

FACTORS ASSOCIATED WITH INAPPROPRIATE USE OF PEDIATRIC EMERGENCY SERVICES. CROSS SECTIONAL STUDY CONDUCTED AT AL KHANSAA TEACHING HOSPITAL IN MOSUL

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ABSTRACT

Background: The increase in the demand of emergency services (ES) is considered an international problem. Emergency services which are provided to users with non-urgent clinical conditions; characterizes the inappropriate use of urgency/emergency services. **Objectives:** The study aims to analyse factors associated with inappropriate use of emergency services and to build a corner stone for future fighting these phenomena at our health care system. **Methods:** A retrospective cross sectional study, the patients case sheets were reviewed to acquire the mandatory information. The Questionnaire was composed of three parts, the first included demographic information of the patients, the second covered patient specific condition and third part for admission details. **Results:** The study included 200 subjects, median (Interquartile range) age of 2.5 years (8 months to 9 years), with 125 (62.5%) males and 75 (37.5%) females. Inappropriate ER visit was found in 118 (59%) of reviewed encounters. The majority of these visits were including complaint of gastroenteritis in 43 (36.5%), followed by fever in 38 (32.2%), Frequency of other presentations and systems involved are shown in table 1. The most likely system involved was gastrointestinal in 51 (43.2%) followed by infectious causes in 41 (34.7%). The study illustrates many factors related to inappropriate ER, these factors are; the median age of patient (more among older children), educational levels of parents being illiterate level, timing of visits at outside of working hours and on days off, self-referral. **Conclusion:** The health system of Iraq in general and of Mosul in specific needs a lot of bases to control inappropriate use of emergency services, better educational session for the Iraqi families about the appropriate services should be given and implementing of referral practices. The directorate of health should pay attention for strict admission criteria and give more payment for medical staffs who work at extra working hours.

KEYWORDS: Inappropriate, Emergency services, Pediatrics, Mosul, Iraq.

1- INTRODUCTION

The increase in the demand of emergency services (ES) is considered an international problem. Emergency services which are provided to users with non-urgent clinical conditions; characterizes the inappropriate use of urgency/emergency services.^[1] The aim of emergency/urgency care is to treat certain clinical disorders as soon as possible. However; sometimes people frequently seek emergency services (ES) for quick attention, which creates problems with the delivery of this kind of care.^[2] Generally, the setup and functioning of the health system in Iraq are impacted, which in turn affects the outcomes of the treatment given, absence of information about which patients should utilize hospital emergency services explain what's wrong with this system; as a result, it is crucial to

examine the factors that motivated people to look for ES.^[3]

With 24-hour services, the emergency department's main responsibilities are to: welcome users and their families in times of emergency situation; communicate with other care assistance services as well as with diagnostic and therapeutic support services; provide prompt, competent care to patients experiencing acute conditions of a clinical, surgical, or traumatic nature; as well as referrals to other services when needed.^[4]

Patients may choose emergency services for a number of reasons, including: greater socio-organizational accessibility (opening hours, wait times, and availability of professionals, particularly physicians) compared to primary health care (PHC); lack of confidence in PHC;

perception of emergency-based services as necessary; views of family, friends, and medical professionals; close proximity to the intensive care unit (ICU); flexibility in referral to specialists and exams; difficulty in making appointments at PHC; doctors' fees at their private clinics; or lack of the knowledge about which care should be provided at different levels of health systems.^[5-7]

In spite of the fact that the patient may believe that using ES is appropriate for almost all types of illness, this kind of thoughts diverts attention from actual emergency situations and raises demand for services that could be better managed at other levels like Primary health care centers.^[8]

Although tribal culture rules are virtually beneficial, they do not always regulate Iraq. When it comes to partiality and tribal affiliation, medical workers in emergency rooms constantly struggle to apply the correct controlling system and adhere to treatment guidelines, and persuade patients and their relatives the right course of action should be given.^[9]

At most of the time, Iraqi emergency services were given in order to prevent problems with patient families.^[10] The majority of people feels that these services are necessary for all conditions they are faces and their patients will not recover without using it.^[11]

On the other hand, the fact of Mosul ISIS conflict which destroy many of Mosul's emergency departments.^[12] As a result, patients and their relatives become irate and dissatisfied with doctor's prescriptions when government solutions are used.

Al Khansa's teaching hospital was destroyed during the conflict; however, it was restarted to receive patients at Al Sukar PHCC near their old building. The emergency department, which has 15 beds and is located in the partially intact ancient hospital structure, is open around the clock and typically sees about 250 patients a day.

The study aims to analyse factors associated with inappropriate use of emergency services and to build a corner stone for future fighting these phenomena at our health care system.

2- PATIENT AND METHODS

The survey was confidential and did not include any information that might be used to identify a specific individual. Ethical approval was given by Nineveh Health Directorate.

The current study is an observational, descriptive, case controlled study was adopted in order to achieve the objectives of the present study. All patients regardless to their age, gender and race who attend emergency department of Al-Khansa'a Teaching Hospital between

10th of May 2024 to the end of June 2024 had been included.

There were two categories for emergency services: appropriate and inappropriate. At least one of the following four factors must be present for an emergency service to be considered appropriate: a) The patient had an urgent or emergency complaint requiring immediate attention and facing a risk of mortality. (The MSF Triage System was helpful in defining the case; red and yellow risks were considered appropriate for usage)^[13]; b) Vital signs that were abnormal and connected to the primary complaint, based on the age group; c) Professional behavior related to the primary complaint. d) The requirement for urgent diagnostic procedures or specific care (such as intravenous medicine, oxygen). It was considered improper if the patients did not fit at least one of the previously listed requirements.

The patients case sheets were reviewed to acquire the mandatory information. This information was used to fill the checklists that been made especially for this purpose. Demographic data (gender, age, place of residence, and educational level of the parents), date, time and day of the week in which the patient attend emergency department, who is refer the patient to emergency department, existence of open primary health center for patient referral, diagnosis of the patient in the ES (according to the Tenth Revision of the International Classification of Diseases and Health-Related Problems - ICD-10)^[14], information regarding whether the child was received treatment before coming to the emergency department and by whom it was described.

Data analysis was done using SPSS (Statistical Package for Social Sciences) software version 26 (IBM Corporation, USA). Median (with interquartile range (IQR)) were used to present the numerical data, while number and percentage were used to present categorical. Univariate analysis on categorical data was performed using chi test. Wilcoxon-Mann-Whitney was used to compare numerical. A p value of <0.05 was considered statistically significant for all statistical tests.

3- RESULTS

The study included 200 subjects, median (Interquartile range) age of 2.5 years (8 months to 9 years), with 125 (62.5%) males and 75 (37.5%) females.

Inappropriate ER visit was found in 118 (59%) of reviewed encounters. Out of these 118, 54 (45.8%) received some form of treatment before coming to ER, but despite that came to ER and continued to waste more resources. These treatments were given by a nurse in 24 (20.3%), by parents in 19 (16.1%), a pharmacist in 7 (5.9%), and by a physician in 4 (3.4%). The majority of these visits were including complaint of gastroenteritis in 43 (36.5%), followed by fever in 38 (32.2%), Frequency of other presentations and systems involved are shown in table 1. The most likely system involved was

gastrointestinal in 51 (43.2%) followed by infectious causes in 41 (34.7%).

Table 1: Frequency of different presenting complaints, and systems involved among those with inappropriate visits to ER (n=118)

Variable	Number	Percentage
Presenting complaint		
Gastroenteritis	43	36.5
Fever	38	32.2
Urinary tract infection	9	7.6
Abdominal pain	5	4.2
Tonsillitis	5	4.2
Skin rash	3	2.5
Bronchiolitis	3	2.5
Cough	3	2.5
Headache	2	1.7
Others *	7	5.6
System involved		
Gastro-intestinal tract	51	43.2
Infectious	41	34.7
Renal	9	7.6
Respiratory	6	5.1
ENT	5	4.2
General	4	3.4
Neurology	2	1.7

* One each of the following: epigastric pain, flu, measles, trauma to the foot, recurrent diarrhea, earache, jaundice.

Timing of all ED visits are shown in figure 1, as stratified by being inappropriate or appropriate. All ER visits were distributed among all hours of the day, but

there seems to be continued inappropriate visits after 2 pm, with observed occurrence of many of those visits at late hours from 8 pm to 5 am).

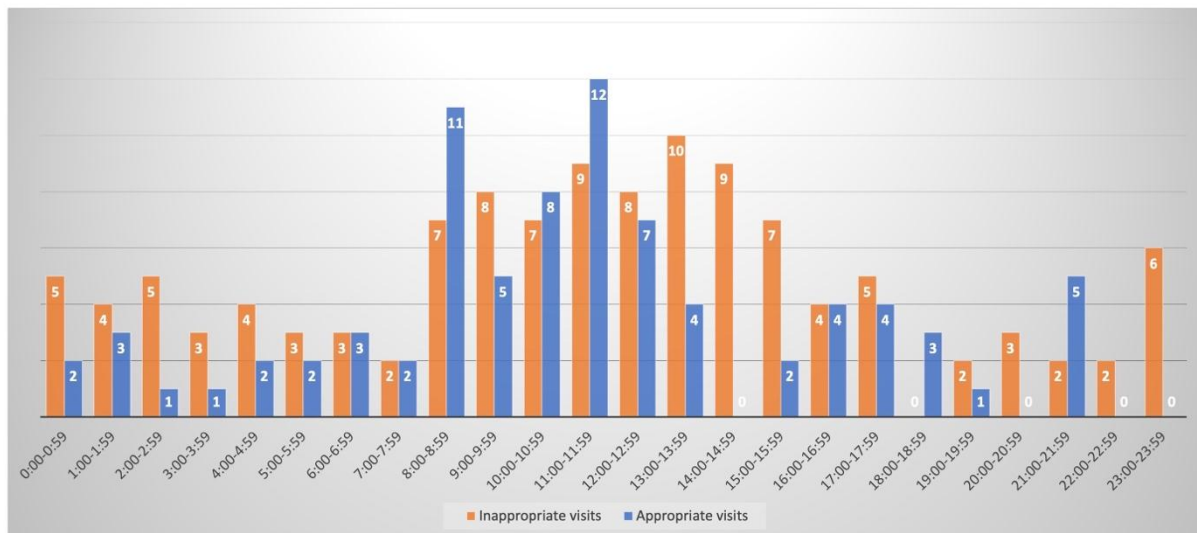


Figure 1: distribution of ER visits on hours of the day, stratified by being inappropriate or appropriate, n=200.

Comparison between subjects with inappropriate ER visits and those with appropriate ER visits is shown in table 2. The data indicates that inappropriate visits were more prevalent among older children, with a median age of 3 years compared to 1 year for appropriate visits, highlighting a significant difference (p=0.001). Difference in educational levels showed a trend towards

significance in being illiterate, with higher proportion of illiterate subjects in group of inappropriate ER visits versus appropriate ER visits (p=0.090), while there was significantly lower proportion of university of higher education in the group of group of inappropriate ER visits (p=0.001). Residency patterns showed no significant difference between rural and urban

populations. Timing of visits revealed that inappropriate visits were more likely to occur outside of working hours and on days off, particularly with a significant difference noted for visits on days outside working days ($p=0.006$). Self-referral was significantly more common in inappropriate visits (90.7%), contrasting with a lower

rate of senior or permanent referrals (9.3%), which was statistically significant ($p=0.004$). The data suggests that educational background, timing of visits, and referral patterns may influence the appropriateness of ER visits, indicating a need for better education and referral practices to reduce unnecessary ER utilization.

Table 2: Comparison between subjects with inappropriate ER visits and those with appropriate ER visits (n=200)

Variable	Inappropriate ER visit (n = 118, 59%)	Appropriate ER visit (n=82, 41%)	P value
Current age in years, Median (interquartile range)	3 (1.2-9)	1 (0.2-7)	0.001
Male, n (%)	77 (65.3%)	48 (58.5%)	0.334
Educational level: - illiterate, n (%)	16 (13.6%)	5 (6.1%)	0.090
- Primary education, n (%)	33 (28%)	16 (19.5%)	0.172
- Secondary education, n (%)	41 (34.7%)	23 (28%)	0.318
- University or higher, n (%)	28 (23.7%)	38 (46.3%)	0.001
Residency: - Rural	48 (40.7%)	33 (40.2%)	0.951
- Urban	70 (59.3%)	49 (59.8%)	
Timing of visit			
Time after working hours, n (%)	60 (50.8%)	35 (42.7%)	0.255
Days outside working days, n (%)	68 (57.6%)	31 (37.8%)	0.006
Outside working day or hours	91 (77.1%)	53 (64.6%)	0.053
Referral details			
Self-referral	107 (90.7%)	62 (75.6%)	0.004
Senior or permanent referral, n (%)	11 (9.3%)	20 (24.4%)	0.004
Received treatment before ER, n (%)	54 (45.8%)	26 (31.7%)	0.136

4- DISCUSSION

The inappropriate use of emergency services has been studied for more than two decades. It is a worldwide concern discussed in several countries with different health contexts.^[15] The study found a high proportion of inappropriate use of emergency care services (59%), which runs with Tatiane Baratieri et al study finding from Brazil.^[16] The proportions found in the studies may be related especially to the methods used to determine situations of inappropriate use, which are characterized by non-urgency or emergency situations assisted in emergency services. About half of them are received some form of treatment before coming to ER, but despite that came to ER and continued to waste more resources. These treatments were given by different source as there is weak supervision law to prevent such practices in Iraq. The majority of these visits were including complaint of fever in 38 (32.2%), followed by gastroenteritis in 29 (24.6%), and vomiting in 14 (11.9%). Which is depend on season of the year and its endemic diseases. Anyhow; Lara Mauch et al found that ill defined and respiratory tract infection are more common system for which patients misuse emergency services.^[15]

Regarding timing of all ED inappropriate visits. The study shows that the patients were distributed among all hours of the day, with peak of inappropriate visiting at time of outside official duties, which is parallel to H.G. Selasawati et al findings.^[17]

The study illustrates many factors related to

inappropriate ER, these factors are; the median age of patient (more among older children), educational levels of parents being illiterate level, timing of visits at outside of working hours and on days off, self-referral. These findings indicates a need for better education and referral practices to reduce unnecessary ER utilization. Vilà-de-Muga et al^[18] and Hong Choon Oh et al^[19] had comparable findings.

Moreover; this is the first study conducted in Mosul that has been able to evaluate the inappropriate use of emergency services in paediatric based population. However, some limitations should be considered. The study is not confident that the results can be generalised to the other regions, since Mosul is characterised by witnessed a huge damage of a lot of health organization infrastructures. Additionally, due to the limitations of administrative databases, we could not evaluate the role of some factors considered in previous studies, for example, family's structure and socioeconomic status, distance between the child's house and the ED.

CONCLUSIONS AND RECOMMENDATIONS

The health system of Iraq in general and of Mosul in specific needs a lot of bases to control inappropriate use of emergency services, better educational session for the Iraqi families about the appropriate services should given and implamenting of referral practices. The directorate of health should pay attention for strict admission criteria and give more payment for medical staffs who work at extra working hours. Further studies are needed to

explore the exact factors associated with in appropriate use of emergency services.

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Conflict of interest

The authors report no conflict of interest concerning this study.

REFERENCES

- Ricciardi C, Marino MR, Trunfio TA, Majolo M, Romano M, Amato F, Improta G. Evaluation of different machine learning algorithms for predicting the length of stay in the emergency departments: a single-centre study. *Frontiers in Digital Health*, 2024 Jan 8; 5: 1323849.
- Anwar H, Al Harthi T, Jaafar N, Al Shuraiqi F, Afifi N, Al Abri K, Al Rujaibi S, Al Ghafri T. Appropriateness of the Emergency Referrals Made by Primary Care Clinicians: A cross-sectional review of referral notes. *Sultan Qaboos University Medical Journal*, 2024 Feb; 24(1): 28.
- Reynolds TA, Stewart B, Drewett I, Salerno S, Sawe HR, Toroyan T, Mock C. The impact of trauma care systems in low-and middle-income countries. *Annual review of public health*, 2017 Mar 20; 38: 507-32.
- Chen H, Johnson M, Boland E, Seymour J, Macleod U. Emergency admissions and subsequent inpatient care through an emergency oncology service at a tertiary cancer centre: service users' experiences and views. *Supportive Care in Cancer*, 2019 Feb; 27: 451-60.
- Cannavacciuolo L, Capaldo G, Ponsiglione C. Digital innovation and organizational changes in the healthcare sector: multiple case studies of telemedicine project implementation. *Technovation*, 2023 Feb 1; 120: 102550.
- Milton J. Interprofessional Teamwork in the Emergency Department-Communicating for Patient Safety, 2022 May 27.
- Cresswell K, Hinder S, Sheikh A, Pontefract S, Watson NW, Price D, Heed A, Coleman J, Ennis H, Beggs J, Chuter A. ePrescribing-Based Antimicrobial Stewardship Practices in an English National Health Service Hospital: Qualitative Interview Study Among Medical Prescribers and Pharmacists. *JMIR formative research*, 2023 Jun 6; 7(1): e37863.
- Sox HC, Higgins MC, Owens DK, Schmidler GS. Medical decision making. John Wiley & Sons, 2024 Apr 22.
- al-Majoun SS. TRIBES AND THE IRAQI REPUBLIC. Tribes and the State in Libya and Iraq: From the Nationalist Era to the New Order, 2024: 137.
- Ibrahim S, Al-Dahir S, Al Mulla T, Lami F, Hossain SM, Baqui A, Burnham G. Resilience of health systems in conflict affected governorates of Iraq, 2014–2018. *Conflict and Health*, 2021 Dec; 15: 1-9.
- Al Janabi T. Barriers to the Utilization of Primary Health Centers (PHCs) in Iraq. *Epidemiologia*, 2023 Apr 13; 4(2): 121-33.
- Lafta R, Al-Nuaimib MA, Sultan LR, Rihawa H, Burnham G. Health care and care-seeking in mosul 1 year after defeat of ISIS. *Disaster medicine and public health preparedness*, 2022 Aug; 16(4): 1524-31.
- AbouZeid A. Emergency health care in crises. *Bull World Health Organ.*, 2024; 102: 5-6.
- Harrison JE, Weber S, Jakob R, Chute CG. ICD-11: an international classification of diseases for the twenty-first century. *BMC medical informatics and decision making*, 2021 Nov; 21: 1-0.
- Mauch L, Dias Sarti T, Madeira de Abreu KC, Santana Coelho Almeida AP. Emergency care in Brazil: factors leading to clinically inappropriate use of emergency care among young adult users in the Brazilian context. *BMC Health Services Research*, 2024 Aug 28; 24(1): 997.
- Baratieri T, Lentsck MH, Corona LP, Almeida KP, Kluthcovsky AC, Natal S. Factors associated to inappropriate use of emergency services. *Ciência & Saúde Coletiva*, 2021 Jul 2; 26: 2281-90.
- Selasawati HG, Naing L, Wan Aasim WA, Winn T, Rusli BN. Factors associated with inappropriate utilisation of emergency department services. *Asia Pacific Journal of Public Health.*, 2007 Jun; 19(2): 29-36.
- Vilà-de-Muga M, Colom-Ferrer L, González-Herrero M, Luaces-Cubells C. Factors associated with medication errors in the pediatric emergency department. *Pediatric emergency care.*, 2011 Apr 1; 27(4): 290-4.
- Oh HC, Chow WL, Gao Y, Tiah L, Goh SH, Mohan T. Factors associated with inappropriate attendances at the emergency department of a tertiary hospital in Singapore. *Singapore medical journal*, 2020 Feb; 61(2): 75.