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Original Research

Emergency Department Pediatric Unscheduled Return Visits: Why Do Patients Return and Does It Matter?

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ABSTRACT

Introduction: Unscheduled return visits are an important quality indicator in the emergency department. We aim to compare clinical characteristics and ED resource usage of pediatric high risk unscheduled return visits (HRURVs) between the index and return visit and explore root cause of HRURVs.

Methods: A retrospective chart-review study conducted between November 1, 2014 and October 31, 2015. All patients who returned to the ED within 72 hours of discharge and were admitted or died on re-presentation were considered.

Results: The incidence rate of HRURV in our study was 0.96% (95%, CI:0.81-1.13%). We found that significantly more patients were febrile on index visit than on the return visit. In contrast, HRURV patients had significantly more imaging, labs, IV fluids, ED consults and procedures on return visit. Also, the return visit length of stay (LOS) was significantly higher than on index visit (2.76±1.82 Vs. 5.88±0.44). Upon revisit, 2.2% of patients required ICU admission and 7.9% required surgery. The most common discharge diagnosis were digestive system disorders (29.5%) and infectious/parasitic diseases (27.3%). Only infectious/parasitic disease showed a high number of changes in diagnosis from first to second visit. The majority (73.4%) of HRURVs were classified as being "illness-related". Digestive disorders accounted for the largest portion of "physician related" reasons for revisit (41%).

Conclusion: HRURV patients require more resources on return visits and have longer ED stays than the index visit. While the majority of re-visits do not lead to a change in diagnosis and are primarily related to progression of disease, specific attention should be paid to digestive disorders where physician related causes were high and which account for 18% of surgeries on return visit.

Keywords: emergency department, discharge, return visits, high risk return visits

INTRODUCTION

Unscheduled return visits (URVs), defined as a return visit to the emergency department (ED) within 72 hours of index visit, are considered to be an quality indicator in the ED.[1] This indicator is particularly important in the pediatric ED, as URVs may signal poor adherence to medication, limited understanding of discharge instructions or issues accessing primary care follow-up.[3,4] The rate of URV ranges from 3.3%-6.5%, and may be due to uncertain diagnosis, worsening symptoms and socioeconomic factors.[5-9] On the other hand, recent studies suggest that URVs who die or require admission on second visit, known as high risk URVs (HRURVs), present with higher disease severity, and have higher rates of mortality and need for surgery.[5,7,10,11] Though the incidence of HRURV is lower than URV, ranging from 0.66%-1.80%, these HRURVs may be a more instructive quality indicator in the ED.[5,10,11]

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A number of studies have looked at predictors of HRURV in the pediatric population. These studies have found certain factors to be associated with HRURV including age group, arrival during off-hours, length of stay, and discharge diagnosis.[5,11-13] Extensive review of clinical characteristics of HRURVs in pediatrics, however, beyond diagnosis and discharge vitals has not been assessed; nor has there been any extensive study of the presentations of the return visit to assess resource implications or diagnostic accuracy. In addition, while some studies have explored root cause of URVS in pediatrics, identifying multiple caregiver related reasons, this has not been explored more specifically for HRURVs.[8,14,15] The goal of our study is to compare clinical characteristics and resources usage of pediatric HRURVs between the index and return visit, in addition to exploring root cause of return visits and patient outcomes.

METHODS

Study Design

We carried out a retrospective chart review study at the Emergency Department (ED) of an Academic Tertiary Care medical setting in Lebanon between November 1, 2014 and October 31, 2015.

Setting

The study setting is a 384-bed tertiary care, teaching hospital and a referral center in Beirut, Lebanon. The ED is one of the largest in the country, seeing close to 54,000 patients per year, of which 27% are pediatrics. The ED is divided into three areas: high acuity, low acuity and pediatrics. The pediatric section of the ED is staffed by a mix of emergency medicine (EM) physicians and non-EM physicians, namely pediatricians and family physicians with extensive experience in the ED. Most pediatric patients (80%) are triaged to an intermediate Emergency Severity Index (ESI), 15% are low acuity and 5% are high acuity. Around 85% are insured, while 15% are self-payers. Among pediatric patients, the admission rate to a regular floor is approximately 11%, admission rate to the pediatric ICU is 3.5% and the mortality rate is 0.03%, including both death on arrival and death in the ED.

Population

We included all patients, ≤18 years, that presented to the ED during the study period who had a HRURV. We defined HRURVs as any patient returning to the ED within 72 hours of index visit and who was admitted to the hospital or died on return. We excluded patients who returned with complaints unrelated to the initial visit, were transferred to another facility, left without being seen, were called back for missed laboratory abnormalities, had an incomplete initial visit, double entries and missing charts. As this is a chart review study, we did not obtain consent from patients due to the difficulty of contacting patients who may be lost to follow-up.

Outcome Measures

Data were extracted from medical records, an administrative database and the departmental peer-review database. Two trained research assistants (medical doctors) blinded to the study objectives reviewed the patient medical records for inclusion criteria and extraction of all clinical data. Final decision on exclusion of cases for unrelated visits was made by the primary investigator.

The administrative database was used to extract socio-demographics, as well as patient disposition and discharge diagnosis. The International Classification of Diseases, Ninth Revision (ICD-9) diagnosis were further classified into 25 Major Diagnostic Categories to collapse the data into more manageable categories.

From the departmental peer-review database, we obtained the severity score of HRURV and root cause assessment. This database includes the reviews of all HRURVs as completed by a committee comprised of EM physicians, that reviews all HRURVs as part of the ED quality assurance program. This includes a case severity scoring of the index visit reflecting the peer assessment of physician practice and a root cause assessment, categorized as: Illness-related, Physician-related, Patient-related, healthcare system-related and "other reasons". A detailed explanation of the peer-review assessment is available as a digital supplement to this article.

Incidence of URV and HRURV was defined as the total number of URV and HRURVs, respectively, divided by the total number of pediatric ED visits

Table 1 Comparison between index visit and return visit

Variable	Visit 1 (n=139)	Visit 2 (n=139)	P-value
Age (Mean ± SD)	5.58 ± 5.56		
Gender			
Male	72 (51.8)		
Female	67 (48.2)		
Acuity[¥]			
High	5 (3.6)	6 (4.3)	
Medium	127 (91.4)	129 (92.8)	0.64
Low	7 (5.0)	4 (2.9)	
SBP in mmHg (low)	6 (5.6)	4 (3.34)	0.41
Heart Rate (high)*	112 (81.2)	111 (80.4)	0.85
O2 Saturation (<95%)	10 (7.3)	6 (4.4)	0.25
Temperature (>38.5°)	37 (26.6)	24 (17.4)	0.02
Respiratory Rate (high)*	51 (46.4)	52 (44.8)	0.85
Imaging	31 (22.3)	55 (39.6)	<0.005
Laboratory	96 (69.1)	108 (77.7)	0.03
Drugs	35 (25.2)	38 (27.3)	0.47
IV Fluids	21 (15.1)	39 (28.1)	<0.005
ECG	2 (1.4)	1 (0.7)	0.56
Consult in ED	30 (21.6)	53 (38.1)	<0.005
Procedure in ED	18 (6.5)	27 (19.4)	<0.005
LOS (hours) (Mean ± SD)	2.76 ± 1.82	5.88±0.44	<0.005
Major Diagnostic Category			
Digestive System	41 (29.5)	41 (29.5)	
Infectious and Parasitic	38 (27.3)	17 (12.2)	
Respiratory System	21 (15.1)	33 (23.7)	<0.005
Other[#]	39 (28.1)	48 (34.5)	

[¥] *Acuity, as defined by emergency severity index (ESI): 1 and 2= high; 3= medium; 4 and 5= low*

**Heart rate and respiratory rate of high Vs. Normal was determined for each age group using the cut-offs suggested by Fleming et al. The cut-offs for hypotension were adapted from the PALS hypotension definition.*

[#] *Others include: The Circulatory System, The Skin, Subcutaneous Tissue and Breast, The Ears, Nose, Mouth and Throat, The Musculoskeletal System and Connective Tissues, The Kidney and Urinary Tract, The Eye, The Blood and Blood Forming Organs and Immunological Disorders, The Female Reproductive System, The Hepatobiliary System and Pancreas, The Male Reproductive System, The Nervous System, Endocrine, Nutritional and Metabolic Diseases, Factors Influencing Health Status and Other Contacts with Health Services, Injuries, Poisonings and Toxic Effects of Drugs, Mental Diseases and Disorders, Pregnancy, Childbirth, and Puerperium, Alcohol/Drug use, Burns and Vaginal Bleeding.*

SBP=Systolic Blood Pressure; O2=Oxygen; IV=Intravenous; ECG=Electrocardiogram; ED=Emergency Department; LOS=Length of Stay

during the study period. Abnormal values for heart rate and respiratory rate were obtained from the systematic review by Fleming et al.[16] Abnormal values for SBP were adapted from the PALS hypotension definition and adjusted by consensus of specialists from the ED of the academic medical center and PICU.[17]

Data Analysis

Data were described as number and percent for categorical variables, whereas the mean and standard deviation (±SD) were calculated for continuous ones. Clinical characteristics between the two visits were compared using the paired t-test or McNemar's test, as appropriate. A p-value less than 0.05 was used to indicate statistical significance. We used IBM SPSS statistical software for Windows version 22 (SPSS for Windows, version 22; SPSS, Inc., Chicago, IL). This study was approved by the Institutional Review Board (IRB) of which medical center is associated with.

RESULTS

During the study period, we identified 14 805 Pediatric ED visits, of which 793 were URVs, and 142 were HRURVs. We included 139 HRURVs in our analysis. The incidence of URVs was 5.36% (95% CI: 5.01-5.73%), and that of HRURVs was 0.96% (95% CI: 0.81-1.13%). The average age of our patients was 5.58 ± 5.56 years old, and 51.8%were males and 48.2% were females.

A comparison of clinical characteristics between the two visits can be found in Table 1. We found that pediatric patients were significantly more likely to present with a fever on index visit than upon their return visit (p=0.02). On the other hand, the amount of imaging conducted was significantly higher at the second visit (p<0.005), and patients were more likely to have labs done (p=0.03), IV fluids (p<0.005), an ED consult (p<0.005), and an ED procedure (p<0.005). Furthermore, the average LOS in the ED was significantly higher at the second visit compared to the index visit (p<0.005). Finally, we found a significant difference in the discharge diagnosis between the two visits (p<0.005). While the percentage of HRURVs discharged with a diagnosis relating to the digestive system did not change between the two visits (29.5% for both), infectious and parasitic diseases decreased from 27.3% to 12.2%, disorders of the respiratory system increased from 15.1% to 23.7%, and "other" diseases increased from 28.1% to 34.5%.

Table 2 Change in diagnostic categories from first visit to second visit

	Visit 2			
Visit 1	Digestive System	Infectious / Parasitic Disease	Respiratory System	Other[#]
Digestive System	33 (80.5)	1 (2.4)	0 (0.0)	7 (17.1)
Infectious / Parasitic Disease	5 (13.2)	12 (31.6)	10 (26.3)	11 (29.0)
Respiratory System	1 (4.8)	2 (9.5)	17 (81.0)	1 (4.8)
Other[#]	2 (5.1)	2 (5.1)	6 (15.4)	29 (74.4)

[#]*Others include: The Circulatory System, The Skin, Subcutaneous Tissue and Breast, The Ears, Nose, Mouth and Throat, The Musculoskeletal System and Connective Tissues, The Kidney and Urinary Tract, The Eye, The Blood and Blood Forming Organs and Immunological Disorders, The Female Reproductive System, The Hepatobiliary System and Pancreas, The Male Reproductive System, The Nervous System, Endocrine, Nutritional and Metabolic Diseases, Factors Influencing Health Status and Other Contacts with Health Services, Injuries, Poisonings and Toxic Effects of Drugs, Mental Diseases and Disorders, Pregnancy, Childbirth, and Puerperium, Alcohol / Drug use, Burns and Vaginal Bleeding.*

Changes in diagnostic categories between the index visit and the return visit can be found in Table 2. For digestive system disorders, respiratory system disorders, and other diagnoses, nearly all patients remained in the same diagnostic category upon re-presentation. However, only 31.6% of those who presented with an infectious/parasitic disease received the same diagnosis on the second visit; 13.2% were subsequently diagnosed with a digestive system disorder, 26.3% with a respiratory

disorder, and 29.0% had a diagnosis of "other".

Patient disposition, surgeries and procedures required during the return visit are shown in Table 3. The majority (97.8%) of HRURVs were admitted to a regular floor, while 2.2% required ICU. There were no reported deaths in our sample. Of the 11 patients who required surgery, the most common surgeries performed were craniectomy, fracture reduction/fixation, and abdominal surgeries (18.2% each). The final 45.5% required other surgeries. Furthermore, 19.4% of patients required procedures in the ED. A large number of these procedures were lumbar punctures (37.0%). The second most common procedures were foley/catheterization (14.8%), followed by incision and drainage and nasogastric tube placement (11.1% each), and finally, ultrasound guided line (7.4%). The remaining patients (18.5%) required other procedures.

Table 3 Second visit outcomes and procedures/surgeries needed

		HRURVs N=139 n(%)
Disposition	ICU	3 (2.2)
	Regular floor	136 (97.8)
	Death	0 (0.0)
Required surgery		11 (7.9)
Surgery	Craniectomy	2 (18.2)
	Fracture reduction and fixation	2 (18.2)
	Abdominal surgeries	2 (18.2)
	Other	5 (45.5)
Procedure in ED	Lumbar puncture	10 (37.0)
	Foley/Catheterization	4 (14.8)
	Incision and drainage	3 (11.1)
	Nasogastric tube placement	3 (11.1)
	Ultrasound guided line	2 (7.4)
	Other	5 (18.5)

Table 4 shows the peer-review severity scoring and root cause assessment for return. A total of 70.5% of our sample was classified as "no physician issues" (score=1), followed by 25.8% having "no physician issues, but system factors that need improvement", 11.5% with "minor physician issues which need improvement", and 2.2% which were classified as "inappropriate requiring performance improvement without change in scope of practice". Regarding the root cause analysis, 73.4% of HRURVs were determined to be a result of illness-related reasons, 19.4% were physician-related, 4.3% were patient-related, and 2.9% were healthcare system-related. Half of the illness-related reasons were further categorized as "progression of disease". The majority (33.3%) of the physician-related reasons were found to be due to "failure of reassessment". Furthermore, the only patient-related reason we found in our study was "discharge against medical advice". Finally, the most common healthcare system-related reason for return was "instructed to return for re-evaluation" (75.0%).

The index visit diagnoses for each reason for return can be found in Table 5.

DISCUSSION

We found the incidence of pediatric HRURV in our ED to be 0.96%, with 2.2% of these patients being admitted to the ICU and 7.9% requiring surgical interventions. HRURV patients had significantly more imaging, labs, IV fluids, ED consults and procedures in the ED on the return visit, resulting in a longer average LOS during the return visit. While the most common discharge diagnosis were digestive system disorders and infectious/parasitic diseases, only infectious/parasitic disease showed a high number of changes in diagnosis from first to second visit. Finally, when looking at the root cause for return visit, the majority of HRURVs were classified as being "illness-related".

The main strength of this study is that it looks comprehensively at patient and clinical characteristics of HRURV between index and return visit. Furthermore, the comparison of the diagnostic categories between the index and return visit allows us to see which diagnoses are likely to change upon return visit. Lastly, it provides a detailed description of the main causes of HRURV among pediatrics.

Table 4 Peer-review severity score and root cause assessment

		HRURVs N=139 n(%)
Peer-review severity score*	1	98 (70.5)
	2	22 (25.8)
	3	16 (11.5)
	4	3 (2.2)
	5	0 (0.0)
	Root cause for HRURV	
Illness-related	**Total**	**102 (73.4)**
	Progression of disease	51 (50.0)
	Failure of outpatient treatment	25 (24.5)
	Recurrent disease process	9 (8.8)
	New problem	9 (8.8)
	Complication	8 (7.8)
Physician-related	**Total**	**27 (19.4)**
	Admission indicated but consultant recommended outpatient management	3 (11.1)
	Failure of reassessment	9 (33.3)
	Misdiagnosis	6 (22.2)
	Treatment error	4 (14.2)
	Admission indicated on initial visit and ED attending did not attempt to admit	5 (18.5)
Patient-related	**Total**	**6 (4.3)**
	Discharge against medical advice	6 (100.0)
	Social issues	0 (0.0)
	Habitual use of ED	0 (0.0)
	Missed clinic follow-up	0 (0.0)
	Psychiatric disorder	0 (0.0)
	Noncompliance	0 (0.0)
Healthcare system-related	**Total**	**4 (2.9)**
	Called back because of missed radiograph abnormalities	1 (25.0)
	Instructed to return for re-evaluation	3 (75.0)
	Sent from clinics	0 (0.0)
	Patient unable to get medication	0 (0.0)

** 1: Appropriate with no identified physician issues; 2: Appropriate with no physician issues, but system factors that need improvement; 3: Appropriate, but minor physician issues need improvement or differing opinions on management; 4: Inappropriate requiring performance improvement without change in scope of practice; 5: Inappropriate requiring performance improvement with change in scope of practice until remediation is complete.*

This study is, however, limited by a relatively small sample size and the absence of a comparison group (non-HRURV) which would allow us to draw conclusions with regards to how the HRURV population differs from other ED patients.

Although there are no national registries on HRUV ED data where we can compare to other EDs within Lebanon, comparison with other studies shows that the URV and HRURV rates in our study are similar to the rates reported in other studies.[5,7,9,11,18] We did, however, find several characteristics which differed between the two visits. Upon return, our patients had more diagnostic tests (labs and imaging), IV fluids and ED procedures, which is reflected in the longer LOS. Overall, the higher proportion of procedures performed on the second visit and the percentage

Table 5 Diagnosis on index visit by reason for return

Reason	Digestive	Infectious/Parasitic	Respiratory	Other[#]
Illness-related	30 (29.4)	27 (26.5)	17 (16.7)	28 (27.5)
Physician-related	11 (40.7)	8 (29.6)	1 (3.7)	7 (25.9)
Patient-related	0 (0.0)	1 (16.7)	2 (33.3)	3 (50.0)
System-related	0 (0.0)	2 (50.0)	1 (25.0)	1 (25.0)

[#]*Others include: The Circulatory System, The Skin, Subcutaneous Tissue and Breast, The Ears, Nose, mouth and Throat, musculoskeletal system and connective tissues, kidney and urinary tract, The Eye, The Blood and Blood Forming Organs and Immunological Disorders, The Female Reproductive System, the Hepatobiliary System and Pancreas, The Male Reproductive System, The Nervous System, Endocrine, Nutritional and Metabolic diseases, Factors Influencing Health Status and Other Contacts with Health Services, Injuries, Poisonings and Toxic Effects of Drugs, Mental Diseases and Disorders, Pregnancy, Childbirth, and Puerperium, Alcohol/Drug use, burns and vaginal bleeding.*

of patients who required surgery indicates that HRURV patients returned with a higher degree of illness. On the other hand, it is also possible that the ED physicians, knowing the patient was in the ED less than 72 hours previously, called for more diagnostics because they felt they needed to explore the presentation more thoroughly in case anything was missed during the index visit.

The most common discharge diagnoses in our study were digestive system disorders and infectious/parasitic diseases. Though a study conducted by Goh et al. also found digestive system disorders and infectious disease to be among the most common diagnoses among HRURVs,[11] the literature suggests that the same is not true among pediatric URVs; in this population, infectious and respiratory disease were prevalent, but digestive disorders were not.[15,19-21] It is noteworthy to mention that 18% of those who required surgery on representation did so for an abdominal complaint (appendicitis and pyloric stenosis), reflecting the potential morbidity of this diagnosis. Additional exploration of change in diagnosis between the index and return visit showed that, while the majority of patients with digestive system disorders and respiratory system disorders returned with the same diagnosis, this was not true of those diagnosed with infectious/parasitic diseases. Our review of the root cause analysis data, however, suggests that the majority of the changes were due to disease progression as opposed to diagnostic error. We postulate that many of the patients were initially diagnosed with infectious diseases because they were febrile on presentation with few other symptoms, and then subsequently diagnosed with digestive disorders or respiratory disorders as more localizing symptoms developed (diarrhea, vomiting, cough, etc.).

The root cause analysis revealed that nearly three quarters of HRURVs are illness-related, with half of that number caused by progression of disease. The next largest group of reasons for HRURV was physician-related reasons, with the top causes being failure of reassessment, failure to admit on first visit and misdiagnosis. Digestive disorders accounted for the largest portion of physician related reasons (Table 6) for revisit (41%). This reflects the continued diagnostic challenge of abdominal complaints in the ED where appendicitis remains one of the most commonly missed diagnosis.[22] Though the categorization of the root cause of HRURV used in our study is unique, studies on URVs also reported that the majority of returns were due to "progression of illness", with only a small number related to misdiagnosis.[21]

Furthermore, only 4% of reasons were classified as patient-related in our study, all of whom are patients who left against medical advice on the index visit. We did not however look at the caregiver perspective on the cause of the return visit, which has been shown to include reasons such as not trusting the physician's diagnosis, not understanding discharge instructions, and worsening symptoms,[14,15] all of which may further qualify the categorizations used in our study.Our findings suggest that, while

Table 6 Discharge Diagnosis on index visit of HRURV patients requiring lumbar puncture on return visit

Diagnosis	N (%)
Digestive System	2 (20.0)
Infectious and Parasitic	7 (70.0)
Respiratory System	0 (0.0)
Other[#]	1 (10.0)

[#]*Others include: The Circulatory System, The Skin, Subcutaneous Tissue and Breast, The Ears, Nose, mouth and Throat, musculoskeletal system and connective tissues, kidney and urinary tract, The Eye, The Blood and Blood Forming Organs and Immunological Disorders, The Female Reproductive System, the Hepatobiliary System and Pancreas, The Male Reproductive System, The Nervous System, Endocrine, Nutritional and Metabolic diseases, Factors Influencing Health Status and Other Contacts with Health Services, Injuries, Poisonings and Toxic Effects of Drugs, Mental Diseases and Disorders, Pregnancy, Childbirth, and Puerperium, Alcohol/Drug use, burns and vaginal bleeding.*

HRURVs are not associated with high mortality, the increased resource utilization on return visit along with ICU admission and surgical intervention reflect an increased complexity of illness on return visit. HRURVs rates can therefore be useful indicators for ED quality programs from a utilization and morbidity standpoint. Interventions should focus on targeting high risk complaints and populations including digestive system disorders and infectious/parasitic diseases.

Our study has some potential limitations. First, our study did not include a control group, therefore we are unable to make comparisons between HRURVs and other patients presenting to the ED. Furthermore, we did not include other hospitals in our study, which could affect the external validity of our results. However, AUBMC is the largest medical center in the country and receives patients from all over Lebanon, so we believe this improves the generalizability of our findings. In addition, we may have missed some HRURVs who revisited other hospitals. Although AUBMC is the largest healthcare center, one cannot ascertain that cases are limited. Finally, patients who returned but were transferred to other facilities were excluded due to a lack of access to their complete medical record pertaining to their return visit. Even though the details of these medical records are unknown, our overall ED transfer rate is less than 1%.

CONCLUSION

HRURV patients require more resources on return visit and have longer ED stays than the index visit. While the majority of re-visits do not lead to a change in diagnosis and are primarily related to progression of disease, specific attention should be paid to digestive disorders where physician related causes were high and which account for 18% of surgeries on return visit.

Supplementary material to this article is available online through the article's permalink or DOI.

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Conflict of Interest: The authors declare no conflict of interest.

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