

Appropriateness of a Telephone Health Line Referral System in a Pediatric Emergency Department

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Abstract

Introduction: Telephone health lines have been increasingly gaining popularity, offering healthcare counseling and triage to the population and resolving the need for unnecessary medical evaluations. This study aimed to characterize the health line referral pattern of the pediatric population to the emergency department of a level II hospital and assess its appropriateness.

Methods: Cross-sectional investigation of all children referrals using the SNS 24 phone line from July 1st to December 31st, 2019. Good referrals were defined based on performing emergency-department-specific examinations, medication prescriptions, hospital admissions, or transfers. The statistical analysis was performed in SPSS software (version 26).

Results: This study included 1080 children with a median age of two years, and the majority of referrals were related to children under the age of three. Furthermore, most good referrals were observed in adolescents ($p = 0.001$) and most patients were referred between 8 PM and midnight. Cough and nausea or vomiting algorithms were frequently associated with good referrals ($p < 0.0001$), while rash was commonly associated with poor referrals ($p < 0.0001$). Only 37.8% of the patients underwent examinations in the emergency department (43.3% were primary-care accessible), 28.3% of the cases required medication in the emergency department, 4.2% of the patients were admitted to hospital care, and 0.4% of the subjects were transferred to another hospital. Viral infectious diseases were the most common discharge diagnosis (52.1%). In addition, over half of the patients did not meet the criteria for a good referral.

Discussion: Although phone triage has been believed to be difficult, an excessive number of poor referrals was observed in this study. Accordingly, algorithms should be modified to decrease the chance of unnecessary hospital visits.

Keywords: Adolescent; Child; Emergency Service, Hospital/statistics & numerical data; Hotlines/statistics & numerical data; Infant; Portugal; Referral and Consultation/statistics & numerical data; Triage/methods

Keypoints

What is known:

- Phone triage has been gaining popularity throughout the years, decreasing the number of patients who seek observation for unnecessary motives.
- Only high-priority cases should be referred to the emergency department.

What is added:

- Most of the referrals did not require evaluation in an emergency department and were considered inappropriate referrals.
- Phone triage algorithms should be adapted to improve referrals in a pediatric population.

Introduction

The Portuguese pediatric service Saúde 24 Pediatria was a public telephone line first implemented in 1999, better known by the Portuguese population as Doi, Doi? Trim, Trim.^{1,2} The main purpose of this service was to provide easier and faster information and counseling to parents and reduce demand in emergency departments. In April 2007, this service was remodeled

as Saúde 24, and provided services not only to the pediatric population but also to all other age groups. Due to its success, this service was modernized in 2017, incorporated other important digital services in addition to the telephone line (including online appointment scheduling, requesting documents, or accessing clinical information), and changed its name to SNS 24 subsequently.³ However, the same main goal of all these services was to offer triage and general

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health information, counseling, and referral services in the event of illness or public health concerns. The SNS 24 telephone line provides a 24 hours and seven days per week nurse-led telephone-based healthcare advice service, which allows people to call and describe their symptoms to healthcare professionals who, based on algorithms, experience, and professional knowledge, make recommendations and decide whether the patient needs an urgent evaluation. The professionals can refer patients to the emergency department and primary care services or offer guidance on managing symptoms from home. Therefore, only high-priority cases will be referred to the emergency department to decrease the number of patients who seek observation unnecessarily.³ The present cross-sectional study is aimed to describe and characterize the SNS 24 referral pattern of the pediatric population to the emergency department of a level II hospital and assess the appropriateness of urgent telephone-based evaluations based on exams performed need for medication, and hospital admission.

Methods

This cross-sectional study was conducted on all pediatric patients from 0 years to under 18 years-old, who were referred by the SNS 24 telephone line to the emergency department of a level II hospital between July 1st and December 31st, 2019. The required data were collected and analyzed from the clinical records of all patients.

As inclusion criteria, we included all the pediatric patients referred by the SNS 24 line, but we excluded those who abandoned the emergency department before discharge. All data from patients were collected, meaning no sampling method was used.

Characteristics of patients

The children were categorized into five age groups: from birth to 1 month, 1-3 months, from 3 months to 3 years, 3-10 years and from 10 years to under 18 years, as seen in Table 1.

Call factors

Time of the day, month, and algorithm of the referral

The time of referral was divided into six categories: from midnight to 4 AM, from 4 AM to 8 AM, from 8 AM to noon, from noon to 4 PM, from 4 PM to 8 PM and from 8 PM until midnight. These categories were then divided into the day shift, from 8 AM to 8 PM, and night shift, from 8 PM to 8 AM. Data concerning the referral month was collected from the clinical records and then categorized into two different groups: months with warm temperatures (July,

August, and September) and with cold temperatures (October, November, December) (Table 1).

The referral algorithm was also collected from the clinical records of patients.

Emergency department

Priority assessment, examinations performed, medication use in the emergency department, prescribed ambulatory medication, destination, and discharge diagnosis

The emergency department assessment priority was based on the Manchester triage system. Green (standard priority), yellow (urgent priority) and orange (very urgent priority) wristbands were given after triage. The data were collected based on the most frequent examinations performed in the emergency department and divided into primary-care accessible and emergency department-specific examinations (Table 2). Primary-care accessible examinations consisted of urine dipstick and rapid streptococcal tests.

Emergency department-specific examinations included plain radiographs, ultrasounds, computed tomography (CT) scans, blood tests, electrocardiography, urine drug test, lumbar puncture, and transcutaneous bilirubin measurements. The use of medication in the emergency department was also investigated in this study (excluding antipyretics).

The data concerning prescribed ambulatory medication and destination after discharge (home with standard

Table 1. Frequency of referrals based on gender, age group, time, and month of referral

Variables	Groups	n	%
Gender	Male	576	53.3
	Female	504	46.7
Age group	[0 - 1 month]	32	3.0
	]1 month - 3 months]	44	4.0
	]3 months - 3 years]	505	46.8
	]3 years - 10 years]	365	33.8
	]10 years - 18 years[	134	12.4
Time of referral	]noon - 4 AM]	111	10.3
	]4 AM - 8 AM]	47	4.4
	]8 AM - 12 PM]	164	15.2
	]12 PM - 4 PM]	182	16.9
	]4 PM - 8 PM]	216	20.0
	]8 PM - 12 AM]	360	33.3
Month of referral	July	138	12.8
	August	100	9.3
	September	144	13.3
	October	171	15.8
	November	241	22.3
	December	286	26.5



Table 2. Frequency of examinations performed in the emergency department and medication prescribed by category

Variables	Groups	n	%
Exams	Urine dipstick	230	21.3
	Rapid streptococcal test	46	4.3
	Plain radiography	113	10.5
	Computed tomography	9	0.8
	Ultrasound	11	1.0
	Blood analysis	125	12.5
	Others	16	1.5
Medication	Emergency department medication	306	28.3
	Antibiotic	251	23.2
	Bronchodilators	105	9.7
	Others	308	28.5

self-care, hospital admission into neonatology or pediatrics, transfer to another hospital, or referral to a pediatrics appointment) were also collected.

According to the etiology, discharge diagnoses were divided into 15 categories: infectious, allergic, gastrointestinal, surgical, neurologic, ophthalmologic, musculoskeletal, dermatologic, psychiatric, adverse effects of vaccination, trauma / accidents / insect bites, ear / nose / throat, genitourinary, other or no disease. The infectious category was further divided into viral, bacterial, fungal, or parasitic infections. All the diagnosis categories are expressed in Table 3.

Classification of the referral

All patients were categorized into two groups based on the appropriateness of their referral. Good referrals were defined as those who underwent emergency department-specific examinations, received medication in the emergency department, and were admitted to the hospital or transferred to another hospital (Table 4). On the other hand, patients who did not meet at least one of these criteria were classified as poor referrals.

Statistical analysis

The statistical analysis was performed in SPSS software (version 26), and a p -value less than 0.05 ($p < 0.05$) was considered statistically significant. Categorical variables were compared using the chi-square test, and we reported the observed and expected values for each cell.

Results

Between July 1st and December 31st, 2019, 1096 pediatric patients were referred to the emergency department by the SNS 24 telephone line, 16 of whom were excluded due to abandoning the emergency department before

the completion of observation. The total number of children evaluated at our hospital in the same period was 14 869, meaning SNS 24 referrals accounted for 7.4% of all hospital evaluations. There was a male predominance (53.3% vs 46.7%, $n = 576$ vs $n = 504$) and the median age was 2 years-old with an interquartile range (IQR) of 0.0-5.5 years. Most referrals included children under the age of 3, mainly in the age group from 3 months to 3 years old (46.8%, $n = 505$). Of all the children evaluated, 47.1% of the cases ($n = 509$) presented with a fever, and a significant association was found between having a fever and age groups in children in the age range of 3 months to 9 years ($p < 0.001$). However, there was no association between having a fever and being well-referred ($p = 0.246$). It should be mentioned that 58.4% ($n = 631$) of all patients were categorized as poor referrals. It was found that adolescents (≥ 10 years) were more likely to be well-referred to the emergency department compared to younger children ($p = 0.001$). Months with warmer temperatures observed fewer referrals than months with colder temperatures (35.4% vs 64.6%, $n = 382$ vs $n = 698$). The chi-square analysis revealed a significant interaction between good referrals and months with colder temperatures (4.170, $p = 0.04$). There was also a correlation between having a fever and being referred in colder months ($p = 0.001$). According to the Manchester triage system, 97.7% ($n = 1055$) of the patients had a standard (54.7%, $n = 591$) or urgent (43.0%, $n = 464$) need for evaluation. Patients with a higher priority of evaluation (urgent or very urgent) were better referred, compared to those with a standard need for evaluation ($p = 0.002$) and were also more likely to be admitted to the hospital or transferred to another hospital ($p < 0.001$). Concerning the time of referral, most referrals occurred between 8 PM and midnight (33.3%, $n = 360$). Day and night shift referrals were similar (52.0% vs

48.0%, $n = 562$ vs 518 , respectively), and although no significant association was observed between the time of the day and being well-referred ($p = 0.265$), children who were referred during the night shift received a higher priority of evaluation, based on the Manchester triage system ($p = 0.007$). Furthermore, children who were referred between midnight and 8 AM were more likely to be under the age of 3 (73.4%, $n = 116$, $p = 0.007$) and more prone to the need for emergency department medication ($p < 0.001$). It is worth mentioning that both emergency department-specific examinations and admissions were less frequent during this period. The most frequent SNS 24 algorithm used for the recommendation of an emergency department evaluation included cough in 22.7% ($n = 245$) of cases,

followed by rash and vomiting in 11.3% ($n = 122$) and 10.4% ($n = 112$) of cases, respectively. Concerning these algorithms, a significant interaction was found between being well referred and the cough, as well as nausea or vomiting algorithm ($p < 0.001$). In addition, receiving a cough algorithm was more frequent in children under the age of 3 (83.2%, $n = 204$, $p < 0.001$). On the other hand, most children with the rash algorithm were found to be wrongly referred to ($p < 0.001$). It should be highlighted that there was no SNS 24 algorithm for fever. Of all children, 37.8% ($n = 408$) of cases underwent examinations in the emergency department, and 56.7% and 43.3% ($n = 232$ vs 176) of them were classified as emergency department-specific and primary-care accessible, respectively. The most

Table 3. Frequency of diagnosis of the discharged patients referred to the emergency department

INFECCIOUS ($n = 823 / 76.2\%$)			
	n (%)		n (%)
VIRAL INFECTIONS	563 (52.1)	BACTERIAL INFECTIONS	252 23.2%
UPPER / LOWER RESPIRATORY TRACT	138 (12.8)	UPPER / LOWER RESPIRATORY TRACT	197 18.2%
Recurrent wheezing	27 (2.5)	Otitis media	85 (7.9)
Acute tonsillitis	20 (1.9)	Pneumonia	31 (2.9)
Acute bronchiolitis	36 (3.3)	Atypical pneumonia	19 (1.8)
Croup	1 (0.1)	Acute tonsillitis	36 (3.3)
Flu	6 (0.6)	Adenoiditis	3 (0.3)
Laryngitis	37 (3.4)	Tonsillar abscess	1 (0.1)
Mononucleosis	1 (0.1)	Conjunctivitis	15 (1.4)
Acute nasopharyngitis	10 (0.9)	Otomastoiditis	1 (0.1)
GASTROINTESTINAL	109 (10.1)	Scarlet fever	4 (0.4)
Gastroenteritis	109 (10.1%)	Sinusitis	2 (0.2)
NEUROLOGICAL	1 (0.1)	CUTANEOUS BACTERIAL INFECTIONS	14 (1.3)
Viral meningitis	1 (0.1)	Cellulitis	5 (0.5)
EXANTHEMATIC VIRAL INFECTIONS	99 (9.2)	Impetigo	2 (0.2)
Hand, foot and mouth disease	17 (1.5)	Paronychia	1 (0.1)
Erythema <i>infectiosum</i>	1 (0.1)	Varicella with overinfection	3 (0.3)
Exanthema <i>subitum</i>	5 (0.5)	Bug bites with overinfection	3 (0.3)
Aphthous stomatitis	16 (1.5)	GENITOURINARY	28 (2.6)
Non-specific exanthema	18 (1.7)	Urinary tract infection	20 (1.9)
Herpangina	5 (0.5)	Balanitis	8 (0.7)
Herpetic gingivostomatitis	3 (0.3)	MUSCULOSKELETAL	2 (0.2)
Herpes infection	1 (0.1)	Osteomyelitis	2 (0.2)
Varicella	32 (3.0)	OTHERS	11 (1.0)
Zoster	1 (0.1)	Mastitis	1 (0.1)
OTHERS	216 (20)	Dental abscess	3 (0.3)
Non-specified viral infection	213 (19.7)	Adenitis	5 (0.5)
Myositis	2 (0.2)	Sepsis	2 (0.2)
Parotitis	1 (0.1)	PARASITIC INFECTIONS	1 (0.1)
FUNGAL INFECTIONS	7 (0.6)	<i>Ascaris lumbricoides</i>	1 (0.1)
Oral candidiasis	1 (0.1)		
Perineal candidiasis	6 (0.6)		



Table 3. Frequency of diagnosis of the discharged patients referred to the emergency department (cont.)

ALLERGIC (n = 26 / 2.4%)			
	n (%)		n (%)
Cow milk protein allergy	2 (0.2)	Allergic conjunctivitis	3 (0.3)
Asthma	1 (0.1)	Urticaria	18 (1.7)
Drug allergy	2 (0.2)		
GASTROINTESTINAL (n = 98 / 9.0%)			
	n (%)		n (%)
Non-specific abdominal pain	9 (0.8)	Constipation	22 (2.0)
Epigastralgia	1 (0.1)	Hematochezia	1 (0.1)
Anal fissure	1 (0.1)	Gastroesophageal reflux	1 (0.1)
Flatulence	1 (0.1)	Vomiting	62 (5.7)
SURGICAL (n = 2 / 0.2%)			
	n (%)		n (%)
Appendicitis	1 (0.1)	Pyloric stenosis	1 (0.1)
PSYCHIATRIC (n = 6 / 0.6%)			
	n (%)		n (%)
Anxiety	5 (0.5)	Voluntary drug intoxication	1 (0.1)
NEUROLOGICAL (n = 12 / 1.1%)			
	n (%)		n (%)
Headaches	7 (0.6)	Epilepsy	1 (0.1)
Post-lumbar puncture syndrome	1 (0.1)	Benign myoclonus of early infancy	1 (0.1)
Febrile seizure	1 (0.1)	Facial nerve palsy	1 (0.1)
OPHTHALMOLOGIC (n = 2 / 0.2%)			
	n (%)		n (%)
Subconjunctival bleeding	1 (0.1)	Diplopia	1 (0.1)
MUSCULOSKELETAL (n = 10 / 0.9%)			
	n (%)		n (%)
Muscular contracture	1 (0.1)	Muscular lesion	1 (0.1)
Dactylitis	1 (0.1)	Intercostal neuritis	2 (0.2)
Non-specific musculoskeletal pain	2 (0.2)	Torticollis	1 (0.1)
Non-specific thoracic pain	2 (0.2)		
DERMATOLOGIC (n = 5 / 0.5%)			
	n (%)		n (%)
Dyshidrosis	1 (0.1)	Prurigo <i>simplex acuta infantum</i>	1 (0.1)
Atopic dermatitis	1 (0.1)	Henoch Schönlein purpura	1 (0.1)
Non-specific prurigo	1 (0.1)		
GENITOURINARY (n = 9 / 0.8%)			
	n (%)		n (%)
Hematuria	1 (0.1)	Urethritis	1 (0.1)
Polyuria	1 (0.1)	Vulvovaginitis	5 (0.5)
Nephrotic syndrome	1 (0.1)		
TRAUMA / ACCIDENT / BUG BITES (n = 26 / 2.4%)			
	n (%)		n (%)
Cat-scratch	2 (0.2)	Accidental ingestion of harmful products	4 (0.4)
Electric shock	1 (0.1)	Bug Bites	16 (1.5)
Traumatic lesion in the lip	1 (0.1)	Choking	1 (0.1)
Fall	1 (0.1)		

Table 3. Frequency of diagnosis of the discharged patients referred to the emergency department (cont.)

OTOLARYNGOLOGIC (n = 8 / 0.7%)			
	n (%)		n (%)
Epistaxis	5 (0.5)	Otalgia	2 (0.2)
Post-surgical odynophagia	1 (0.1)		
OTHERS (n = 20 / 1.9%)			
	n (%)		n (%)
Cervical adenopathy	1 (0.1)	Neonatal jaundice	4 (0.4)
Abdominal cramps	6 (0.6)	Lymphatic malformation	1 (0.1)
Vasovagal syncope	2 (0.2)	Palpitations	1 (0.1)
Gingivitis	1 (0.1)	Secondary reaction to intrathecal treatment	2 (0.2)
Umbilical granuloma	1 (0.1)	Food refusal	1 (0.1)
VACCINES ADVERSE EFFECTS (n = 6 / 0.6%)			
NO DISEASE (n = 27 / 2.5%)			

Table 4. Frequency of good referrals by criteria

Variables	n	%
Emergency department specific examinations	274	26.3%
Emergency department medication	306	28.3%
Hospitalization	45	4.2%
Transferral	4	0.4%

frequent examinations performed were urine dipstick (21.3%, n = 230), blood analysis (12.5%, n = 135), and radiographs (10.5%, n = 113).

Most urine dipstick tests were performed in children under the age of 3 ($p < 0.001$). In total, 28.3% (n = 306) of patients required medication in the emergency department. It is verified that most patients (52.4%, n = 566) were discharged without any recommended specific therapy. However, 23.2% and 9.7% (n = 251 and n = 105) of the cases received antibiotics and bronchodilators, respectively. Regarding destination after discharge from the emergency department, 4.2% (n = 45) of the patients were admitted to hospital care (0.4% in neonatology and 3.8% in pediatrics, n = 4 and n = 21), 0.4% (n = 4) were transferred to another hospital, and 2.4% (n = 26) of cases were referred to pediatrics. The remaining patients were recommended home care. Concerning discharge diagnosis, the most common etiologies included infectious diseases (76.2%, n = 822), as either viral or bacterial infections (52.1% and 23.3%, respectively). The most common diagnosis was a non-specific viral infection (19.7%, n = 213), followed by gastroenteritis (10.1%, n = 109) and otitis media (7.9%, n = 85). The most frequent bacterial and viral infections included those with upper and lower respiratory tract involvement (18.2% vs 12.8%). Moreover, exanthema viral infections accounted for 9.2% (n = 98) of all diagnoses, and gastrointestinal manifestations, such as

vomiting and abdominal pain, among others, accounted for 9.0% of discharge diagnoses. It was also observed that 27 (2.5%) patients had no acute disease at the time of evaluation in the emergency department. The remaining diagnoses are exposed in Table 3.

Discussion

Emergency department visits have been growing over the years worldwide. Portugal is one of the countries with more admissions *per capita* in the emergency department (about 70 admissions per 100 inhabitants), and the pediatric population accounts for a great portion of it.⁴⁻⁶

Even though 14 869 children were assisted in a six-month period in our hospital, only a small percentage of these patients were referred by the SNS 24 line, indicating a lack of adherence. Nonetheless, a growing adherence to SNS 24 has been described over the years.⁷

Most referrals occurred in children under the age of 3, as reported by several authors.⁸⁻¹⁰ At these ages there is bigger insecurity and apprehension, which can distort the real severity of the disease, as indicated by the results of another study conducted in the USA.¹¹ On the other hand, consistent with our findings, there is a higher prevalence of infectious diseases in younger children that motivates caregivers to seek medical advice. It is demonstrated that almost half of the children in our



study had a fever, mainly in the age range of 3 months-9 years, suggesting that preschoolers and school-age children are more prone to infectious diseases with fever which require referral to an emergency department. This is also suggestive that fever phobia remains a problem, mainly due to misconceptions and beliefs of parents regarding the harmfulness of fever and the necessity for urgent treatment.¹² Although phone triage tries to diminish this problem, there was a high prevalence of bad referrals to the emergency department, which supports the findings of other studies.¹³⁻¹⁶ This can probably be explained by the difficulty of assessing a disease severity based on the description of parents in the absence of a physical examination of the child by a physician. Patients may often be unable to judge the severity of their child condition and view non-urgent symptoms as urgent. The differences between self-assessed and clinically-assessed urgency represent an important limitation of phone triage. Emergency departments are designed to provide emergency care and are not ideal for other non-urgent matters. This is due to the fact that they do not provide continuity of care even though patients seek rapid answers to their problems. Some studies suggest that patients observed in the emergency departments have worse chronic disease control and a more irregular follow-up.¹⁷⁻¹⁹ People may even exaggerate their symptoms due to poor knowledge of basic healthcare and inability to determine the severity of their condition, which may result in hampering phone triage. Nevertheless, referral of adolescents to the emergency department (≥ 10 years) was performed better than younger children's referral. This can be explained by the lower prevalence of viral infections that makes parents seek medical advice, ability of adolescents to better explain their condition, compared to toddlers, as well as higher levels of apprehension among younger children. There was no relationship between having an infectious disease with fever and the need for urgent medical evaluation in this study. Notwithstanding the previous statement, there was a better referral in months with colder temperatures and infectious diseases with fever were more prevalent in these months probably due to a higher incidence of respiratory infections that require emergency department medication as well as the likeliness of performing the examination in the presence of fever. It was found that most of the referrals occurred between 8 PM and midnight, which was compatible with out-of-work schedules. Most primary care facilities close at 8 PM, suggesting that in the event of an extension of work schedule, referrals to the emergency department would drop. It is believed that night referrals (from midnight

to 8 AM) would be more serious and well-referred since it is an unpleasant period, although this may not be the correct explanation of the stated relationship. There was a higher priority given to children who were referred in this period, and more medication was being administered during the night. This can be explained by a higher count than expected of children vomiting and coughing during the night, which motivated parents to seek instant help. Notable examples of situations that require specific treatment are antiemetics for persistent vomiting, inhalers for respiratory distress, or corticosteroids for laryngitis.²⁰ As expected, the rash was one of the most frequent algorithms observed in the emergency department²¹ even though the majority of these cases were poorly referred. Rashes can appear in many forms and be associated with a great number of conditions ranging from a mild infection that will disappear naturally or a mild allergic reaction to severe infectious diseases, such as sepsis or severe allergic reactions, such as anaphylaxis. This causes uncertainty and anxiety among both caregivers and healthcare workers on the other end of the phone call. Since rashes may be difficult to differentiate by description alone, it is important to consider the entire clinical presentation to make an appropriate diagnosis. It is also important to inquire about the presence of associated symptoms that may help us narrow the differential diagnosis and avoid a high number of bad referrals.

Regarding the examinations, it was found that about one-third of the referrals underwent examinations, which is a higher value, compared to the one noted in another Portuguese study.²² Nevertheless, it is important to notice that the aforementioned study accounted for all pediatric emergency department admissions, suggesting a higher need for examinations in cases of SNS 24 referrals.

Although almost half of the medical examinations should be accessible in primary care, we neither accounted for primary care work hours nor did we check their availability in primary care facilities in our hospital range. Nonetheless, the administration of basic examinations is believed to be crucial for the reduction of emergency department congestion. No relationship was found between the referral and the severity of discharge diagnosis, due to the fact that most diagnoses were viral infections and did not require emergency department observation or ambulatory medication, leading to 93.3% of medical discharges with no orientation.

Just as noted in other studies, most of our referrals had a low priority for evaluation, with no examinations performed and no need for medication, supporting the notion that the severity perceived by parents does not

correspond to actual clinical severity.^{15,23-25}

The present study mainly aimed to determine the adequacy of SNS 24 phone line referral for the pediatric population in the emergency department. Although more than half of the calls in our study did not require evaluation in an emergency department, it was very difficult to assess the need for evaluation through phone calls. On the other hand, the description of many pathologies or clinical manifestations is believed to be difficult without visiting the child. Nonetheless, the algorithms for children emergency department referrals should be modified to decrease the number of unnecessary hospital visits. Regarding the current internet globalization and the ever-increasing dependency on mobile devices, some adaptations should be made (for example, the capability of sending photos or videos through the SNS 24 platform) to allow for a more appropriate evaluation and referral.

It is believed that SNS 24 phone-line service has brought an accessible form of information and knowledge to parents all over the country. There is substantial evidence about the operational and clinical effectiveness of telephone-based triage and advice services in the management of requests for urgent health care.^{26,27} Nonetheless, it would be prudent to adjust the referral criteria to reduce the high number of poor referrals. Regarding the noteworthy limitations in our study, one can refer to the lack of access to the phone call audio, meaning that caregivers might have misled the healthcare professionals. Furthermore, all the medication prescription cases in the emergency department (except for antipyretics) were supposed to be good SNS 24 referrals. We also know that many patients were medicated only because that specific medication was accessible in the emergency department, and not due to their urgent need for it. These patients could have

been evaluated elsewhere and prescribed ambulatory treatment. In addition, the absence of a control group did not allow us to compare the appropriateness of the emergency department visit when no referral was made. Furthermore, there is a lack of information on the number of calls that were made in our hospital area of influence and were referred to primary health care or even self-care rather than the emergency department.

Author Contributions

SCO, TSS participated in the study conception or design. SCO, SM, CP participated in acquisition of data. SCO, PS participated in the analysis or interpretation of data. SCO, PS, CP participated in the drafting of the manuscript. SCO, PS, SM, TSS participated in the critical revision of the manuscript. All authors approved the final manuscript and are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

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Protection of human and animal subjects

The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki 2013).

Provenance and peer review

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Confidentiality of data

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

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Adequação de um Sistema Telefónico de Referência a um Departamento de Emergência Pediátrica

Introdução: As linhas de triagem telefónica têm ganho popularidade ao oferecer conselhos sobre saúde e triagem, diminuindo as avaliações médicas desnecessárias. O objetivo do nosso estudo foi caracterizar o padrão de referência via triagem telefónica a um serviço de urgência pediátrico e aferir a sua adequabilidade.

Métodos: Estudo retrospectivo e estatístico das crianças referenciadas ao serviço de urgência pela linha SNS 24 entre 1 de julho e 31 de dezembro de 2019. Considerámos uma boa referência quando foram realizados exames específicos de um serviço de urgência, administrada medicação, ocorreram internamentos ou transferências. A análise estatística foi efectuada com o SPSS V.26.

Resultados: Incluímos 1080 crianças no estudo, com mediana de idade de 2 anos. A maioria das referências ocorreu abaixo dos 3 anos. As boas referências foram mais frequentes em adolescentes ($p = 0,001$). A maioria dos doentes foi referenciada entre as 20h00 e a meia-noite. Os algoritmos tosse e náuseas e vômitos foram frequentemente associados a boas referências ($p < 0,0001$), contrariamente

ao *rash* que foi associado a más referências ($p < 0,0001$). Verificou-se que 37,8% dos doentes realizaram algum exame complementar no serviço de urgência (43,3% dos quais seriam acessíveis nos cuidados de saúde primários), 28,3% foram medicados, 4,2% foram internados e 0,4% transferidos para outro hospital. As infeções virais foram os diagnósticos mais frequentes. Mais de metade das referências não cumpriam critérios de boa referência.

Discussão: Apesar da dificuldade e limitações da triagem telefónica, observou-se um número excessivo de más referências. Sugerimos modificar ou adaptar algoritmos de modo a diminuir as utilizações desnecessárias dos serviços de saúde.

Palavras-Chave: Adolescente; Criança; Encaminhamento e Consulta/estatística & dados numéricos; Lactente; Linhas Diretas/estatística & dados numéricos; Portugal; Serviço Hospitalar de Emergência/estatística & dados numéricos; Triage/métodos