Original Article

The Humpty Dumpty Scale: cross-cultural adaptation and validation for Brazilian culture

Escala *Humpty Dumpty*: adaptação transcultural e validação para cultura brasileira

Escala *Humpty Dumpty*: adaptación transcultural y validación para la cultura brasileña

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Abstract

Objective: To adapt and validate The Humpty Dumpty Scale for Brazilian culture.

Methods: Methodological study that followed the steps of translation, synthesis, back-translation, evaluation by specialists, pre-test and evaluation by the author of the original instrument for the cross-cultural adaptation. A total of 103 children/adolescents admitted to a public hospital in the countryside of the state of Sao Paulo were selected. We used a characterization form, The Humpty Dumpty Scale and the Pediatric Patient Classification Instrument, which was used to assess construct validity, with Spearman's correlation coefficient. Interobserver reliability was assessed using the Intraclass Correlation Coefficient and the Kappa coefficient.

Results: The committee of 12 experts evaluated the equivalence, clarity and relevance of the items and after three rounds, the percentage of 100% agreement was reached. The reformulations made the items more understandable and, after the author's evaluation, the final version of the instrument was obtained. Positive and significant correlations were found between The Humpty Dumpty Scale and the Patient ($r=0.5184$; $p<0.0001$) and Therapeutic Procedures ($r=0.2143$; $p<0.0332$) domains of the patient classification instrument. With the Family domain ($r=0.0676$; $p=0.5060$), no significant relationships were achieved. Satisfactory evidence of reliability (Intraclass Correlation Coefficient of 0.93 and Kappa coefficient of 0.80) was observed.

Conclusion: The Humpty Dumpty Scale was cross-culturally adapted and is now called (in Portuguese) the Ferramenta de Avaliação de Risco de Quedas - Escala Humpty Dumpty. It demonstrated satisfactory evidence of validity and reliability to assess the risk of falling in children and adolescents in the Brazilian context.

Resumo

Objetivo: Adaptar e validar a *The Humpty Dumpty Falls Scale* para a cultura brasileira.

Métodos: Estudo metodológico, que seguiu, para a adaptação transcultural, os estágios de tradução, síntese, retrotradução, avaliação por especialistas, pré-teste e avaliação pela autora do instrumento original. Foram selecionadas 103 crianças/adolescentes internados em um hospital público do interior do estado de São Paulo. Foram utilizados ficha de caracterização, *The Humpty Dumpty Falls Scale* e o Instrumento de Classificação de Pacientes Pediátricos, o qual foi utilizado para avaliar a validade de construto, com o coeficiente de correlação de Spearman. A confiabilidade interobservador foi avaliada pelo Coeficiente de Correlação Intraclasse e pelo coeficiente Kappa.

Resultados: O comitê de 12 especialistas avaliou as equivalências, a clareza e a relevância dos itens e, após três rodadas, foi alcançado o percentual de 100% de concordância. As reformulações tornaram os itens mais compreensíveis e, após avaliação da autora, foi obtida a versão final do instrumento. Correlações positivas e significantes foram encontradas entre a Escala Humpty Dumpty e os domínios Paciente ($r=0,5184$; $p<0,0001$)

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e Procedimentos terapêuticos (r=0,2143; p<0,0332) do instrumento de classificação de pacientes. Com o domínio Família (r=0,0676; p=0,5060), não foram alcançadas relações significantes. Evidências satisfatórias de confiabilidade (Coeficiente de Correlação Intraclasse de 0,93 e coeficiente Kappa de 0,80) foram observadas.

Conclusão: *The Humpty Dumpty Falls Scale* foi adaptada transculturalmente, sendo denominada Ferramenta de Avaliação de Risco de Queda – Escala Humpty Dumpty. Demonstrou evidências satisfatórias de validade e confiabilidade para avaliar o risco de queda em crianças e adolescentes, no cenário brasileiro.

Resumen

Objetivo: Adaptar y validar *The Humpty Dumpty Falls Scale* para la cultura brasileña.

Métodos: Estudio metodológico, en el que se realizaron las siguientes etapas para la adaptación transcultural: traducción, síntesis, retrotraducción, evaluación por especialistas, prueba piloto y evaluación por la autora del instrumento original. Se seleccionaron 103 infantes/adolescentes internados en un hospital público del interior del estado de São Paulo. Se utilizó la ficha de caracterización, *The Humpty Dumpty Falls Scale* y el Instrumento de Clasificación de Pacientes Pediátricos, que se usó para evaluar la validad del constructo, con el coeficiente de correlación de Spearman. La fiabilidad interobservador fue evaluada por el coeficiente de correlación intraclase y por el coeficiente Kappa.

Resultados: El comité de 12 especialistas evaluó las equivalencias, la claridad y la relevancia de los ítems y, después de tres rondas, se llegó al 100 % de concordancia. Con las reformulaciones los ítems quedaron más comprensibles y, luego de la evaluación de la autora, se obtuvo la versión final de instrumento. Se observaron correlaciones positivas y significativas entre la Escala Humpty Dumpty y los dominios Paciente (r=0,5184; p<0,0001) y Procedimientos terapéuticos (r=0,2143; p<0,0332) del instrumento de clasificación de pacientes. En el dominio Familia (r=0,0676; p=0,5060) no se encontraron relaciones significativas. Se observaron evidencias satisfactorias de fiabilidad (coeficiente de correlación intraclase de 0,93 y coeficiente Kappa de 0,80).

Conclusión: *The Humpty Dumpty Falls Scale* fue adaptada transculturalmente y se la denominó Herramienta de Evaluación de Riesgo de Caída – Escala Humpty Dumpty. Demostró evidencias satisfactorias de validez y de fiabilidad para evaluar el riesgo de caída en infantes y adolescentes, en el contexto brasileño.

Introduction

Pediatric hospitalization grows every year and challenges institutions and health professionals in caring for children, adolescents and their families. The hospital environment is complex, full of restrictions and behaviors directed by strangers, which can cause fear, pain and contribute to the occurrence of adverse events – such as infections, skin lesions, medication errors and falls.[1,2]

Fall is defined as an unintentional displacement of the body to a lower level than the initial position, can be triggered by several factors and result in harm to the victim. Its discussion is very important in the pediatric context, considering initiatives to meet international and national recommendations for patient safety.[3]

Despite its importance, most of the evidence available in the literature is directed at adult and older adult patients. However, falls threaten children's safety, especially in the hospital environment, as it is the fourth cause of unintentional death among children and adolescents.[4-6]

In health institutions, falls are underreported adverse events, due to the culture of linking childhood falls as intrinsic to children's growth and development.[5] The lack of data to manage indicators related to pediatric falls contributes to the lack of implementation of prevention protocols. However, prevention strategies are essential and must consider the risk of the population.

The implementation of prevention strategies, based on risk assessment, must be preceded by the individual assessment of each child and their family.[2,7] Thus, the application of specific instruments to assess the risk of falling in children and adolescents is essential. Among the internationally available instruments, Falls Assessment Tool - The Humpty Dumpty Scale (HDFS) stands out. The HDFS was developed with the aim of classifying children and adolescents according to the risk of falling in the hospital and outpatient setting, and has demonstrated adequate interobserver reliability (Kappa>0.80) and sensitivity above 70%, but with low specificity (<40%).[6,7,8-16]

Considering that no specific and validated instruments have been identified in Brazil to assess the risk of falls in children and adolescents, the context of patient safety and the need to assess the risk of falls for the implementation of prevention programs, this study aimed to adapt and validate the HDFS for the Brazilian culture.

Methods

Methodological study, which followed a systematic and internationally recommended process for

adapting instruments and evaluating the measurement properties of the adapted instrument.[17]

The adaptation process followed the stages of translation, synthesis, back-translation, evaluation by a committee of experts, pre-test and evaluation by the author of the original instrument. The translation was performed by two independent translators, fluent in English and having Portuguese as their native language – only one of them being informed of the objectives of the instrument. The translations were synthesized by a third translator, and after evaluation by the researchers, the synthesis version was produced, which was back-translated, independently, by two other translators, both with English as their native language and with fluency in Portuguese, with the objective of comparing it to the original version. These translators were not informed of the objectives of the study.

The versions - original, translated and synthesis - were submitted to the evaluation of the expert committee, composed of professors and clinical practice nurses, selected for convenience, according to clinical experience (professionals from pediatric units of public and private hospitals in Campinas, SP) and/or publications on the research topic or knowledge on adaptation and validation of measurement instruments (professors and researchers from teaching units in the countryside of the State of Sao Paulo, SP).[18]

The specialists evaluated the semantic, idiomatic, cultural and conceptual equivalence, as well as the clarity and relevance of the items, using a four-point Likert-type scale, ranging from (1) strongly disagree to (4) strongly agree. For items that received a score of one or two, suggestions for improvements were requested.[18]

These evaluations were quantitatively analyzed using the Content Validity Index (CVI). Items that did not reach a minimum CVI of 0.80 were revised, changed as suggested by the specialists, and sent to the second and third rounds of evaluation.[18]

A total of 30 nurses participated in the pretest, who provided direct care to children and adolescents in pediatric hospitalization units, selected by convenience, who analyzed the patient's medical record, filled out the instrument and answered two questions: (1) "Was it easy to understand the instrument items?" and (2) "Was it easy to understand and complete the instrument answers?". For those who disagreed with the ease of understanding, a field for suggested changes was made available. Items that received suggestions for changes were analyzed according to relevance and possible changes in the instrument. Suggestions that did not interfere with the content and were considered relevant were incorporated into the instrument. The suggestions that resulted in changes in the content were forwarded for new evaluation by the expert committee.

In the last stage of cross-cultural adaptation, the Brazilian version of the HDFS was sent to the author of the original instrument, who validated the process performed. After completing the cross-cultural adaptation, the measurement properties were evaluated – a step that is strongly recommended.[17]

The assessment of measurement properties included evaluating the interobserver reliability and construct validity of the Brazilian version of the HDFS.

The study was conducted in a public hospital in the countryside of the State of Sao Paulo, which offers quaternary care, through the Unified Health System – *Sistema Único de Saúde* (SUS), with 411 beds, 55 of them in pediatric units (36 ward beds and 20 intensive care beds) for clinical and surgical treatment of children and adolescents up to 14 years old.

The sample size was established in accordance with the recommendation for reliability studies,[19] in which a sample of ≥100 participants is considered to be very good. Newborns, infants, children and adolescents admitted to pediatric units and who were not under continuous sedation at the time of data collection were included. Participants classified as receiving intensive care, according to the Pediatric Patient Classification Instrument (PPCI), were excluded from the statistical analysis, as it is understood that they depend intensively on the nursing team and are probably bedridden and/or sedated. Sampling was obtained by convenience, sequentially, until completing the desired minimum sample size, considering the pre-established period for data collection (January and February 2020).

Data were collected using the sociodemographic and clinical characterization form, the HDFS and the PPCI.

The sociodemographic and clinical characterization form was prepared according to previous studies and submitted to face validation by four nurses. This form included the variables age, gender, education, length of hospital stay, diagnosis, chronic disease, surgical intervention, previous hospitalizations, previous falls in the hospital environment, presence of a guardian over 18 years old and a companion during the 24 hours of hospitalization.

The purpose of the HDFS is to assess the risk of falling in children and adolescents, from birth until incomplete 21 years old, using seven parameters: age; gender; diagnosis; cognitive impairments; environmental factors; response to surgery/sedation/anesthesia; and medication usage. For each parameter, the answers can vary between 1 and 4 points.[11] The total score, composed of the sum of the evaluated items, varies from 7 to 23 points, in which scores <12 indicate low risk and ≥12 classify children or adolescents as at high risk for falls.[11] The recommendation is that the HDFS be applied when the patient is admitted to the unit, daily and whenever there are changes in the complexity of care.[11]

The PPCI aims to define categories of care for children and adolescents according to the dependency degree of the nursing team. It is composed of 11 indicators, distributed in three domains – family, patient and therapeutic procedure -, with four situations that reflect the patient's dependence. The higher the score, the greater the demand for care. The final score, obtained by adding the scores of the indicators, classifies patients into five categories of care: minimal (11 to 17 points), intermediary (18 to 23 points), high dependence (24 to 30 points), semi-intensive (31 to 36 points) and intensive (37 to 44 points). The original study demonstrated that the instrument has moderate interobserver reliability (Kappa>0.40) and Content Validity Indexes >0.70 for most of the instrument's items.[20,21]

The construct validity, through the hypothesis test, considered that the greater the risk of falling, the greater the patients' demand for care from the nursing team. The greater the risk of falling, the greater the patients' demand for care related to the patient and therapeutic procedure domains. There is no significant correlation between the risk of falling and the demand for care assessed in the family domain, as the HDFS does not address the family construct.

Data were collected in January and February 2020, by two of the researchers, previously trained to apply the instruments, based on the original operational definitions. Weekly, the main researcher introduced herself to parents, guardians and patients and explained the purpose of the study to them. Those who agreed to participate, indicated their agreement through the Informed Consent Form and the Informed Assent Form – for children and adolescents aged over 7 years old. Once this step was completed, the other researchers, simultaneously and independently, applied the adapted version of the HDFS – with only one of these researchers applying the PPCI.

Data were entered into an electronic spreadsheet by the main researcher and checked by the second researcher. The analysis was performed using the Statistical Analysis System for Windows, version 9.4, and the Statistical Package for the Social Sciences (SPSS), version 23, using descriptive statistics for absolute and relative frequencies of categorical variables, and using measures of central tendency and dispersion, for continuous variables.

To assess the agreement between the evaluators, regarding the classification of the risk of falling, the Kappa coefficient was calculated, whose strength of agreement suggests values: less than zero (poor); from 0.00 to 0.20 (slight); from 0.21 to 0.40 (fair); from 0.41 to 0.60 (moderate); from 0.61 to 0.80 (substantial) and from 0.81 to 1.00 (almost perfect).[22,23] For interobserver agreement regarding the instrument's total score, the Intraclass Correlation Coefficient (ICC) was applied – in which values >0.75 indicate good reliability.[24]

For construct validity, we used Spearman's correlation coefficient – between the HDFS total score and the domains of the PPCI. To compare the total HDFS score and the categorical variables characterizing the sample (gender, chronic disease, history of falls, surgical intervention, hospitalization for

less than 1 year and presence of a companion), the Mann-Whitney test was used, as it contains two categories, and for categorical variables with more than two categories (education and diagnosis), the Kruskal-Wallis test was used. For continuous variables (age and length of stay), we used Spearman's correlation coefficient. The significance level adopted for all tests was 5%.

Initially, authorization was obtained from the author of the original instrument. The study was approved by the local Research Ethics Committee (# 3 276 236/2019) and followed national and international standards for research involving human beings. All participants (experts, nurses, parents/guardians and children and adolescents) signed the Informed Consent Form, and children over 7 years old, signed the Informed Assent Form (Certificate of Presentation of Ethical Appreciation: 09163619 2 0000 5404).

Results

The HDFS was translated into Brazilian Portuguese, adapted to the Brazilian culture and named (in portuguese) *Ferramenta de Avaliação de Risco de Queda - Escala Humpty Dumpty*. The cross-cultural adaptation process of this instrument followed all the steps recommended for validation studies. The translation, synthesis and back-translation steps did not result in significant changes in the original version of the instrument. The versions were submitted to the evaluation of 12 specialist nurses, 4 with clinical experience in pediatrics, 2 in risk management, 5 with publications in the study area and 1 with experience in adapting and validating measurement instruments. Regarding the evaluation by the committee, the title and header achieved CVI values above 0.80 in all equivalences, clarity and relevance. Seven items did not reach the recommended CVI in at least one of the evaluated criteria, and the changes suggested by the specialists were incorporated and forwarded to the second evaluation round. Although the title, one parameter (Cognitive impairments) and five criteria (Not aware limitations, within 24 hours, within 48 hours, multiple usage of sedatives and one of the meds listed above) achieved a satisfactory CVI (>0.80), these items received suggestions for improvements that were considered relevant and were also reassessed (Table 1).

In the second round, from the 14 reassessed items, 13 reached the recommended CVI. The title of the instrument was changed (in Portuguese) from *Instrumento de Avaliação de Queda - Escala Humpty Humpty* to *Ferramenta de Avaliação de Risco de Queda - Escala Humpty Dumpty*. The criterion "Patient uses assistive device or child/infant (learning how to walk) in crib or mobile/poor lighting" obtained a CVI 0.50, was reformulated and submitted to the third round. In this round, after evaluation by five specialists, the criterion reached 100% agreement. In the pre-test, the participants partially or totally agreed with the instrument's clarity and ease of understanding. With regard to completion, there was doubt about whether more than one criterion in each parameter could be selected. To resolve this issue, the following instruction was inserted at the beginning of the guidelines: "To evaluate each parameter, you must choose only one criterion". In the Age parameter, the participants identified that the criteria "Less than 3 years old" and "Over 13 years old" did not present age limits. Thus, these criteria were rewritten, respectively, as: "Over 28 days to less than 3 years old" and "From 13 to 18 incomplete years old". In the Diagnosis parameter, nurses did not know which diagnosis to fill in: the diagnosis of the underlying disease or of the current hospitalization. This item has not been changed, since according to the operational definitions of the instrument, the highest score criterion must always be considered, it being understood that this type of guidance must be provided to the team before applying the instrument. The parameter Environmental factors also changed: the criterion "Infant/child (learning how to walk) placed in bed" was replaced by "Infant/child aged 1 to 3 years old placed in a hospital bed (not considering those bedridden)". The criterion "Infant/child (learning how to walk) in crib or furniture with low lighting" was changed to "Infant/child aged 1 to 3 years old in crib or furniture that favors risk (stairs, changing tables, chairs)/Low lighting environment". In the pa-

Table 1. Content Validity Index in the first round of evaluation regarding semantic/idiomatic, cultural and conceptual equivalence, as well as clarity and relevance, between the original version of the The Humpty Dumpty Scale™ and the synthesis of translations

Items	Semantic idiomatic	Cultural	Conceptual	Clarity	Relevance
Age	1.00	1.00	1.00	1.00	1.00
Less than 3 years old	0.90	0.90	0.90	1.00	1.00
3 to less than 7 years old	0.70*	0.70*	0.80	0.70*	1.00
7 to less than 13 years old	0.70*	0.80	0.80	0.80	1.00
13 years and above	0.60*	1.00	0.80	0.60*	1.00
Gender	1.00	1.00	1.00	1.00	1.00
Male	1.00	1.00	1.00	0.90	0.90
Female	1.00	1.00	1.00	0.90	0.90
Diagnosis	1.00	1.00	1.00	1.00	1.00
Neurological Diagnosis	0.90	0.90	1.00	0.90	1.00
Alterations in Oxygenation (Respiratory Diagnosis, Dehydration, Anemia, Anorexia, Syncope/Dizziness, etc.)	1.00	1.00	1.00	1.00	0.90
Psych/Behavioral Disorders	1.00	1.00	1.00	1.00	1.00
Other Diagnosis	1.00	1.00	1.00	1.00	1.00
Cognitive impairments	1.00	1.00	1.00	1.00	1.00
Not Aware of Limitations	0.80	0.80	0.90	0.80	1.00
Forget Limitations	0.90	0.80	0.80	0.60*	0.90
Oriented to own ability	0.70*	0.70*	0.70*	0.70*	0.90
Environmental Factors	0.90	0.90	0.90	0.90	0.90
History of Falls or Infant-Toddler Placed in Bed	0.70*	0.80	0.60*	0.70*	1.00
Patient uses assistive devices or Infant Toddler in Crib or Furniture/Lighting (Tripled Room)	0.70*	0.60*	0.60*	0.50*	1.00
Patient Placed in Bed	1.00	1.00	1.00	1.00	1.00
Outpatient Area	0.90	0.90	0.90	0.90	0.80
Response to Surgery/Sedation/ Anesthesia	0.90	0.90	0.80	0.80	1.00
Within 24 hours	0.90	0.90	0.90	0.80	1.00
Within 48 hours	0.90	0.90	0.90	0.80	1.00
More than 48 hours/None	0.90	0.80	0.90	0.80	1.00
Medication usage	1.00	1.00	1.00	1.00	1.00
Multiple Usage of: Sedatives (excluding ICU patients sedated and paralyzed) Hypnotics Barbiturates Phenothiazines Antidepressants Laxatives /Diuretics Narcotic	1.00	1.00	0.90	0.80	1.00
One of the meds listed above	0.90	1.00	0.90	1.00	1.00
Other Medications/None	1.00	1.00	1.00	1.00	1.00

* Content Validity Index <0.80; ICU – Intensive Care Unit

rameter Medication usage, the criterion "Multiple use of sedatives (except for sedated ICU patients or under the influence of drugs that cause muscle relaxation): hypnotics, barbiturates, ..." was replaced by "Use of more than one of the classes of medications listed below: sedatives, ...". All these changes were evaluated by the experts, who agreed with the new wording of the items. In the last stage of the cross-cultural adaptation, the author of the original instrument evaluated the process performed and requested two changes: from "Over 28 days to less than 3 years old" to "Newborns to less than 3 years old" and "From 13 to 18 incomplete years old" to "From 13 to 21 incomplete years old". In evaluating the measurement properties, the sample consisted of 103 patients with a mean age of 5.7 years old (standard deviation of 5.0); 59.2% (n=61) male; 55.3% (n=57) did not study and 35.9% (n=37) attended elementary school. The mean length of stay was 59.8 days (standard deviation 328.5). Diseases of the nervous system were the most prevalent (n=22; 21.3%), followed by diseases of the digestive system (n=21; 20.3%). Most had chronic diseases (n=56; 57.3%) and had not been hospitalized in the last year (n=63; 61.1%), with 26.2% (n=27) undergoing some procedure surgery in the current hospitalization. Regarding the fall, three patients (2.91%) suffered some type of fall in the hospital environment - in the current or previous hospitalization. All patients were accompanied, and 88.3% (n=91) of these companions stayed at the institution for 24 hours. HDFS achieved adequate levels of reliability (Kappa=0.80 and ICC of 0.93). Interobserver reliability showed a coefficient with substantial strength (Table 2) and ICC >0.75 (Table 3).

Table 2. Interobserver reliability, according to risk classification, of the The Humpty Dumpty Scale

Risk rating Evaluator 1	Risk classification Evaluator 2		Kappa (95%CI)
	Low	High	
Low	12	1	0.80 (0.63-0.97)
High	4	86	

95%CI - 95% confidence interval

Table 3. Interobserver reliability, regarding the total score, of the The Humpty Dumpty Scale

Evaluators	The Humpty Dumpty Scale						
	n	Mean	SD	Minimum	Maximum	Median	ICC (95%CI)
1	103	14.4	2.5	9.0	21.0	14.0	0.93 (0.88-0.96)
2	103	15.0	2.6	10.0	20.0	15.0	

SD – standard derivation; ICC - Intraclass Correlation Coefficient; CI - confidence interval

The HDFS total score showed a significant correlation with the Patient (r= 0.5184; p<0.0001) and Therapeutic Procedures (r=0.2143; p=0.0332) domains. With the Family domain, of the PPCI, the correlation was not statistically significant (r=0.0676; p=0.5060). Regarding sociodemographic variables, significant correlations were only achieved with length of stay (p<0.0064) and age (p<0.0001). The group that did not have a companion during the 24 hours achieved a higher mean in the risk of falls assessment score, when compared to the group that had a companion (17.08 and 14.73, respectively; p=0.0043). The variables education and diagnosis were not included in the analysis, considering the sample distribution.

Discussion

The refusal of non-nursing professionals to participate in the expert committee can be considered a limitation of this study, as the group cannot be considered multidisciplinary.

Strict follow-up of internships made it possible to prevent nonconformities in the cross-cultural adaptation process and supports the results found.[17,25] In the evaluation of the expert committee, the changes made were important, as they contributed to identifying and correcting problems in the synthesis version, ensuring the equivalence of the adapted instrument.[26] The items with the lowest percentage of agreement among the experts showed divergences related to semantic and idiomatic equivalence.

The instrument's title was widely discussed among specialists, as Humpty Dumpty is a known child character in English-speaking countries, but not very popular in Brazil. It is characterized by being similar to an egg, walking slowly and clumsily, which makes it an easy target for imbalances and falls. However, after discussion, it was decided to change the name of the instrument, due to the difficulty of reference to the character in Brazil, but it was considered important to highlight the name of the original scale at the end, to make access by international researchers easier.

In the pre-test, the changes made contributed to make the items more understandable, and the involvement of the participants was very important, as they were responsible for applying the instrument in clinical practice.[25] The author's assessment, at the end of the process, clarified aspects that had not been found in the literature. Despite being recommended, this step is little explored by researchers, but brings more solidity to the research.[25] In the evaluation of measurement properties, the reliability coefficients were similar to those of other studies that evaluated the scale (Kappa>0.80).[6,8,14]

Validity assessment demonstrates whether the instrument actually measures the risk of falling among children and adolescents. For this, the scores of the Brazilian version of the HDFS were correlated with the domains of the PPCI and showed significant correlations with the Patient and Therapeutic Procedures domains – confirming the established hypotheses.[18,19]

The correlation found between the risk of falling and the Patient domain indicates that the more psychomotor alterations, development deficit, impaired mobility, use of devices for feeding, elimination and oxygen therapy, the greater the risk of falling.[4,15] This domain encompasses the possibilities for the child and/or adolescent to carry out activities compatible with their age, mobility, walking, body hygiene, as well as oxygenation, food, hydration and eliminations.[20,21]

With regard to the Therapeutic procedures domain, it was possible to infer that the greater the need

to check vital signs and medications, the more compromised the child and/or adolescent may be and, consequently, the greater the risk of falling. These findings were also found by other researchers, who stated that children and adolescents using multiple medications have a 43% higher risk of falls.[27,28]

The absence of a significant correlation between the HDFS and the Family domain was also observed, as the instrument for assessing the risk of falls does not have items that assess the family's role in care, that is why this type of result was expected.

Conclusion

The Humpty Dumpty Scale was cross-culturally adapted, with evidence of validity and reliability to assess the risk of falling among children and adolescents in Brazil. In the Brazilian context, the availability of a validated tool to measure the risk of falls in pediatric patients makes it possible to plan, implement and evaluate fall prevention strategies among children and adolescents. Fall prevention programs are highly recommended as strategies to improve the quality and safety of care and can contribute to reducing damage and costs resulting from this type of adverse event. Future research, which includes information about practicability and acceptability, as well as the evaluation of criterion validity, are recommended in order to complement the results of this study.

Collaborations

Rodrigues ESA, Alves DFS, Mendes-Castillo AMC, São-João TM, Bueno GCV, Hill-Rodriguez D and Gasparino RC contributed to the study design, critical review of the intellectual content, data analysis and interpretation, and approval of the final version to be published.

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