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RESEARCH

CHARACTERISTICS OF CARE OF A PUBLIC EMERGENCY ROOM ACCORDING TO THE MANCHESTER TRIAGE SYSTEM

CARACTERIZAÇÃO DOS ATENDIMENTOS DE UM PRONTO-SOCORRO PÚBLICO SEGUNDO O SISTEMA DE TRIAGEM DE MANCHESTER

CARACTERIZACIÓN DE LA ATENCIÓN DE PACIENTES EN URGENCIAS Y EMERGENCIAS DE UM HOSPITAL PÚBLICO SEGÚN EL SISTEMA DE TRIAJE DE MANCHESTER

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ABSTRACT

Obcjetive: to characterize the care of patients classified by the Manchester Triage System (MTS) in a large public hospital. **Methodology:** it is a descriptive study with a quantitative approach that analyzed 52,657 patients with a risk classification made on admission to the Emergency Room in the year 2015. The data were collected in electronic records and subjected to descriptive analysis by the program Statistical Package for Social Sciences 19.0 version. **Results and discussion:** predominant male population (54.2%), average age of 33 years (IQ: 19-51). The most frequent age groups were young adults between 19 and 29 years old (20.7%) and elderly (16.4%). The most frequent clinical priority levels were urgent/yellow (45.6%) and less urgent/green (33.4%) and the most visited flowcharts were extremity problems (31.4%) and "adult malaise" (10.1%). The time between recording and classification had an average of 6.2 minutes (IQ: 2.8-13). As for the time between the risk classification and the primary care, the average in minutes was 20.1 (IQ: 9.3-33.7) for emergency/red, 18.5 (IQ: 10.9-33.2) for very urgent/orange, 58.2 (IQ: 30.2-111.2) for urgent/yellow, 92.7 (46.9-177.3) for less urgent/green and 103.4 (IQ: 41.5-209.6) for non-urgent/blue. Prevailed as the outcome hospital discharge after consultation/medication (61.3%). **Conclusion:** the reassessment of the flows and processes related to risk classification and initial care is intended to improve the accuracy of the records and the time of primary care, which may contribute to a more qualified and resolutive assistance.

Keywords: Emergency Service, Hospital; Emergency Medical Services; Triage; Patient Admission; Emergency Nursing; Quality of Health Care.

RESUMO

Objetivo: *caracterizar os atendimentos de pacientes classificados pelo Sistema de Triagem de Manchester (STM) em um hospital público de grande porte.* ***Metodologia:*** *trata-se de estudo descritivo com abordagem quantitativa que analisou 52.657 atendimentos com classificação de risco realizada à admissão no Pronto-Socorro no ano de 2015. Os dados foram coletados nos prontuários eletrônicos e submetidos à análise descritiva pelo programa Statistical Package for Social Sciences versão 19.0.* ***Resultados e discussão:*** *predominou população do sexo masculino (54,2%), mediana de 33 anos de idade (IQ: 19-51). As faixas etárias mais frequentes foram adultos jovens entre 19 e 29 anos (20,7%) e idosos (16,4%). Os níveis de prioridades clínicas mais frequentes foram urgente/amarelo (45,6%) e pouco urgente/verde (33,4%) e os fluxogramas mais acessados foram problema de extremidades (31,4%) e "mal-estar em adulto (10,1%). O tempo entre o registro e a classificação teve mediana de 6,2 minutos (IQ: 2,8-13). Quanto ao tempo entre a classificação de risco e o primeiro atendimento, a mediana em minutos foi de 20,1 (IQ: 9,3-33,7) para emergência/vermelho, 18,5 (IQ:10,9-33,2) para muito urgente/laranja, 58,2 (IQ:30,2-111,2) para urgente/amarelo, 92,7 (46,9-177,3) para pouco urgente/verde e 103,4 (IQ:41,5-209,6) para não urgente/azul. Predominou como desfecho a alta após consulta/medicação (61,3%).*

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Conclusão: *a reavaliação dos fluxos e processos relacionados à classificação de risco e ao atendimento inicial tem o intuito de melhorar a precisão dos registros e do tempo de primeiro atendimento, o que pode contribuir para uma assistência mais qualificada e resolutiva.*

Palavras-chave: *Serviço Hospitalar de Emergência; Serviços Médicos de Emergência; Triagem; Admissão do Paciente; Enfermagem em Emergência; Qualidade da Assistência à Saúde.*

RESUMEN

Objetivo: *caracterizar la atención de pacientes clasificados por el Sistema de Triaje de Manchester (STM) en un gran hospital público. Estudio descriptivo de enfoque cuantitativo que analizó 52.657 procesos de atención de pacientes con clasificación de riesgo en la entrada de urgencias y emergencias en 2015.* ***Método:*** *los datos eran recogidos en expedientes electrónicos y sometidos al análisis descriptivo por el programa Statistical Package for Social Sciences , versión 19.0.* ***Resultados y discusión:*** *predominio de población de sexo masculino (54,2%), promedio de 33 años de edad (IQ: 19-51). Las franjas de edad más frecuentes eran de adultos jóvenes entre 19 y 29 años (20,7%) y de adultos mayores (16,4%). Los niveles de prioridades clínicas más frecuentes eran urgente/amarillo (45,6%) y poco urgente/verde (33,4%) y los diagramas de flujo con más entradas eran problemas de extremidades (31,4%) y malestar en adultos (10,1%). El tiempo promedio entre el registro y la clasificación era de 6,2 minutos (IQ: 2,8-13). El tiempo promedio entre la clasificación de riesgo y la primera atención era de 20,1 minutos (IQ: 9,3-33,7) para emergencias/rojo, 18,5 (IQ:10,9-33,2) para muy urgente/anaranjado, 58,2 (IQ:30,2-111,2) para urgente/amarillo, 92,7 (46,9-177,3) para poco urgente/verde y 103,4 (IQ:41,5-209,6) para no urgente/azul. El desenlace más frecuente era el alta después de la consulta/medicación (61,3%). Conclusión: la reevaluación de flujos y procesos relacionados con la clasificación de riesgo y la atención inicial buscan mejorar la precisión de los registros y del tiempo de la primera atención, lo cual puede contribuir a la atención más calificada y resolutiva.*

Palabras clave: *Servicio de Urgencia en Hospital; Servicios Médicos de Urgencia; Triaje; Admisión del Paciente; Enfermería de Urgencia; Calidad de la Atención de Salud.*

INTRODUCTION

Diseases of the circulatory system and neoplasias are the two main causes of death in the Brazilian population, followed by external causes.[1] Complications of both chronic disease patients and those in acute conditions require immediate care in urgency and emergency units. The continuous growth of these services associated with the difficulties of organizing the health care network contributes to the constant overcrowding of urgency and emergency services.[2]

The overcrowding is a worldwide problem characterized by the large number of beds occupied, patients accommodated in corridors and long waiting times for care.[3] In Brazil, since 2004, the *Ministério da Saúde* has adopted measures to reorganize the urgency and emergency services, among which the implementation of the reception with Risk Classification, defined by the *Política Nacional de Humanização*.[4] This strategy aims at managing safely patient flow and to optimize the clinical management of these patients, establishing care priorities according to the health needs of the patients, so as not to delay the care of patients who have serious or potential deterioration in their clinical condition.[4-6]

In order to achieve the risk classification (RC), it is necessary to use protocols that allow the identification and prioritization of care at the doors of emergency units. After experiences with protocols adapted by the emergency services of the state of *Minas Gerais*, the *Ministério da Saúde* indicated the Manchester Triage System (MTS) as the protocol to be standardized for RC.[5,7]

The MTS is based on determining the clinical priority of the patient. In this perspective, the nurse has been the most recommended professional, being legally backed to make the classification of risk at the entrance doors of urgency and emergency units, especially for being able to explore the patient's complaint without the presumption of medical diagnosis.[8,9] This protocol presents has advantages such as international recognition, successful implementation in different health systems, be auditable and provide a systematic and logical roadmap for the decision-making of the professional who uses it.[4]

National studies comparing MTS with an institutional protocol have shown that it is more inclusive, increases the level of clinical priority in the occurrence of divergences between classifications and is able to predict which patients are most likely to unfavorable evolution.[10,11] However, it is noteworthy that only the implementation of MTS does not ensure the optimal functioning of emergency services, and it is necessary to monitor its results for improvements in the management of these services.[12]

Thus, considering the high demand for urgency and emergency services and the need to continuously evaluate the results of care after the implementation of the risk classification with the use of MTS, this study was proposed with the purpose of contributing to the analysis of the care processes of the services, in terms of the flows of care and management of resources, subsidizing effective interventions in the dynamics of the unit and, consequently, improving the quality of care and the outcomes of care. Thus, the objective was to characterize the treatments to patients classified by the Manchester Triage System in the emergency room of a large public hospital.

METHOD

This is a descriptive study of a quantitative approach, carried out with the database of a large public teaching hospital, located in the state of *Minas Gerais*, Brazil. The hospital is a reference in clinical and surgical urgencies and emergencies, traumatology and vascular surgery and performs the risk classification with the use of MTS since 2008.

The study population was composed of electronic medical records, data referring to the visits made in the emergency room, in the period of January 1st to December 31, 2015. All medical records of patients classified by MTS were included on admission to the emergency room. During this period, 60,421 entry records were made to the emergency room. Of these, 7,764 did not present data regarding the classification of risk. Thus, the analyzed sample was 52,657 medical records.

The categorical variables analyzed were: gender; (categories defined according to the recommendations of the *Estatuto da Criança e Adolescente e do Departamento de Informática do Sistema Único de Saúde*); care shift (morning: 6-11:59h; afternoon: 12-17:59h; night: 18-23:59h and early hours: 0-5:59h); day of the week; flowchart; priority and outcome level (referral after risk classification, discharge after consultation/medication, discharge due to withdrawal, avoidance, hospitalization, transfer to another institution and death).

At the time of data collection, the MTS was composed of 52 presentation flowcharts.[5] The clinical priority levels were categorized according to the MTS definition, which considers number, name, color and maximum response time in minutes, being: 1: emergency/red/0min; 2: very urgent/orange/10min; 3: urgent/yellow/60min; 4: less urgent/green/120min; and 5: non-urgent/blue/240min.[5] Considering the maximum times for the primary care after the classification, the percentage of care that were adequate or not, at each clinical priority level.

In this study it was also considered patients classified in the color white. This clinical priority is not contemplated by the MTS, but was determined by the institution for the identification of patients admitted for elective outpatient care. Thus, for this group, the flowchart variable and the adequacy in percentage of time between classification and primary care were not considered, since there is no such definition.

The continuous variables analyzed were: time between registration and risk classification (minutes); and time between the risk classification and the primary care (minutes) at each clinical priority level. These data were obtained in the Information Technology sector of the institution, which at the time had two softwares of data storage, one of management of medical records and one for the accomplishment of the classification of risk according to the MTS. With this information a database was generated in the Microsof Excel® program, 2010 version.

The data were submitted to descriptive analysis by the Statistical Package for Social Sciences (SPSS) program, 19.0 version. For the analysis of the continuous variables, was performed the test of Kolmogorov-Smirnov for verification of normality and the calculation of mean, median, standard deviation and interquartile ratio (IQ). Frequencies and proportions were calculated for the categorical variables.

This study was based on the national recommendations for the development of researches with human beings, being approved by the *Comitê de Ética em Pesquisa* of the *Universidade Federal de Minas Gerais*, CAAE nº: 58499516.2.0000.5149.

RESULTS

The 52,657 records of persons classified by the MTS corresponded to 87.2% of the total records of care in the emergency room in the period studied. More than half of the patients (54.2%) were male. The age ranged from zero to 106 years, with an average of 33 years (IQ: 19-51). The distribution of patients by age group and clinical priority level attributed after classification is presented in Table 1.

Table 1 – Distribution of care by age group and clinical priority level after risk classification (N=52657) *Belo Horizonte*, MG, Brazil, 2015

Variables	N	%
Age group		
0-11	7378	14.0
12-18	4869	9.3
19-29	10904	20.7
30-39	8328	15.8
40-49	6788	12.9
50-59	5745	10.9
60 or more	8645	16.4
Clinical priority level		
Red/Emergency	304	0.6
Orange/Very Urgent	8102	15.4
Yellow/Urgent	24025	45.6
Green/Less Urgent	17588	33.4
Blue/Non-urgent	759	1.4
Caucasian	1879	3.6

The level of clinical priority attributed after the classification of risk according to the age group was obtained (Figure 1). It is observed that the majority of the patients classified with priority level red and orange are composed of elderly. In contrast, the predominant age group in the green priority level is composed of patients aged between 19 and 29 years.

The days of the week with the most demand of the service were Monday (15.2%) and Tuesday (15.1%). The other days had a homogeneous distribution with frequencies between 13.0 and 14.8%.

As for the service hours, the afternoon shift was predominant (37.3%), followed by morning (30.2%), night (25.2%) and early hours (7.3%). We chose to analyze the frequency of the clinical priority level after the classification according to the shift (Figure 2).

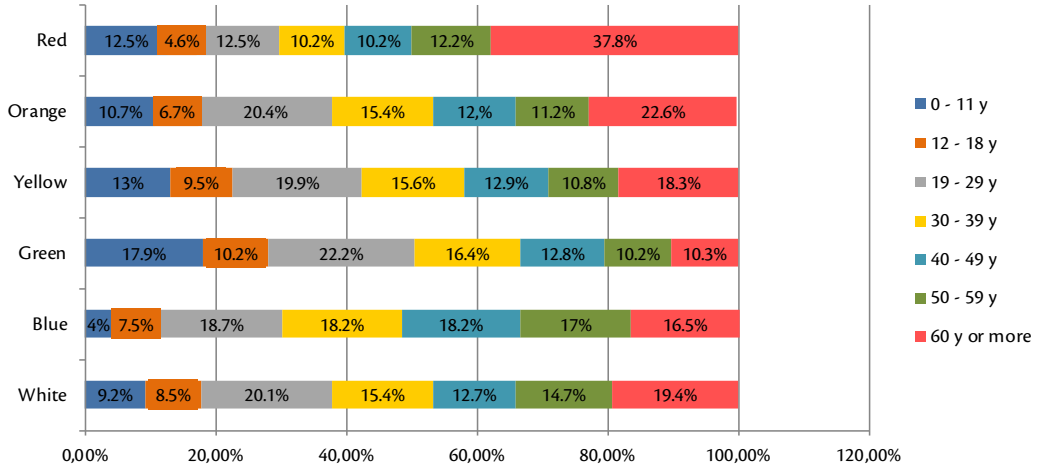

Figure 1 - Distribution of patients by level of clinical priority after the classification of risk according to the age group. *Belo Horizonte*, MG, Brazil, 2015.

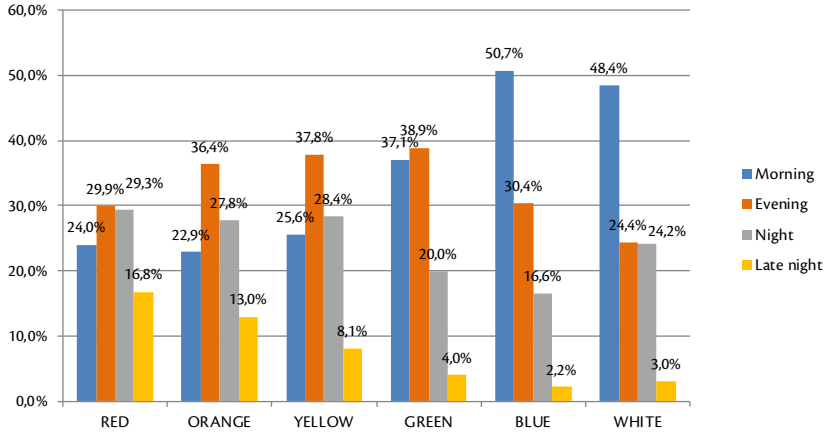

Figure 2 - Distribution of the frequency of the clinical priority level after the classification of risk according to the shift of care. *Belo Horizonte*, MG, Brazil, 2015.

The waiting time between the patient's registry and the risk classification ranged from -0.95 to 1999.4 minutes, with an average of 6.2 minutes (IQ: 2.8-13). The average duration of RC was 2.0min (SD: ± 1.58), ranging from 0.5 to 29.5min. The time elapsed between the risk classification and the primary care for each level of clinical priority is presented in Table 2.

The presentation flowchart was recorded in 50,365 attendances (95.6%). All 52 MTS flowcharts at the time were accessed, with "extremity problems" (31.4%) and "adult malaise" (10.1%) being the most frequent. It was decided to stratify the flowcharts according to the level of clinical priority. These data are shown in Figure 3.

Table 2 - Time of the primary care after the classification of risk according to level of clinical priority. *Belo Horizonte*, MG, 2015

	Clinical priority level	N	SD	1st Q	2nd Q	3rd Q	Maximum time recommended by MTS	Adequate (%)	Inadequate (%)
Time between classification and primary care (minutes)	Red	297	46.9	9.3	20.1	33.7	0	7.4%	92.6%
	Orange	7994	44.8	10.9	18.5	33.2	10	21.1%	78.9%
	Asian	22286	100.4	30.2	58.5	111.2	60	51.1%	48.9%
	Green	9954	448.8	46.9	92.7	177.3	120	60.7%	39.3%
	Blue	166	3559.6	41.5	103.4	209.6	240	77.7%	22.3%
	Caucasian	1623	73.8	21.9	47.4	84.7	-	-	-

Note: SD – standard deviation; Q – Quartile; MTS – Manchester Triage System.

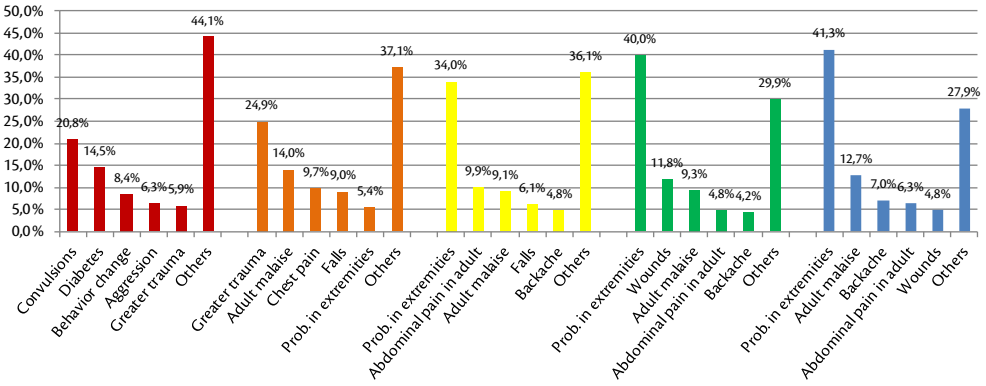

Figure 3 - Distribution of the five most visited flowcharts according to the level of clinical priority after risk classification. *Belo Horizonte-* MG, Brazil, 2015. Prob. Problem, Alt. – Alteration.

It is observed the predominance of the flowchart "problems in extremities" in the levels of non-urgent/blue, less urgent/green and urgent/yellow clinical priority. The distribution of the flowcharts at the levels that demand priority care shows the predominance of the flowcharts of major trauma and the ones related to clinical emergencies: seizures, diabetes and malaise in adult.

Concerning outcomes, there were 49,311 (93.6%) medical records, the most frequent being discharge after consultation/medication (61.3%), followed by hospitalization (17.1%); evasion/withdrawal (15.0%); referral after risk classification (6.3%); transfer to another institution (0.2%); and death (0.1%).

DISCUSSION

In this study, approximately 12% of patients enrolled and cared for at the unit did not present a registry referring to the risk classification and were not part of the analyzed population. This loss can be attributed to temporary non-operation of the software used for this activity, involving the use of manually filled forms. Another factor that may be related to the non-registration of risk classification data is the immediate referral of the patients (clinical emergency priority level/red) to emergency rooms. A study performed at the same institution showed a loss of approximately 25% in the sample of medical records valid for analysis due to the absence or inadequate recording of data related to risk classification.[13,14] This data shows that there was an improvement in the registration of information regarding risk classification, but actions are still needed to reduce such losses.

Regarding the characteristics of the patients attended, more than half were male. Research developed in a hospital in the municipality of *Diamantina* (MG) showed similar results, in which 58.1% of the population were male.[12] Regarding age, an average of 33 years was observed, a result similar to that of another Brazilian study, which found an average age of 32 years.[15]

The most frequent age groups were young adults and the elderly. A study carried out in a hospital in São Paulo obtained similar results, being more frequent individuals in the age groups between 18 and 29 years followed by the patients with 70 years or more.[16] It should be emphasized that MTS does not consider the age for determining the clinical priority level of care. Among patients classified at the same level of severity the elderly should be prioritized.[17]

Regarding the level of clinical priority determined by the MTS, there was a predominance of urgent/yellow and less urgent/green levels. Research conducted in 2015 in a public hospital in *Belo Horizonte* found similar results, showing a higher frequency of urgent/yellow clinical priority levels (47.4%), followed by less urgency/green (36.5%).[15] These data indicate that urgency and emergency services are still sought by a representative portion of the population with clinical demands characterized as less urgent, a fact that can be attributed to difficulties in accessing health care network services for these assistances.

Another point observed was the low frequency of patients with emergency clinical priority/red. This result may be related to the work process in the scenario institution, since in order to guarantee the immediate care of patients with high clinical severity, they are referred directly to the emergency rooms, causing losses in the records of risk classification data.

When analyzing the level of clinical priority according to the age group, it was observed that the elderly patients presented high level of priority. A study carried out in Southern Brazil accused the tendency of the elderly population to present potentially more serious cases due to the morbidity profile associated with chronic diseases and their complications.[18] Another factor that may contribute to this demand is the difficulty of following up and the poor adherence of the population to the treatment and control of chronic diseases, increasing their complications and increasing recurrence in urgency and emergency services.[8]

Urgent/yellow, less urgent/green and non-urgent/blue clinical priority levels were more frequent in people aged 19-29. One of the main reasons for seeking care in emergency services by patients with less urgent demands is related to the organiza-

tion of basic health units, which often have restricted working hours and difficulty of available agenda. Another reason is the perception, on the part of the patient, of needing urgent care in units with more availability of resources.[19]

The days of the week with the most demand for service were Monday and Tuesday. A study carried out in a reference hospital for trauma in the municipality of *Itajubá*, *Minas Gerais*, showed different results regarding the seasonality of care, presenting as the most demanded days on Saturdays and Sundays.[19] The prevalence of visits on the weekdays evidenced in the present study can be related to the profile of the population served in the scenario institution, composed, in part, of people living in municipalities that have weaknesses in care in their network of health services.

In relation to the hours of attendance, the shifts with the most movement were the afternoon and morning. Other studies showed similar results, with the shifts with most movement the afternoon shift[20] and the morning one[18]. In the group of patients with no classification/white, the highest concentration was in the morning period. This data reflects the dynamics of outpatient care. The movement of patients classified as white in the night shift may be related to the scheduling of returns, especially of patients requiring orthopedic reassessment.

It was also observed that the greater the severity defined by the clinical priorities, the more frequent were the attendances during the night and early hours, indicating that, faced with severe cases, the population tends to seek immediate care, regardless of the time of occurrence. A similar study demonstrated an association between the severity of the patient and the time of care, indicating that patients with more severe clinical conditions were admitted at night and at early hours.[21] This shows the unpredictability of the timing of the occurrence of urgency and emergency situations, which implies the importance of the continuous availability of a skilled multiprofessional team and of diagnostic and therapeutic resources, aiming at a quality and resolutive service.[22]

Regarding service times, the median between the registry and the risk classification was 6.2 minutes. A study conducted at the same institution with data from the consultations in the year 2014 obtained an average of 6.36 minutes.[14] It is recommended that the time between the arrival of the patient and the risk classification does not exceed 10 minutes, in order not to cause harm, especially to patients classified as having a high level of severity.[8]

Regarding the time between the risk classification and the first care, the average found for the non-urgent/blue, less urgent/green and urgent/yellow priorities showed adequate values considering the maximum response time defined by the MTS. In what concerns the very urgent/orange and emergency/red priorities, the average was higher than the estimated maximum time. It should be emphasized that in these clinical priorities the waiting time recorded may be overestimated, once the service is first performed and at a later time is made the record in the electronic system. Investigation of the times regarding the attendances of the year 2014 revealed an average of 49.13 minutes in urgent/yellow priority and 16 minutes in very urgent/orange priority. The times of the other clinical priorities were not analyzed in this study.[14] This data points out an increase in waiting time between the risk classification and the first service in 2015, which indicates the need to readjust the internal flows to reduce the waiting time.

When analyzing the proportion of adequacy of the times of the first care, it was observed that the recommended time was exceeded in the majority of service. This result reinforces the need for review and optimization of the processes related to the care of these patients, since the patients classified in the emergency and very urgent clinical priorities have an immediate need for care and those of urgent priority present a potential risk of worsening if they are not treated within the stipulated maximum response time.[8]

A Dutch study comparing trial run times; waiting until service; time of care and length of stay in an emergency hospital before and after MTS implantation indicated that there was no reduction in waiting time, but with the use of the protocol the time was better distributed according to the level of severity of the patients, which improves service and makes it safer.[13]

As for the flowcharts accessed, the extremity problem was the most frequent in the studied population and among patients with non-urgent/blue, less urgent/green and urgent/yellow clinical priority levels. This data reinforces the results of studies performed in two hospitals in the state of *Minas Gerais*, which showed a high prevalence of the same flowchart.[12,14] One factor that may have contributed to this result is that the institution is considered a regional reference for meeting the demands of vascular surgery, besides presenting expressive volume of patients attended in reason of orthopedic problems.

In the very urgent/orange and emergency/red clinical priorities, the most widely used flowcharts were, respectively, major trauma and seizures. The adult malaise flowchart appears as one of the three most accessed in all classification priorities, except in the emergency/red. Studies developed in *Minas Gerais* showed that the adult malaise flowchart had a high prevalence in patients classified in all clinical priorities.[23,24] Research that obtained similar results highlights the need to evaluate the high frequency of this flowchart and if it was not really possible to determine a major complaint, since it is associated with high mortality at all levels of clinical priority.[22]

Regarding the outcomes of the assistances, more than half of the patients were discharged after consultation/medication. Research conducted in the state of *São Paulo* showed similar

results, in which 94.5% of the patients had the same outcome and were mostly classified into lower priority levels.[23]

Hospital admission was the second most frequent outcome. A study carried out in a large hospital, reference for emergencies in the South of Brazil, showed a similar result, in which 23% of patients attended were hospitalized.[18]

The proportion of withdrawal and evasion found in the present study was three times higher than the data reported in a national study that showed evasion/withdrawal of patients frequency of 4.9%.[24] One reason that may be related to the high frequency of evasion/withdrawals in the present study is the difficulty of the population with less urgent demands to wait for the completion of care. It is emphasized that such behavior can lead to constant returns to the service, besides the risk of worsening the health status of these patients.

Regarding the death outcome, there is a reduced proportion compared to the total number of assistances performed. There is great variability in the proportion of deaths described in the literature. Studies carried out in the state of *São Paulo*[25] and in the southern region of the country[23] recorded respectively 1% and 3.9% of deaths in the populations evaluated. These differences may be a result of the variability of the profile of the population and of the scenario institutions of each study.

Although the results are relevant, this research presented as limitations the access to the data only through electronic records. The search for data after the occurrence of the visits and access to the descriptions only in electronic medical records may have contributed to the absence of information on important variables such as service times and the flowchart accessed.

CONCLUSION

From the analysis of the characteristics of the care given to people classified by MTS, it was possible to verify that more than half the population was male and the most frequent age groups were young adults and elderly. The most frequent clinical priority levels were urgent/yellow and less urgent/green and the most accessed presentation flowchart was extremity problems. The time between registration and classification and the time between RC and first care for non-urgent/blue, less urgent/green and urgent/yellow clinical priorities demonstrated adequate values, considering the maximum response times defined by the MTS. However, in the very urgent/orange and emergency/red clinical priorities the average was higher than the recommended maximum time. As a hospital outcome, the majority of patients were discharged after consultation/medication.

The results revealed that emergency services are still points in the network where there is a great demand for patient care, who could be evaluated at other levels of care. They also indicate the need for reevaluation of the flows related to risk classification and primary care, in order to improve the accuracy of the records and the time related to the primary care after classification.

It is possible that the investment in continuous qualification of the professionals who act in the risk classification and the reorganization of the internal flows of the scenario institution of the study contribute to the improvement of the records and enable continuous evaluations of the assistance processes, thus guaranteeing the optimization of the resources of the institution and more qualified assistance to patients.

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