

Children who Leave the Emergency Department: Missing Opportunities?



Crianças que Abandonam a Urgência Pediátrica: Oportunidades Perdidas?

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ABSTRACT

Introduction: Children who leave the Emergency Department may be at risk for preventable health problems related to the lack of timely assessment.

Objective: The aim of this study was to evaluate and characterize the cases of children leaving our Emergency Department and to determine their clinical outcome.

Material and Methods: A retrospective and descriptive review of the patient's medical records was conducted. All children leaving the Emergency Department of Hospital de São Bernardo between January 1 and December 31, 2012, were included in the study.

Results: A total of 538 children abandoned the Emergency Department (1.35 % of all admissions). The majority (89.5%) had no criteria for urgent assessment and abandoned before medical observation (82.7%). The percentage of leaving was higher in the months of December, January and February (64%), on Tuesday (19.3%) and in the afternoon shift (60.8%). These periods coincided with the peak inflow of patients to the Emergency Department. The waiting time for medical observation was in most cases (94.4%) appropriate to the clinical severity. Six patients returned within 72 hours, 2 requiring hospitalization.

Discussion: The percentage of patients that walked-out from the Emergency Department was within the expected range. A non-urgent triage level and prolonged waiting times were predisposing factors to abandonment.

Conclusion: Overcrowding of the Emergency Department with children with non-urgent problems, that increase waiting times, can lead to abandonment with unfavorable outcome, which in our series occurred in only 2 cases.

Keywords: Child; Patient Dropouts; Emergency Service, Hospital; Waiting Lists; Time Factors; Portugal.

RESUMO

Introdução: As crianças que abandonam a Unidade de Urgência Pediátrica antes do seu processo de atendimento estar terminado podem apresentar um agravamento clínico posterior, relacionado com a falta de avaliação médica atempada.

Objetivos: Este estudo teve como objectivo avaliar os casos de abandono na nossa Unidade de Urgência Pediátrica, caracterizar este grupo de crianças e a sua evolução clínica.

Material e Métodos: Análise retrospectiva e descritiva dos processos de urgência das crianças que abandonaram a Unidade de Urgência Pediátrica do Hospital de São Bernardo antes de terminar o processo de atendimento, entre 1 de Janeiro e 31 de Dezembro de 2012.

Resultados: Um total de 538 crianças abandonou a Unidade de Urgência Pediátrica (1,35% de todas as admissões). A maioria (89,5%) não apresentava critério de observação urgente e abandonou antes da observação médica inicial (82,7%). A percentagem de abandonos foi maior nos meses de Dezembro, Janeiro e Fevereiro (64%), à terça-feira (19,3%) e durante o turno da tarde (60,8%). Estes períodos coincidiram com os picos de maior afluência à Unidade de Urgência Pediátrica. O tempo de espera para observação médica foi na maioria (94,4%) adequado à gravidade clínica. Seis doentes regressaram nas 72 horas seguintes, dos quais dois necessitaram de internamento.

Discussão: Verificou-se uma percentagem de abandonos dentro do espectável. A menor gravidade aferida na triagem e os tempos de espera prolongados foram factores predisponentes ao abandono.

Conclusão: A sobrelocação das Urgências Pediátricas com doentes sem critérios de urgência, que aumentam os tempos de espera, pode conduzir ao abandono com posterior readmissão em situação clínica de agravamento, o que na nossa série aconteceu em apenas dois casos.

Palavras-chave: Criança; Desistência; Serviço de Urgência Hospitalar; Tempos de Espera; Portugal.

INTRODUCTION

Children queue abandonment from a Paediatric Emergency Department (PED) before the medical attendance procedure has been completed has not to the present date ever been studied and published in Portugal. These represent a group of patients with undetermined pathology and clinical evolution raising concerns regarding possible clinical worsening that could have been prevented by a timely medical examination.¹

Early queue abandonment from the PED is commonly referred¹⁻³ as a result of overcrowding of patients with

medical conditions that not meet urgent medical assistance criteria and unnecessarily increase waiting times. In addition to waiting time, other aspects considered as promoting abandonment include lower severity on triage and hospital proximity to the patient's home.^{1,4} Queue abandonment percentages in international paediatric series of patients usually vary between 1 and 15%⁵⁻⁷ and it is considered that the ideal percentage should remain below 2%.⁸

The adverse outcome of children abandoning the PED has been assessed in prospective studies^{9,10} and has been

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defined in terms of the need for hospital admission, invasive procedures (intravenous therapy, surgery), transfer to ICU or death in the 72 hours following abandonment. Admission rates for these patients usually vary between 1.5 and 4%.^{6,11} According to quality criteria, this figure should stay below 5% and as close as possible to 1%.^{12,13}

Patients attending the Paediatric Emergency Department (PED) at the *Hospital de São Bernardo* are classified by a triage system in three categories identified with a colour and an average target time to the first medical examination. The first category corresponds to the first priority, red coloured, in need of immediate or very urgent medical assistance (0 to 10 minutes). The second category corresponds to an urgent priority, yellow coloured, with a 60-minute medical assistance target time. The third category corresponds to non-urgent priority, blue coloured, with on average 120-240 minute estimated medical assistance time.

This system was based on initial priority criteria defined at the PED for the current facility starting in 1997 and updated in 2000, according to the recommendations of the *Administração Regional de Saúde de Lisboa e Vale do Tejo* for paediatric emergency units. These criteria are not necessarily related to the diagnosis and seek to reproduce aspects regarding a patient's particular condition (for instance, patient's age group and the presence of a previous referral are taken into account). Therefore, apart from presenting complaints, signs and symptoms are also considered (as for example any airway compromise), as well as respiratory and circulatory status, presence of bleeding, level of consciousness, duration of presenting complaints and some measurable parameters such as blood glucose, body temperature, pulse rate and oxygen saturation.

We did not find any published evidence regarding the number of patients abandoning the PED in Portugal. Therefore, our study aimed to assess the percentage of children queue abandonments from PED at our hospital and to characterise this group of children and their clinical evolution. We also aimed to develop strategies to improve medical assistance at our PED through the identification of possible queue abandonment risk factors.

MATERIAL AND METHODS

This was a descriptive retrospective study, carried out from the 1st January to the 31st December 2012.

The initial data were provided by the Management Information Department (*Gabinete de Informação para a Gestão*) at the *Centro Hospitalar de Setúbal, Hospital de São Bernardo*. All children discharged from the hospital in the ALERT® system were initially included in the study, classified as 'discharged against medical opinion' ("*saída contra parecer médico*"), 'abandonment' ("*abandono*") or 'did not answer to call' ("*não respondeu à chamada*"). The individual emergency records of these children were subsequently analysed, including only those considered as real queue abandonment from the PED. Children with an incorrect discharge record at the ALERT® system were excluded from the study.

The group of children that had actually abandoned the PED was characterised regarding their age, gender, reasons to attend to the hospital and their time variation (month, day of the week, time of day). Waiting times, clinical outcome and re-admission rate of these patients were also assessed. The number of abandonments has been analysed regarding the total number of PED admissions for the considered timeframe.

RESULTS

The PED at the *Hospital de São Bernardo* admitted 39,998 patients during the study period. According to the initial data of the Management Information Department (*Gabinete de Informação para a Gestão*), 671 of these patients had been discharged against medical opinion, abandoned the department or failed to answer at the time of the call. However, an individual review of all records revealed that 133 patients had been incorrectly entered as discharged in the ALERT® system, excluding them from the present study.

The present study included 538 patients that abandoned the PED between the 1st January and the 31st December 2012, corresponding to 1.35% of all patients admitted to the PED during this timeframe. Approximately 14% of these children had previously abandoned the PED.

As regards patient's demographic characteristics, a slight male predominance was found (294, 54.6%), mean and median age was 4.5 and 3 years of age, respectively.

The higher abandonment percentage was found in the 29 day-to-two year age group (191 patients, 35.5%) with a progressive reduction in the number of abandonments with increasing age. We only found one case of abandonment of a newborn child.

We found that 91 children (16.9%) abandoned the PED immediately upon enrolment and before nurse's triage. However, the highest percentage of abandonment occurred after the nurse's triage and before the medical examination (354 patients, 65.8%) (Fig. 1).

Among children that abandoned upon medical examination (93 patients, 17.3%), most of them left before clinical re-evaluation (49 patients, 52.7%) and the remaining left while waiting for test results (28 patients, 30.1%) or even against medical opinion (16 patients, 17.2%) (Fig. 2).

From the 447 triaged patients, most of them (400 patients, 89.5%) did not meet any criteria for urgent medical assistance. From the 47 patients with urgent assistance criteria (Table 1), 17 were not examined by the physician.

Considering the reasons for the patients that abandoned before nurse's triage or upon medical examination (447 patients) to attend the PED, we found a predominance of respiratory (177 patients, 39.6%) and gastrointestinal symptoms (102 patients, 22.8%). A significant number of children presented simply with fever, with no other symptoms (44 patients, 9.8%) and with dermatological problems (44 patients, 9.8%) (Table 2).

The most frequent respiratory symptoms related to upper respiratory tract infections (140 patients, 79.1%) mostly

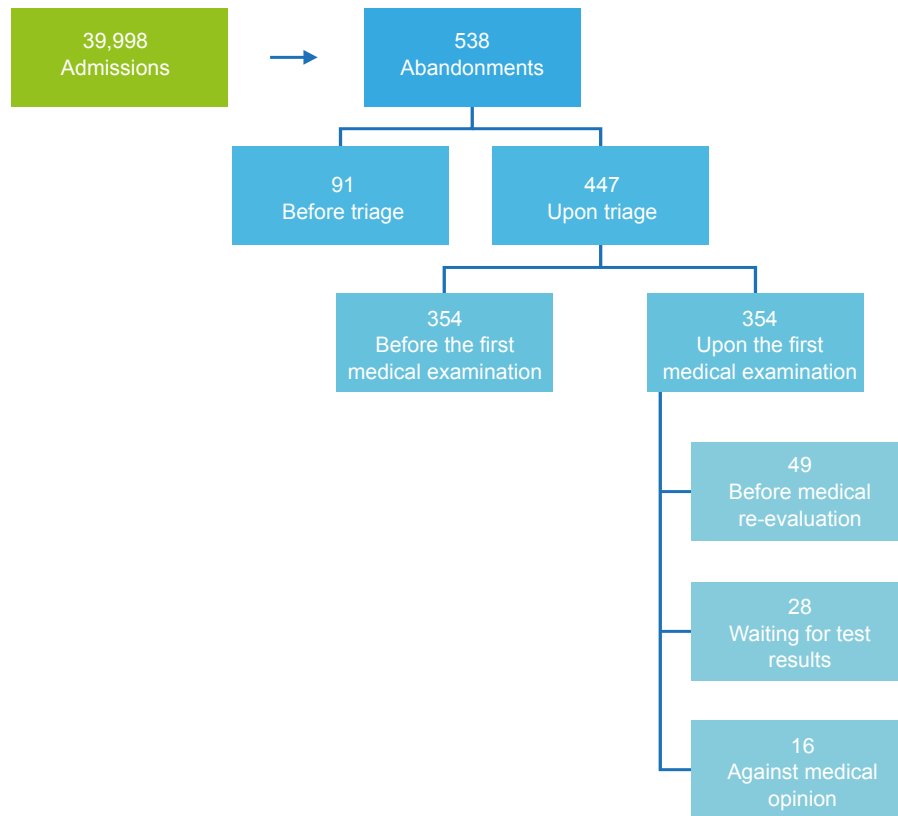


Figure 1 – Time of abandonment

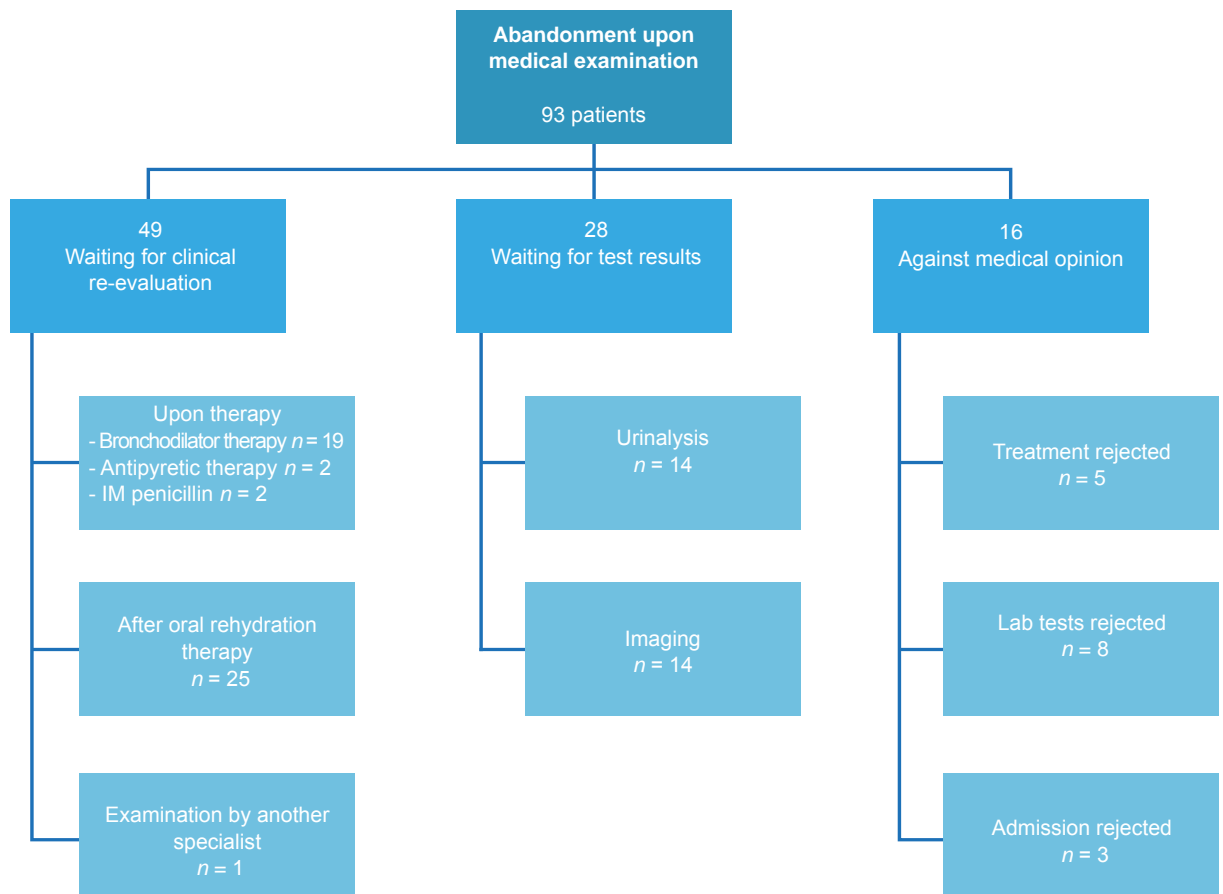


Figure 2 – Patients having abandoned upon medical examination

Table 1 - Characteristics of the 47 patients with urgent-assistance criteria that abandoned the PED

Characteristics	Number of patients
Gender	
Male	34
Female	13
Age	
Average	58 M
Median	22 M
Admission schedule	
(00:00 - 08:00h)	9
(08:00 - 16:00h)	15
(16:00 - 00:00h)	23
Average time until triage	15 Min
Average time until the first medical examination	55 Min
Moment of the abandonment	
Before medical examination	17
Waiting for clinical re-evaluation	18
Waiting for test results	8
Abandonment against medical opinion	4
Diagnostic tests	
Yes	9
No	21
Therapy	
Yes (SC/BD/ORT)	17
No	13

M – Months; Min – minutes; SC – systemic corticosteroids; BD – inhaled or nebulized bronchodilators; ORT – Oral rehydration therapy

rhino-pharyngitis. Gastrointestinal symptoms were mainly related to acute infectious gastroenteritis (69 patients, 67.6%). Skin problems mostly included non-specific rashes (18 patients, 40.9%). Traumatic brain injury occurred in 14 patients (48.3%).

Waiting times – The average waiting time between arrival and being called to the nurse's triage station was 17 minutes (minimum 0 minutes, maximum 57 minutes). The average waiting time between triage and medical examination was 1 hour and 29 minutes (minimum 3 minutes, maximum 4 hours and 40 minutes). Non-urgent patients waited on average 1 hour and 53 minutes to be examined by a physician and urgent patients waited 55 minutes. We should note that 11 patients triaged as urgent waited more than one hour (but less than two hours) and 19 patients triaged as non-urgent waited more than four hours (but less than five hours). The average time to medical re-evaluation upon the first examination was 2 hours and 36 minutes (minimum 16 minutes, maximum 6 hours and 29 minutes).

Time variation – The highest percentage of abandonment occurred in December, January and February (344 patients, 64%). The admissions during these months were on average 4,259 compared to 2,916 in the remaining months (Fig. 3A).

Despite a small difference, the highest percentage of queue abandonments occurred on Tuesday (104 patients, 19.3%) followed by Monday (94 patients, 17.5%). These were the busiest days at the PED over the study timeframe (on average 6,283 admissions compared to 5,486 on the remaining days). Saturday was the day when less queue abandonments occurred (35 patients, 6.5%) and also the day with the less affluence of patients to the PED (4,850

Table 2 – Reasons for patient abandonment after the nurse's triage or the medical examination by diagnosis-related group and triage results

Diagnosis-related Groups	Number of patients with non-urgent criteria	Number of patients with urgent assistance criteria
Respiratory <i>n</i> = 177	158	19
Gastrointestinal <i>n</i> = 102	97	5
Infectious (unspecified) <i>n</i> = 44	43	1
Dermatology <i>n</i> = 44	44	—
Osteoarticular/Traumatic <i>n</i> = 29	17	12
Genitourinary <i>n</i> = 14	12	2
Psychiatric <i>n</i> = 9	6	3
Ophthalmology <i>n</i> = 8	8	—
Neurologic <i>n</i> = 5	3	2
Stomatology <i>n</i> = 4	4	—
Undetermined <i>n</i> = 11	8	3
Total	400	47

admissions) (Fig. 3B).

The highest number of abandonments occurred during the late shift (16:00-00.00; 327 patients, 60.8%), corresponding to the busiest period in the PED (18,907 patients, 47.3% of all admissions) (Fig. 3C).

Clinical progress – From all the children that abandoned the hospital, six (1.11%) returned to the hospital in the following 72 hours, of which two required hospital admission (re-admission rate of 0.37%) (Table 3).

DISCUSSION

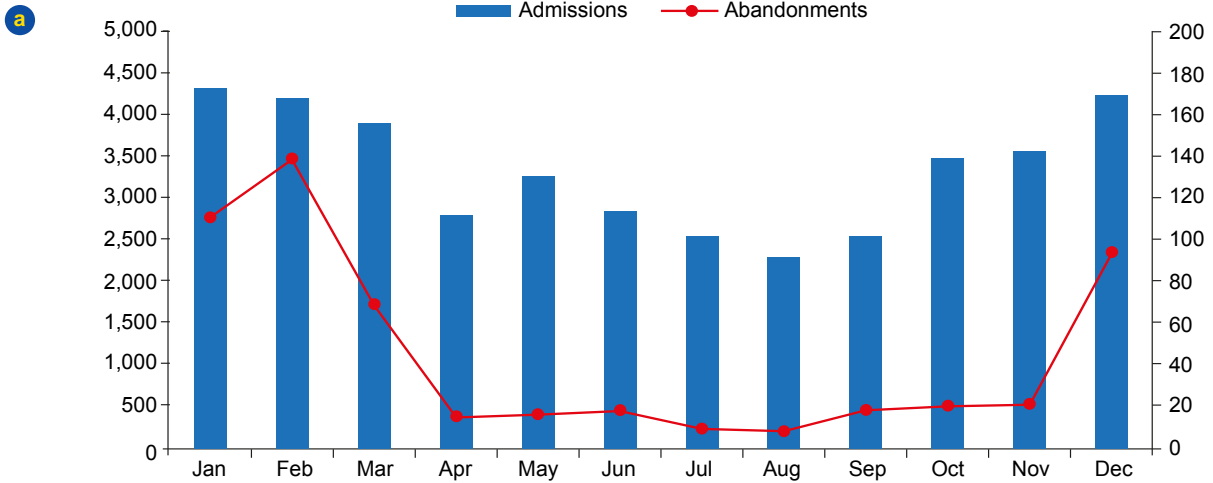


Figure 3a – Monthly time distribution of abandonment occurrences

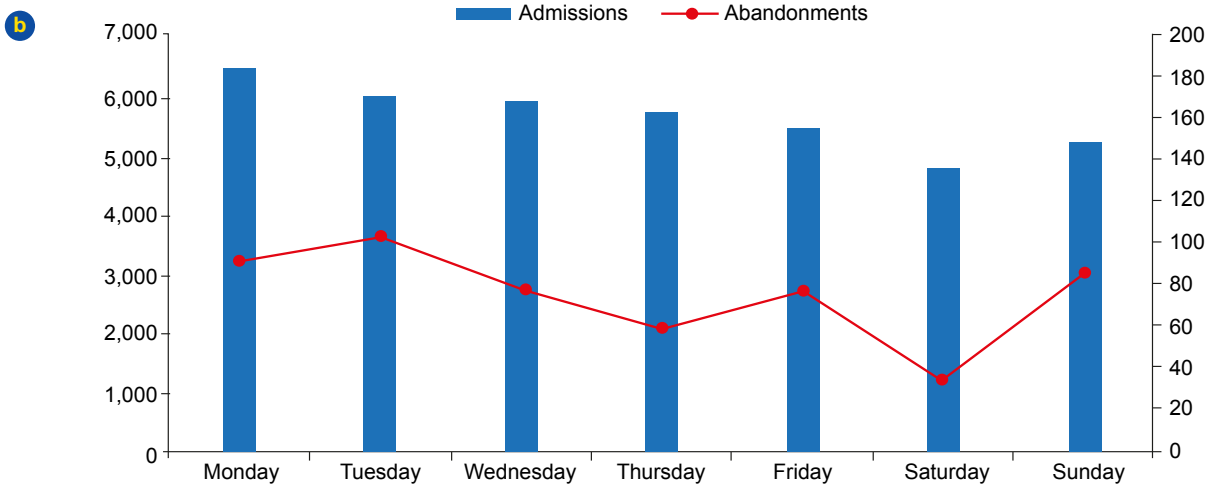


Figure 3b – Weekday time distribution of abandonment occurrences

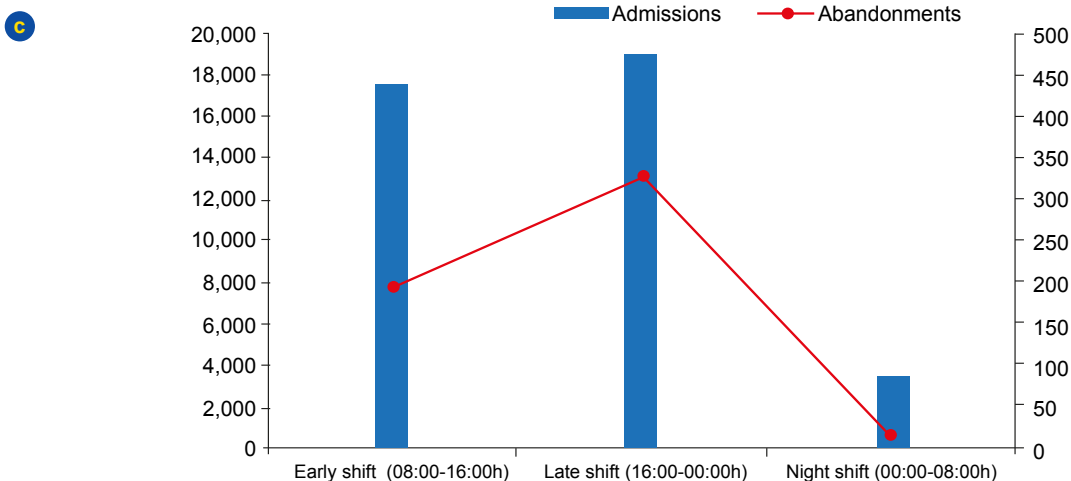


Figure 3c – Schedule distribution of abandonment occurrences

Our study revealed a percentage of queue abandonment as expected and as previously described (< 2%). A significant percentage of patients (14%) had abandoned the PED on a previous occasion, again, a result in line with previous studies,² recognized to be a risk factor for abandonment recurrence.

We found that more than one third of the patients (35.5%) were in the 29 days-to-two year age group, with a progressive reduction in the number of abandonments as age increased. In fact, younger age is a risk factor for abandonment, in line with previous report.² In addition, as the age increases, the episodes of acute illness decrease with a consequent decrease in the need to attend the emergency department, consequently contributing to a lower abandonment probability in the oldest age groups.

The average waiting time to triage was of 17 minutes, which may be considered unreasonable. However, it is known that paediatric triage may be longer than in adults.¹⁴ In addition, at our hospital's PED, the nurse who is responsible for the triage is required to work in other areas whenever necessary (including patient treatment room and resuscitation). As our study revealed that the more relevant time periods, related to a higher risk of abandonment, occurred while waiting for triage, it seems reasonable to suggest that a nurse should perform the triage exclusively. Considering children that have abandoned the PED upon arrival and before the nurse's triage, we found that, while waiting for the call for triage, the perception of waiting time for medical examination may have induced the accompanying family members to leave the hospital.

Considering children that have abandoned the hospital after the nurse's triage and before medical examination,

we believe that nurse's assessment in triage may have reassured the parents that the clinical problem was non-severe and therefore did not require urgent medical assistance, leading to abandonment. In addition, the estimated average waiting time for medical examination, according to the triage's assigned priority announced at the PED, may have contributed to the decision to leave the hospital.

The waiting time from triage to medical examination was mostly appropriate for the clinical severity assigned in the triage (94.4%).

We found a high number of queue abandonments upon the first medical examination which in most of these patients occurred while waiting for clinical re-evaluation. We consider that the high affluence of patients waiting for the first medical examination may have delayed the clinical re-evaluation of patients already under medical surveillance/monitoring at the PED where any clinical worsening would be rapidly identified. At the same time, we should remark that more than half of these patients presented with persisting vomiting. In these, the abandonment followed a probably successful oral rehydration therapy, without prior notice being given to the physician.

A significant number of patients having abandoned the hospital upon the first medical examination were waiting for the result of laboratory tests, a delay not controlled by the physician. It is our opinion, however, that this aspect is not related to the PED circuit of biological products, as blood collections are carried out at the very PED in the great majority of cases, its transportation by our Operational Assistant is very quick, and the tests are rapidly performed at the Emergency Laboratory which is contiguous to the

Table 3 - Characteristics and clinical progress of the patients that returned after abandonment

Gender	Age	Waiting time up to the triage	Symptoms	Assigned priority by triage	Waiting time up to the first medical examination	Time of abandonment	Clinical progress at recurrence
Male	2.5 M	11 min	Stridor	Urgent	25 min	Waiting for medical re-evaluation upon NT	Discharged
Fem	18 M	30 min	Vomiting, diarrhoea, fever	—	—	Before triage	Admission due to dehydration
Male	20 M	3 min	Vomiting and diarrhoea	Non-urgent	32 min	Waiting for medical re-evaluation after ORT	Discharged
Male	3 A	14 min	Vomiting	Non-urgent	1h31 min	After triage	Re-abandoned from PED
Male	3 A	20 min	Aphthous ulcers and fever	Non-urgent	1h38 min	After triage	Admission due to feeding refusal
Fem	15 A	16 min	Nasal discharge and cough	Non-urgent	39 min	After triage	Discharged

Fem – female; M – months; Y – years; Min – minutes; ORT – oral rehydration therapy; NT – nebulized therapy; PED – Paediatric Emergency Department

PED. However, it should be noted that half of these patients were waiting for urine analysis, in which the delay is related to obtaining the sample, many times depending on a child's spontaneously passing urine when there is still no proper sphincter control. In addition, we should also remark that the high affluence of patients may have delayed the timely examination of the test results. This is another aspect where we may individually try to improve our methodology, balancing the need to call new patients for examination versus the clinical and laboratory test re-evaluation of waiting patients.

Regarding the patients that abandoned the PED, the major reasons to attend were infectious pathologies of a respiratory and gastrointestinal nature and infectious rashes.

The periods (month, week day, daily schedule) with the higher affluence of patients to the PED and therefore with longer waiting times coincided with the highest percentage of abandonments from hospital, demonstrating that delay in medical assistance is a major factor for abandonment, in line with the literature review.

We found a low recurrence rate in the 72 hours after abandonment (1.11%). The admission rate of these patients was also very low (0.37%). We should note that none of the two children that were admitted had been examined when they first attended the PED, one of them having abandoned even before the nurse's triage. The latter prevented us from knowing the clinical severity when this patient first attended the PED and whether the indication for admission at the recurrence was related to clinical worsening associated to the abandonment.

Given the retrospective design of this study, we were not able to determine if a spontaneous clinical resolution occurred with the other patients that did not return, if they were observed at another healthcare unit and in which clinical situation.

There seems to be a strong association between the number of abandonments and the periods of overcrowding at the PED. As the number of health professionals assigned to this department cannot be increased we expect the relevant Health Authority to create efficient alternatives

aimed at a better assessment of acute paediatric problems in primary care healthcare,

We have considered as a limitation to the study its retrospective design, preventing the analysis of socio-economic and human aspects which contribute to abandonment, as is the case of a lower socio-economic level associated to a lower satisfaction/trust towards the health professional.^{2,7} Due to the retrospective nature of the study, we were not able to assess the clinical progress of the patients that abandoned the hospital and may also have introduced some information bias. We consider that the small size of our group of patients may also represent a limitation.

CONCLUSION

We found a low rate of abandonment in our PED. The factors related to abandonment were the lower severity assigned in the triage and the long waiting times associated to periods of higher affluence (December to February, Tuesday, late shift).

Most children that abandoned the PED left after the nurse's triage and did not have any urgent-assistance criteria, revealing a high quality of triage at our PED.

Assessment of clinical progress in those patients who do not return to the PED after the abandonment can only be performed through prospective studies. Recurrences upon abandonment were scarce and only two patients had an indication to be admitted.

CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in the writing of this manuscript.

FINANCIAL SOURCES

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The results of our study were presented as a poster at the 14th National Paediatrics Congress held at the *Centro de Congressos da Alfândega, Porto*, on the 3rd-5th October 2013.

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