The Pediatric Disease Spectrum in an Emergency Department at a Tertiary Care Center in Beirut, Lebanon

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Objective: The aim of this study was to identify the most common diagnoses for pediatric emergency department (ED) visits at a tertiary care center in Lebanon.

Methods: A retrospective chart review of pediatric patients (aged ≤18 years) presenting to the American University of Beirut Medical Center ED during 2010–2011 was completed. The common diagnoses among 5 age groups (<1, 1–4, 5–9, 10–14, and 15–18 years) in 3 categories (all pediatric ED visits, treat and release, admitted visits) were assessed. Diagnoses were classified according to the Clinical Classifications Software. Descriptive statistics and Pearson χ^2 test were used.

Results: A total of 12,637 pediatric ED visits were included. The majority (90.2%) were among the treat-and-release group. The mean age for all patients was 7.2 years, 57.1% of whom were males. The top 5 most common diagnoses for all ED visits included fever of unknown origin, external injuries, upper respiratory tract infections, open wounds, and abdominal pain. Cardiac conditions were the most common reason for admission in children younger than 1 year, intestinal infection among 1 to 4 years old, pneumonia among 5 to 9 years old, and appendicitis among 10 to 14 and 15 to 18 years. Seasonal analysis showed fever of unknown origin to be the most common diagnosis across all seasons.

Conclusions: This study is the first to assess pediatric ED visits in a Lebanese setting. The top most common reason was communicable diseases, with fever of unknown origin being the most common reason for all visits, contrary to North America where injury and poisoning are the most common. Noncommunicable diseases (cardiac, pneumonia, gastroenteritis, and appendicitis) were common reasons for admission in different age groups.

Key Words: diagnosis, Lebanon, Middle East

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Emergency departments (EDs) across the world have witnessed an increase in patient visits in the last decade.[1,2] In high-income countries such as France, England, and the United States, ED visits have experienced 64%, 21.9%, and 23% increases, respectively.[3] This growth has also been described in the Middle East, where the number of ED visits in Saudi Arabia increased by 30% over a 3-year study period.[4] Data on the number and type of ED visits in low- and middle-income countries are scarce, posing a serious challenge for resource planning, personnel training, and system development.[5]

Pediatric ED visits in high-income countries such as the United States account for 22.1% of total ED visits.[6] In 2011, the National Hospital Ambulatory Medical Care Survey dissected this percentage to show that acute upper respiratory tract infections, fever of unknown origin, and otitis media top the list of the pediatric ED visits in the United States.[7] On the other hand, data from lower-income countries such as Pakistan showed that injuries, fever/malaise, and gastrointestinal symptoms are the most common reasons for pediatric ED visits.[8]

Lebanon, an upper middle-income Middle Eastern country, has recently witnessed the emergence of emergency medicine (EM) as an independent field with the establishment of the Lebanese Society of Emergency Medicine in 2003, the first academic ED in 2007, and the first EM residency program in 2012.[9] There are more than 168 private hospitals in Lebanon with 115 pediatric EDs available.[9] Little attention has been given regarding assessing the pediatric disease spectrum across various emergency departments in Lebanon, although children aged 0 to 17 years comprise 31% of the total Lebanese population.[10] One study by Sawaya et al[9] assessed the level of support system and staffing pattern across various emergency departments in Lebanon, but they did not address the ED-related disease spectrum for children in their study. Another study by Musharrafieh et al[11] looked at the profile of trauma patients including pediatric patients presenting to an ED at a single center, but their study was limited to trauma cases. In their study, pediatric low-level falls (<15-ft height) contributed to 51.9% of pediatric injuries, penetrating and gunshot injuries accounted for 12.3% of childhood injuries, and road traffic crashes accounted for 5.2% of childhood injuries.

This study aimed to assess the disease spectrum of pediatric ED visits in a tertiary care center in Lebanon, an upper middle-income country, between May 2010 and April 2011.

METHODS

Study Setting and Design

The study was conducted at the ED of the American University of Beirut Medical Center, the largest tertiary care center in Beirut, Lebanon, seeing approximately 48,000 ED visits annually, of whom 28.8% are pediatric patients. Patients are triaged to 3 sections of the ED (high acuity, low acuity, and pediatric) based on the Emergency Severity Index and age. Emergency Severity Index relies on first making an acuity judgment based on the likelihood of immediate life or organ threats followed by a prediction of the number of resources that would be required in order to stream patients to appropriate ED sections. It further integrates pediatric fever guidelines into its algorithms, assigning all stable patients between 3 and 36 months an ESI of 3 to reflect the intensity of resources required for these patients. All nontrauma pediatric cases (≤18 years old) are seen in the pediatric section. Otherwise, pediatric trauma cases are triaged to the high-acuity (ESI 1 and 2) or low-acuity area (ESI 3, 4, or 5). The ED, including pediatric section, is staffed with a combination of American board-certified/eligible EM physicians and non–EM-trained physicians with extensive practice and experience in EDs. The inpatient team that admits patients is staffed by non-ED faculty under the Department of Pediatrics and Adolescents. Residents from off-services

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rotate in the ED with only family medicine and pediatric residents rotating through the pediatric section. The majority (75%) of ED patients are covered through private insurance coverage, whereas 23% are out-of-pocket, and 2% are covered through governmental insurance.

The study is a retrospective review of medical record administrative data of all pediatric cases who presented to the ED in a 1-year period. The study was approved by the institutional review board at the American University of Beirut.

Sample

The study sample included all pediatric ED visits for patients 18 years or younger and who presented to the ED between May 1, 2010, and April 30, 2011.

Measures

Medical record data on ED visit included information on sociodemographic variables including age (<1, 1–4, 5–9, 10–14, and 15–18 years); sex (male/female); guarantor group (insurance companies/self-paying patients/others); ESI, which is a 5-level tool for use in emergency department triage used to classify patient acuity from level 1 (most urgent) to level 5 (least resource intensive); and discharge diagnosis and patient disposition (treat and release vs admitted). Treat-and-release group included the patients who were evaluated by the emergency care provider and discharged home. Admitted patients include the patients who had a diagnosis requiring hospital admission.

Data Source and Definitions

The data used in this study were obtained from the medical records office. These data contained individual records including patient demographics, source of payment, and diagnosis. Our medical records department is responsible for coding all hospital record diagnoses according to the *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*). For admitted patients, the principal diagnosis is the one that was primarily responsible for the admission of the patient to the hospital for care. For treat-and-release ED visits, the diagnosis is the one that appears on the record. There are approximately 14,000 *ICD-9-CM* codes. Therefore, the study authors further classified the ED diagnoses according to single-level Clinical Classifications Software (CCS), which collapse the *ICD-9-CM* diagnosis into 285 meaningful diagnoses to allow for more manageable trend analysis. Thus, all diagnoses used in this study refer to the single-level CCS categories that the *ICD-9*–coded diagnosis mapped to, rather than the clinical definitions.

Statistical Analyses

To describe the basic sociodemographic and clinical characteristics (age, sex, insurance, ESI) of the study sample, the categorical variables were summarized according to their frequency distributions, whereas the continuous variable "age" was presented as mean. The Pearson χ^2 test was used to assess the significance of the statistical association between the patient's disposition (discharge from the ED vs admitted to the hospital) and the different age groups, sex, guarantor group, and ESI. $P < 0.05$ was used for statistical significance. Statistical analyses were performed using SPSS 23 (Statistical Package for Social Sciences, IBM Corp, Armonk, NY).

RESULTS

During the study period, there were 45,434 visits to the ED, among which 12,637 (28%) were children 18 years or younger. The vast majority (90.2%) of ED visits resulted in the child being treated and released rather than being admitted to the hospital. The mean age of children was significantly greater for treat-and-release ED visits (7.3 years) than that of those admitted to the hospital (6.2 years). Infants younger than 1 year accounted for only 4.1% of

TABLE 1. Demographic Characteristics Related to ED Visits for the Pediatric Population (≤18 Years Old), May 2010 to April 2011

	All Pediatric ED Visits	Treat-and-Release Pediatric ED Visit	Pediatric ED Visits Resulting in Hospital Admission
No. visits (% of all ED visits)	12,637 (100)	11,394 (90.2%)	1243 (9.8%)
Mean child age, y	7.2	7.3	6.2
Age, n (%)			
<1 y	665 (5.3)	469 (4.1)	196 (15.8)
1–4 y	4762 (37.7)	4320 (37.9)	442 (35.6)
5–9 y	2973 (23.5)	2713 (23.8)	260 (20.9)
10–14 y	2160 (17.1)	1996 (17.5)	164 (13.2)
15–18 y	2077 (16.4)	1896 (16.6)	181 (14.6)
Sex, n (%)			
Girls	5416 (42.9)	4863 (42.7)	553 (44.5)
Boys	7221 (57.1)	6531 (57.3)	690 (55.5)
Guarantor group, n (%)			
Insurance companies	8736 (69.1)	8090 (71.0)	646 (52.0)
Self-paying patients	2955 (23.4)	2584 (22.7)	371 (29.8)
Others	946 (7.5)	720 (6.3)	226 (18.2)
ESI, n (%)			
1	28 (0.2)	14 (0.1)	14 (1.3)
2	807 (6.5)	625 (5.5)	182 (17.2)
3	6800 (54.6)	6054 (53.1)	746 (70.3)
4	4357 (35.0)	4253 (37.3)	104 (9.8)
5	463 (3.7)	448 (3.9)	15 (1.4)

TABLE 2. Most Common Reasons for All Pediatric ED Visits, May 2010 to April 2011

Most Common Conditions*	n	%
Fever of unknown origin†	1681	21.5
Other injuries and conditions due to external causes	1376	17.6
Other upper respiratory tract infections‡	641	8.2
Open wounds of head, neck, and trunk	574	7.3
Abdominal pain	565	7.2
Noninfectious gastroenteritis§	551	7.0
Intestinal infection‖	439	5.6
Other lower respiratory disease¶	414	5.3
Otitis media and related conditions	392	5.0
Fracture of upper limb	339	4.3
Nausea and vomiting	300	3.8
Asthma	282	3.6
Acute and chronic tonsillitis	279	3.6

*CCS categories based on *ICD-9-CM* diagnoses.

†The most frequent *ICD-9-CM* diagnoses within this CCS category were pyrexia of unknown origin (98.1%), unspecified fever (1.8%), and fever in other diseases (0.1%).

‡The most frequent *ICD-9-CM* diagnoses within this CCS category were acute upper respiratory tract infection of unspecified site (62.2%), acute pharyngitis (16.8%), and croup (12.8%).

§The most frequent *ICD-9-CM* diagnosis within this CCS category was noninfectious gastroenteritis not elsewhere classified (100%).

‖The most frequent *ICD-9-CM* diagnoses within this CCS category were colitis, enteritis, and gastroenteritis of presumed infectious origin (41.0%); intestinal infection due to other organism not elsewhere classified (39.0%); and rotavirus enteritis (12.3%).

¶The most frequent *ICD-9-CM* diagnoses within this CCS category were cough (61.8%), other respiratory abnormalities (18.6%), and shortness of breath (11.1%).

all pediatric treat-and-release ED visits and 15.8% of ED visits resulting in hospital admission. The age distributions of children older than 1 year among the 3 groups (all pediatric ED visits, treat-and-release pediatric ED visits, and pediatric ED visits resulting in ED admission) were comparable to each other. The proportion of visit for boys was greater than that of girls, irrespective of whether the child was treated and released from the ED or was admitted to the hospital. However, sex was not shown to be statistically associated with the patient's disposition ($P = 0.221$). Most patients were insured. Guarantor group was found to be significantly associated with the patient's disposition ($P < 0.001$). A high proportion (54.6%) of the patients were classified as having ESI equal to 3 (Table 1).

Fever of unknown origin (21.5%) was the top most common reason for ED visits, followed by other injuries and conditions due to external causes (17.6%) (Table 2). Stratifying the diagnoses of all ED visits by season revealed that the most common diagnosis in summer was fever of unknown origin (13.1%), followed by noninfectious gastroenteritis (10.4%) and other injuries and conditions due to external causes (9.4%). The top common diagnoses in winter, spring, and autumn seasons were fever of unknown origin, other injuries and conditions due to external causes, and other upper respiratory tract infections (Table 3).

The top common diagnoses for ED visits in each age group are displaced in tables[4–6] according to the disposition status of the patient. Fever of unknown origin was the top most common diagnosis in all ED visits and treat-and-release visits for children younger than 1 year and those aged 1 to 4 years and 5 to 9 years. On the contrary, other injuries and conditions due to external conditions topped the list for all ED visits and treat-and-release group for children 10 to 14 years and 15 to 18 years old (Tables 4 and 5).

Appendicitis was a frequent condition for admission among children aged 10 to 14 years and 15 to 18 years. However, pneumonia was among the top most common diagnoses for children aged 5 to 9 years. Cardiac and circulatory congenital anomalies besides intestinal infection accounted for 16.3% and 12.7% respectively, in children younger than 1 year and those aged 1 to 4 years, respectively (Table 6).

DISCUSSION

This study is the first in Lebanon to assess the pediatric disease spectrum in emergency department across a tertiary care center in Beirut, Lebanon. Our study highlighted important frequent conditions for pediatric ED visits and admissions. The top most common reason for all ED visits was communicable diseases, with fever of unknown origin being the most common reason for all visits, contrary to North America where injury and poisoning are the most common.[12] Cardiac and circulatory anomalies were the top most common reason for admission among children younger than 1 year versus intestinal infection in children 1 to 4 years. On the contrary, pneumonia was the most common reason for admission in children aged 5 to 9 years versus appendicitis in

TABLE 3. Most Common Reasons for All Pediatric ED Visits by Season, 2010–2011

All Listed Conditions*	Winter (n = 3192)	Rank	Spring (n = 3212)	Rank	Summer (n = 3360)	Rank	Autumn (n = 2873)	Rank
Fever of unknown origin	346 (10.8%)	1	433 (13.5%)	1	440 (13.1%)	1	462 (16.1%)	1
Other injuries and conditions due to external causes	329 (10.3%)	2	422 (13.1%)	2	315 (9.4%)	3	310 (10.8%)	2
Other upper respiratory tract infections	274 (8.6%)	3	151 (4.7%)	3			160 (5.6%)	3
Intestinal infection	254 (8.0%)	4						
Otitis media and related conditions	150 (4.7%)	5						
Open wounds of head, neck, and trunk			138 (4.3%)	4	191 (5.7%)	4		
Abdominal pain			136 (4.2%)	5	179 (5.3%)	5	138 (4.8%)	4
Noninfectious gastroenteritis					348 (10.4%)	2		
Other lower respiratory disease							134 (4.7%)	5

Percentages are based on the total number of ED visits during each season.

*CCS categories based on *ICD-9-CM* diagnoses.

TABLE 4. Top Most Common Reasons for All Pediatric ED Visits for Children by Age Group

	n (%) of All ED Visits for Children by Age Group, 2010									
All Listed Conditions*	<1 y (n = 665)	Rank	1–4 y (n = 4762)	Rank	5–9 y (n = 2973)	Rank	10–14 y (n = 2160)	Rank	15–18 y (n = 2077)	Rank
Fever of unknown origin†	84 (12.6)	1	936 (19.7)	1	418 (14.1)	1	168 (7.8)	2	75 (3.6)	4
Other upper respiratory tract infections‡	50 (7.5)	2	318 (6.7)	2						
Acute bronchitis§	45 (6.8)	3								
Other lower respiratory disease‖	40 (6.0)	4								
Hemolytic jaundice and perinatal jaundice	40 (6.0)	4								
Cardiac and circulatory congenital anomalies	32 (4.8)	5								
Fracture of upper limb							119 (5.5)	4	71 (3.4)	5
Other injuries and conditions due to external causes			309 (6.5)	3	286 (9.6)	2	405 (18.8)	1	350 (16.9)	1
Abdominal pain					151 (5.1)	4	147 (6.8)	3	174 (8.4)	2
Noninfectious gastroenteritis¶							86 (4.0)	5	80 (3.9)	3
Other upper respiratory disease					149 (5.0)	5				
Otitis media and related conditions			289 (6.1)	4						
Open wounds of head, neck, and trunk			278 (5.8)	5	206 (6.9)	3				

Percentages are based on the total number of ED visits for each age group.

*CCS categories based on *ICD-9-CM* diagnoses.

†The most frequent *ICD-9-CM* diagnosis within this CCS category across all age groups was pyrexia of unknown origin.

‡The most frequent *ICD-9-CM* diagnosis within this CCS category across all age groups was acute upper respiratory tract infection of unspecified site.

§The most frequent *ICD-9-CM* diagnoses within this CCS category were acute bronchiolitis due to other infectious organisms (<1 year: 55.6%, 1–4 years: 56.9%), acute bronchitis (<1 year: 4.4%, 1–4 years: 19.6%, 5–18 years: 100%), and respiratory syncytial virus bronchiolitis (<1 year: 40.0%, 1–4 years: 23.5%).

‖The most frequent *ICD-9-CM* diagnosis within this CCS category across all age groups was cough.

¶The most frequent *ICD-9-CM* diagnosis within this CCS category across all age groups was noninfectious gastroenteritis not elsewhere classified.

those aged 10 to 14 years and 15 to 18 years. Awareness of the above categorical statistics is of paramount importance for judicious emergency staffing, resource utilization, and recognition of the serious conditions leading to admission when identifying the sick child among the different age groups.

In our study, pediatric population represented 28% of all ED visits with a higher percentage of male-to-female ratio (57.1% vs 42.9%). This reflects our Lebanese population demography where children aged 0 to 17 years accounted for 31% of the total population in 2009, with boys representing 53% among all children's age group versus 47% of females.[10] The mean age of children seen in our ED was approximately 7 years, which is similar to the US population.[12] Children aged 1 to 4 years accounted for the highest percentage (37.7%) of all pediatric ED visits with the highest admission rate (35.6%). The majority of patients (54.6%) had an ESI of 3, reflecting the stable acuity but high resource intensity of the conditions our patients presented with, commonly including fever and gastrointestinal complaints. Only a small percentage (9.8%) of our patients were admitted, with the majority (90.2%) being treated and released. The percentage of admitted patients in our setting was, however, higher than that in the United States (9.8% vs 4%), which corresponds to the higher proportion of ESI 3 presentations (54.6% vs 37%).[12–14] This disparity could be explained by the fact that our study is assessing a single tertiary care center ED in Lebanon with high referral of complicated cases. However, our admission rates were low compared with other developing countries. A systematic review by Obermeyer et al[5] assessed emergency care in low- and middle-income countries and showed that the median inpatient pediatric admission across all regions was 22% (interquartile range, 10.7%–44.3%). In Pakistan, 47.8% of pediatric patients presenting to ED during the period 2010–2011 were treated and released,[8] which is similar to percentages in Egypt, where 46.7% were treated and released during 2008–2009.[15] Our results also differ from data in a developing country such as India, where 42.1% were admitted.[16] This difference could be explained by variability not only in disease illness in different countries but also in the level of emergency care provided in EDs, including training of emergency care providers, equipment, formal triage systems, provider education, disease burden, funding, and availability of standardized protocols on treatment and admission.

Upon assessing the most common reasons for all ED visits, fever of unknown origin and injuries/conditions due to external cause topped the list, followed by upper respiratory tract infections (Table 2). This pattern was different from US pediatric ED visits, where injuries/poisoning and respiratory disorders were a common reason for ED visits followed by nervous system disorders.[12] This pattern was also different from the developing countries. For example, in Pakistan, injury followed by constitutional symptoms, such as fever and malaise, accounted for the most frequent complaint.[8] In Egypt, respiratory complaints and convulsions accounted for the most common reasons.[15] In India, gastrointestinal and respiratory illnesses were the most common[16]; however, the pattern in Pakistan was similar to Malaysia, where injuries and fever were the main presenting complaints.[17] These differences are mainly related to difference in disease spectrum, immunization status, food safety, global hygiene, and endemic nature of common diseases.

When looking into the most frequent conditions across age groups for treat-and-release ED visits, fever of unknown origin was the top listed condition in children younger than 1, 1 to 4,

TABLE 5. Most Frequent All Listed Conditions for Pediatric Treat-and-Release ED Visits by Age Group, May 2010 to April 2011

	n (%) of Treat-and-Release ED Visits by Age									
All Listed Conditions*	<1 y (n = 469)	Rank	1-4 y (n = 4320)	Rank	5–9 y (n = 2713)	Rank	10–14 y (n = 1996)	Rank	15–18 y (n = 1896)	Rank
Fever of unknown origin†	81 (17.3)	1	930 (21.5)	1	416 (15.3)	1	166 (8.3)	2	74 (3.9)	4
Other upper respiratory tract infections‡	41 (8.7)	2	311 (7.2)	2						
Acute bronchitis§										
Other lower respiratory disease‖	39 (8.3)	3								
Hemolytic jaundice and perinatal jaundice	27 (5.8)	4								
Fracture of upper limb							105 (5.3)	4		
Other injuries and conditions due to external causes	26 (5.5)	5	301 (7.0)	3	285 (10.5)	2	404 (20.2)	1	349 (18.4)	1
Abdominal pain					150 (5.5)	4	147 (7.4)	3	173 (9.1)	2
Noninfectious gastroenteritis¶							81 (4.1)	5	77 (4.1)	3
Other upper respiratory disease					146 (5.4)	5			62 (3.3)	5
Otitis media and related conditions			273 (6.3)	5						
Open wounds of head, neck, and trunk			276 (6.4)	4	204 (7.5)	3				

Percentages are based on the total number of ED visits for each age group.

*CCS categories based on *ICD-9-CM* diagnoses.

†The most frequent *ICD-9* diagnoses within this CCS category included pyrexia of unknown origin across all age groups.

‡The most frequent *ICD-9-CM* diagnoses within this CCS category were acute upper respiratory tract infection of unspecified site (<1 year: 100%, 1–4 years: 100%, 5–9 years: 100%, 10–14 years: 100%, 15–18 years: 45.2%) and acute pharyngitis (15–18 years: 45.2%).

§The most frequent *ICD-9-CM* diagnoses within this CCS category were acute bronchitis (<1 year: 5.9%, 1–4 years: 27.6%, 5–9 years: 100%, 15–18 years: 100%) and acute bronchiolitis due to other infectious organisms (<1 year: 94.1%, 1–4 years: 72.4%).

‖The most frequent *ICD-9-CM* diagnosis within this CCS category across all age groups was cough.

¶The most frequent *ICD-9-CM* diagnosis within this CCS category across all age groups was noninfectious gastroenteritis not elsewhere classified.

and 5 to 9 years, followed by upper respiratory tract infections in children younger than 1 year and those 1 to 4 years old. However, injuries due to external causes were the most common listed condition for treat and release in children 10 to 14 years and 15 to 18 years. These patterns were different than the US population, where upper respiratory tract infections were the most frequent conditions for pediatric treat-and-release for children younger than 1, 1 to 4, and those 5 to 9 years. However, our distribution was similar to US population for children 10 to 14 years and 15 to 17 years, where superficial injury and contusion accounted for the most frequent condition.

On the contrary, the most common reason for admission varied between different age groups. Cardiac and circulatory congenital anomalies were the most common diagnosis for admission in children younger than 1 year versus intestinal infections in children aged 1 to 4 years and pneumonia among children aged 5 to 9 years. The high proportion of cardiac cases as an admitting diagnosis among children younger than 1 year is explained by the fact that the American University of Beirut Medical Center is a referral center for pediatric cardiac anomalies. Being aware of this high proportion of cardiac cases among this age group is very important when caring for those children and emphasizes the importance of having skilled ED personnel and appropriately implemented policies and protocols for cardiac cases. The high incidence of gastrointestinal infection among children 1 to 4 years, especially in summer season (Table 6), suggests the need for better public health evaluation of local food safety and alert ED staff and equip their departments with the resources needed to care for these patients especially in peak season when additional personnel may be needed to handle the extra load. In our setting, appendicitis was the most common reason for admission in children aged 10 to 14 years, and it is also a common reason for admission among US children of the same age group.[12] Also, appendicitis tops the admission diagnosis among Lebanese children aged 15 to 19 years; on the contrary, mood disorders top the list for admission among US children of the same age group. Multiple community surveys in different US regions have shown that 1 in every 3 to 4 children has a mental disorder, and 1 in every 10 children suffers from a serious emotional disturbance.[18] Little attention is given in terms of assessing the emotional and behavioral problems among the Lebanese children. One study by Maalouf et al[19] assessed the prevalence of psychiatric disorders among 510 Lebanese adolescents (11 to 17 years) in 2012, and their study showed that 1 (26.1%) in 4 adolescents suffer from at least 1 psychiatric disorder, with anxiety disorders (13.1%) and attention-deficit/hyperactivity disorder (10.2%) being the most common. Only 6% of those with disorders reported seeking professional help.[19] Despite the fact that prevalence of psychiatric disorders among Lebanese adolescents was high in 2012, mood disorders were not a frequent reason for admission (3.3%) among adolescents in our study compared with US adolescent children. This could be related to lack of third-party payer coverage for psychiatric illnesses in Lebanon. In addition, limited public awareness on mental health in Lebanon could have contributed to the low admission rate.

A distinct seasonal pattern was seen in the frequency of some of the common emergencies. In summer, the most common diagnosis was fever of unknown origin, followed by noninfectious gastroenteritis and conditions due to external causes, whereas in autumn, winter, and spring the most common diagnoses were fever of unknown origin, injuries due to external causes, and upper respiratory tract infections (Table 3).

Limitations

One of the main limitations of our study is that it included data from only 1 medical center in Beirut, an urban tertiary care setting that might not reflect what more rural community hospital

TABLE 6. Most Frequent All Listed Conditions for Pediatric ED Visits That Resulted in Admission to the Hospital by Age Group, May 2010 to April 2011

	n (%) of ED Visits Resulting in Admission by Age									
All Listed Conditions*	**<1 y (n = 196)**	**Rank**	**1-4 y (n = 442)**	**Rank**	**5–9 y (n = 260)**	**Rank**	**10–14 y (n = 164)**	**Rank**	**15–18 y (n = 181)**	**Rank**
Cardiac and circulatory congenital anomalies	32 (16.3)	1								
Appendicitis and other appendiceal conditions							16 (9.8)	1	20 (11.0)	1
Other upper respiratory tract infections†	9 (4.6)	5								
Acute bronchitis‡	28 (14.3)	2	22 (5.0)	4						
Intestinal infection§	18 (9.2)	3	56 (12.7)	1						
Hemolytic jaundice and perinatal jaundice	13 (6.6)	4								
Viral infection	13 (6.6)	4	20 (4.5)	5						
Fracture of upper limb					16 (6.2)	5	14 (8.5)	2	12 (6.6)	2
Noninfectious gastroenteritis‖			51 (11.5)	2	19 (7.3)	3				
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)			49 (11.1)	3	26 (10.0)	1	6 (3.7)	5		
Diseases of white blood cells					23 (8.8)	2	10 (6.1)	3	12 (6.6)	2
Cancer of brain and nervous system							7 (4.3)	4		
Fracture of lower limb									8 (4.4)	3
Mood disorders									6 (3.3)	4
Skin and subcutaneous tissue infections									6 (3.3)	4
Leukemias					17 (6.5)	4			5 (2.8)	5

Percentages are based on the total number of ED visits for each age group.

*CCS categories based on *ICD-9-CM* diagnoses.

†The most frequent *ICD-9-CM* diagnoses within this CCS category were acute upper respiratory tract infection of unspecified site (<1 year: 100%, 1–4 years: 71.4%, 5–9 years: 33.3%, 10–14 years: 100%, 15–18 years: 100%), acute maxillary sinusitis (5–9 years: 33.3%), streptococcal sore throat (5–9 years: 33.3%), and acute tracheitis without mention of obstruction (1–4 years: 14.3%).

‡The most frequent *ICD-9-CM* diagnoses within this CCS category were acute bronchitis (<1 year: 3.6%, 1–4 years: 9.1%, 5–9 years: 100%, 10–14 years: 100%), respiratory syncytial virus bronchiolitis (<1 year: 64.3%, 1–4 years: 54.5%), and acute bronchiolitis due to other infectious organisms bronchitis (<1 year: 32.1%, 1–4 years: 36.4%).

§The most frequent *ICD-9-CM* diagnoses within this CCS category were rotavirus enteritis (<1 year: 50%, 1–4 years: 60.7%, 5–9 years: 57.1%); intestinal infection due to other organism not elsewhere classified (<1 year: 33.3%, 1–4 years: 21.4%, 5–9 years: 14.3%, 10–14 years: 33.3%); colitis, enteritis, and gastroenteritis of presumed infectious origin (<1 year: 11.1%); *Salmonella* enteritis (1–4 years: 12.5%, 5–9 years: 14.3%, 10–14 years: 33.3%); shigellosis unspecified (10–14 years: 33.3%); and bacterial enteritis unspecified (15–18 years: 100%).

‖The *ICD-9-CM* diagnosis within this CCS category across all age groups was noninfectious gastroenteritis not elsewhere classified.

EDs in Lebanon experience. It is, however, the busiest ED in Lebanon, seeing the highest loads of patient annually. Another limitation is the retrospective study design that depends on the *ICD-9-CM* coding of our medical records department, which may be subject to human error as well as limitations of what is documented in the chart and available in their records and thus the level of accuracy of the ultimate *ICD-9-CM* diagnosis assigned.

CONCLUSIONS

This study is the first in Lebanon to assess the pediatric disease spectrum in an emergency department at a tertiary care center in Beirut, Lebanon. The vast majority of our patients were treated and released with 10% admission rate. The top most common reason was communicable diseases, with fever of unknown origin being the most common reason for all visits, contrary to North America where injury and poisoning are the most common. Intestinal infection was a common reason for ED visits that resulted in admission.

Adequate data regarding the epidemiology of complaints at each pediatric emergency department are a necessity for evaluation of each department's needs, planning, and judicious allocation of the available resources at each institution.

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