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Factors Associated with Pediatric Emergency Department Avoidance During COVID-19 Pandemic: A Cross-sectional, Telephone-based Survey in Beirut, Lebanon

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ABSTRACT

Introduction: We aimed to explore avoidant behavior of parents of frequent pediatric Emergency Department (ED) users, reasons behind avoidance and healthcare seeking behaviors in avoiders during COVID-19 pandemic.

Methods: We conducted a cross-sectional telephone-based survey on parents of frequent pediatric ED users at a tertiary care center in Beirut between March and August 2021.

Results: A total of 240 frequent pediatric ED users were included. Female comprised 39.6% of the sample. Of the surveyed patients, 117 reported ED avoidance. ED avoidance was common among parents of patients with concern for their child contracting COVID-19 during an ED visit (aOR=1.28, p<0.001, 95%CI[1.13, 1.45]). However, parents of patients with an underlying malignancy/hematologic disease were less likely to refrain from ED visits (aOR=0.29, p<0.001, 95%CI[0.14, 0.60]). Moreover, 97.9% of parents of patients with acute symptoms who avoided the ED reported the fear of contracting COVID-19 as the main reason behind their avoidance. Of those who had acute symptoms and avoided the ED, the majority messaged or called a doctor as an alternative for their acute complaint. Furthermore, 28.9 sought yielded worse quality of care than what they would have experienced from the ED.

Conclusion: In patients with high ED utilization rates, ED avoidance was common among parents of patients with concern for their child contracting COVID-19 during an ED visit. However, parents of patients with an underlying malignancy/hematologic disease were less likely to report avoidance. Developing alternative strategies to reduce emergency department (ED) avoidance during pandemics is crucial to ensuring that children continue to have access to acute care without a reduction in quality during public health crises.

Keywords: emergency department; ED avoidance; pediatric population; frequent ED users

INTRODUCTION

During the Coronavirus Disease 2019 (COVID-19) pandemic, Emergency Departments (EDs) across the world faced rising cases of COVID-19 especially during the surges that occurred as new variants emerged. While ED visits related to COVID-19

increased globally, overall ED visits actually dropped during the pandemic. This pattern was observed across countries with variable degrees of Government Response Stringency Indices and transmission levels.¹⁻³ ED visits dropped across all age groups but was most pronounced in pediatric patients.²

A systematic review conducted in Taiwan that included 25 articles assessing the impact of COVID-19 pandemic on ED utilization among the pediatric population found a significant drop in overall pediatric ED utilization.⁴ Several studies suggest that the drop was more pronounced in low-acuity visits with a slight increase in pediatric ICU admission.^{5,6} Similar data has emerged from other EDs where 11 tertiary-

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care pediatric EDs in Canada reported an increase in the proportion of ward and ED visits resulting in ICU admissions of pediatric patients with higher acuity levels.⁷

Furthermore, studies looking at ED utilization during the pandemic identified a change in disease patterns presenting to the ED. A dramatic drop in pediatric patients presenting to the EDs with communicable diseases, acute infections, and physical traumas was noted across multiple studies.²⁻⁴ Some of these patterns may have been related to the social distancing that occurred with school closures, remote learning and the various degrees of lockdowns that countries experienced. Emerging evidence however suggests that patterns of ED utilization were also impacted by patient avoidant behavior.

ED avoidance behavior during the pandemic was explored in several studies.⁸⁻¹¹ A study conducted in Portugal found that 24.5% of patients whose symptoms required an ED visit chose to avoid seeking care during the pandemic.⁸ Similar results have emerged in the United States and Australia, where avoidance of any type of medical care reached up to 32.9%, and the avoidance of emergency care specifically was noted to be between 10.1% and 12.0%.^{9,10} A more recent study looking at reasons for ED avoidance in adult patients found that the main driver was fear of contracting COVID-19 in the ED.¹¹ While these studies have started trying to understand ED avoidance behavior during the pandemic, no study has explored this in the pediatric population.

Understanding ED avoidance behavior of parents whose children have acute complaints during a pandemic is important to explaining the patterns of ED utilization that were witnessed during COVID-19. Whether the changes in patterns were reflective of changes in disease patterns alone or concerns about seeking care is yet to be understood fully, especially for the pediatric patients. Exploring this is a first step to trying to understand health outcomes during pandemics and how the pandemic may impact health seeking behaviors for non-pandemic related conditions especially. This study aimed to explore avoidant behavior of parents of frequent pediatric ED users, reasons behind ED avoidance and healthcare seeking behaviors in avoiders during COVID-19 pandemic.

METHODS

We conducted a cross-sectional telephone-based survey on parents of frequent pediatric (<18 years old) ED users at a tertiary care center in Beirut, one year

into the COVID-19 pandemic in Lebanon.

Study design and setting

The institution is an over 380-bed capacity tertiary care center, recognized as one of the leading medical centers in Lebanon. The ED at the institution handles a patient census of around 57,000 visits per year, 28% of which are pediatric patients. The ED comprises three main clinical areas: high acuity, low acuity, and pediatrics, and patients are triaged according to age and the Emergency Severity Index (ESI). Of our total ED patients, 80% are insured and frequent pediatric ED users constitute around 1% of our annual total ED visits and 3.7% annual pediatric ED visits respectively. The mean age of frequent pediatric ED users is 5 years and hospitalization rates in this category of patients is 17.2% compared to the overall ED admission rate of 11.3%, reflecting a higher complexity of cases within this subgroup.

In 2018, our institution successfully implemented a comprehensive electronic medical record system. As a response to the pandemic, we introduced telehealth services for patients in our ambulatory outpatient services. These services were scheduled by appointment in the ambulatory clinic setting, but were not accessible as an immediate care option in the ED.

At the time of the survey (March 1st till August 30, 2021), Lebanon was in the process of recovering from a surge in COVID-19 cases that occurred after the holiday season. The peak of this surge was experienced in January 2021, when the positivity rate reached a high of 22.8%. In an effort to control the spread of the virus, a strict lockdown was implemented in January. Additionally, on February 14th, 2021, the COVID-19 vaccination campaign began, prioritizing high-risk individuals. By April 23rd, 2021, the positivity rates had declined to their pre-surge levels, standing at 12.4%. However, vaccination for children under the age of 18 did not begin till March 1st, 2022.

Selection of participants

The study population was selected from the 574 frequent pediatric ED users, defined as patients who visited the ED at least 4 times during the year prior to the first COVID-19 case in Lebanon (February 21st, 2020).^{12,13} Selection was conducted on the basis of weighted random sampling that accounted for the annual number of ED visits per patient. Sample size was calculated based on a confidence of 95%, a margin of error of 5%, and a proposed 40% probability of ED avoidance. The target sample size to be achieved was 240 pediatric patients.

Data collection and processing

The patient's age, sex, and comorbidities were retrieved along with the phone number of their parents from medical records. The remaining information was collected by means of a telephone-based survey developed by well-trained Emergency Medicine physicians and epidemiologists who also pilot tested and revised its final version (S1 File). In order to ensure an ultimate level of comprehension and better data accuracy, the survey was initially written in English and was made available in Arabic as well after a process of translation and back-translation by two independent translators. A team consisting of four professional physicians, research fellows, and a research coordinator was supervising the administration of the survey diffused between March 1 and August 30, 2021. A maximum of five calls were made per patient. The target sample size of 240 patients was reached after 353 patients were contacted.

The survey was composed of 23 questions covering the following topics: patients' demographics, concern of parents for their child contracting COVID-19, changes in patterns of ED utilization, reasons behind these changes, alternatives sought for medical attention, and perceived impact on health outcomes. The demographics included patients' nationality, family composition, and area of residence as well as the level of education of their parents. Parents of pediatric patients expressed their concern that their child contracts COVID-19 during an ED visit using a Likert Scale from 0 to 10 where zero represents "no concern" and 10 represents "severe concern". To define our primary variable of interest, ED avoidance/non-avoidance, we considered the following as avoidant behavior: parents of patients with acute symptoms who reported a decrease or full avoidance of the ED during COVID-19 pandemic, and those who reported waiting longer to present to the ED for their child's acute complaints than they would have prior to COVID-19. Among parents who sought alternative treatments for their children's acute medical complaints, we gathered additional information on how they perceived the quality of alternative care received, in comparison to care provided in the emergency department.

Data analysis

Data management and analysis were conducted using IBM SPSS version 28 (IBM, New York, NY, USA). Categorical variables were presented using count (%), while continuous variables were presented using median (IQR). Associations between categorical exposures and outcome (avoiders vs.

non-avoiders) were assessed using the chi-square test or Fisher's exact test, as appropriate, while associations between continuous exposures and the outcome were assessed using independent-samples t-tests. Statistically significant variables ($p < 0.05$) and clinically significant variables were entered in a forward stepwise multivariate logistic regression model to identify risk factors for avoiding or delaying ED visits. The variables included in the model were age, concern for contracting COVID-19 in daily life, concern for contracting COVID-19 during an ED visit, gender, number of underlying medical conditions, lung disease, cardiovascular disease, diabetes mellitus, malignancy/hematologic disease, neurological disease, psychiatric disease, chronic kidney disease, gastrointestinal/ liver disease, other diseases, level of education, and guarantor. Results of this analysis were presented as adjusted odds ratio (aOR) with 95% confidence interval (CI).

Ethical considerations

Participants were consented verbally, and ethical approval was obtained from the Institutional Review Board at our institution under the ID number SBS-2020-0214. Confidentiality was guaranteed by removing all patient identifiers from the database after data collection.

RESULTS

The study response rate was 68.0% and a total of 240 frequent pediatric ED users were included in this study.

Sociodemographic characteristics

Table 1 presents a comparison of the sociodemographic characteristics between avoiders (N=117) and non-avoiders (N=123). Patients were categorized based on age into 4 groups: 46.7% of our patients were less than 5 years old, 30.4% were between 5 and 9 years old, 16.3% were between 10 and 14 years old, and only 6.7% were between 15 and 17 years old. Of the 240 patients, 39.6% were females. There was a statistically significant difference between both groups when it comes to having a malignancy or hematologic disease as a chronic condition (10.3% for avoiders versus 26.8% for those who did not avoid the ED, $p=0.001$). In parallel, parents' demographic characteristics were presented in table 1 which also compares both groups with regards to their concern for their child contracting COVID-19 in daily life and during an ED visit, and their level of education. Parents of children with acute symptoms who avoided or delayed their ED visit, reported a statistically

significant higher median score for their concern visit than those who did not (9, 7-10 vs. 8, 5-8.5, for their child contracting COVID-19 during an ED p-value<0.001).

Table 1. Sociodemographic characteristics

		Total population (N=240)	Avoided or delayed ED visits (N=117)	Did not avoid or delay ED visits (N=123)	p-value
Demographic characteristics					
Age	<5 5-9 10-14 15-17	112 (46.7) 73 (30.4) 39 (16.3) 16 (6.7)	61 (52.1) 36 (30.8) 16 (13.7) 4 (3.4)	51 (41.5) 37 (30.1) 23 (18.7) 12 (9.8)	0.11†
Concern for contracting COVID-19	In Daily Life Median (IQR) During an ED Visit Median (IQR)	7 (5-10) 8 (6-10)	7 (5-10) 9 (7-10)	7 (5-9) 8 (5-8.5)	0.25* <0.001*
Gender	Female	95 (39.6)	43 (36.8)	52 (42.3)	0.38†
Chronic conditions	Lung Disease Cardiovascular Disease Chronic Kidney Disease Diabetes Mellitus Malignancy/ Hematologic Disease Gastrointestinal/ Liver Disease Neurological Disease Psychiatric Disease Other Diseases	21 (8.8) 3 (1.3) 0 (0.0) 1 (0.4) 45 (18.8) 0 (0.0) 12 (5.0) 4 (1.7) 103 (42.9)	13 (11.1) 2 (1.7) 0 (0.0) 0 (0.0) 12 (10.3) 0 (0.0) 5 (4.3) 1 (0.9) 52 (44.4)	8 (6.5) 1 (0.8) 0 (0.0) 1 (0.8) 33 (26.8) 0 (0.0) 7 (5.7) 3 (2.4) 51 (41.5)	0.21† 0.61‡ - 1.00‡ 0.001† - 0.61† 0.62‡ 0.64†
Level of education of parents	No Schooling Up to High School	102 (42.5) 138 (57.5)	54 (46.2) 63 (53.8)	48 (39.0) 75 (61.0)	0.26†
Guarantor	Insurance Self-Payer Other	214 (89.2) 9 (3.8) 17 (7.1)	108 (92.3) 3 (2.6) 6 (5.1)	106 (86.2) 6 (4.9) 11 (8.9)	0.34‡

*Independent-samples t-test

†Pearson's Chi-Square Test

‡Fisher's Exact Test

Variables associated with ED avoidance

Table 2 documents the results of the forward stepwise multivariate logistic regression analyses of the variables associated with ED avoidance. Parents' concern for their child contracting COVID-19 during an ED visit and patients having an underlying malignancy or hematologic disease were found to be variables associated with ED avoidance. In fact,

parents with concern for their child contracting COVID-19 during their ED visit were more likely to avoid the ED (aOR, 1.28; 95%CI 1.13 to 1.45, p-value <0.001). Furthermore, parents of patients having an underlying malignancy or hematologic diseases were less likely to avoid the ED than those who do not (aOR, 0.29; 95%CI 0.14 to 0.60, p-value <0.001].

Table 2. Stepwise (forward) multivariate logistic regression of variables associated with ED avoidance

	Variables (reference)	Adjusted OR	95% CI for adjusted OR	p-value
Last model p<0.001	Concern for contracting COVID-19 during an ED Visit	1.28	(1.13, 1.45)	<0.001
	Malignancy/ hematologic disease (No)	0.29	(0.14, 0.60)	<0.001

(Entry 0.05, Removal 0.10)

Variables included in the model: age (ref: <5); concern for contracting COVID-19 in daily life (continuous variable, scale 0-10); concern for contracting COVID-19 during an ED Visit (continuous variable, scale 0-10); gender (ref: male); number of underlying medical conditions (ref: none); lung disease (ref: no); cardiovascular disease (ref: no); diabetes mellitus (ref: no); malignancy/ hematologic disease (ref: no); neurological disease (ref: no); psychiatric disease (ref: no); chronic kidney disease (ref: no); gastrointestinal/ liver disease (ref: no); other diseases (ref: no); education (ref: no schooling); guarantor (ref: insurance).

Reasons for avoidance, healthcare alternatives and perceived impact on care

The majority of parents of patients with acute symptoms who completely avoided the ED (N=47), reported the fear of contracting COVID-19 as the main reason behind their avoidance (97.9%). Of those who had acute symptoms and did not visit the ED, 4.3% did not seek any alternative for their acute complaint,

whereas the majority (77.8%) messaged or called a doctor, 31.1% visited a clinic, 4.4% arranged for a home visit, and only 2.2% used telehealth. Furthermore, 68.9% of parents who sought alternatives for the acute complaint of their child believed that the alternatives had no impact on quality of care, 28.9% believed that alternatives yielded worse quality of care, and only 2.2% reported better quality of care (n=45) (Table 3).

Table 3. Reasons for avoidance, healthcare alternatives for acute complaints, and perceived impact on care*

Survey response categories		No. (%)
Reason behind not going to the ED**		
Fear of contracting COVID-19		46 (97.9%)
Concerns about hospital being overwhelmed		10 (21.3%)
Concerns about hospital receiving patients with COVID-19		8 (17.0%)
Others		2 (4.3%)
Alternatives sought for acute complaints**		
None		2 (4.3%)
Alternatives ***		45 (95.7%)
	Messaged or called a doctor	35 (77.8%)
	Arranged for a home visit	2 (4.4%)
	Visited a clinic	14 (31.1%)
	Used telehealth	1 (2.2%)
Perceived impact of alternatives on care***		
Believed that the alternatives sought yielded better quality of care		1 (2.2%)
Believed that the alternatives sought yielded worse quality of care		13 (28.9%)
Alternatives sought had no impact on quality of care		31 (68.9%)

*In those who had acute symptoms and did not visit the ED (N=47)

**Multiple answers were allowed

***In those who sought alternatives for their acute complaint (n=45)

DISCUSSION

Our study assessed ED avoidance among parents of frequent pediatric ED users, reasons behind this behavior and healthcare seeking behaviors in avoiders during COVID-19 pandemic. In patients with high ED utilization rates, ED avoidance during COVID-19 was common especially among parents of patients with concern for their child contracting COVID-19 during an ED visit. However, parents of patients with an underlying malignancy or hematologic disease were less likely to report ED avoidance. Of those who had acute symptoms and did not visit the ED, the majority sought care through messaging or calling their primary care practitioner, followed by outpatient clinic visits. Of those who avoided ED utilization, most of them believed that the alternatives sought had no impact on quality of care.

Although several studies have explored ED avoidance during COVID-19 pandemic, few have looked at drivers of these changes especially among pediatric patients. One study explored the association between perception of COVID-19 risk, confidence in health services, and ED avoidance but did not delve into the reasons behind ED avoidance nor the alternative healthcare access points among individuals who chose to avoid the ED.⁸ To our knowledge only one study has attempted to understand the reasons behind ED avoidance. This study, however, focused on adult patients whose utilization behaviors and concerns may not be generalizable to the pediatric population.¹¹ Our study is unique in focusing on pediatric patients, exploring changes in their ED utilization behavior as well as reasons behind reported changes.

ED avoidance was common among almost half of our frequent pediatric ED users. This is higher than what has been reported in studies looking at ED avoidance in adults where avoidance rates ranged from 10.1% to 44.8%.^{10,11} Whereas studies from the Australia and the United States (US) reported rates of 10.1% and 12.0% respectively, a study looking at ED avoidance rates in the same setting in adult patient in Lebanon found the highest avoidance rate reported in the literature.⁹⁻¹¹ Whether this markedly higher rate in both adult and pediatric patients in this setting reflects community confidence in the health care system, or other more population specific factors, is an area that needs further exploration. It could also be related to what the community was experiencing in terms of COVID-19 pandemic surges at the time. During the time of our study (March 1st till August 30, 2021), Lebanon was recovering from its toughest COVID-19

surge, having reached peak levels of both positivity rate and mortality rate. The peak positivity rate, which refers to the highest proportion of positive COVID-19 PCR test results, was 22.8% in January 2021. Meanwhile, the peak mortality rate, defined as the highest number of confirmed deaths due to COVID-19 per million people, occurred on February 6, 2021, with 21 deaths per million.

Concern about contracting COVID-19 during an ED visit was the only independent variable found to be associated with ED avoidance in our study. This is in line with all other studies that found fear of contracting COVID-19 to be an important variable.^{3,11,14,15} While studies looking at adult patient ED avoidance identified additional variables associated with ED avoidance including gender, insurance status, and the education level of patients,⁹⁻¹¹ these did not emerge as drivers of ED avoidance in our study. Interestingly, having comorbidities - a common factor associated with ED avoidance in adult patients - was found to have the opposite effect in our population. Specifically, having comorbidities including lung diseases and malignancy or hematologic diseases have been found to be associated with higher ED avoidance behavior in multiple adult studies.^{11,16} This includes a study in Australia that found that 41.5% of adult patients with malignancy reported avoiding EDs during COVID-19 pandemic. In our study, however, parents whose children suffered from malignancy/hematologic disease were found to have significantly lower ED avoidance behavior. This suggests that concerns about the acute illness in the context of hematologic/malignancy diseases in children outweigh the parents' perceived risks of their child contracting COVID-19.

Among patients who avoided the ED in spite of having acute symptoms, fear of contracting COVID-19 was the main reason reported for avoidance. Interestingly, concern about hospitals being overwhelmed - a reason often cited in the lay press - was reported as a reason among 21.3% of complete avoiders. The main alternative sought by patients who avoided the ED in spite of having acute symptoms was messaging or calling their primary care practitioner, followed by visiting a clinic. Outpatient clinic visits rates are slightly higher than those reported in a study looking at ED avoidance rates among adult patients in the same Lebanese setting. In contrast to previous studies that highlighted the increased use of telehealth during the COVID-19 pandemic, with data reporting 76% rise in its utilization during the first three months of the pandemic,¹⁷ our survey found that only one parent reported utilizing this approach for acute care

symptoms of their child. Despite the increase in the use of telehealth services worldwide and its importance in providing healthcare assistance remotely,⁴ telehealth was underutilized in our setting. Low-middle income countries (LMICs) like Lebanon, continue to encounter challenges in adopting and implementing formal telemedicine services including inaccessibility, poor security standards, technological concerns and lack recognition by third party payers. In a country where accessibility of physicians through phone/messaging is high,¹⁹ this modality emerged as the highest platform of alternative care. While this was essential for care during the pandemic in this community, the impact of this typically uncompensated and undocumented accessibility on physicians' wellbeing and quality of care is unclear.

While we did not explore true health outcomes in our study, we did assess patients' perception of the quality of care that they received through these alternatives access routes. The majority of the avoiders reported that the alternatives sought did not have any impact on the quality of care and only a small minority (2.2%) believed that the alternatives sought yielded a better quality of care. Understanding the impact of avoidant behavior on health outcomes fully, however, requires further exploration.

The aim of our study was to assess ED avoidance among parents of frequent pediatric ED users as well as the drivers behind their avoidance behavior. ED underutilization was common among our sample and was mostly attributed to the high concern of contracting COVID-19 during an ED visit. Increasing community confidence in the health system during pandemic by raising awareness about the infection control measures taken by the hospitals to reduce in-hospital transmission of communicable disease is an important step to reducing underutilization for acute emergency conditions. Moreover, telehealth is gaining popularity worldwide and can improve access to care for urgent and non-urgent conditions. However, it is still underutilized in the Lebanese setting. The COVID-19 pandemic highlighted the need for addressing infrastructure barriers to telehealth services, especially in LMICs.

LIMITATIONS

This study has some limitations. First, given the survey methodology, response bias, or the tendency of survey participants to provide wrong or inaccurate answers,²⁰ may have influenced the results. Second, our study population was limited to one center. This is, however, the largest medical center in Lebanon with the highest ED visit annual load nationally.

Third, the cross-sectional nature of the study hinders the ability to address causality, as the data reflects only the time of collection and does not allow us to determine whether one factor directly influenced another. Despite our extensive efforts to include all eligible subjects, we encountered a response rate of 68.0%. This response rate introduces the possibility of sampling or non-response bias in our study. Finally, patients included in our study were frequent pediatric ED users. By targeting this specific subgroup, we are limiting the generalizability of our results to the general population.

CONCLUSION

In patients with high ED utilization rates, ED avoidance during COVID-19 was common especially among parents of patients with concern for their child contracting COVID-19 during an ED visit. On the other hand, parents of patients with an underlying malignancy or hematologic disease were less likely to avoid the ED. While some parents resorted to messaging or calling their doctors, telemedicine was underutilized in our setting. Developing strategies to reduce or counter negative impact of ED avoidance in parents of pediatric patients is essential to ensuring access to acute care for children during pandemics.

DECLARATIONS

Ethics approval and consent to participate: Participants were consented to participate verbally, and ethical approval was obtained from the Institutional Review Board at our institution under the ID number SBS-2020-0214. Confidentiality was guaranteed by removing all patient identifiers from the database after data collection.

Conflicts of Interest & Funding: The authors declare no conflicts of interest or sources of funding.

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