Evaluation of Wait Time in the Children's Emergency and Outpatient Units of a Tertiary Hospital in Southeast Nigeria

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Abstract

Background: Promptness of intervention in the emergency room (ER) or outpatient unit is a major determinant of outcome in acutely ill children. Time is, therefore, of the essence in trying to reduce complications and mortality associated with children. Methods: This was a cross-sectional study conducted in the children ER and the children outpatient unit of the Enugu State University Teaching Hospital (ESUTH), Enugu, Southeast Nigeria. Waiting time defined as the time between arrival and doctor consultation was calculated. Results: A total of 248 respondents were enrolled during the study period. In the emergency unit, majority (67.5%) of the respondents’ sick children were attended to almost immediately, while 13.3% and 19.3% waited for ≤10 and >10 min, respectively, before being attended to by a doctor. The mean waiting time in the emergency unit was approximately 9.27 ± 29.2 min (95% confidence interval [CI]: 2.90–15.65 min) with a range of 0–56 min. In the outpatient unit, the mean waiting time was 12.67 ± 15.3 min (95% CI: 10.31–15.01 min) with a time range of 5–245 min. Eighty-five (51.5%) of the 165 respondents waited for <10 min, 60 (36.4%) waited for between 10 and 30 min, while 20 (12.1%) waited for >30 min before their sick children were attended by a doctor. Conclusion: The mean waiting times reported in this study in the emergency and outpatient units of the ESUTH were within acceptable standards. However, there were cases where the waiting time in both children's units was exceptionally long. There is need for continued monitoring and evaluation of waiting times in these units for prompt attention to patients.

Keywords: Children, emergency and outpatient unit, Enugu, waiting time

Introduction

Background
The emergency department, also known as emergency room (ER), is the entry point for most acute unplanned visits to the hospital. The ER offers medical services for a wide spectrum of illnesses that cut across medical specialties, and it serves as a referral point for most emergencies. Because of the life-threatening nature of injuries and illnesses seen in the ER, immediate medical attention is generally expedient. Time is, therefore, of the essence in every emergency scenario, especially in pediatric units. It is well documented that prolonged waiting time reduces the quality of care rendered to patients and can increase adverse outcomes as well as patient dissatisfaction in the ER.[1,2] The waiting time in ERs of many hospitals in developed countries is reviewed periodically to enhance efficiency and reduce mortality. The updated waiting time is well publicized to help inform patient’s decision with regard to the choice of hospital in emergencies. In Northern Ireland, for instance, quarterly emergency department waiting time targets are set and emergency departments are expected to attain these targets.[3] According to the Standards for Children and Young People in Emergency care settings, it was recommended that an initial clinical assessment of children and young persons in an emergency should occur within 15 min of arrival, and a system of prioritization for full assessment must be put in place if the waiting time exceeds 15 min.[4]
There has not been any study that assessed waiting time in any health facility in Nigeria. This study was, therefore, conducted to assess the waiting time of children who presented to the children emergency and children outpatient (CHOP) units of a tertiary health-care facility in Enugu, Nigeria. This tertiary health facility was chosen because it serves as a referral center for children in Enugu state and other states in the southeastern region. It is hoped that the findings of this study will help stimulate policies in the hospital to minimize waiting time and ensure quality health-care delivery in the emergency and outpatient departments of hospitals in Nigeria.

**Objectives**

1. To evaluate the waiting time of children who presented to the children emergency unit of a tertiary health-care facility in Enugu, Nigeria
2. To evaluate the waiting time of children who presented to the outpatient unit of a tertiary health care facility in Enugu, Nigeria
3. To determine the factors that influence the waiting time in the children emergency unit of a tertiary health-care facility in Enugu, Nigeria
4. To determine the factors that influence the waiting time in the outpatient unit of a tertiary health-care facility in Enugu, Nigeria.

**Methods**

**Study design**

This was a hospital-based, cross-sectional study conducted over 3 months (May–July 2017) in the children emergency room (CHER) and children outpatient (CHOP) units of the Enugu State University Teaching Hospital (ESUTH) in Southeast Nigeria.

**Study setting**

This tertiary health facility serves as a referral center offering specialized medical services to residents in Enugu state and its environs. The CHER is a 14-bedded unit that runs a 24-h schedule and is staffed each day by different teams of three pediatric residents, a consultant pediatrician, and two pediatric nurses on a rotational basis. The ER offers specialized emergency services to children aged 2 months to 18 years. The South African Triage Scale is the triage system practiced in the ER. Patients and their caregivers are mainly responsible for the procurement of drugs and other items used for the treatment in CHER. The volume of patient seen in the children emergency varies between 120/month during peak period and 60/month during off-peak period. The CHOP is the outpatient clinic for children in the same age bracket. It opens between 8 am and 4 pm from Monday to Friday. It comprises a nurse’s station where vital signs and other documentations of patients are done before being sent to the doctor’s room. The number of patients attended to in the CHOP varies between 100 and 200/month during off-peak and peak periods, respectively. Different teams of doctors run the pediatric outpatient clinic on specific days of the week. Aside from drug prescriptions and minor surgical procedures such as wound dressing, no major medical treatment or procedures are carried out in the outpatient department. Patients are immediately referred to the ER if there is need for in-patient care.

**Study participants**

This study mainly focused on the waiting time of the patients from presentation to the emergency and outpatient unit to being attended by a doctor. Parents and/or caregivers who brought their children to the ER were consecutively enrolled using purposive sampling method after informed consent to participate in the study was obtained. Parent who declined to participate in the study were excluded. A structured questionnaire adapted from a similar study in the pediatric ER of the Hadassah Ein Kerem Hospital was used for data collection. Following presentation to the emergency or outpatient units, trained research assistants were made aware of the new potential participants. The waiting time defined as the time difference between arrival to these units and when a doctor attended to them where noted in all cases. The questionnaires were administered by trained research assistants.

**Variables**

Apart from noting the arrival and intervention time in the emergency or outpatient units, we collected other demographic information from the respondents, such as age, sex, gender, marital status, educational level, and occupation of parents or caregivers, principal complaint of the sick child, and if respondents were given any information on estimated waiting time. Other information obtained was the source of referral categorized as medical (doctor, pharmacist, and qualified nurses) and nonmedical (self, friends, and relatives) and means of transportation to the hospital categorized as ambulance, public, and private means.

**Bias**

For respondents in the emergency unit, a period of time (usually within 8–12 h) was allowed for necessary management and stabilization of the sick child by the medical team on-call before questionnaires were administered. This was done to allow the caregivers recover from the initial stress of the ER visit. In cases where the caregiver was not emotionally or psychologically prepared to answer questions, more time was given for recovery after which they are re-approached for questioning.

**Study size**

The study size was determined by the duration of the study and the number of respondents who gave consent to participate in the study.

**Statistical methods**

Raw data collected from questionnaires were analyzed using IBM® SPSS version 22.0 (SPSS Inc., Chicago, IL, USA). Waiting time was calculated using mean and standard deviation. Student’s t-tests and analysis of variance where appropriate were used to compare mean waiting times between
subcategories of the respondents. Results were presented in percentages and confidence intervals (CIs). Statistically significant value was set at a \( P < 0.05 \).

**RESULTS**

**Participants**

Of the 196 children who were seen in the CHER and the 321 attended to in the CHOP section during the study period, 83 and 165 parents and/or caregivers, respectively, consented to participate in the study and were successfully enrolled giving a response rate of approximately 48%. The low response rate in the CHER was mostly due to the acute nature of illnesses presenting to CHER causing most parents to decline participation even after the window period of recovery was given.

**Descriptive data**

Table 1 shows a summary of features of the respondents whose children were seen in the children's emergency and outpatient units of the ESUTH during the study period. Respondents interviewed in the emergency department were mostly above 30 years (55.4%) and predominantly females (86.7%). Roughly, a third had university or higher education (37.3%) and a similar proportion had postprimary education (33.7%) or had completed primary education or less (28.9%). Approximately 40% of the respondents were from the middle socioeconomic class while 32.5% and 27.7% belonged to the high and low socioeconomic classes, respectively. Thirty-four (41.0%) of the respondents who presented with their sick children to the emergency unit were referred to the unit by medical personnel, while the remaining 51% were either self-referrals or referred by friends and family. Over two-thirds (73.5%) of the respondents reached the emergency unit using public transport while the other 22 (26.5%) via private means of transportation. None were via ambulance. Fever was the most common (48.2%) principal complaint in children presenting to the emergency unit during the study period.

In the CHOP unit, majority of the respondents were between 31 and 40 years old. Male: female ratio is approximately 1:6 and about 90% had at least postprimary education. Close to half (47.3%) were of the low socioeconomic strata. Only about 15% of the respondents were referred to the outpatient unit by medical personnel. Majority of the sick children in the outpatient unit were seen by a resident doctor (84.2%), while 10.3% and 1.2% were seen by a house officer and consultant pediatrician, respectively. Seven (4.2%) did not know the designation of the doctor they first met in the outpatient unit. Similar to the findings in the emergency unit, fever (62.4%) and

| Table 1: Characteristics of respondents in the children emergency and outpatient department of the Enugu State University Teaching Hospital |
|-----------------|-----------------|
| **Variables** | **Frequency (%)** | **Variables** | **Frequency (%)** |
| **CHER** | | **CHOP** | |
| **Age of respondents (years) (n=83)** | | **Age of respondents (years) (n=165)** | |
| <20 | 22 (22.5) | ≤20 | 40 (24.2) |
| 20-30 | 15 (18.1) | 21-30 | 22 (13.3) |
| >30 | 46 (55.4) | 31-40 | 59 (35.8) |
| **Sex of respondents (n=83)** | | >40 | 44 (26.7) |
| Male | 11 (13.3) | Male | 25 (15.2) |
| Female | 72 (86.7) | Female | 140 (84.8) |
| **Maternal education (n=83)** | | **Maternal education (n=165)** | |
| University or higher | 31 (37.4) | University or higher | 74 (44.8) |
| Postprimary | 28 (33.7) | Postprimary | 74 (44.8) |
| Primary or lower | 24 (28.9) | Primary or lower | 17 (10.4) |
| **Socioeconomic class (n=83)** | | **Socioeconomic class (n=165)** | |
| High | 27 (32.5) | High | 38 (23.0) |
| Middle | 33 (39.8) | Middle | 49 (29.7) |
| Low | 23 (27.7) | Low | 78 (47.3) |
| **Referral source (n=83)** | | **Referral source (n=165)** | |
| Medical personnel | 34 (41.0) | Medical personnel | 26 (14.5) |
| Nonmedical personnel | 49 (59.0) | Nonmedical personnel | 149 (85.5) |
| **Wait time in CHER (n=83)** | | **Wait time in CHOP (n=165)** | |
| None | 56 (67.5) | ≤10 min | 85 (51.5) |
| ≤10 min | 11 (13.3) | 10-30 min | 60 (36.4) |
| >10 min | 16 (19.2) | >30 min | 20 (12.1) |
| **Patient informed of EWT (n=27)** | | **Patient informed of EWT (n=165)** | |
| No | 25 (92.6) | No | 153 (92.8) |
| Yes | 2 (7.4) | Yes | 12 (7.2) |

1Management of child commenced immediately. EWT: Estimated waiting time, CHER: Children emergency, CHOP: Children outpatient
cough and catarrh (25.8%) were the most common presenting complaints among the sick children of respondents.

**Main results**

The mean waiting time in the emergency unit was 9.27 ± 29.2 min (95% CI: 2.90–15.65 min) with minimum and maximum waiting times of 0 and 56 min, respectively. On arrival to the unit, majority (67.5%) of the sick children were attended to almost immediately while 13.3% and 19.3% waited for ≤10 and >10 min, respectively, before being attended to by a doctor. No clinical and/or sociodemographic parameters of the respondents were significantly associated with waiting times of >10 min in the ER. Only two (7.4%) of 27 of the respondents who were not attended to immediately were given an estimated waiting time before their child could be seen by a doctor. Table 2 shows the mean waiting times stratified by parameters of interest in this study. Respondents aged 30 years or more (12.1 ± 36.3; \( P = 0.533 \)), male respondents (24.7 ± 71.6; \( P = 0.059 \)), respondents with primary education or less (15.2 ± 45.1; \( P = 0.327 \)), respondents from low socioeconomic class (17.1 ± 48.1; \( P = 0.246 \)), and those referred to the emergency unit by nonmedical personnel (10.5 ± 35.1; \( P = 0.771 \)) had longer mean waiting times compared to respondents in the corresponding categories [Table 2]. Similarly, respondents whose children’s principal presenting complaint was fever (12.8 ± 38.7) had a longer mean waiting time compared with those that presented with convulsion (1.7 ± 2.8), shortness of breath (2.5 ± 3.5), and diarrhea and vomiting (0.0 ± 0; \( F\)-test = 0.311, \( P = 0.905 \)). None of these, however, attained statistical significance. For respondents whose children were not attended to immediately, reasons given for the delay included: Too many patients, 6/27 (22.2%); doctor not around, 2/27 (7.4%); and case not an emergency, 3/27 (11.1%); while no reason was offered to the respondents in over half of the cases, 16/27 (59.3%).

In the outpatient unit, the mean waiting time was 12.67 ± 15.3 min (95% CI: 10.31–15.01 min) with a time range of 5–245 min (~4 h). However, in the unit, 85 (51.5%) of the 165 respondents waited for <10 min before their sick child was seen by a doctor. Sixty respondents (36.4%) waited for between 10 and 30 min, while 20 (12.1%) waited for >30 min to be seen by a doctor. Majority of the respondents (92.8%) were not informed of the estimated waiting time. Similar to what was found in the emergency unit, no maternal sociodemographic factors were significantly associated with waiting times of more than 30 min in the outpatient unit. Some of the reasons given for long waiting times according to the respondents included: Doctors not around, 3/133 (2.3%); too many patients, 89/133 (69.0%); few doctors consulting, 9/133 (6.8%); administrative delays, 13/133 (9.8%); and no reason given in 21/133 (12.1%) of cases. Table 3 shows the mean waiting time of respondents in the outpatient unit stratified into sociodemographic and clinical parameters of interest in this study. Respondents in the 21–30 years of age bracket (15.6 ± 16.8; \( P = 0.472 \)), female respondents (13.1 ± 15.7; \( P = 0.441 \)), respondents with university or higher education (13.3 ± 15.2; \( P = 0.612 \)), respondents in the high socioeconomic class (14.7 ± 15.3; \( P = 0.130 \)), and those referred by nonmedical personnel (12.9 ± 15.4; \( P = 0.529 \)) had longer mean waiting times compared to respondents in the corresponding categories. Furthermore, respondents who had children with main presenting complaints of shortness

| Parameters | Variables | \( n \) | Median (IQR) Waiting time | Mean±SD | F-test | \( P \) |
|------------|-----------|--------|---------------------------|--------|--------|-----|
| Age of respondents (years) (\( n=83 \)) | <20 | 22 | 40.0 (16.5–75.0) | 7.9±20.0 | 0.633 | 0.533 |
| | 20-30 | 15 | 10.0 (3.5–15.0) | 2.5±5.3 | | |
| | >30 | 46 | 15.0 (10.0–25.0) | 12.1±36.3 | | |
| Gender of respondents (\( n=83 \)) | Male | 11 | 15.0 (4.0–185.0) | 24.7±71.6 | 3.667† | 0.059 |
| | Female | 72 | 15.0 (10.0–35.0) | 6.9±14.8 | | |
| Maternal educational status (\( n=83 \)) | University or higher | 31 | 12.5 (6.3–30.0) | 7.7±13.6 | 1.133 | 0.327 |
| | Postprimary | 41 | 10.0 (4.0–20.0) | 4.0±10.2 | | |
| | Primary or less | 11 | 17.5 (13.8–45.0) | 15.2±45.1 | | |
| Socioeconomic class (\( n=83 \)) | High | 27 | 15.0 (6.5–37.5) | 5.4±10.5 | 1.429 | 0.246 |
| | Middle | 33 | 22.5 (10.0–40.0) | 5.6±12.3 | | |
| | Low | 23 | 15.0 (10.0–35.0) | 17.1±48.1 | | |
| Referral source (\( n=83 \)) | Medical personnel | 34 | 15 (10.0–38.0) | 8.2±17.8 | 0.085† | 0.771 |
| | Nonmedical | 49 | 15 (10.0–35.0) | 10.5±35.1 | | |
| Main symptom at presentation (\( n=83 \)) | Fever | 40 | 15 (10.0–30.0) | 12.8±38.7 | 0.311 | 0.905 |
| | Convulsion | 3 | 2.0 (1.5–10.0) | 1.7±2.8 | | |
| | Shortness of breath | 13 | 9 (3.7–12.5) | 2.5±3.5 | | |
| | Diarrhea and vomiting | 16 | Not computable | 0.0±0.0 | | |
| | Others | 11 | 20 (15.0–42.5) | 7.7±17.4 | | |

†-test. IQR: Interquartile range, SD: Standard deviation
of breath (3.3 ± 5.8) and those whose children presented with diarrhea and vomiting (7.5 ± 11.2) had shorter mean waiting times compared with those who presented with other symptoms (F-test = 0.887 P = 0.494). None of these, however, attained statistical significance [Table 3].

**Discussion**

The duration of waiting time varies between and within countries.[15] The ER mean waiting time reported in this study was approximately 9 minutes. This waiting time is long compared to that seen in a similar study in South Africa which reported no wait time in ER for patients between 1 and 13 years.[6] Possible reasons for this disparity may include differences in size, staffing, and hospital policies. Long waiting time has been reported in both developed and developing countries.[1] In the USA, an average waiting time of about 60 and 188 min were found in Atlanta and Michigan, respectively,[7] while 173 and 73 min have been reported in Benin and Ibadan, respectively.[8,9] The waiting time seen in this study is nonetheless within the 15 min recommended by the Standards for Children and Young People in Emergency care settings in the United Kingdom.[10] There is no standard recommendation with regard to ER waiting time for comparison in Nigeria.

The outpatient waiting time also varies across settings, and in the present study, it was approximately 13 min. In comparison, this is shorter than the average total waiting time of 41 and 42 min reported in Malaysia and Vietnam, respectively.[11,12] There were no sociodemographic factors considered in this study that were significantly associated with long waiting times in both the emergency and outpatient units. However, sizable racial/ethnic differences in children’s emergency unit waiting times have been reported by other researchers.[13,14] This current study was done in a predominantly Igbo area. Therefore, further studies in areas with a significant ethnic mix in Nigeria may be necessary.

There were several problems identified from this study that need to be mentioned. The main reasons given for children who were not attended to immediately were related to inadequate staffing, and hospital policies. Long waiting time has been reported in both developed and developing countries.[1] In the USA, an average waiting time of about 60 and 188 min were found in Atlanta and Michigan, respectively,[7] while 173 and 73 min have been reported in Benin and Ibadan, respectively.[8,9] The waiting time seen in this study is nonetheless within the 15 min recommended by the Standards for Children and Young People in Emergency care settings in the United Kingdom.[10] There is no standard recommendation with regard to ER waiting time for comparison in Nigeria.

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**Table 3: Waiting time in the children outpatient unit stratified by clinical and sociodemographic parameters of respondents in the study**

| Parameters                          | Variables                | n  | Waiting time Median (IQR) | F-test | P   |
|-------------------------------------|--------------------------|----|--------------------------|--------|-----|
| Age of respondents (years) (n=165)  | ≥20                      | 40 | 120.0 (60.0-172.5)        | 9.6±13.8 | 0.843 | 0.472 |
|                                     | 21-30                    | 22 | 145.0 (57.4-202.5)        | 15.6±16.8 | 0.597 | 0.494 |
|                                     | 31-40                    | 59 | 120.0 (50.0-180.0)        | 13.2±15.7 | 0.472 | 0.612 |
|                                     | >40                      | 44 | 120.0 (76.3-180.0)        | 13.2±15.2 | 0.494 | 0.441 |
| Gender of respondents (n=165)       | Male                     | 25 | 120.0 (65.0-187.5)        | 10.4±13.2 | 0.597 | 0.441 |
|                                     | Female                   | 140| 120.0 (60.0-180.0)        | 13.1±15.7 | 0.597 | 0.441 |
| Maternal educational status (n=165) | University or higher     | 74 | 120.0 (60.0-180.0)        | 13.3±15.2 | 0.492 | 0.612 |
|                                     | Postprimary              | 74 | 120.0 (65.0-180.0)        | 12.8±15.6 | 0.492 | 0.612 |
|                                     | Primary or less          | 17 | 130.0 (90.0-211.0)        | 10.2±14.9 | 0.492 | 0.612 |
| Socioeconomic class (n=165)         | High                     | 38 | 120.0 (45.0-180.0)        | 14.7±15.3 | 2.670 | 0.130 |
|                                     | Middle                   | 49 | 120.0 (70.0-180.0)        | 12.5±16.9 | 2.670 | 0.130 |
|                                     | Low                      | 78 | 130.0 (80.0-190.5)        | 13.1±18.2 | 2.670 | 0.130 |
| Referral source (n=165)             | Medical personnel        | 24 | 120.0 (60.0-162.5)        | 10.8±14.7 | 0.349 | 0.529 |
|                                     | Nonmedical               | 141| 120.0 (60.0-180.0)        | 12.9±15.4 | 0.349 | 0.529 |
| Main symptom at presentation (n=122)| Fever                    | 58 | 120.0 (60.0-180.0)        | 12.3±15.3 | 0.887 | 0.494 |
|                                     | Diarrhea and vomiting    | 9  | 120.0 (60.0-180.0)        | 7.5±11.2  | 0.887 | 0.494 |
|                                     | Shortness of breath      | 3  | 60.0 (60.0-120.0)         | 3.3±5.8   | 0.887 | 0.494 |
|                                     | Cough and catarrh        | 24 | 102.5 (95.0-180.0)        | 15.5±15.4 | 0.887 | 0.494 |
|                                     | Eye-related problems     | 2  | 110.0 (52.5-190.0)        | 11.1±13.9 | 0.887 | 0.494 |
|                                     | Ear discharge            | 5  | 210.0 (180.0-240.0)       | 20.2±61.3 | 0.887 | 0.494 |
|                                     | Follow-ups               | 21 | 120.0 (52.5-180.0)        | 15.7±56.4 | 0.887 | 0.494 |

*T-test. IQR: Interquartile range, SD: Standard deviation*
delays coupled with household delays (i.e., decision to seek care) further increase the time between illness and receiving appropriate lifesaving management, and this is an important factor influencing patient outcomes.

**Limitation**

First, the inherent limitation of cross-sectional study design means that causality cannot be implied from findings of this study. Furthermore, since we enrolled participants using purposive sampling method, this may have weakened the ability to generalize the findings of this study.

**Conclusion**

The mean waiting times reported in the emergency and outpatient units of the ESUTH were within acceptable standards. There is need for continued monitoring and evaluation of waiting times in these units to improve healthcare services and prompt attention to patients.

**Research quality and ethics statement**

We declare that this scientific work complies with reporting quality, formatting, and reproducibility guidelines set forth by the EQUATOR Network. We also attest that this clinical investigation was determined to determine wait times in children emergency and outpatient unit of the ESUTH. Ethical clearance was obtained from the ESUTH ethical committee before commencement of the study. We also certify that we have not plagiarized the contents in this submission and have done a Plagiarism Check.

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**Conflicts of interest**

There are no conflicts of interest.

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