR scale provides a broad assessment by verifying the respiratory pattern and the brainstem reflexes [6,14,17,22,25-26,28,34]. It is worth mentioning that this scale assess four domains characterized by ocular response, motor response, brainstem reflexes and respiratory pattern, which differs from other existing instruments used in the assessment of the level of consciousness [37].

From the analysis of the studies included in this review, it was possible to understand that the assessment of the respiratory and brainstem pattern can be applied in patients with or without intubation, thus providing relevant data for establishing the patients' prognosis. Thus, some advantages are attributed in relation to other scales, such as GCS [22,31]. A study carried out in Uganda with the objective of comparing the GCS and FOUR scales, complements that the dispensation of the assessment of the respiratory pattern can impair the early recognition of a physiological deterioration [15].

Most of the studies observed in this review demonstrate potential and advantages in the management of the FOUR scale, as it is a quick tool, easy to apply and memorize, which also facilitates the work of the health team, implements and trains the team in a simplified way, early detects the patient's clinical parameters, recognizes non-verbal signs and intervenes quickly and directly in the patients' clinical state [22,25,31].

Although the FOUR scale has several potentialities, it also has some limitations: among them, it was observed that the FOUR scale does not stand out from the GCS with regard to the prediction of unfavorable prognoses characterized by the increase in the length of stay in the ICU and the indication of endotracheal intubation, that is,

there is no significant difference between the two scales[15,21,27,29,31-33].

It should be noted that studies show that a score equal to or less than 11 on the FOUR scale can identify those who are likely to need ICU care, due to the level of reduced consciousness[15,21,27,29,31-33]. A research with the objective of comparing the performance of the FOUR and GCS scales in the prediction of results corroborates this statement, in which it is noted that the score 11 in the FOUR scale obtained predictive significance in the criterion for endotracheal intubation. In view of this gap, there is a lack of more studies that point to this evidence, correlating other scales[33].

On the other hand, another study that correlates the FOUR and GCS scales shows that the first allows an assessment of accuracy greater than the second for the definition between vegetative state and minimally conscious state, due to its potentiality to assess minimum signs of consciousness that are not considered in GCS[31].

The limitation of this integrative review stands out due to the low level of evidence of the findings and the scarcity of national studies that have applied the FOUR scale, which makes it difficult to identify the facilities and difficulties of implementing the instrument at the national level. Therefore, it is suggested to advance the production of intervention studies that address the theme, its applicability, performance, gaps and weaknesses focused on the health field.

CONCLUSION

The analysis of the findings identified in this integrative review allowed us to conclude that the application of the FOUR scale, in the assessment of the level of consciousness of adult and older patients in the hospital environment, is capable of predicting mortality when compared to other instruments, besides presenting good interobserver reliability and providing a broad assessment by verifying the respiratory pattern and the brainstem reflexes. Although it stands out among the other scales, when compared with the GCS this scale does not stand out for the prediction of unfavorable prognoses characterized by the length of stay in the ICU and the indication of endotracheal intubation.

This study contributes to teaching, research and health care by presenting an overview of the application of the FOUR scale in the assessment of the level of consciousness of adult and older patients in the hospital environment and by highlighting the potentialities and limitations of the use of this scale, with the objective of supporting future research that seeks the elaboration of protocols, whose outcomes guide the choice of best practices in this area.

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