Risk classification of children and adolescents: priority of care in the emergency unit

Classificação de risco de crianças e adolescentes: prioridade do atendimento na emergência

Clasificación de riesgo de niños y adolescentes: prioridad de la atención en la emergencia

Fernanda Jorge Magalhães[I]
ORCID: 0000-0003-0104-1528

Francisca Elisângela Teixeira Lima[II]
ORCID: 0000-0002-7543-6947

Lorena Pinheiro Barbosa[II]
ORCID: 0000-0002-8006-7517

Fernanda Jorge Guimarães[III]
ORCID: 0000-0003-4618-3730

Gilvan Ferreira Felipe[IV]
ORCID: 0000-0003-0674-4396

Karla Maria Carneiro Rolim[V]
ORCID: 0000-0002-7914-6939

Essyo Pedro Moreira de Lima[VI]
ORCID: 0000-0002-6583-0166

[I] *Universidade de Pernambuco. Recife, Pernambuco, Brazil.*
[II] *Universidade Federal do Ceará. Fortaleza, Ceará, Brazil.*
[III] *Universidade Federal de Pernambuco. Vitória de Santo Antão, Pernambuco, Brazil.*
[IV] *Universidade da Integração Internacional da Lusofonia Afro-Brazileira. Redenção, Ceará, Brazil.*
[V] *Universidade de Fortaleza. Fortaleza, Ceará, Brazil.*
[VI] *Hospital Distrital Maria José Barroso de Oliveira. Fortaleza, Ceará, Brazil.*

Corresponding author:
Fernanda Jorge Magalhães
E-mail: fernandajmagalhaes@yahoo.com.br

ABSTRACT

Objective: to evaluate the clinical conditions and the risk classification of children and adolescents treated in a hospital emergency, according to the Pediatric Risk Classification Protocol. **Method:** cross-sectional study, with 200 participants, using an instrument based on the Pediatric Risk Classification Protocol and using odds ratio for the analysis. **Results:** most participants were male patients in early childhood and who were or weren't in daycare. As for clinical conditions, most showed changes in vital (24.5%) and respiratory (20.0%) signs, most patients (57.5%) did not present pain; 35.5% were classified as urgent and 45.0% as non-urgent. There was a greater chance of being classified as very urgent (orange) when compared to non-urgent (blue). **Conclusion:** the protocol used contributed to an effective classification and was considered a valid and reliable health technology for determining the priority of care.
Descriptors: Child; Adolescent; Emergency; Risk; Clinical Protocols.

RESUMO

Objetivo: Avaliar as condições clínicas e o risco de urgência de crianças e adolescentes atendidos em emergência hospitalar, conforme o Protocolo de Acolhimento com Classificação de Risco. **Métodos:** Estudo transversal, com 200 participantes. Utilizou-se instrumento embasado no Protocolo de Acolhimento com Classificação de Risco em Pediatria, usando para análise a razão de chances. **Resultados:** Predominaram pacientes do sexo masculino, na primeira infância, em creche ou que não estudam. Como condições clínicas, verificou-se maior frequência de alterações dos sinais vitais (24,5%) e respiratórias (20,0%), sendo que a maioria (57,5%) negou dor, 35,5% foram classificados como urgentes e 45,0% como não-urgente. Evidenciou-se maior chance de serem classificados como maior urgente (laranja) quando comparados com o não-urgente (azul). **Conclusão:** Concluiu-se que o protocolo utilizado contribuiu para uma classificação eficaz e foi considerado como tecnologia em saúde válida e confiável para a determinação da prioridade de atendimento.
Descritores: Criança; Adolescente; Emergências; Risco; Protocolos Clínicos.

RESUMEN

Objetivo: Evaluar las condiciones clínicas y el riesgo de urgencia de niños y adolescentes atendidos en las emergencias hospitalarias, según el Protocolo de Recepción con Clasificación de Riesgos. **Métodos:** Se trata de un estudio transversal, realizado entre 200 participantes. Se utilizó un instrumento basado en el Protocolo de Recepción con Clasificación de Riesgos en Pediatría, utilizándose la razón de momios (odds ratio) para el análisis. **Resultados:** Predominaron los pacientes varones en la primera infancia, en guarderías y aquellos que no estaban estudiando. Como condiciones clínicas, la frecuencia de las alteraciones en los signos vitales (24,5%) y respiratorios era más grande (20,0%), la mayoría (57,5%) negaba el dolor, el 35,5% se clasificaba como urgente y el 45,0% como no urgente. La probabilidad de ser clasificado como urgente (naranja) era mayor en comparación con no urgente (azul). **Conclusión:** El protocolo utilizado ha contribuido a una clasificación eficaz y se considera una tecnología sanitaria válida y fiable para determinar la prioridad de la atención.
Descriptores: Niño; Adolescente; Emergencias; Riesgo; Protocolos Clínicos.

INTRODUCTION

Several pediatric urgent and emergency situations require the attention of a team of competent professionals, using scientific knowledge, skills and attitudes to recognize the clinical conditions of children and/or adolescents and make urgent decisions[1-2].

Among the health problems of children and adolescents in urgent and emergency situations, acute diseases (fevers and respiratory diseases), external causes (falls and accidents) and even non-urgent complaints were more frequent. These factors lead to a greater demand for care and overcrowding, causing organizational difficulties in health systems[1-2].

In this perspective, in the daily work in pediatric care emergencies, several factors can facilitate or provide a proper and reliable identification of priority of care. One of these factors is the use of health technologies such as the Pediatric Risk Classification Protocol (PRCP), which is a reliable instrument that enables the risk classification of children and adolescents based on their clinical manifestations and complaints, reported by themselves and/or their guardian, with the objective of identifying priority of care[3].

The high prevalence of pediatric emergency care can be related to preventable and unpreventable causes, which are often considered by health professionals as urgent or non-urgent clinical conditions. This can lead to overcrowding and increase the risk of complications and death among children and adolescents[4].

Therefore, the PRCP should be inserted as an institutional guideline and strategy that still needs investment, mainly regarding the physical structure and the multidisciplinary team trained to identify the priority of care according to the degree of severity and the risk of complications of patients in the waiting lines of health units[5].

As an example of this type of technology, it is important to mention the PRCP in Pediatric Care. A recent study has demonstrated it is a valid and reliable instrument for the risk classification of children and adolescents by health professionals such as nurses, regardless of the need for training. This protocol uses five priorities with corresponding colors to characterize the degree of clinical impairment of children and adolescents: Priority 1 (red) – Emergency, with immediate medical care and activation of a sound signal; Priority 2 (orange) – Very urgent, with medical care within 15 minutes, no sound signal and reassessment by the nurse every 15 minutes; Priority 3 (yellow) – Urgent, with medical evaluation within 30 minutes or reassessment by the nurse every 30 minutes; Priority 4 (green) - Less urgent, with medical evaluation within 60 minutes or reassessment by the nurse every 60 minutes; and Priority 5 (blue) – Non-urgent, with medical evaluation on the same day or referral to primary care with guaranteed care[6].

Therefore, this study consisted of assessing the risk of urgency among children and adolescents in emergency care, through the PRCP in Pediatric Care[7], which establishes the clinical conditions for emergency, very urgent, urgent, less urgent and non-urgent.

Therefore, this study is justified by the importance of knowing and identifying the clinical conditions of children and adolescents treated at the emergency unit, as well as assessing the risk and the degree of severity in the presence of clinical conditions.

Regarding its relevance, the study seeks to corroborate the evidence from clinical practice in relation to the need to organize the care flow for children and adolescents in primary care and emergency services. In addition, it may encourage further studies, stimulate the development of policies and plans for effective care in pediatric emergencies, reduce complications in waiting lines at hospitals and decrease health costs.

OBJECTIVE

To evaluate the clinical conditions and the risk classification of children and adolescents attended in a hospital emergency, according to the Pediatric Risk Classification Protocol.

METHOD

Ethical aspects

The study followed the precepts and guidelines for research on human beings established in Resolution 466/2012[8]. The project was approved by the Research Ethics Committee of the Federal University of Ceará.

Study design and setting

Cross-sectional study, using the standards for reporting implementation and operational research, which includes implementation studies, with the objective of expanding access to health products and strategies that are already available and have been demonstrated effective, but have not reached many of the people who could benefit from them. This study is based on the identification of practical problems[9]. It was conducted in a pediatric secondary hospital in the city of Fortaleza, Ceará, Brazil, through targeted clinical evaluation of children and adolescents seen in the pediatric emergency unit.

Population and sample

The population consisted of children and adolescents who sought treatment at the institution. There was a mean of 8,034 patient visits per month in the pediatric emergency, from June 2014 to July 2015. This data was provided by the Medical and Statistical Service of the institution.

The sample size was determined by sample calculation of cross-sectional studies with finite population, which resulted in 200 children and/or adolescents who met the following inclusion criteria: seeking treatment at that hospital and being with a companion. Children and/or adolescents who were admitted for elective care with a physician, nurse, physical therapist or occupational therapist were excluded.

Data collection

The data collection went on for about 3 weeks and occurred during daytime in a private room, where the evaluation and risk classification of children and/or adolescents in urgent and emergency situations was carried out individually. The risk classification instrument based on the PRCP Pediatric Care was used for data collection. The instrument contained the following variables: name of the patient, age, gender, clinical manifestations, vital signs (heart rate, respiratory rate, temperature and blood

pressure), Glasgow Coma Scale score, pediatric pain scale score, percentage of body surface area burned and risk classification. The time spent in the evaluation of each child was approximately three minutes.

Analysis of results

The data were tabulated in Microsoft Office Excel, then transcribed and analyzed in the Statistical Package for the Social Sciences (SPSS), version 21.0, using descriptive statistics with absolute and relative frequency, mean and standard deviations.

In the univariate analysis, the quantitative variables were investigated using bivariate measures (prevalence ratio or odds ratio). The level of significance was set at 0.05.

For the analysis, the risk classification from most urgent to least urgent was used, for example: emergency (priority 1- red), very urgent (priority 2- orange), urgent (priority 3- yellow), less urgent (priority 4- green) and non-urgent (priority 5- blue); urgent versus non-urgent and less urgent versus non-urgent, very urgent versus non-urgent. Therefore, the probabilities of an event in each group were calculated; an odds ratio of 1 indicates that the condition or event under study is equally likely to occur in both groups. An odds ratio greater than 1 indicates that the condition or event is more likely to occur in the first group.

RESULTS

Socio-demographic and clinical data of patients seen in the hospital emergency characterize 105 children and 95 adolescents, most were males (51.0%). The most prevalent age group was 50.2 months (approximately four years), with a median of 26.5 months (2 years) and standard deviation of 40.3 months (3 years). Most participants did not study or was in a daycare center, as 105 were children (52.5%).

The predominant clinical conditions of the children and adolescents were changes in vital signs (24.5%), with emphasis on hyperthermia, followed by respiratory alterations (20.0%) and water-electrolyte imbalance (17.5%), as shown in Table 1.

Regarding the degree of impairment, 45.0% of children and/or adolescents were classified as non-urgent (blue) and 35.5% were classified as less urgent (green), reinforcing the idea that there is a high frequency of non-urgent and less urgent patients, who could be seen at primary health care services.

The most common respiratory alterations were productive cough and dry cough and runny nose, which are considered by the PRCP in Pediatric Care as less urgent (green) or non-urgent (blue). The frequencies of these alterations were 52.5% and 35.0%, respectively.

In the evaluation, the pain reported by pediatric patients and/or their guardians showed that the health team faces a growing challenge for the implementation of comprehensive and humane care, mainly because the facial or numerical pain scale is rarely used in clinical practice with children or adolescents seeking care with pain as their main complaint.

Table 1 – Clinical conditions grouped by the Risk Classification Determinants recommended in the Pediatric Risk Classification Protocol in Pediatric Care, Fortaleza, Ceará, Brazil, 2016

Risk Classification Determinants	Orange		Yellow		Green		Blue		Total	
	n	%	n	%	n	%	n	%	n	%
Changes in vital signs	4	8.2	23	46.9	19	38.8	3	6.1	49	24.5
Water-electrolyte imbalance	0	0	3	8.6	19	54.3	13	37.1	35	17.5
Respiratory alterations	0	0	5	12.5	21	52.5	14	35.0	40	20.0
Pain	0	0	0	0	1	50.0	1	50.0	2	1
Abdominal Pain	0	0	0	0	1	5.9	16	94.1	17	8.5
Headache	0	0	0	0	1	100	0	0	1	0.5
Burn and/or skin injury	0	0	2	6.3	5	15.6	25	78.1	32	16
Head trauma	0	0	0	0	1	100	0	0	1	0.5
Special situations	2	8.6	0	0	3	13.1	18	78.3	23	11.5
Total	6	3.0	33	16.5	71	35.5	90	45.0	200	100

Table 2 – Pain assessment of the patient using the numerical pain scale recommended in the Pediatric Risk Classification Protocol in Pediatric Care, Fortaleza, Ceará, Brazil, 2016

Pain scale	n	%
No pain (zero)	115	57.5
Mild pain (1-3/10)	22	11.0
Moderate pain (4-7/10)	51	25.5
Severe pain (8-10/10)	12	6.0
Total	200	100

Table 2 shows the main categories of pain attributed by the triage nurse.

Pain assessment showed that 57.5% of children and/or adolescents in urgent and emergency situations were classified as pain-free, according to the analogue pain scale recommended by the PRCP in Pediatric Care. This contributes to the high prevalence of non-urgent patients.

Regarding the odds ratio of the risk of greater urgency or the occurrence of the degree of clinical impairment of children and/or adolescents treated in the emergency service, it was possible to verify that 55.0% were classified as urgent (orange, yellow and green) and 40.0% were classified as non-urgent (blue), as shown in Table 3.

Regarding the odds ratio of the occurrence of a specific clinical discriminator of urgency (orange, green and yellow) compared to non-urgency (blue), it was found that children and/or adolescents treated with complaints of changes in vital signs were 57.3 times more likely to be classified as orange when compared to blue and 65.9 more likely to be classified as yellow when compared to blue. This demonstrates that when children have a clinical condition associated with an alteration in vital signs, they are more likely to be classified as urgent than non-urgent.

Another aspect related to the odds ratio, the degree of impairment and the risk of death of children and adolescents in urgent and emergency situations refers to the clinical condition called Special Situations. In this classification, newborns in the first 7 to 28 days of life, physical or mental disability and conditions related to child and adolescent abuse stand out.

It was found that in special situations, children and adolescents are 2.4 times more likely to be classified as green (less urgent) when compared to blue (non-urgent).

Table 3 – Odds ratio of occurrence of an urgent determinants (orange, yellow and green) in relation to non-urgent (blue), Fortaleza, Ceará, Brazil, 2016

Clinical conditions/ Impairment Degree	Orange x Blue OR; (95%CI)		Yellow x Blue OR; (95%CI)		Green x Blue OR; (95%CI)	
Changes in vital signs	57.3 (7.4 – 445.7)	1	65.9 (16.7 – 259.4)	1	8.8 (2.5 – 31.6)	1
Water-electrolyte imbalance	1.2 (1.1 – 1.3)	1	0.6 (0.2 – 2.2)	1	2.1 (0.96 – 4.6)	1
Respiratory alterations	1.2 (1.1 – 1.3)	1	0.9 (0.3 – 2.9)	1	2.2 (1.0 – 4.7)	1
Pain	1.0 (0.9 – 1.0)	1	1.0 (0.9 – 1.0)	1	3.8 (0.4 – 37.6)	1
Abdominal Pain	1.2 (1.1 – 1.3)	1	1.2 (1.1 – 1.3)	1	0.06 (0.08 – 0.5)	1
Headache	0	1	0	1	0.9 (0.96 – 1.0)	1
Burn and/or skin injury	1.4 (1.2 – 1.6)	1	0.08 (0.01 – 0.6)	1	0.1 (0.5 – 0.4)	1
Head trauma	0	1	0	1	0.98 (0.96 – 1.0)	1
Special situations	2.4 (0.4 – 14.7)	1	0.15 (0.2 – 1.2)	1	2.1 (0.6 – 0.7)	1

DISCUSSION

The high prevalence of children and adolescent classified as less urgent or non-urgent is corroborated in other studies that show similar characteristics among individuals who seek care in hospital emergency units[4,10].

These clinical conditions also demonstrate the clinical profile of the study participants, the profile of the region in which they are inserted, and the influence of the data collection period, between September and October, when there are climatic and seasonal changes in the Northeast region. This period is called "Period of Cashew Rain" and it brings sudden temperature changes, which frequently lead to respiratory alterations and flu symptoms such as allergic rhinitis, asthma, allergic conjunctivitis and fever[11].

The most frequent clinical conditions of children and adolescents were respiratory conditions (such as: common colds, with cough and low-grade fever, pharyngitis and tonsillitis with sore throat, otitis, sinusitis and pneumonia with severe respiratory distress). This corroborates a study that was carried out in Minas Gerais – Brazil and found that the main etiology in consultations and hospitalizations of pediatric patients, especially children under five years of age, was viral, with a predominance of the respiratory syncytial virus and the influenza A virus[12].

Environmental and housing conditions are also considered factors that enhance the high number of cases of respiratory disorders such as acute respiratory infections, tuberculosis and asthma, and have been proven in the literature to be related to these conditions. For this reason, these factors are considered as one of the major public health problems throughout the world [13].

Similarly, the age group may have peculiarities that favor the predominance of respiratory diseases, since the contact of children under five years of age with microorganisms or chemical components on people on their family can be an aggravating factor for the dissemination of respiratory tract infections, which, consequently, can increase hospitalization rates[13].

It is important to implement the reception with risk classification, as it increases accessibility to emergency services, prioritizes the most severe cases, and is very effective when the situation demands. It does less harm to the health of users, as it facilitates the classification and orientation of the flow of patients, prioritizing most severe patients over the less severe ones. Therefore, triage and risk classification protocols promote a better organization of emergency services, whose main objective is to guarantee the

Unified Health System (SUS) principles of Universality, Resolution and Humanization of the service provided[14].

The surplus of patients in emergencies also occurs because users consider these sectors as an easy gateway, since they offer greater resources such as consultations, laboratory tests, medications, imaging tests, among others. The inaccurate use of these services compromises the work of emergency units and is mainly related to the lack of orientation of the population and the insufficient structure of primary care networks[15].

These results demonstrate the efficiency of the classification in relation to the triage of the degree of impairment. This triage also depends on the interaction between patient and nurse, which helps professionals to review all clinical complaints clearly and thoroughly. For this to happen, an adequate environment and a good reception must be provided[16-17].

Many studies demonstrate the reliability and safety of the risk classification, as it has contributed and still contributes to the improvement of quality from the admission of the patient to the units until the responsible referral of less urgent cases, ensuring care is provided according to the necessity[18].

Limitations of the study

A limitation of the study was that it was difficult for nurses to value and adhere to the use of the PRCP in Pediatric Care as a valid and reliable health technology, which would favor a reliable and safe risk classification in view of the clinical conditions of children and/or adolescents in urgent and emergency situations. In addition, the clinical profile of children and adolescents at the institution of the study showed a prevalence of children classified as non-urgent, with no case of emergency (red) during the period of data collection.

Another limitation of the study refers to the validation of the PRCP in Pediatric Care in only one urgency and emergency unit in the city of Fortaleza-Ceará-Brazil. In addition, it was difficult to involve health managers in the implementation of the PRCP process in the reception of the SUS, due to insufficient human resources, with only one nurse on the 12-hour scale, and lack of adequate material for physical examination, which would provide a thorough clinical evaluation to determine the risk classification of children and/or adolescents in urgent and emergency situations.

Therefore, other studies on a broader scale should be carried out, as a cross-sectional design can have a positive effect in the work of triage nurses.

Contributions to the areas of nursing, health or public policy

The results presented here contribute to the reflection on the use of the PRCP as a reliable and valid health technology in clinical practice in emergency units. Data show that its use contributes to a careful evaluation by nurses, with adequate and consistent triage, aiming to determine the priority of care based

on the clinical condition of the child or adolescent. Its use can be an appropriate and safe strategy that allows nurses to give appropriate directions and to determine the priority of care for children and adolescents in urgent and emergency situations. This can make care more rational, comprehensive and effective, as recommended by SUS principles.

CONCLUSION

The results of the study lead to the following conclusions: (1) It was possible to evaluate clinical conditions considering the risk of complications, degree of impairment or risk of death of children and/or adolescents seen in an urgency and emergency unit, as well as to compare the odds ratio of the classifications according to the clinical conditions and the proportion of very urgent (orange), urgent (yellow), less urgent (green) or non-urgent (blue) classifications; (2) Most participants were male children and adolescents in early childhood (mean of 4 years old) and who were still in daycare or did not study; (3) As for the clinical conditions of children and adolescents seen in the emergency, there was a predominance of changes in vital signs and respiratory alterations, and the majority was classified as less urgent (green) or non-urgent (blue); (4) As for pain assessment, most children did not present pain, which reinforces the profile of patients who could be seen in a primary health care unit; (5) As for odds ratio and risk of complications and death among children and adolescents in the waiting lines for urgent and emergency care, it was found that patients with changes in vital signs were more likely to be classified as urgent (orange, yellow and green) than as non-urgent (blue). Another highlighted aspect is the clinical condition called special situations, in which patients are more likely to be classified as urgent (orange, yellow and green) than as non-urgent (blue). This demonstrates the strength of the triage and the effectiveness of the protocol when more severe conditions and risk of complications and death are presented.

This study highlights the importance of the risk classification carried out by nurses and shows that these professionals can use valid and reliable health technologies for a proper, safe and reliable determination of priority of care, considering the chance and the manifestation of clinical conditions among children and adolescents in urgent and emergency situations. For this, nurses must understand the clinical profile of the community they serve, and demonstrate knowledge, skills and attitudes when evaluating the clinical conditions of health users, so that they can prevent complications and risk of death in the waiting lines, and give adequate directions for a quick and effective evaluation, which allows health recovery with the involvement and care of the multidisciplinary team.

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