

## Waiting time analysis in a paediatric outpatient clinic in South East Nigeria

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### ABSTRACT

**Objective:** Waiting time is a resource investment by the patient for the desired goal of being attended to by the physician. It is the time taken or spent in waiting to be attended to by a physician in a health facility. It is important because waiting time is an essential determinant of patient satisfaction in health care practice, and its study would expose the bottleneck areas in patient's time-flow so that the facility can improve services with that regard.

**Materials and Methods:** A cross-sectional study of time spent by paediatric patients in the outpatient department of Alex Ekwueme Federal University Teaching Hospital Abakaliki by secretly following the patients from arrival at CHOP till after consultation. Means were calculated of time spent in various areas.

**Results:** Of the 384 patients observed, the mean (SD) total time spent in the hospital was 142.58 (23.17) minutes while waiting time and consultation time were 113.15(18.01) and 24.43 (10.38) minutes respectively. The mean time spent at the nurse's bay was 23.79 (6.47) minutes, while that spent at the queue was 22.94 (8.98) minutes. The time spent at the records unit was the highest, with a mean time of 47.2 (17.42) minutes.

**Conclusion:** The long waiting time obtained from the current study is mostly attributable to delays from the records/registration unit, therefore concerted efforts aimed at improvement of service delivery in this unit will reduce patient waiting time and invariably patient satisfaction.

**Keywords:** waiting time, outpatient clinic, paediatrics, consultation time, AE-FUTHA

### INTRODUCTION

Ensuring timely access to health care is a major policy concern in Nigeria. A patient time-flow analysis is a process that tracks patient flow, time spent, in addition to the use of personnel time in clinic settings (1). Its usefulness resided in the clarity with which it identified portions of the visit where excessive waits appeared to occur (1). Time-flow studies are used to identify problems in patient flow, as well as personnel needs to improve patients' timely access and continuity of health care. It identifies bottlenecks, system flaws, and hospital protocols that may cause a delay in health care delivery (2).

In 2001, the final report of the Quality of care in America project gave recommendations for improving the health care delivery system (3). Six aims were defined to help improve the quality of health care, and these were outlined in a framework of guiding principles that would help health institutions stay abreast of an increasingly competitive health care market (3). Timeliness was one of these six aims and involved providing timely care to patients that would help reduce harmful delays. Timeliness which is better recognized as waiting time in many literatures, although an understudied aspect of health care has been described as an essential determinant of patient satisfaction in health care practice (4), particularly because long wait times have been found to result in negative perceptions of the quality of services provided in outpatient departments (5,6) and the resultant decrease in patient satisfaction, in turn, may influence the return rate to outpatient departments, an essential element in the treatment of complex and chronic conditions (7).

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The recommendation by the Institute of Medicine (IOM) is that at least 90% of patients should be seen within 30 min of their scheduled appointment time (8). Long waiting time cuts across countries whether developed or developing as several studies have shown that patients spend 2-4 h in the outpatient departments before seeing the doctor (9-13). In the USA, there is an average of 188 min in Michigan (9). Singh et al (10) in Trinidad and Tobago reported an average waiting time of 160 minutes while several studies in Nigeria, reported an average waiting time range from 73-173minutes (11-14).

Time spent waiting is a resource investment by the patient for the desired goal of being attended to by the physician and therefore may be moderated by the outcome. Huang (15) observed that patients appear satisfied if they waited not more than 37 minutes when arriving on time for the appointment and no more than 63 minutes when late for appointments.

Patient's satisfaction is increasingly becoming a yardstick for the measurement of quality of health care delivery. Prolonged waiting time leads to a reduction in patient's satisfaction, increased risk of leaving without being seen by the doctor, and ultimately resulting in poor health outcomes (16). The frustration experienced by patients as a result of prolonged waiting time may explain the reduction in utilization of available health care services as patients seek alternatives to orthodox health care. Goodacre and Webster (17) observed that time of presentation rather than the individual characteristics were the most powerful predictor of waiting time. This finding was corroborated by Bamgboye et al (14) who noted that patients who presented at night and weekends had longer waiting time in the children's emergency room. On the contrary, Ofili and Ofovwé (10) and Ocheet al (13) attributed the long waiting time observed in their studies to large numbers of patients waiting to see relatively few doctors and hospital bureaucratic bottlenecks.

The Paediatrics department of Alex-Ekwueme Federal University Teaching Hospital Abakaliki (AE-FUTHA) is committed to providing children with the highest level of care, a mission that is impossible if patients are not seen in a timely manner. No assessment of waiting time among patients in the paediatrics outpatient department has been done to the best of our knowledge. This study aims to describe the waiting time for patients while identifying the bottlenecks and spots that delay timeliness in health care in the outpatient department.

## MATERIAL AND METHODS

**Study design:** This was a cross-sectional descriptive study

**Study area:** Abakaliki is the capital city of Ebonyi State in the southeastern part of Nigeria. It has an area of 452sq kilometers. The inhabitants are mainly Igbo-speaking though other ethnic groups may be found. The metropolis has a total population of 149,683 inhabitants according to the 2006 census records (18). 57,029 are children and adolescents. Alex Ekwueme Federal University Teaching Hospital Abakaliki(AE-FUTHA) is a tertiary health institution located in Abakaliki the capital of Ebonyi State in Southeast Nigeria. It is the only tertiary health institution in the state that offers paediatric care to Ebonyi indigenes and other persons from nearby states.

The Paediatrics department has the ambulatory unit known as the children outpatient clinic where patients are seen on a daily basis except on weekends. Several paediatric subspecialty clinics hold concurrently in CHOP as follows: Infectious Diseases unit and Adolescent/Social Paediatrics unit on Mondays, Neurology and Endocrinology units on Tuesdays, Paediatric Respiratory, and Gastroenterology units on Wednesdays, Haemato-oncology and Nephrology units on Thursdays while Cardiology unit holds on Fridays. The daily Children Outpatient clinic(CHOP) of AE-FUTHA has an average daily client turnover of 106 clients usually seen by 8 physicians of different cadre averagely. Every year, averages of 19,109 clients are seen. It also has the inpatient unit which consists of the emergency and the non-emergency units. The Children outpatient clinic (CHOP) of AE-FUTHA is open to see patients from 8am to 4pm from Mondays through Friday. However, it most often stays on till 6pm or until the last patient is seen.

The following describes patients flow in CHOP in AE-FUTHA,

Paediatric patients who come into the hospital are first received at the reception area of CHOP. From there they are directed to the general Records Department where they either obtain a new case note or retrieve an old one and go back to CHOP. The general records unit serves all patients who present for care irrespective of subspecialty and has an average of 4 staff per shift. The record staff takes case notes of patients periodically to CHOP where these case notes are registered by attendants. After this, nurses take the vital signs of the patients and document the same on the patients' case notes. The case notes are taken back by the attendants again who document the vitals in their books of record as written by the nurse. Nurses then move case notes into doctors consulting rooms and each patient takes a number in the queue to see the doctor. At his turn, the patient goes in to see the doctor and after the consultation, nurses/orderlies take the case notes again to the attendants to record findings and plans. Patient has now referred appropriately to one of the following according to the doctor's request, Pharmacy, Laboratory, Home, Paediatric ward/Children emergency department, Neonatal ward, or to another subspecialty unit.

**Study population:** Patients who present at the children outpatient department of AEFUTHA for ambulatory care.

**Sample size calculation:** The desired sample size was determined by the formula for sample size appropriate for an infinite population (19).

$$n = \frac{Z^2 pq}{d^2}$$

n = sample size when the target population is above 10,000

Z = Z statistic for a level of confidence, usually set at 1.96 (95% confidence level)

P = expected prevalence or proportion. In this case taken as 0.5 since there is no previous study

$$q = (1-P) = 1 - 0.5 = 0.5$$

d = precision

(In proportion of one; if 5%,  $d = 0.05$ ).

$$n = \frac{Z^2 pq}{d^2}$$

$$= \frac{(1.96)^2 (0.5)(1-0.5)}{(0.05)^2}$$

$$= \frac{0.9604}{0.0025} = 384.16$$

Approximately 384 subjects was the minimum sample size used for the study

### Sampling technique/ subjects selection

A minimum sample size of 384 was calculated and this number was recruited over 1 year. We, therefore, recruited 32 clients monthly ( $384/12\text{months} = 32$ ). This number was shared among the five days of the clinic.

Hence we recruited 7 clients on Mondays and Tuesdays which had the largest number of clients the preceding year and 6 clients on Wednesday, Thursday and Fridays.

The second week of each month was selected for this study arbitrarily.

Six or seven patients were randomly selected daily.

**Inclusion criteria:** All clients who presented to the paediatrics children outpatient clinic (CHOP) of AE-FUTHA.

**Exclusion criteria:** Clients who presented to CHOP but found to need emergency care were referred to the Children emergency room of FETHA.

**Ethical consideration:** Ethical approval was not required for this study because it was an observatory, and had no direct involvement with human or animal participants.

**Duration of study:** The study was carried out between August 2018 and July 2019.

**Research assistants:** Three research assistants were recruited. These assistants were Doctors who had just finished housemanship and were waiting to do NYSC

**Data collection:** Selected clients were identified on arrival at CHOP reception area. The following time were recorded in a proforma .

T1. Time of arrival at CHOP

T2. Time of arrival at records department for folder retrieval

T3. Time case note arrived at chop (usually piled up till a significant is available to be carried to chop by an orderly)

T4. Time client finished with the attendants and nurses at CHOP, then took a number to see the doctor

T5. Time patient was ushered in to see a doctor

T6. Time client finished the consultation with the doctor

T7. Time client finished with nurse and record attendants and gets referred to the appropriate place

From these the total time (TT), time spent waiting to see the doctor (WT), and time spent consulting the doctor (CT) was calculated. Other times calculated were, time spent at general hospital records for folder retrieval (RT), time spent with nurses for vital signs and attendants for recording (NT), and time spent on the queue to be consulted (WsT).

These were calculated as follows:

TT=T1-T7

WT=T1-T5

CT=T5-T6

RT=T2-T3

NT=T3-T4

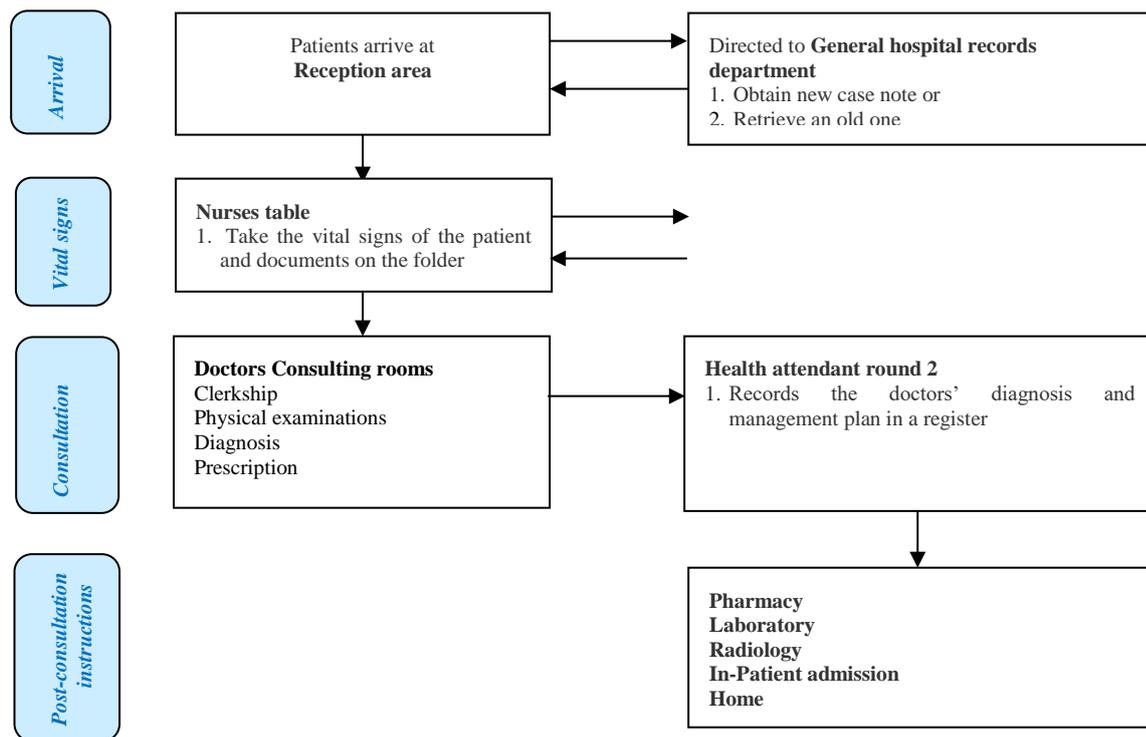
WsT=T4-T5

The number of doctors on duty each of the days of study was also noted

The total number of patient seen each week day was also recorded, from this the average number of patient seen each day (mean daily patient load) of the week was calculated.

**Data analysis:** The data obtained was transferred into an electronic data base using the Statistical Package for Social Sciences (SPSS) version 22.0. descriptive analysis was done with calculations of means. A comparison of means was done using the ANOVA. All calculations was based on a significant level of  $p < 0.05$ .

**Table I:** Patient Time Flow Diagram



## RESULTS

Total clients reviewed were 384. Table I shows the distribution of clients followed on each day of the week. It also shows that the total number of patients who were seen in CHOP during the one year study period was 19,558. These clients were seen over 51 weeks. The number of days the clinic opened in each day of the week as well as, the total and means of each week of the days are noted in Table I. Mondays had the greatest mean attendance of 103 clients while Fridays had the least client attendants, 53.

The mean age of clients seen as well as the mean time spent in the different areas, waiting time as well as the total time spent in the hospital is represented in Table II.

Table III and IV show the descriptive analysis as well as the comparison of mean time spent on the different days of consultation. Mean total time, mean consulting time, and mean queue time was greatest on Tuesdays while mean nursing time was the least on Tuesdays.

Tuesdays and Wednesdays seemed to have the greatest time spent and these were statistically significant. Also Figures 1-5 are shows the graphical representations of the different times studied.

**Table II:** Descriptive analysis of time spent for all patients

	Total clients	Mean	Min	Max	SD
Age of patient(years)	384	6.13	1	16	±4.59
Total Time spent (TT)	384	142.58	100.00	197.00	± 23.17
Waiting time (WT)	384	113.15	80.0	160.00	± 18.01
Consultation time (CT)	384	24.43	12.00	50.00	± 10.38
Time spent at record (RT)	384	47.20	20.00	90.00	± 17.42
Time spent at nursing bay (NT)	384	23.79	15.00	40.00	± 6.47
Time spent on the queue (WsT)	384	22.94	10.00	40.00	± 8.98

\*all time is in minutes

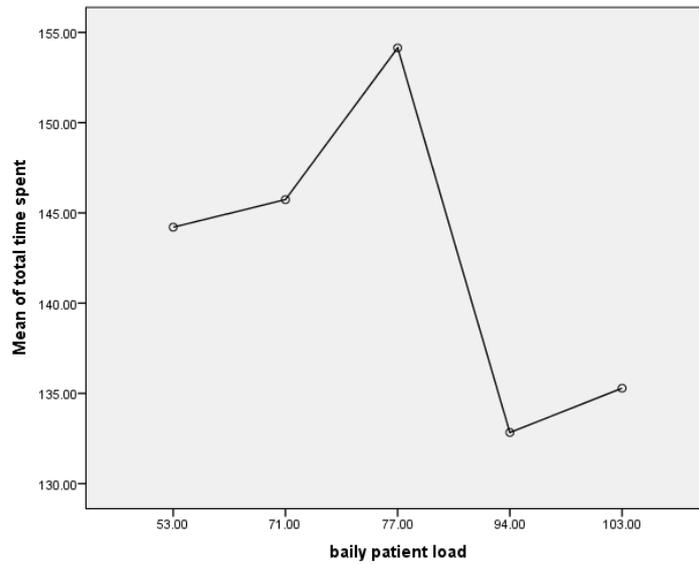
**Table III:** Comparison of means on the different days of consultation

	Day patient was seen	Mean daily patient load	Mean time (seconds)	Standard deviation	F <sub>2</sub>	p
Total time spent	Monday	103	135.28	15.21	12.201	0.000
	Tuesday	77	154.14	23.14		
	Wednesday	71	145.74	27.08		
	Thursday	94	132.83	26.23		
	Friday	53	144.21	15.71		
Waiting time	Monday	103	106.00	12.68	14.237	0.000
	Tuesday	77	119.00	12.21		
	Wednesday	71	121.07	22.02		
	Thursday	94	105.33	22.19		
	Friday	53	114.57	13.48		
Consulting time	Monday	103	24.29	10.89	12.027	0.000
	Tuesday	77	30.14	12.44		
	Wednesday	71	19.67	6.59		
	Thursday	94	22.50	8.60		
	Friday	53	24.64	8.88		
Records time	Monday	103	44.86	14.19	17.486	0.000
	Tuesday	77	55.00	20.12		
	Wednesday	71	55.28	21.43		
	Thursday	94	38.00	7.00		
	Friday	53	44.28	12.84		
Nursing/recording time	Monday	103	23.86	4.08	19.553	0.000
	Tuesday	77	19.14	2.04		
	Wednesday	71	24.10	4.54		
	Thursday	94	26.33	10.98		
	Friday	53	26.31	4.66		
Queue time	Monday	103	22.86	9.26	2.427	0.048
	Tuesday	77	24.86	10.36		
	Wednesday	71	21.69	4.97		
	Thursday	94	21.00	10.83		
	Friday	53	23.99	7.49		

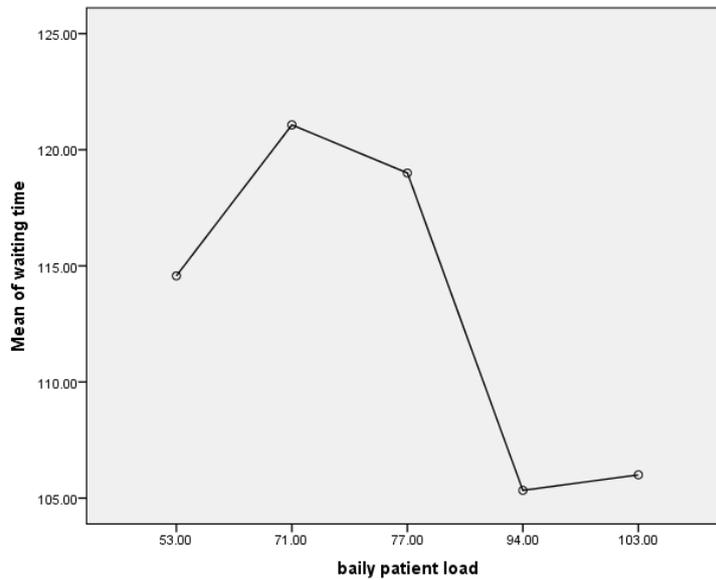
The means of total time, waiting time, consultation time, record time and nursing time were significantly different for the various days with different daily patient load (F<sub>2</sub> = ,p<0.001)

**Table IV:** Representation of the comparison of means of various times to the different days of presentation (ANOVA)

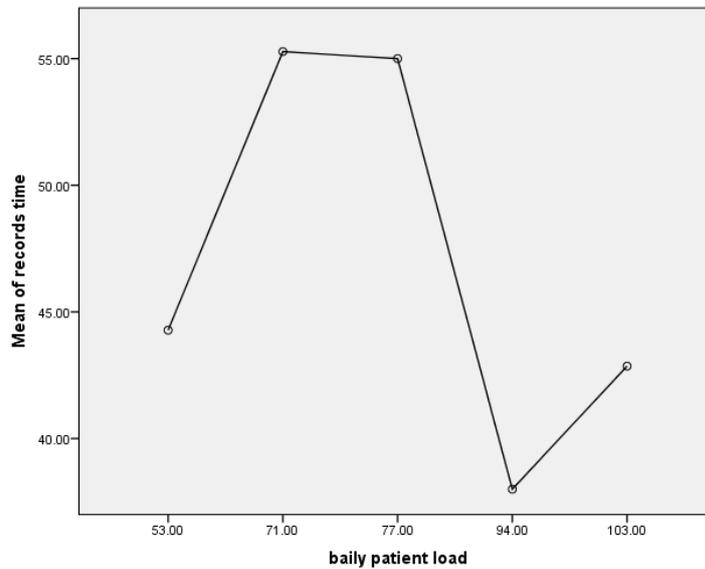
		Sum of Squares	df	Mean Square	F	Sig.
total time spent	Between Groups	23448.044	4	5862.011	12.201	.000
	Within Groups	182087.290	379	480.441		
	Total	205535.333	383			
waiting time	Between Groups	16228.934	4	4057.234	14.237	.000
	Within Groups	108010.306	379	284.988		
	Total	124239.240	383			
consulting time	Between Groups	4648.200	4	1162.050	12.027	.000
	Within Groups	36620.040	379	96.623		
	Total	41268.240	383			
records time	Between Groups	18101.784	4	4525.446	17.486	.000
	Within Groups	98085.175	379	258.800		
	Total	116186.958	383			
nursing/record time	Between Groups	2742.579	4	685.645	19.553	.000
	Within Groups	13290.169	379	35.066		
	Total	16032.747	383			
queue time	Between Groups	770.787	4	192.697	2.427	.048
	Within Groups	30094.835	379	79.406		
	Total	30865.622	383			



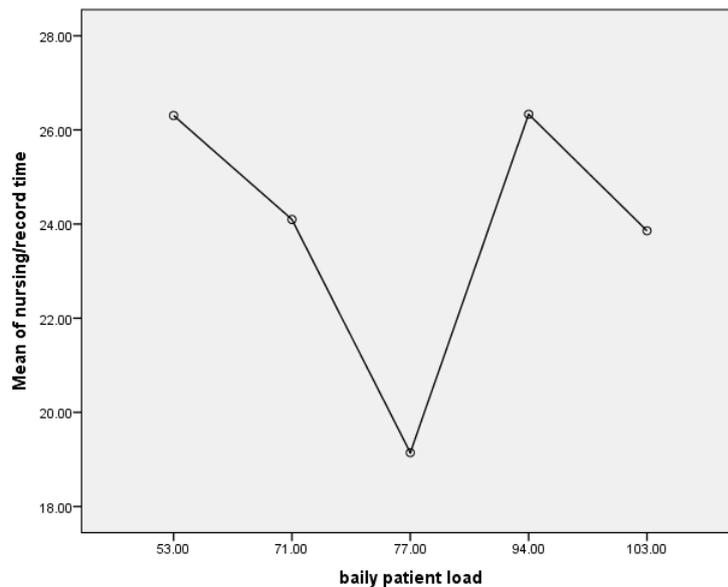
**Figure I:** graphical representation of comparison of mean of total time spent on the various days with varying patient load



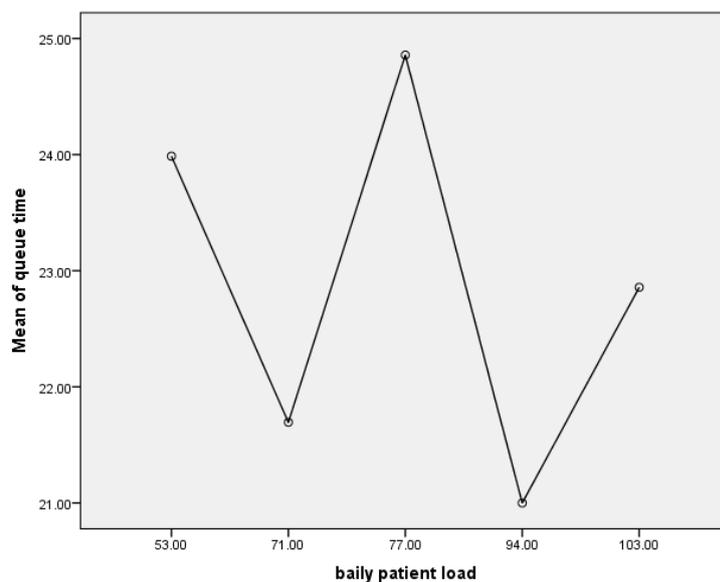
**Figure II:** graphical representation of comparison of mean of waiting time on the various days with varying patient load



**Figure III:** Graphical representation of comparison of mean of time spent in records department on the various days with varying patient load



**Figure IV:** Graphical representation of comparison of mean of nursing time spent on the various days with varying patient load



**Figure V:** Graphical representation of comparison of mean of time spent on the queue on the various days with varying patient load

## DISCUSSION

From this study, one can appreciate various hurdles a client or patient seeking to access health care in hospital would have to jump, from the entrance into the out-patient department to departure. It entails movement and waiting from arrival at CHOP to arrival at records department for folder retrieval and registration; and eventual arrival of folder or case note at the CHOP, where client waits to be called by the Nurses for a record of vital signs. This is followed by a wait on a queue until the patient is ushered into the consulting room. After the consultation, the client returns to the nurses' station and gets referred to the appropriate station eg pharmacy or laboratory as the case may be. The mean total waiting time as shown in this study was 142.58 minutes, from arrival to exit from the outpatient department with most of this time spent at the records/registration department.

Oche& Adams in their study noted an even longer waiting time of 168 minutes, similarly having most of the time spent at the registration end (13).

Waiting time specifically has been defined as the length of time between arrival in the clinic/unit to when being attended to (20). In this study, the actual time spent before the client gets to see the doctor was recorded as 113.15 minutes. This is somewhat less than the time recorded by some other authors, such as Ofowve&Ofili, who recorded waiting time as long as 173 minutes (11) and Hasanpoor-Azghdy et al (21) in Iran who reported an average total time of 161 minutes, from entry to exit (21).

Some other studies on the contrary have reported that patients waited for a period of time ranging between 30 and 45 minutes to get the needed treatment (22-24).

As a standard, the Institute of Medicine (IOM) recommends that, at least 90% of patients should be seen within 30 minutes of their scheduled appointment time, but the findings in this paper are way behind the recommendation (8).

A further breakdown of the time intervals has shown that registration specifically took 47.20 minutes. This is quite long and different from findings by some authors in India where 10-20 minutes was spent at registration (25,26).

On the other hand, Oche & Adamu (11), in their study in Northern Nigeria, recorded registration time as high as 60–120 minutes in a majority of the clients studied, which they attributed to a few record clerks. Notably, Babalola et al have reported that three major factors associated with a long wait time are registration time, insufficient number of physicians, and insufficient number of counter staff (27). Some literature have associated this long wait at registration to the time of the day, specifically between 8am – 10am (28). Others added not just the time of visiting the counter, but also patients flow in hospital and numbers of registration counter etc (25).

From our study, the consultation time was an average of 24.43 minutes. This is more than the findings of 13.35 and 13 minutes by Sharma & Chowhan (29) and Wafula et al (30) respectively. It may be stated here that consultation time may depend on factors such as peculiarity of illness, the age of the patient, the type of services needed, the expertise of the medical officer and possibly the nature of the health institution. Indeed, Oche & Adamu (11) noted that the reason for higher consultation time in some tertiary hospitals may not be unconnected to the fact that in such an area the doctors use the opportunity of their interaction with patients to teach medical students undergoing various clinical postings, thus increasing the time spent.

Current study has shown notable variations in the time flow across days of the week, whereby the longest mean waiting time was on Wednesdays despite relatively lower average patient load and the least waiting time spent was on Thursday, although the registration time component was longest on Tuesday. Patel and his companion noted the influence of day of visit to the hospital on registration time (25). This provokes a thought that this longer waiting time disparity may be a problem with human resource capacity or the work attitude of the workers involved on some particular days. The consultation time was longest on Tuesday with mean of 30.14 minutes. The specialties that consult on Tuesday are the Paediatric Neurology and the Paediatric Endocrinology. The relatively longer consultation time might depend on the type of cases seen on that specific day or the degree of services needed, or time spent on training medical students during the consultation. It may also depend on the skills/expertise of the doctor being consulted.

Generally, anything that will make a patient spend so much time in the hospital may have a deleterious effect on the health seeking behaviour. Various studies have been able to show that prolonged waiting time for people has negative effects on health-seeking actions and that better patient satisfaction leads to better utilization of health services and

contented patients are also more willing to adhere to the healthcare provider (31,32). McCarthy et al reported that patient dissatisfaction due to a long wait has been a reason why some of them will not return to the unit/clinic for care in future, instead, they resort to expensive, small private hospitals (33). Not only does waiting time influence patient satisfaction, it also serves as an indicator, used to evaluate the health care institution and its quality of services.

It is important to note that the outpatient department is the window to a hospital's services, and a patient's impression of the hospital, begins there (25). Although our study did not explore the possible causes of a long wait time, it is necessary to mention possible causes of undue waiting time in our health care setting. Inadequacies in equipment and manpower may often lead to prolonged and stressful waiting time for the patients (34). In our study area, efforts are continuously being made to computerize hospital records or patient's folders, but this is yet to be achieved as at the time of this study. This has put much stress on the staff and the clients, as time is spent sorting folders, following or trying to trace back folders. It is even worse with the interdepartmental movement of folders occasionally from the surgical units to the paediatric units depending on the case. There is need for a successful transition to computerized documentation of patient records with the provision of necessary up to date equipment and assurance of relatively constant electric supply to power the equipment. Inadequacies in manpower come in the form of quantity and quality. With enough personnel at the registration counter or the various service ends, to serve the teeming population of clients, waiting time should be significantly reduced. In addition, well trained, experienced personnel can maximize time with better work efficiency.

Oguet al included inadequate staffing with attendant excessive work load experienced by health providers (35), as Okonofua et al added poor attitudes of care providers as causes of long waiting time (36).

Having to see 50 – 100 clients on a clinic day as seen in this study may take a toll on the human resources and the available equipment. It demands adequate capacity planning and proper coordination of services to reduce frustration for the provider as well as the consumer. Some authors have attributed the availability of high workload, work procedures and environment, employee attitude and beliefs, employee's supervision management problems, and medical and administrative facilities availability to be common causes of waiting time problems in healthcare settings (37,38).

This study has been carried out as a simple review of patient time flow in the children's outpatient department of our Tertiary Health care institution, with the aim of discovering areas that need improvement for better quality of service to our clients.

**Recommendation:** Having noted that patient registration and card sorting takes the bulk of the patient's time flow and time spent on registration prolongs the average waiting time, it is hereby recommended that decentralization and computerization of the patients' record will effectively reduce waiting time. Capacity building for the records staff on quick, efficient data entry and folder retrieval may help on the interim and always. Where waiting is inevitable, clients can be made more comfortable while they wait through the use of

Television, newspaper, periodicals, drinking water, heating and cooling facilities etc. It may not be out of place to serve some simple refreshments to the children while they wait with their parents. These gestures allay clients' frustration and possibly may improve clients' willingness to return.

It is a fact that people generally do not like waiting especially for a service they have paid for. People tend to value their time more for some other economic gain. Conceited efforts must therefore be made to ensure minimum waiting time and patient satisfaction. In order to improve the health seeking behaviour of our people in the developing world, and boost their confidence in the tertiary health facility, waiting time must be effectively tackled, and time spent must be shown to be worthwhile.

## CONCLUSION

In conclusion, from our study, most of the delay in the clients waiting time is from the records/registration unit. It calls for concerted effort to improve and mobilize resources for more efficient service delivery at this unit, which will ultimately result in much shorter waiting time and better patient satisfaction.

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**Limitation:** None

**Author contributions:** OUA, TE, MLO, OE, CI, NKO, UVA, OEO, NBO; Design of the study and data collection. CI; review of the literature, analyzes and writing of the manuscript.

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**Ethical issues:** All authors declare originality of research.

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