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Original Article

Time-Flow Study for Receipt of Outpatient Services in Public and Private Hospitals: Implications for Lean Approach in Health Facilities in Rivers State, Nigeria

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Abstract

Background: Waiting time is an important indicator of the quality of healthcare services in public and private health facilities. This study compared the waiting time at the general outpatient clinics (GOPC) in a private and public hospital in Rivers State.

Methods: A comparative cross-sectional survey using a multi-stage sampling technique was used to select a total of 299 ambulatory adult patients attending the GOPC in a public and a private hospital. Time spent at service stations was obtained using a record sheet. SPSS version 23 was used to analyze data and p-values ≤0.05 were considered significant.

Results: Ambulatory patients on average spend 122.6 minutes for GOPC encounters in the public hospital and 44.9 minutes in the private hospital. This difference of 77.8 (95%CI: 66.6, 89.0) minutes was statistically significant (p = 0.001).

Conclusion: The duration of time spent to access GOPC services underscores the need for system redesign to reduce the time spent and improve the satisfaction of patients attending the GOPC.

Keywords: Waiting time; general outpatient clinic; GOPC; Port Harcourt; Nigeria.

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Introduction

A core priority of the health system is providing patients with timely and high-quality services. Waiting time may be described as the duration of time spent before a patient receive attention from healthcare providers while total time for a general outpatient clinic (GOPC) encounter by an ambulatory patient is the time taken from registration till consultation with a physician. [1] Long waiting times have been reported in developing and developed countries alike, [2] with variations in waiting times reported between and even within countries.[3] There are reports of patients spending up to 4 hours in the outpatient department before consultation with a physician in some settings. [4]
Responsiveness which is an important attribute of health care is determined by the extent to which public and private health facilities demonstrated respect for persons and client orientation in the delivery of their services. Promptness in the receipt of needed services is an important element of client-oriented services. [5] Time-wasting can affect patients' experiences and their views on service quality. [6]Unnecessary wait time can cause stress for both doctor and patient and this can pose a significant barrier to access to healthcare services.[3] Curbing this menace would involve the integration of consumer-driven attributes when designing patient time flow in a health service organization to minimize patients' and providers' frustration.[7,8]

The GOPC is an important gateway in the design of a hospital operation as patients' impression of the hospital builds up from there.[9] It is important to ensure that GOPC services provide patients with an excellent experience to create a good first impression before they encounter services at referred stations such as laboratories, pharmacies or specialist clinics.[1,10] Studies have shown that when patients wait for long periods before they are seen, they are less likely to continue the use of the health service.[11] An overall improvement in patient satisfaction can be achieved when patient waiting time is continually minimized by managers and administrators.[12]

While the number of patients seeking Outpatient Clinic (OPC) treatments has expanded dramatically in recent times, there are indications that the available OPC facilities have not kept pace with this trajectory.[13,14] A basic time and motion study of an OPD system can go a long way toward generating evidence for improving efficiency, effectiveness, economy and equity in a hospital.

Common determinants of prolonged waiting time include supply factors like availability and quality of human, financial and material resources, system efficiency as well as demand factors reflecting changes in the needs and health-seeking behaviour of the population. Patient scheduling and efficient human resource management are core strategies deployed to reduce waiting time and improve patient satisfaction. However, balancing demand and supply in a resource-limited setting can be a herculean task. [15]

Formal healthcare is provided through public and private health facilities in many health systems.[16] Both provide significant portions of outpatient health services but face different incentives to deliver services of high value and guarantee client satisfaction.[17]The provision of health services in public facilities is not often profit-driven and is characterized by low employee morale, performance, poor quality of care, shortages of workers, medicine, supplies, and working equipment, as well as various wastes and inefficiencies. Private for-profit facilities are more likely to be client-friendly and efficient to increase demand for their services, retain patient loyalty and improve their competitiveness. [18]

Many studies have been done in parts of Nigeria on waiting time in either public hospitals or private hospitals. However, a gap in literature exists as to how waiting time differs between public and private hospitals, especially in developing health systems like Nigeria. This study measured and compared the waiting time at general outpatient clinics in a large public and private hospital in Port Harcourt, River's state.

Methodology

Study Area

This study was conducted in a large public and private health facility in Port Harcourt metropolis which is the capital city in Rivers State, Nigeria. Nigeria has a plural health service with public and private providers running alongside traditional medicine.[16] The federal, state and local government areas in Nigeria oversee public tertiary, secondary and primary health services respectively, spread across the entire landscape while private hospitals are concentrated in the urban areas and owned by a single or group of medical practitioners or charity organizations.[16] There exist no government regulation on waiting time in both public and private hospital in Nigeria.

Study Design
A comparative longitudinal time and motion study design

Sample Population
The study participants were ambulatory patients aged 18 years and above attending general outpatient clinics of the selected private and public hospitals. The study protocol excluded critically ill patients and patients who were not visiting the hospital to have a consultation with a physician.

Sample and Sampling Technique
The sample size was calculated using the formula for comparative design showing difference in proportion [19]

$$n \text{ per group} = \frac{2(Z_{\alpha/2} + Z\beta)^2 * \rho(1 - \rho)}{(P_1 - P_2)^2}$$

The calculated sample size of 136 for the private and public hospitals was increased to 150 to accommodate a 10% potential loss to follow-up. The multi-stage sampling method firstly, stratified hospitals by ownership and one hospital was selected from each stratum by random sampling. A Systematic sampling approach was used to select one in every six and one in every four patients seeking care at the GOPC of the public and private hospital respectively from a sample frame of all eligible adult patients that congregate at the record unit for general outpatient visit in the hospital each day. The average number of patients seen per day (from 8am to 2pm) during the duration of this study was Ninety (92) in the private hospital and one hundred and fifteen (115) in the public hospital. The private hospital had two registration staff, two nurses for vital sign checks and three doctors for general consultation while the public hospital had three registration staff, three nurses for vital sign checks and three doctors for general consultation.

Data Collection
Ambulatory patients visiting the GOPC in public and private hospitals usually navigate the care system by going through various service stations as shown in Figure 1. The outpatient transit time at the public and private hospital begins when the patient arrives at the front desk, continues through medical records, nursing stations, consultations and based on the recommendation of the health providers - laboratory investigations, pharmacy, referral for specialist consultation and ends when the patient is discharged (Figure 1). Total visit time was defined as the time from arrival to consultation with a physician.

A structured self-administered questionnaire containing a record sheet was used for this study. The questionnaire was used to obtain information on the socio-demographic characteristics and clock-in and clock-out times for every station in the visit. The questionnaires were given to eligible patients who gave their consent upon arrival at the hospital and could read the time from either their wristwatches or mobile handsets. Patients were encouraged to consistently use the same timing device throughout the visit. This enabled them to record the time of arrival, commencement, and conclusion of the various activities at each station during their visit. Time spent by patients was operationalized as follows:

- Waiting (Idle) time at each station - from the point of arrival at a particular service station to the time of initiation of the intended service at that station.
- Effective time at each station – time spent receiving attention from the appropriate health provider at each station.
- Total time spent for GOPC encounter - the time from arrival at the hospital to the conclusion of consultation with the physician.
- Total effective time –duration of time spent receiving attention from the health providers at the various service stations.
- Total idle time –cumulative duration of time spent waiting for attention to be provided by the health providers at all service stations.
- Percentage wasted time – the percentage of overall time spent not receiving specific attention from the health providers.

Data Analysis
The data were entered into SPSS version 23 for analysis. Descriptive and inferential statistics conducted included comparisons of the background characteristics of patients attending the GOPC in public and private hospitals. The mean difference alongside the 95% confidence interval and an independent sample t-test of statistical significance were

calculated to compare the time spent at each service station. A multi-level linear regression analysis was done to identify other factors influencing waiting time as patients were nested within facilities. For all inferential analyses, statistical significance was set at a p-value ≤0.05.

Ethics

Ethical clearance to carry out this research was obtained from the Ethics Committee of the University of Port Harcourt on the 28th of January 2021 with reference number UPH/CEREMAD/REC/MM72/078. Permissions were obtained from the public and private hospitals included in this study. A consent form and information sheet were attached to the questionnaire to help the patients understand the purpose and procedures, and their readiness to participate in the study. No financial obligation from participating patients was required and all data was kept secure and made available to only the researcher. Confidentiality and privacy were respected during the research.

Results

Table 1 shows the socio-demographic characteristics of patients in public and private hospitals. There were no significant differences in the distribution across gender, marital status, and level of education. A higher proportion of respondents from the public hospital were employed (81.3%), older than 40 years (52.7%) and covered by health insurance (26.0%).

The mean overall time spent from registration to the end of the consultation process in the public hospital was higher (122.6 minutes) compared to the private hospital (44.9 minutes) with a mean difference of 77.8 (95%CI: 66.5, 89.5) minutes. Overall mean idle time (waste) for a general outpatient encounter was 86.7 minutes in the public hospital compared to 20.9 minutes in the private hospital which was statistically significant (p<0.001) (Table 2).

Table 3 shows the factors associated with waiting time. The multi-level linear regression analysis illustrated that age, level of education, visitation status and hospital type were significantly associated with waiting time. Female patients spent 21.16 minutes (95% CI: 7.78, 34.54) more time on average during their visit to the GOPC than male patients and this difference was statistically significant (p = 0.002). Patients with education greater than secondary level spent on average 27.93 minutes (95% CI: -45.68, 10.18) less time in the GOPC than patients who had education lower than secondary level and this difference was statistically significant (p=0.002). Repeat visitors spent 25.79 minutes (95% CI: 13.51, 38.08) more than first-time visitors and this difference was statistically significant (p=<0.001). Patients who attended the GOPC in the private hospital spent 71.51 minutes (95%CI: -83.17, -59.86) less time than patients who visited the public hospital. This difference was statistically significant (p=<0.001). The mode of payment was not found to confer any advantage on waiting time from both the bivariate and the multivariate analyses.

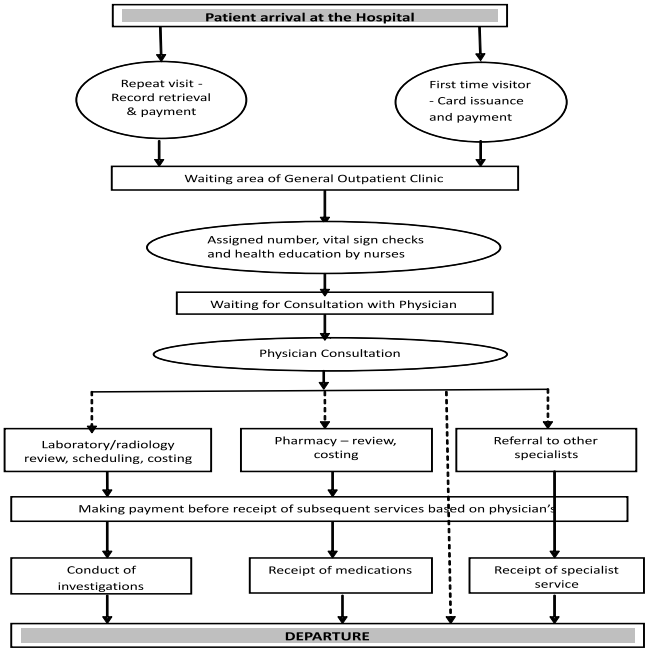

Figure 1: The patient flow diagram in a public and private hospital

Table 1: Socio-demographic characteristics of patients

Variable	Public Freq (%)	Private Freq (%)	X^2	p-value
Age in years				
<40	71 (47.3)	119 (79.9)	34.15	<0.001
⩾40	79 (52.7)	30 (20.1)		
Gender				
Male	65 (43.3%)	50 (33.6)	3.01	0.096
Female	85 (56.7%)	99 (66.4)		
Marital Status				
Single	36 (24%)	28 (18.8)	5.52	0.063
Married	114 (76.0%)	121 (81.2)		
Level of Education				
⩽Secondary	22 (14.7)	15 (10.1)	1.45	0.292
>Secondary	128 (85.3)	134 (89.9)		
Employment				
Unemployed	28 (18.7)	35 (23.5)	9.49	0.009
Self-Employed	54 (36.0)	72 (48.3)		
Employed	68 (45.3)	42 (28.2)		
Payment Method				
Insurance	39 (26.0)	6 (4.0)	11.84	<0.001
Out-of-pocket	111 (74.0)	143 (94.0)		

Table 2: Comparison of waiting time by hospital type

Station/activity	Time spent in minutes – mean (SD)		Mean difference (95%CI)	t-test	p-value
	Public	Private			
Registration	17.5 (15.9)	9.2 (4.8)	8.3 (5.6, 11.0)	6.10	<0.001
Waiting for nursing service	35.4 (25.7)	3.2 (3.7)	32.2 (28.0, 36.4)	15.19	<0.001
Nursing service	5.7 (2.3)	3.8 (1.9)	1.9 (1.4, 2.4)	7.69	<0.001
Waiting for doctor consult	51.4 (45.0)	17.7 (15.4)	33.7 (26.0, 41.4)	8.65	<0.001
Consultation with doctor	12.6 (3.3)	10.9 (3.6)	1.7 (0.9, 2.5)	4.20	0.007
Total idle (waste)	86.7 (64.5)	20.9 (15.9)	65.9 (55.2, 76.6)	12.11	<0.001
Total effective time	35.8 (17.2)	23.9 (6.7)	11.9 (8.9, 14.9)	7.88	<0.001
Percentage effective time	34.7 (14.8)	58.8 (20.3)	-24.1 (-28.2, -20.1)	-11.76	<0.001
Percentage waste time	65.3 (14.8)	41.2 (20.3)	24.1 (20.1, 28.2)	11.75	<0.001
Total	122.6 (67.7)	44.9 (16.7)	77.8 (66.5, 89.5)	13.66	<0.001

Variables Reference	Mean	Bivariate B (95% CI)	p-value	Multivariate B (95% CI)	p-value
Age in years					
<40	62.87	-	-	-	-
⩾40 - 60	120.48	34.20 (22.41, 45.99)	<0.001	21.16 (7.78, 34.54)	0.002
Gender					
Male	91.28	-	-	-	-
Female	79.24	-4.04 (-15.66, 7.57)	0.494	-9.49 (-21.98, 2.99)	0.136
Marital Status					
Single	64.75	-	-	-	-
Married	88.98	30.47 (17.17, 43.77)	<0.001	27.79(-21.19, 76.77)	0.265
Level of Education	124.78	-	-	-	-
⩽Secondary	78.10	-38.63 (-55.18, -22.08)	<0.001	-27.93 (-45.68, 10.18)	0.002
>Secondary					
Employment					
Self-employed	88.98	-	-	-	-
Unemployed	62.94	-27.29 (-41.98, -12.59)	<0.001	-8.91 (-24.24, 6.41)	0.253
Employed	90.02	-13.90(-26.52, -1.30)	0.031	-1.92 (-15.11, 11.28)	0.775
Visit Status					
First time	63.21	-	-	-	-
Repeat visitor	94.26	30.85(19.46, 42.25)	<0.001	25.79 (13.51, 38.08)	<0.001
Payment Method					
Out-of-pocket	77.88	-	-	-	-
Insurance	117.69	-7.05 (-23.57, 9.47)	0.40	8.96 (-10.43, 28.34)	0.364
Category of Hospital	122.63	-	-	-	-
Public	44.85	-77.78 (-89.02, -66.55)	<0.001	-71.51 (-83.17, -59.86)	<0.001
Private					

Discussion

This study aimed to assess and compare the time spent receiving services in the General Outpatient Clinic of a public and private hospital. It also identified the factors influencing waiting time.

Findings in this study showed more patients attending the GOPC in the public hospital was aged above forty years which is in contrast with a similar study [1] in Ethiopia which had more patients less than forty years attending both public and private hospital.

A higher proportion of patients in the public hospital was formally employed and had insurance cover. Studies have shown that most people in Nigeria with health insurance mainly have employer-based coverage. [20,21] An earlier study revealed that more patients under insurance cover have formal employment. This explains why the public hospital in this study presented a higher proportion of employed and insured patients compared to the private hospital which had more patients who were unemployed and paid out-of-pocket.

It is not uncommon for patients seeking primary care in health facilities in Nigeria to wait long before accessing such services. [5] The situation is worse in public health facilities as depicted by the overall mean time of 122.6 minutes spent from registration to consultation compared to patients in the private hospital who spent an average of 44.9 minutes in this study. The longer overall waiting time in the public hospital corroborates an earlier report in Lagos Nigeria,[22] which observed that private patients experienced shorter waiting times compared to public users as they waited, on average, 49 minutes compared to the 127-minute wait by public users.

This study also showed the longest waiting time for patients in the public hospital was time spent waiting for nursing service (35.5 minutes) and doctor consult (51.4 minutes) compared to patients in the private hospital who spent most of their time in the outpatient department waiting for doctor consult (17.7 minutes). A similar mean waiting time for doctor consult (60 minutes) was found in the study conducted by Ogunfowokan at the outpatient clinic in the National hospital, Abuja. [23]

Prolonged waiting time for nursing services might be related to the late arrival of doctors in public hospitals. Nurses start attending to patients late as a way of giving the doctors time to arrive to reduce the pool of patients waiting for doctors' consultations. Prolonged waiting time for doctor consult can be due to the high pool of patients converging at the waiting area because of delayed commencement of consultation activities nursing service attendance due to late arrival of doctors and other health staff.

While the daily patient load in the private hospital was slightly lower than in the public hospital, the average number of available was much lower providing a higher per capita caseload in the private clinic. The shorter waiting time reported in the outpatient department in private hospitals may be due to the design of their operations and the motivation of the available staff to cope with the patient turnout.

Patients aged forty years and above spent more time receiving care in the GOPC. This may be reflective of the higher prevalence of non-communicable diseases and multi-morbidity among older patients who in turn may require longer time for their GOPC encounter.

Patients with a higher level of education were found to have spent significantly less time than patients who had an educational level less than or equal to secondary. A previous study done in a tertiary health institution in Northern Nigeria reported that the patients who had formal education spent less time in the GOPC compared to those without formal education. [24] This could be because patients with tertiary education find it easier to navigate the different service stations in the hospital and also understand health concepts as opposed to those without tertiary education. There may exist some discriminatory attention accorded to patients based on their social status with patients who are assumed to be more influential preferentially provided quicker attention at the service stations which subsequently could prolong the waiting time of others.

Repeat visitors spent significantly more time in GOPC encounters than first-time visitors. Patients who have visited the hospital more than once may have developed a preference for a particular healthcare provider thereby causing them to spend more time waiting to receive service from their preferred healthcare provider. Being able to choose a provider in a practice with many providers is an important element of responsiveness and there is evidence that this is not the norm in

this setting. [5] A study carried out on patient waiting and consultation time found that patients are willing to wait longer to see a familiar doctor. [25]

Patients who visited the private hospital spent significantly less time than patients who utilized GOPC services in the public hospital. The problem of waiting time may be exacerbated by organizational processes, employee attitudes, job processes, workload, management, supervisory issues, and insufficient facilities. [26, 27] The amount of time spent at a public health facility can also be influenced by the time patients arrive at the facility. In a setting like this, where there is no patient appointment system, patients who arrive early for treatment often spend more time in the hospital than those who arrive late. [27] This could be due to health attendants being unprepared or unavailable to begin their clinical duties to early visitors who arrive before the clinic officially opens. More research is however needed to examine how staff and organizational factors affect waiting times GOPC encounters in Nigerian public hospitals.

Implications of the findings of this study

Private practices in urban areas in Nigeria are profit-oriented and operate in a competitive environment and deliberately strive to attract and retain clients due to the plentitude of private hospitals in urban areas. For these profit-motivated hospitals, employees, including healthcare providers and support staff show attitudes that promote high-quality service delivery and patient retention. Private hospitals, therefore, are keen on applying best practices in recruiting, training and retaining staff to enhance responsiveness to patients. Public hospitals, which are non-profit organizations, have less incentive to focus on patient retention.

The shorter waiting time reported in the outpatient department in private hospitals may not only be related to the relative patient caseload but the level of staff motivation and supervision in the private hospital. This calls for effective supervision, staff motivation and recognition of the benefits of task-shifting in leveraging patient caseload. There is also the need to encourage the use of statistics on patients visit to inform decisions on staffing by hospital administrators in the public sector.

The finding of overall mean idle time in the public hospital being significantly higher compared to the private hospital may have implications for the many non-value-added activities carried out in the OPC in the public hospital which leads to time waste. Waste signifies any activity that does not benefit the patient or moves them closer to a cure which is the main intent of their visit to the OPC [28]. Lean healthcare (LH) is a set of service strategies for reducing or eliminating waste and non-value-added activities in healthcare. [29] Waiting to be seen by a nurse or a physician, are some of these wastes in the outpatient encounter and over 65% and 41% of time spent accessing GOPC services in public and private hospitals respectively account for time waste. LH should start with examining a healthcare procedure and establishing what the patient values. Activities during the visit should be classified as either value-added (VA) or non-value added (NVA) according to lean principles. [30] Because lean focuses on improving how value is given to patients and customers, it's critical to identify NVA activities and take quick steps to eliminate them. A follow up qualitative study would be useful in identifying the VAs and NVAs and developing strategies for improving time and motion efficiencies in the GOPC.

Value stream mapping (VSM) and time-flow studies are indeed useful in identifying time and motion wastes in ambulatory healthcare and reducing inefficiency in the delivery of outpatient care. These approaches can help to reduce waste and enable smooth patient flow; identify how long each high-level process step normally takes to complete, as well as the amount of time spent waiting between them. The effects of LH interventions on patient flow in ambulatory care have been studied, and the majority of the reviewed studies demonstrated improvements in terms of reduced length of stay and shorter waiting times after an LH intervention. [31]

Patients spend more time waiting for services in both public and private hospitals even though this is shortened in private health facilities. Low adoption of technology-driven innovations for patient appointment systems and physician scheduling; poor coordination among staff and quality of amenities in health facilities can increase waiting time in hospitals. The legitimate concerns about long patient waiting times are consequent on the significant frustrations it poses for the public, health providers and policymakers alike.[32,26] While variations in waiting times between facilities may reflect patients load and system efficiency, long waiting times could result in frustration and deterioration in the health of patients seeking care while waiting, loss of man-hour, substantial opportunity costs and negatively influence patients' confidence in available health service.[32]

The routine conducts of low-cost time-flow studies provide an opportunity for healthcare organizations to measure their performance toward achieving targets set for time spent by patients in their institutional standard operating procedures, or government-backed regulations or legislation on time spent. The implications of this work include directions for managers and healthcare professionals in healthcare organizations to embark on a focused Lean journey.

Demographic transitioning with a higher proportion of aged population and attendant higher incidence of non-communicable diseases and multi-morbidity makes it an imperative to promote strategies for self-reliance such as patient empowerment and self-care in this setting as a way of reducing frequent visits and high patient loads in the GOPC.

Finally, there would be a need to explore the enactment of regulations on time spent accessing care in public and private health facilities and this would force facility managers to develop and enforce strategies to reduce patient waiting time and improve their experiences with the service.

Study Limitation

The small sample size and utilization of only one public and private hospital were both limitations of this study. Nonetheless, it will provide insight into future scholarly endeavours.

Conclusion

Waiting time is a major factor that shows the condition of the quality of service in an organization. There is a need to explore other causes of these long waiting times as well as patient and system predictors of patient satisfaction. There is a need to introduce interventions centred on these findings that would enhance quality, effectiveness in time management and the experiences of patients accessing general outpatient care in both private and public hospitals.

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