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Original Research

# Determinants and Prevalence of Paediatrics Return Visits to the Emergency Department in a Tertiary Hospital in Southeast Nigeria: A Retrospective Study

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## Abstract

**Background**: Pediatric Emergency Department (ED) return visits are an essential quality indicator, assessing the adequacy of care provided during the initial consultation, patient management, and subsequent follow-up. Despite the high burden of pediatric emergency cases, there is paucity of data on the prevalence and determinants of return visits in Nigeria. This study therefore aims to determine the prevalence and determinants of pediatric return visits to the ED in a tertiary hospital in Southeast Nigeria.

**Methods**: A retrospective review of medical records was conducted for pediatric patients who visited the ED of the National Obstetric Fistula Center (NOFIC) Abakaliki Ebonyi State, from September 2022 to August 2023. Data on demographics, presenting complaints, diagnoses, investigations, and treatments from initial and return visits were collected and analyzed. Statistical analyses were performed to determine the prevalence of return visits and explore associations with factors such as age, sex, type of caregiver, number of diagnoses, and duration of admission.

**Results**: Among 181 pediatric patients, 19 (10.5%) had a return visit to the ED. Most of these patients were 0-5 years old (80.7%), with a slightly higher proportion of males (56.9%). The most reported symptoms were fever (77.3%) and vomiting (44.8%), with malaria being the predominant diagnosis at both initial (65 cases) and return visits. Although male children (68.4%) and those with multiple diagnoses had higher return rates, statistical analysis revealed no significant associations between return visits and the examined variables.

**Conclusion**: The 10.5% prevalence of pediatric return visits to the ED is a clear indicator of the complex relationship between illness severity, the quality of care provided and the health-seeking behavior of care givers in a resource limited health care facility. The study helps to understand some causes of return visits and develop strategies to reduce their occurrence.

**Keywords**: Pediatric Emergency Care; Return Visits; Prevalence; Malaria; Nigeria.

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## Introduction

Pediatric Emergency Departments (EDs) are essential components of healthcare systems, providing critical care to children with acute illnesses or injuries. In low- and middle-income countries (LMICs) like Nigeria, pediatric EDs often face significant challenges, including high patient volumes, limited resources, and a diverse range of clinical presentations. [1-3] Despite the crucial role of pediatric EDs, comprehensive data on the patterns and outcomes of pediatric emergency visits is scarce, particularly in sub-Saharan Africa.

Among the critical issues in pediatric emergency care is the occurrence of return visits. A return visit to the emergency department (RTED) is defined as an unscheduled ED visit for same or related complaints within 48hrs to 7days of the index visit and it's a frequent occurrence. [4,5] An overall prevalence of RTED within the pediatric EDs ranges from 2.7 to 8.1 as observed from studies in the US, Canada and UK. [4,6-8] RTED can signal inadequacies in initial care, progression of disease, or issues related to patient management and follow-up. [9] Return visits to the ED are an important quality indicator and a measure of the effectiveness of healthcare delivery.

These visits can result from various factors, including the initial condition's severity, the initial diagnosis's accuracy, the treatment appropriateness, and the patient's or caregiver's adherence to follow-up care instructions. Studies in high-income countries have identified several factors associated with pediatric return visits to the ED, including younger age, male gender, specific diagnoses such as respiratory infections or gastrointestinal disorders, and the presence of co morbidities. [1-3] However, the application of these findings to LMICs, where healthcare systems and disease patterns differ significantly, is not well established.

Nigeria, the most populous country in Africa, faces substantial challenges in its healthcare system, particularly in pediatric care. The burden of infectious diseases, malnutrition, and limited access to healthcare services contribute to high rates of morbidity and mortality among children. The World Health Organization (WHO) has highlighted that healthcare facilities in many parts of Nigeria are under-resourced, with inadequate staffing, poor infrastructure, and limited access to essential medicines and diagnostic tools. [9]

These challenges are particularly pronounced in emergency care settings, where timely and accurate diagnosis and treatment are critical to patient outcomes. The hospital's pediatric ED is a critical access point for acute care, but it is also a setting where the limitations of the healthcare system are starkly evident. In this environment, understanding the factors that contribute to return visits to the ED is essential for improving quality of care and patient outcomes.

The literature on pediatric ED visits in Nigeria is sparse, with most studies focusing on specific conditions or patient populations rather than a comprehensive analysis of return visits. For instance, studies have reported on the prevalence and outcomes of conditions such as malaria, respiratory infections, and diarrhea, which are common causes of pediatric morbidity and mortality in Nigeria. [10,11,4]

However, there is a significant gap in the literature regarding the overall prevalence of return visits to pediatric EDs and the determinants of these visits in the Nigerian context. This gap is particularly concerning given the high burden of disease and the challenges associated with managing pediatric emergencies in resource-limited settings.

The rationale for this study is grounded in the need to fill this gap in the literature by providing a detailed analysis of the prevalence and determinants of pediatric ED return visits in a tertiary hospital in Southeast

Nigeria. By identifying the factors associated with return visits, this study aims to inform strategies for improving the quality of care in pediatric emergency settings, with the goal of reducing preventable morbidity and mortality among children.

Return visits to the ED are often seen as a proxy for suboptimal care during the initial visit, either due to an incorrect or incomplete diagnosis, insufficient treatment, or inadequate follow-up care. In high-income countries, studies have shown that return visits are associated with a range of factors, including patient demographics, the nature of the presenting complaint, and the quality of care provided during the initial visit. [5,12,13] However, in LMICs, where healthcare resources are constrained and disease patterns differ, the factors contributing to return visits may be more complex and multifaceted. For example, in Nigeria, where malaria remains endemic and access to healthcare is often limited, the patterns of pediatric ED return visits may reflect broader systemic issues such as delayed diagnosis, limited access to appropriate medications, and challenges in patient follow-up. [7,14]

Moreover, the high prevalence of infectious diseases in Nigeria, particularly among children, presents additional challenges in managing pediatric emergencies. Malaria is a leading cause of pediatric morbidity and mortality in Nigeria, and it is frequently associated with complications that can lead to return visits to the ED. In this context, managing malaria and other infectious diseases in pediatric patients is critical, and any gaps in care during the initial ED visit can have serious consequences. [8,15] Therefore, understanding the specific challenges associated with managing these conditions in the pediatric ED setting is essential for improving care quality and reducing the frequency of return visits.

Another important consideration is the role of caregiver factors in pediatric ED return visits. In many cases, the decision to return to the ED is influenced by the caregiver's perception of the child's condition, as well as their ability to follow medical advice and access follow-up care. In Nigeria, where many families live in rural areas with limited access to healthcare facilities, caregivers may face significant barriers to obtaining timely and appropriate care for their children. These barriers can include transportation difficulties, financial constraints, and a lack of understanding of the importance of follow-up care. [16] As a result, even when appropriate care is provided during the initial ED visit, challenges in follow-up care can lead to a higher likelihood of return visits. In addition to these caregiver factors, healthcare system-related factors also play a critical role in pediatric ED return visits.

In Nigeria, healthcare facilities often face challenges related to staffing, infrastructure, and access to essential medications and diagnostic tools. These challenges can impact on the quality of care provided during the initial ED visit, leading to suboptimal outcomes and a higher likelihood of return visits. For example, studies have shown that healthcare facilities in many parts of Nigeria are understaffed, and healthcare workers are often overburdened, leading to delays in diagnosis and treatment. [17,18] Furthermore, the lack of access to essential diagnostic tools and medications can limit the ability of healthcare providers to accurately diagnose and effectively treat pediatric patients during their initial visit to the ED.

This study therefore broadly aims to determine the prevalence and likely determinants of return visits to the pediatric emergency department, identify populations at risk and proffer solutions to reduce return visits at the National Obstetrics Fistula Center Abakaliki Ebonyi State South East Nigeria. The specific objectives are to determine the prevalence of return visit to the children ED of a tertiary center; ascertain the determinants of return visits, populations at risk and proffer solutions to reduce return visits in our children ED; determine the commonest symptom and diagnosis in the children ED in our center and determine the quality of care at the initial visit for the patients with early return to the hospital after discharge

This study will also provide valuable insights into the factors contributing to pediatric ED return visits in a resource-limited setting there by, informing targeted interventions to improve the quality of care provided in pediatric EDs in Nigeria. Furthermore, this study will contribute to the broader literature on pediatric emergency care in LMICs.

## Materials and Methods

### Study design and duration

This retrospective study spanned 12 months, from September 1, 2022, to August 31, 2023. This timeframe was chosen to ensure sufficient sample size and to account for potential seasonal variations in disease patterns and healthcare utilization.

### Study Participants

The study included all pediatric patients (aged 2months-18 years) who presented to the ED during the study period.

### Inclusion criteria

Patients that had an initial ED visit during the study period; patients that had at least one subsequent return visit to the ED within seven days of the initial visit; and patients whose medical records were complete and available for review.

### Exclusion criteria

Patients who returned more than seven days after the initial ED, patients with chronic conditions requiring frequent ED visits

### Ethical clearance

Ethical clearance was obtained from the ethical committee of the hospital.

### Case Ascertainment and Control Selection

This study defined cases as pediatric patients with at least one return visit to the ED within seven days of their initial visit. The rationale for selecting these 7 days was based on previous studies, which have shown that most return visits occur within this time frame. The control group consisted of pediatric patients with a single ED visit during the study period without any return visit within seven days. Matching criteria were applied to control for potential confounding variables. Cases and controls were matched based on age, gender, and the primary diagnosis at the initial ED visit.

### Variables

The primary outcome of interest was a return visit to the ED within seven days of the initial visit. The primary exposures and predictors included patient demographics (age, gender), clinical characteristics (primary diagnosis, severity of the condition, presence of comorbidities), and treatment-related factors (type of treatment provided, whether follow-up care was advised). Potential confounders included the time of day of the initial visit (daytime vs. nighttime), the day of the week (weekday vs. weekend), and the availability of healthcare resources (staffing levels, availability of diagnostic tools). These variables were selected based on previous research suggesting they influence the likelihood of return visits. Diagnostic criteria for the primary conditions seen in the ED were based on the hospital's standard clinical protocols aligned with national and international guidelines. These criteria were used to classify the primary diagnosis and assess the presenting condition's severity.

### Data collection methods

Data was secured from hospital files and medical records, providing detailed information on patient demographics, clinical presentations, treatments received, and outcomes consecutively over one year. The

accuracy of the data was ensured by cross-referencing medical records with other available documentation, for example manual documentations from the children emergency notebooks. Each variable of interest was meticulously recorded, with data collection procedures standardized to ensure consistency.

**Bias**

Several strategies were employed to minimize bias in the study. Selection bias was addressed by applying strict inclusion and exclusion criteria, ensuring that the study population was representative of the broader pediatric population seen in the ED. Information bias was minimized through standardized data collection methods and the cross-verification of data sources. Recall bias was not a significant issue in this study, as all data were extracted from medical records rather than relying on patient or caregiver recall.

**Statistical Methods**

All statistical analyses were conducted using SPSS software (version 26.0). Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population, with means and standard deviations reported for continuous variables and frequencies and percentages reported for categorical variables. To control confounding, multivariable logistic regression models were used to assess the association between various predictors and the likelihood of a return visit. The models included variables such as age, gender, primary diagnosis, and the severity of the condition, with adjustments made for potential confounders identified during the study design phase. Subgroup analyses were performed to examine whether the association between certain predictors and return visits differed by specific patient characteristics, such as age or diagnosis. For example, separate models were run for different age groups to determine whether younger children were more likely to have a return visit than older children. Missing data was handled using multiple imputations, ensuring incomplete records did not bias results. The imputation model included all variables used in the primary analysis, and sensitivity analyses were performed to assess the impact of missing data on the study findings. For matched cases and controls, conditional logistic regression accounted for the matched design. This method allowed for comparing cases and controls while controlling for the matching variables, ensuring that the results reflected the true association between the predictors and return visits. Sensitivity analyses were conducted to assess the robustness of the findings. These included analyses excluding certain subgroups (e.g., patients with incomplete follow-up data) and analyses using alternative definitions of return visits (e.g., return visits within seven days). The results of these sensitivity analyses were consistent with the main findings, suggesting that the conclusions drawn from the study were robust and not unduly influenced by specific assumptions or data handling decisions.

## Results

The demographic variables and prevalence of return visits is shown in Table 1. There were 181 participants, with (80.7%) 0-5 years old. Male were 56.9% of the population, and 95% were cared for by their mothers. The prevalence of return visits was 10.5%, with 19 children returning.

**Table 1: Demographic Characteristics and Prevalence of Return Visits to Children's Emergency Department**

| **Variable** | **Frequency (n=181)** | **Percentage** |
|---|---|---|
| **Age** (Years) | | |
| 0-5 | 146 | 80.7 |
| 6-12 | 27 | 14.9 |
| 13-18 | 8 | 4.4 |
| **Sex** | | |
| Male | 103 | 56.9 |
| Female | 78 | 43.1 |
| **Caregiver** | | |
| Mother | 172 | 95.0 |
| Father | 4 | 2.2 |
| Parents | 2 | 1.1 |
| Others | 3 | 1.7 |
| Return to ED | Frequency (n=181) | Percent |
| Yes | 19 | 10.5 |
| No | 162 | 89.5 |

## Common Diagnoses and Complaints

The common diagnosis and presenting complaints of the patients is shown in Figure 1. Malaria was the most prevalent diagnosis at both visits, emphasizing its significant burden on the pediatric population in the region. Meningitis and Respiratory infections were the next most frequent causes of initial and return visits.

Figure 2 displays the diagnoses made among all study participants. Malaria was the most common diagnosis, reflecting its endemic nature in the region and its significant impact on the pediatric population. Other diagnoses, though less common, are as shown in Figure 2.

Figure 3 presents the most common complaints reported by patients at both the initial and return visits. The analysis showed that fever was the most frequently reported complaint, followed by diarrhea, referred to as "watering stool."

The spectrum and pattern of symptoms for the participants who were hospitalized is shown in Figure 4. Fever was the most common symptom, reported by 77.3% of the participants, followed by vomiting, which was reported by 44.8%.

The determinants of return visits are displayed in Table 2. More returns were observed within the 0-5-year-old age group. Also, more male children (68.4%) returned to the ED. Patients diagnosed with more than one condition had a higher prevalence of return visits than those with a single diagnosis. The observations were, however, not statistically significant.

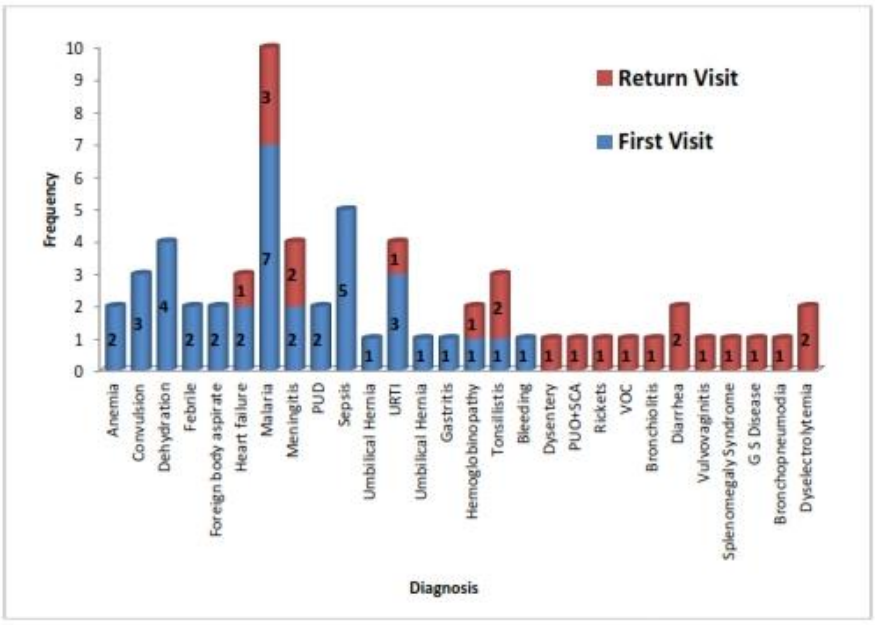


**Figure 1: The pattern of diagnosis for initial and return visits in the study participants**

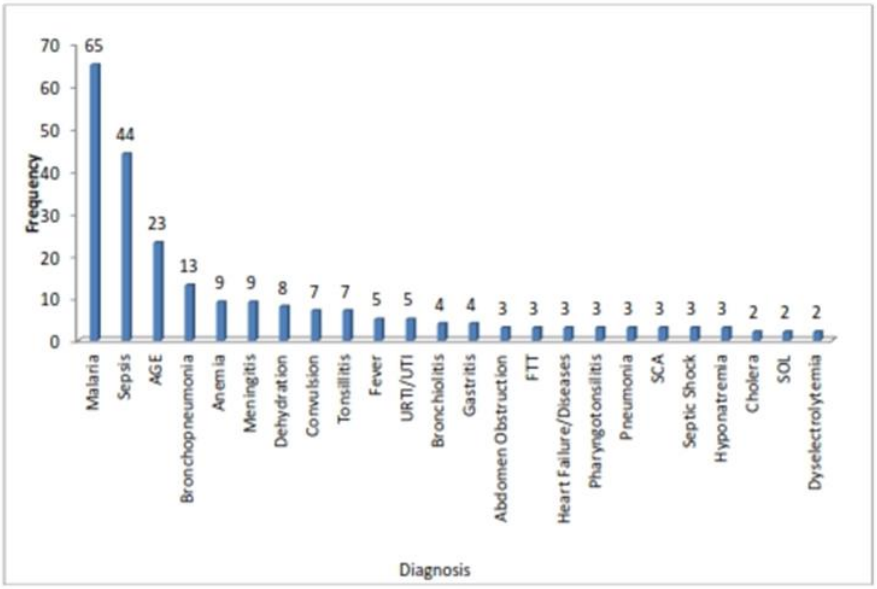


**Figure 2: displays the diagnoses made among all study participants.**

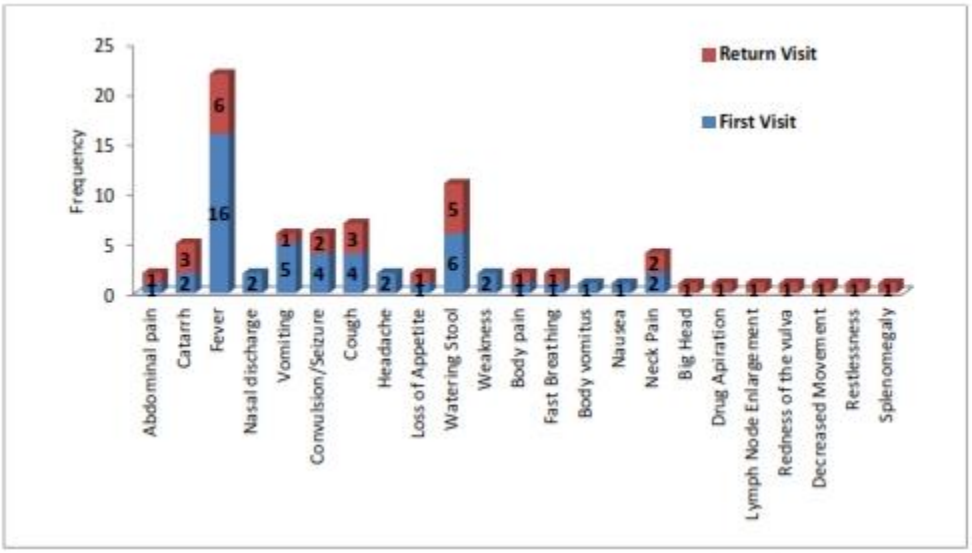


**Figure 3: Showing pattern of presenting complaints of participants at first and return visits**

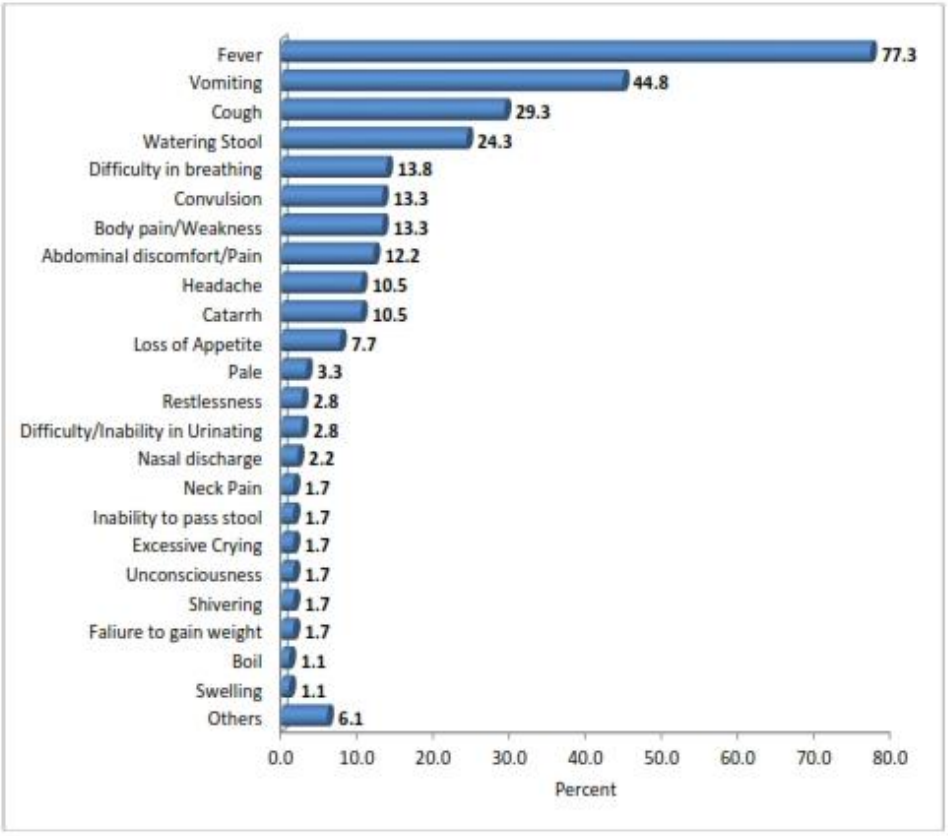


**Figure 4: spectrum and pattern of symptoms for the participants who were hospitalized**

**Table 2: The determinants of return visits.**

| Variable | Return Visit | | Fisher's Exact | p-value |
|---|---|---|---|---|
| | Yes | No | | |
| **Age (years)** | | | | |
| 0-5 | 15(78.9) | 131(80.9) | 1.033 | 0.597 |
| 6-12 | 4(21.1) | 23(14.2) | | |
| 13-18 | 0(0.0) | 8(4.9) | | |
| **Sex** | | | | |
| Male | 13(68.4) | 90(55.6) | 1.148 | 0.335 |
| Female | 6(31.6) | 72(44.4) | | |
| **Caregiver** | | | | |
| Mother | 18(94.7) | 154(95.1) | 1.647 | 0.640 |
| Father | 1(5.3) | 4(2.5) | | |
| Parents | 0(0.0) | 2(1.2) | | |
| Others | 0(0.0) | 2(1.2) | | |
| **Number of Diagnosis** | | | | |
| One | 5(22.2) | 26(16.1) | 1.048 | 0.629 |
| Two | 7(38.9) | 61(37.7) | | |
| Above two | 7(38.9) | 75(46.2) | | |
| **Duration of Admission (year)** | | | | |
| 1-7 | 17(89.5) | 143(88.3) | 0.491 | 0.831 |
| 8-14 | 2(10.5) | 13(8.0) | | |
| >14 | 0(0.0) | 6(3.7) | | |
| **Doctor's Category** | | | | |
| Consultant | 1(5.3) | 17(10.5) | 0.450 | 0.924 |
| Consultant +MO | 10(52.6) | 80(49.4) | | |
| Consultant +MO+SR | 8(42.1) | 61(37.7) | | |
| SR or MO | 0(0.0) | 4(2.5) | | |

The clinical Investigations requested during the initial and return visits are shown in figure 5. Full blood count, Malaria parasite screening and serum electrolytes urea and creatinine were the most frequent investigations requested.

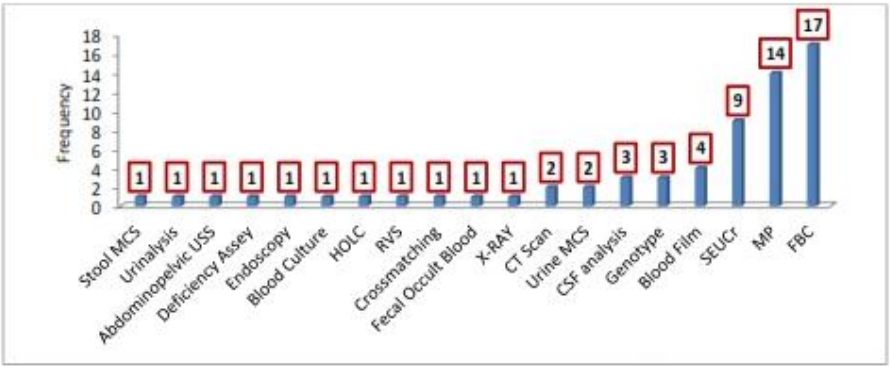


**Figure 5: The investigations carried out during the initial visits for patients who eventually returned to the ED.**

## Discussion

This study evaluated the prevalence and determinants of pediatric return visits to the Children's Emergency Department (ED) in a tertiary center in, South East Nigeria.

As illustrated in Table 1, most study participants were children between 0-5 years, accounting for 80.7% of the population. These findings align with previous research indicating that younger children are more vulnerable to health complications requiring repeated medical attention. [1,2]

The gender distribution showed a slight male predominance, with 56.9% of the participants being male. Additionally, an overwhelming 94.2% of these children were under the care of their mothers, emphasizing the critical role mothers play in the healthcare of children in this region. The study found that the prevalence of return visits to the Children's Emergency Department (ED) was 10.5%. This is higher than the overall prevalence of 2.7 to 8.1 of RTED observed from studies in the US, Canada and UK. [4,6-8,19]

This higher return rate suggests that some pediatric populations experienced ongoing or unresolved health issues requiring further medical attention. The data highlights the need for improved initial treatment protocols and closer follow-up to reduce the likelihood of return visits and enhance patient outcomes.

The most common diagnoses at both the initial and return visits were complicated malaria, and other infectious diseases such as meningitis, respiratory infections and heart failure. The high prevalence of complicated malaria as a diagnosis especially during the initial visits underscores the ongoing burden of this disease in Nigeria reflecting its endemic nature in the region and its significant impact on the pediatric population. It also suggests potential challenges in the initial treatment and management of malaria before hospital presentation such as poorly treated malaria which may lead to drug resistance or issues with treatment adherence. [3,9]

Further analysis of other diagnoses among all the patients though less common, included appendicitis, asthma, brain injury, cellulitis, cerebral anoxia, enteritis, gastroenteritis, hernia, laryngomalacia, septicemia, and vasocclusive crises (VOC) in a sickle cell anemic patient. The diverse range of diagnoses highlights the complexity of cases managed in the Children's ED and the need for a broad differential diagnosis when evaluating pediatric patients. The study also found that certain diagnoses were only made once among the participants, suggesting that these conditions were relatively rare in this population. These diagnoses included hyperactive airways, intracranial hemorrhage (ICH), inadequate food intake, intussusception, osteomyelitis, pertussis, psychosis, peptic ulcer disease (PUD), pyelonephritis, acute kidney injury (AKI), arthritis, electrolyte imbalance, food poisoning, fungal dermatitis, hemiplegia, hemoglobinopathy, hypovolemic shock, seizure disorder, aspiration pneumonitis, bleeding, hypertrophic pyloric stenosis, hysteria, peritonitis, stroke, and typhoid perforation. Identifying these diagnoses underscores the need for vigilance and a thorough diagnostic approach in the ED, as even uncommon conditions can have significant implications for patient outcomes.

The persistence of low-grade fever as the most common complaint in return visits further highlights the need for effective caregiver counseling and outpatient follow up for febrile illnesses in children. Despite these associations, the relationships were not statistically significant, indicating that while certain trends were observed, they were not strong enough to conclusively determine specific risk factors for return visits.

The study also explored the relationship between the number of diagnoses and the likelihood of return visits. Patients diagnosed with more than one condition had a higher prevalence of return visits than those with a single diagnosis though not statistically significant. This finding suggests that children with

multiple health issues are at greater risk of experiencing complications that necessitate further medical evaluation and treatment.

The investigations performed in the subjects aimed to identify the underlying causes of the symptoms reported by the patients to provide appropriate treatment to prevent future complications. Despite these efforts, the persistence of some symptoms in return visits suggests that there may be gaps in the initial diagnostic process, the subsequent management of these conditions, counseling to alley caregiver anxiety and possibly lack of adherence to treatment by caregivers.

Understanding the factors associated with these return visits is crucial for improving patient care, reducing healthcare costs, and optimizing resource allocation in emergency departments. Other determinants of return visits in this study include parental refusal of admission and treatment on the first visit due to cost, the natural history of the disease, parental anxiety, different symptoms from initial visits, follow-up, aspiration of drugs prescribed on discharge from the first visit, and vomiting of oral medications. Some of the Solutions proffered included but were not restricted to proper counseling of parents on discharge about the natural history of the illness to alleviate parental anxiety. Counseling against force-feeding to prevent drug aspiration, and it was advised that drugs be given with syringes, administered in juice containers, or given one hour before or after feeding. Additionally, there is a need for community awareness and sensitization on the common diseases attributed to return visits, training and retraining of healthcare workers on managing pediatric emergency cases, and adequate health sector funding. Consistent with the endemic nature of malaria in our region, the most common diagnosis was malaria, followed by sepsis and acute gastroenteritis. This emphasizes the imperative of concerted efforts to combat infectious diseases in our locale. However, the modes and choices of treatment should undergo scrutiny to enhance the efficiency of initial visits. The high prevalence of self-medication in Africa may contribute to the development of resistant strains, amplifying the burden on patients and caregivers and necessitating a reevaluation of treatment strategies. A commendable aspect of our findings is the involvement of consultant pediatricians during the initial visit for most of the children. This approach signifies a positive trend in pediatric emergency care, especially in resource-limited settings where a scarcity of specialist manpower poses a challenge. Additionally, the quality of care is reflected in the thoroughness of basic investigations, exemplified by most children receiving a full blood test result during their first visit. This comprehensive approach facilitates the accurate diagnosis and management of pediatric cases and underscores the commitment to providing high-quality care in emergency settings.

**Limitations**

Firstly, the study was conducted in a single healthcare facility, which may limit the generalizability of the findings to other regions or healthcare settings. The healthcare-seeking behaviors, disease prevalence, and management protocols may differ in different areas, affecting the external validity of the study results. Secondly, the study relied on retrospective data, which may be subject to biases inherent in medical record-keeping. Additionally, the study did not account for certain potential confounders, such as socioeconomic status, distance to the hospital, and availability of healthcare resources, which could influence the likelihood of return visits. Despite these limitations, the study provides important insights into the characteristics of children who are more likely to return to the ED, which can inform targeted interventions to reduce the rate of return visits. For example, healthcare providers could implement more rigorous follow-up protocols for younger children and those with multiple diagnoses to ensure they receive the necessary care to prevent complications and reduce the likelihood of return visits.

## Conclusion

This study provides valuable insights into the prevalence and determinants of pediatric return visits to the Children's ED. The findings suggest that younger children, particularly those aged 0-5 years and those with multiple diagnoses, are more likely to return to the ED, although these associations were not statistically significant. Malaria and febrile illnesses were the most common diagnoses and complaints at both initial and return visits, highlighting the need for effective management strategies for these conditions. The study's limitations includes its reliance on retrospective data, small sample size, and potential biases. Future research should address these limitations and explore additional factors that may contribute to return visits to the ED. Despite these limitations, the study provides important insights that can inform targeted interventions to improve patient care and reduce the burden of return visits on the healthcare system.

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