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All correspondences should be addressed to

Professor Oghenekaro Godwin Egbi
Editor-in-chief

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Content Pages

Table of Content

INTERNATIONAL EDITORIAL ADVISORY BOARD continues

EDITORIAL: STEADILY FORGING AHEAD

Prof. Oghenekaro G. Egbi (MPH, FMCP, FWACP)
Editor-in-Chief

Niger Delta Medical Journal 2022;**6**(4):5

We welcome our readers to the last issue of 2022.

It has indeed been a pleasant year for our journal. We maintained our quarterly issue production and we are steadily forging ahead. As an icing on the cake, our Editor-in-Chief, Dr Oghenekaro Godwin Egbi was elevated to the position of a full Professor of Medicine by the Governing Council of his University in December. Congratulations to him and all members of his editorial team. We wish him greater strides in his academic journey.

We present a few articles in this issue in the fields of public health, obstetrics and general surgery. Udechukwu et al take a critical look at patients' waiting time which is considered as a key indicator of quality of health care and patients' satisfaction and identifies certain factors which may need to be addressed[1]. Addah and colleagues delve into the practice of obstetrics to take a retrospective look at placenta praevia and outcome in a tertiary hospital in a developing setting[2]. Dimoko and associates take a holistic view of acute appendicitis in their narrative review and report current trends in management while addressing possible challenges with various approaches[3].

We wish to use this opportunity to express our gratitude to our peer reviewers for their selfless service. We particularly thank all those that reviewed our articles in this out-going year. Their names are listed on the last page of this issue[4].

We are also grateful to all our subscribers and readers and to the members of the Medical and Dental Consultant Association of the Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State, Nigeria for their continued support as we look forward to a more prosperous 2023.

References

1. Udechukwu CU, Ogaji D, Ogoina D, Adesina AD. Analysis of waiting time in a General Outpatient Clinic of a Tertiary Hospital In Bayelsa State, Nigeria. *Nig Del Med J* 2022, 6(4): 6-21

2. Addah AO, Ofuruma NN, Ibrahim IA. The retrospective audit of clinical presentation and obstetric outcomes of pregnancies complicated by placenta previa: A five-year review in the Niger Delta. *Nig Del Med J* 2022, 6(4): 22-29.

3. Dimoko AA. Management of acute appendicitis: A review. *Nig Del Med J* 2022, 6(4): 30-43.

4. Peer reviewers for year 2022. *Nig Del Med J* 2022;6(4):44

ORIGINAL ARTICLE: ANALYSIS OF WAITING TIME IN A GENERAL OUTPATIENT CLINIC OF A TERTARY HOSPITAL IN BAYELSA STATE, NIGERIA.

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ABSTRACT

Background: *Waiting time impacts quality of care and reflects the responsiveness of the health systems. Analyzing factors affecting waiting time and addressing challenges leading to long waiting time in the outpatient department (OPD) may improve patient perception of and satisfaction with care.*

Objectives: *The study sought to investigate outpatient characteristics and to determine its association with waiting time among general outpatients in the Niger Delta University Teaching Hospital, Okolobiri.*

Methods: *A time flow study was done among 164 randomly selected outpatients. Questionnaires were used to obtain information on socio-demographic and household characteristics, payment mechanisms, patient type (new or returning) and day of visit. Data on time spent were collected using a time-motion log and a time piece. The median effective, idle and total time spent by participants were calculated and compared using non-parametric test. The level of significance was set at* $p \leq 0.05$.

Results: *Of the 164 participants, majority were females (65.2%), married (60.4%) and Christians (89.0%). Median total service, idle and waiting time were 36.5minutes (IQR:26.0–46.0minutes), 74.0minutes (IQR:55.3–99.5minutes) and 113.5minutes (IQR:86.0–138.7minute) respectively. Marital status (p -0.012), level of education (p = 0.0.037), socioeconomic status (p = 0.001), day of visit (p =0.042) and payment mechanism (0.001) significantly influenced waiting time in the GOPD.*

Conclusion: *Marital, educational and socio-economic status as well as payment method and patient type were found to be significantly associated with long waiting time in the GOPD. Health care providers should ensure equity in access and quality for different categories of patients attending the general outpatient clinic.*

Keywords: Outpatient; waiting time; tertiary hospital; Bayelsa State.

Introduction

Waiting time has become a vital component of healthcare delivery. It is an important indicator of quality care and a measure of responsiveness of the health systems function globally. Waiting time is defined as "the length of time from when the patient enters the outpatient clinic to the time the patient actually leaves the outpatient department (OPD)" [1] Other scholars define waiting time as the time a patient must wait between effective demand and receipt of specific services in the hospital [2]; as the time a patient waits in the clinic before being seen by one of the clinic medical staff [3] and as "the time that the patient spends waiting for service/s in a facility" per visit from entry to exit, taking into consideration the official opening time of a facility [4].

The OPD is the section of the hospital that provides healthcare services to patients without the need to stay overnight in the hospital. It is the window to hospital services [5,6]. Irrespective of the definition of waiting time, there is a consensus of opinions that patients should not be made to wait for too long in the OPD. The Institute of Medicine (IOM) in the USA, recommends that 90% of patients should be seen by a healthcare staff within 30 minutes of their presentation at the clinic. Waiting time is therefore, an important indicator of quality of services offered by hospitals and also affects patients' satisfaction and utilization of healthcare services.

Time-specific appointments are not the usual practice in Nigeria general outpatient clinics as most visits are unscheduled [7,8]. The volume of patients could be unpredictable which leads to crowding, poor queue management, long waiting time and reduced patient satisfaction [7,8].

Several studies on waiting time in a developing country like Nigeria, show that patients spend long hours in the OPD before seeing the doctor due to several institutional and manpower factors. Reported duration of time spent in the Nigerian clinical setting reveal in Usman Danfodio Teaching Hospital Sokoto, North-west Nigeria, patients spend between 90 – 180 minutes before seeing the doctor [3]. At the National hospital Abuja, the median patient–clinic encounter time was 2.7 hours (Range: 0.2–7.2 hours)[7]. At the University of Port Harcourt teaching hospital (UPTH), waiting time was found to be 274 minutes (80 – 525) minutes[9]; in a General hospital in Calabar 220.11 minutes (SD±62.26) [10]and a lower mean time of 146 minutes was reported in University of Benin Teaching Hospital [1].

Few studies have found waiting time to be associated with gender[3], insurance status[12], educational status [13] and day of visit [7,14]. There is a need to study general outpatients' characteristics in relation to patient waiting time as this will help healthcare institutions develop patient-centered standard of care for equitable service delivery

to all categories of patients.

This study investigated relationships between general outpatient characteristics (socio-demographic characteristics, household features, weekday of visit, payment mechanism and patient type) and waiting time in the general outpatient clinic of Niger Delta University Teaching Hospital Okolobiri, Bayelsa state, Nigeria.

METHODOLOGY

Study Design

The study was a cross-sectional descriptive survey that analysed waiting time in relation to outpatients' characteristics in the General Outpatient Clinic of Niger Delta University Teaching Hospital, Okolobiri.

Study setting

This study was carried out in the General Outpatient Clinics (GOPC) of the Family Medicine Department of Niger Delta University Teaching Hospital (NDUTH), Okolobiri, Bayelsa State South -South Nigeria. The hospital is a 200-bed state tertiary teaching hospital established in 2007. It has remained a hub for patient care and training of all cadres of undergraduate health workers and serves as a referral centre to other secondary care hospitals in the state.

The general outpatient clinics are operated in two separate buildings, one for the insured and the other for the non-insured patients. These outpatient clinics do not have formal appointment system, as patients' visits are largely unscheduled and documentations manually done. From the hospital's records during the study, average daily attendance for non-insured was 25 patients and for the insured was 56 patients. The general outpatient flow pathway for the insured and fee-paying patients is shown in the figure below.

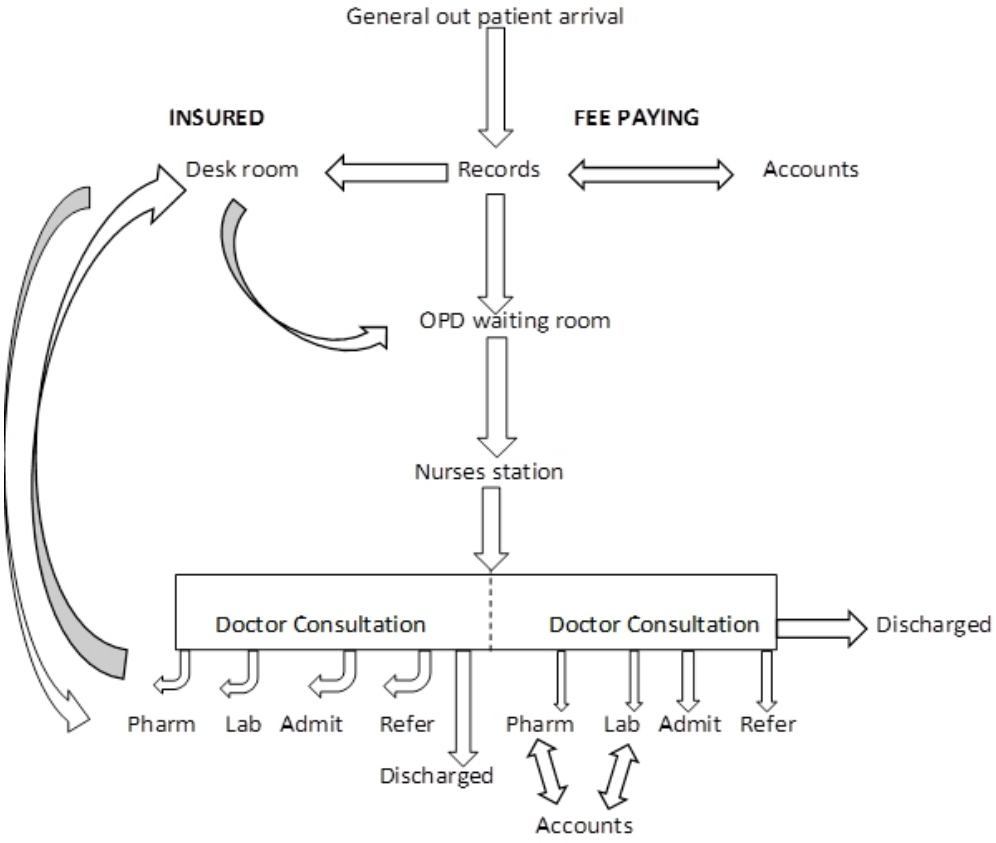

Figure 1: General Outpatient Flow Pathway

Study population

The study population included all adult patients (>18 years) that visited the general outpatient department during the period of the study. Very ill patients, patients for laboratory investigations and referred patients were excluded.

Sample size calculation

This is part of a larger study that analysed waiting time, satisfaction with waiting time and predictors of waiting time, in which the sample size of 164 was calculated using the formula for categorical data involving two independent proportions as shown below:

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

where,

n = sample size in each group (assumed equal sized groups)

p = (P1 +P2)/2 is the mean of the two proportions from previous study (75% and 96.7%).

$(P_1 - P_2)^2$ = Effect size (the difference in proportion)

$Z_{\alpha/2}$ = standard normal deviation corresponding to selected α level of 0.025 in each tail = 1.96

Z_{β} = desired power (typically 0.84 for 80% power)

$$n \text{ per group} = \frac{2\,(1.96 + 0.84)^2 * 0.8585\,(1 - 0.8585)}{(75 - 96.7)^2}$$

n per subgroup= 41 ×4 = 164

Sampling Method

From the hospital's records department, the average number of patients attending the general outpatient clinics daily for the past six months was determined. Because of the patient subgroups involved in this study, stratified sampling method was employed. The patient population was divided into the subgroups (insured, fee paying, new or revisit patients). The study sample was obtained by taking proportionate sizes from each subgroup.

From each stratum of patients, participants were recruited for the study by simple random sampling (balloting) starting from 8am and ending by 11am each day.

Study Procedure/Data Collection Process

Data was collected over a period of 3 weeks between October and November 2021. Eligible patients were recruited after the objectives, procedure and benefits of the study were explained to them and written informed consent obtained. Participants were followed by trained research assistants who used the time-motion logbook and synchronized time piece (handsets) to collect quantitative data on patients' time of entry, type of service and time spent at each service point, (records, nursing, consulting doctor and pharmacy) till the exit of the patient. This captured the waiting time in minutes at the various stations and the total clinic time by the patient at exit from the GOPD. This study investigated general outpatient waiting time in the records, nursing, doctor and pharmacy stations of the GOPD.

The times spent by the patients were operationalized as:

1. Idle time – time spent before receiving attention at the station
2. Service time – time spent receiving care

at the service station
3. Station waiting time – summation of the idle and service time at each station
4. Total service time –/ sum of all times spent receiving care across all service stations
5. Total idle time – sum of all idle times spent before receiving attention across all the service stations
6. Total Waiting time – sum of total service and total idle time spent at all service stations

At exit point, a validated structured questionnaire was used to collect information on patients' socio-demographic characteristics and household data.

Data analysis

The data obtained from the questionnaires were coded and entered into SPSS Version 25.0 (IBM Corp., Armonk, New York, USA) which was also used for data cleaning and analysis. Categorical variables (sex, marital status, residence, educational level and employment status) were summarized as frequencies and percentage. Continuous variables – total service, idle and waiting time - were summarized using median and interquartile range as the data were not normally distributed. The difference in waiting time between the groups, in the different categories were analyzed using non-parametric statistical tests (Mann-Whitney U- test and Kruskal-Wallis's test). Level of statistical significance was set at P value <0.05.

RESULTS

Characteristics of participants

There were 57 male participants (34.8%) and 107 female participants (65.2%) in the study giving a male to female ratio of 1: 1.9. The age ranges were nearly evenly distributed, however, participants aged 51 – 60 years were the modal age group (23.2%). Average age of participants was 44.3 years with a standard deviation of 14.0years. About 3 of every 5 participants (60.4%) were married, while 89 participants (54.3%) had tertiary level of education. (table1)

Table 1: Characteristics of study participants

Characteristics	Frequency N = 164	Percent (%)
Gender		
Male	57	34.8
Female	107	65.2
Age		
18 – 30 years	30	18.3
31 – 40 years	33	20.1
41 – 50 years	33	20.1
51 – 60 years	38	23.2
> 60 years	30	18.3

Marital status		
Married	99	60.4
Single	38	23.2
Separated/Widowed	27	16.5
Educational status		
No formal education	9	5.5
Primary	17	10.4
Secondary	49	29.9
Tertiary	89	54.3
Religion		
Christianity	146	89.0
Islam	4	2.4
Others	14	8.5
Employment status		
Public (Government) employed	83	50.6
Self- employed	40	24.4
Private sector employed	14	8.5
Very rich	18	11.0

While about half (50.6%) were employed in public service, close to a quarter (24.4%) were self-employed and about 16.5% were unemployed. Almost a third of participants were categorized as very poor (31.1%), while just above a tenth (11.0%) were classified as very rich (Table 1). This classification was based on the household properties owned by the patients using principal component analysis (PCA) [23].

Majority of the participants visited the hospital from Yenagoa town (45.1%), while 35.4% of participant were from the hospital host community (Gbarain), other participants were from other LGAs in Bayelsa state (13.4%) and some were from neighbouring states (6.1%) to Bayelsa state.

Systems characteristics (visit/payment/day)
Also, majority of participants were returning patients (71.3%), 50.0% were insured patients. Participants visiting the hospital on Wednesday (24.4%) and Thursday (24.4%) formed majority of participants (table 2)

Table 2: Participants' household/Hospital characteristics (visit/payment/day)

Characteristics	Frequency N = 164	Percent (%)
Residential location		
Gbarain	58	35.4
Yenagoa LGA	74	45.1
Other LGA in Bayelsa state	22	13.4
Neighbouring states (Rivers, Delta and Imo)	10	6.1
Number of members working in the household		
1 – 2 persons	145	88.4
≥ 3 persons	19	11.6
Number of HH members		
1 – 2 persons	22	13.4
3 – 5 persons	80	48.8
6 – 9 persons	52	31.7
>10 persons	10	6.1
Visit Status		
First timers	47	28.7
Returning	117	71.3

Service time, Idle time and Total waiting time

The median duration for service experience was 36.5 minute, ranging from 13.0 minutes to 109.0 minutes. Time spent waiting for service (idle time) was between 16.0 minutes and 236.0 minutes with a median value of 74.0 minutes. Total time spent in the GOP department was a median of 113.5 minutes with an interquartile range of 86.0 – 138.7 minutes (fig 2).

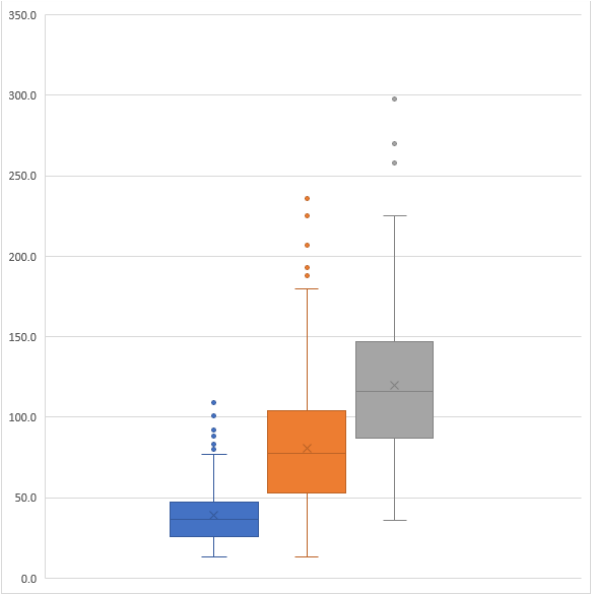

Figure 2: Box and Whisker plots showing the Service time (blue), the idle time (brown) and the Total waiting (grey) spent at the GOP Clinic

Waiting time and Sociodemographic characteristics of participants

Table 3 shows that total waiting time among participants was significantly higher (KW test = 8.80; P= 0.012) among participants who were married (Median = 123.0; IQR:89.0 – 155.0 minutes) than their counterpart who were single (Median = 99.0; IQR:80.8 – 121.0 minutes). The educational status of participants also significantly influenced (KW test = 8.47; P= 0.037) the length of time spent in the GOP department (Table 3).

Table 3: Waiting time and participants characteristics

Characteristics	Effective time Median (IQR)	*Significance Test (P Value)*	Idle Time Median (IQR)	*Significance Test (P Value)*	Total Time Median (IQR)	*Significance Test (PValue)*
Gender						
Male	37.0 (26.0, 46.0)	2942.5	80.0 (51.5, 99.5)	2997.0	116.0 (85.5, 137.5)	3067.0 **
Female	36.0 (26.0, 47.0)	(0.712)	72.0 (58.0, 100.0)	(0.856)	112.0 (86.0, 141.0)	(0.952)
Age group						
≤ 30 years	32.5 (23.8 – 41.2)	5.07	65.0 (49.0 – 87.0)	4.11	99.0 (84.0 – 127.8)	3.59 ***
31 – 40 years	39.0 (25.5 – 46.0)	(0.280)	72.0 (56.5 – 113.5)	(0.391)	108.0 (83.0 – 155.5)	(0.463)
41 – 50 years	40.0 (26.0 – 52.0)		82.0 (59.0 – 105.0)		123.0 (88.5 – 157.0)	
51 – 60 years	37.5 (28.0 – 46.0)		73.5 (57.3 – 95.3)		117.0 (89.5 – 136.3)	
>60 years	30.5 (22.8 – 46.3)		77.5 (63.5 – 104.8)		113.5 (86.0 – 150.3)	
Marital status						
Single	33.0 (24.0 – 39.5)	3.89	65.5 (44.5 – 82.8)	7.28	99.0 (80.8 – 121.3)	8.80 ***
Married	39.0 (26.0 – 47.0)	(0.143)	78.0 (58.0 – 111.0)	(0.026*)	123.0 (89.0 – 155.0)	(0.012*)
Separated/Widowed	34.0 (24.0 – 50.0)		74.0 (59.0 – 107.0)		113.0 (86.0 – 151.0)	
Residential address						
Yenagoa	37.0 (26.8 – 46.8)	1.65	75.0 (55.0 – 98.0)	0.12	111.0 (88.8 – 140.3)	0.20***
Gbarain	34.0 (23.8 – 45.0)	(0.649)	68.5 (59.0 – 98.5)	(0.990)	115.0 (85.0 – 136.0)	(0.977)
Other LGAs	38.0 (26.0 – 47.0)		77.0 (48.8 – 106.3)		116.5 (85.8 – 151.3)	
Other States	36.5 (23.8 – 51.0)		89.5 (40.8 – 122.3)		118.0 (72.0 – 169.3)	
Educational status						
No formal education	29.0 (25.5 – 34.5)	7.49	59.0 (44.0 – 88.0)	7.84	86.0 (71.0 – 121.5)	8.47***
Primary	30.0 (20.0 – 45.0)	(0.059)	82.0 (61.5 – 112.0)	(0.049*)	111.0 (81.5 – 150.5)	(0.037*)
Secondary	35.0 (26.5 – 45.5)		63.0 (52.5 – 84.5)		97.0 (86.0 – 130.5)	
Post-secondary	38.0 (26.0 – 49.5)		81.0 (59.0 – 106.5)		122.0 (91.0 – 157.5)	
Religion						
Christianity	36.5 (26.0 – 46.0)	0.33	74.5 (56.5 – 100.3)	1.71	115.0 (86.0 – 139.5)	1.07***

*Statistically significant; IQR – Interquartile range; Mann-Whitney U test (MU**) was used in comparing the categories of two to variables; Kruskal-Wallis's test (KW***) was used to compare characteristics with more than two variables.

While participants with no formal education spent a median time of 86.0 minutes (IQR: 71.0 – 121.5 minutes), participants with tertiary level of education spent as high as 122.0 minutes (IQR: 91.0 – 163 minutes) in the GOP department (Table 3). There was no significant difference in the total waiting time of the categories of gender (U test = 3067.0; p = 0.952), age group (KW test = 3.59; p =0.463), residential area (KW test = 0.20; p = 0.977), and religion (KW test = 1.07; p = 0.587).
Furthermore, table 3 revealed that the significant difference observed in total waiting time with respect to marital status (KW test = 7.28; p = 0.026) and educational status (KW test = 7.84; p = 0.049) was a result of significantly longer idle time. Across all the categories of sociodemographic variables the effective service time was not significantly different (p > 0.05).

Waiting time and household characteristics
As shown in table 4, effective service time increased gradually from the very poor (Median = 31.0minutes; IQR: 24.0 – 42.0) to the very rich (Median = 46.5minutes; IQR: 36.8 – 67.5 minutes) showing a significant difference (KW test – 9.86; P= 0.043).

Table 4: Household features and waiting time in minutes

Characteristics	Effective time Median (IQR)	*Significance Test (P value)*	Idle Time Median (IQR)	*Significance Test (P Value)*	Total Time Median (IQR)	*Significance Test (PValue)*
Number of HHS						
1 – 2 persons	34.5 (22.8 – 39.3)	6.08	68.5 (50.8 – 81.0)	2.69	98.0 (84.0 – 120.3)	4.44***
3 – 5 persons	34.0 (26.0 – 45.8	(0.108)	72.0 (53.0 – 103.0)	(0.449)	110.5 (83.0 – 144.8)	(0.218)
6 – 9 persons	41.0 (28.5 – 50.0)		80.0 (60.5 – 100.3)		122.5 (92.3 – 150.8)	
>10 persons	33.5 (19.8 – 48.8)		86.5 (61.3 – 124.3)		120.5 (86.3 – 168.8)	
Number of working in the household						
1 – 2	37.0 (26.0 – 46.0)	1300.0	74.0 (55.0 – 99.5)	1495	113.0 (86.0 – 143.5)	1433 **
>3	36.0 (25.0 – 43.0)	(0.690)	80.0 (60.0 – 100.0)	(0.544)	124.0 (85.0 – 136.0)	(0.776)
Primary occupation						
Publicly employed	39.0 (27.0 – 47.0)	3.23	82.0 (63.0 – 106.0)	6.19	124.0 (90.0 – 151.0)	6.61***
Self employed	33.5 (25.0 – 46.0)	(0.358)	65.5 (57.3 – 93.8)	(0.102)	105.5 (83.0 – 137.3)	(0.085)
Privately employed	39.0 (25.8 – 43.8)		63.5 (42.8 – 84.5)		92.0 (76.0 – 142.5)	
Unemployed/students	31.0 (24.0 – 38.0)		68.0 (49.0 – 89.0)		101.0 (84.0 – 130.0)	
Household income source						
Salary	39.0 (26.0 – 47.0)	3.01	78.0 (59.0 – 100.0)	2.03	118.0 (89.0 – 139.0)	3.37***
Business/investment	34.0 (26.0 – 46.0)	(0.223)	65.5 (55.3 – 102.0)	(0.363)	98.5 (83.0 – 149.5)	(0.185)
Welfare	28.0 (20.0 – 42.5)		65.0 (42.5 – 100.0)		101.0 (74.0 – 124.5)	
Socioeconomic status						
Very poor	31.0 (24.0 – 42.0)	9.86	66.0 (49.0 – 87.0)	18.85	101.0 (81.0 – 123.0)	21.21***
Poor	34.0 (26.0 – 46.8)	(0.043*)	61.5 (53.0 -89.8)	(0.001*)	101.5 (81.8 – 130.3)	(0.001*)
Not poor	39.0 (17.0 – 47.0)		66.0 (41.0 – 111.0)		121.0 (84.0 – 137.0)	
Rich	38.0 (26.0 – 46.3)		86.0 (61.5 – 126.0)		123.0 (93.0 – 157.0)	

*Statistically significant; IQR – Interquartile range; Mann-Whitney U (MU**) test was used in comparing the categories of these variables; Kruskal-Wallis' test (KW***) was used test the mean rank of more than two variables

The idle time ((KW test – 18.85; P= 0.001) and total waiting time (KW test – 21.21; P=0.001) were also significantly different among the socioeconomic categories of participants (Table 4). Occupation, household income source, number of working adults and number of household members did not significantly influence a change the service, idle and total waiting time (P > 0.05)

Waiting Time and hospital Visit features

Insured participants spent significantly longer (P < 0.005) service time (Median = 41.5 minutes Vs 31.5 minutes), idle time (Median =92.0minutes Vs 60.0 minutes), and total waiting time (Median =135.0 minutes Vs 91.5 minutes) than the fee-paying participants in the GOP department (Table 5). Although, idle time (Median = 80.0 minutes Vs 68.0 minutes) and total waiting time (Median = 121.0minutes Vs 101.0 minutes) were significantly longer (P < 0.05) in returning patients than new patients (Table 5), the effective service was not significantly different (P= 0.849) between new and returning patients. Participants attending the GOP department on Thursday recorded the longest idle time (Median = 83.0 minutes; IQR: 63.5 – 121.8 minutes) and total waiting time (Median = 128.5 minutes; IQR: 92.3 – 160.3 minutes) on Thursday showing a significant difference between idle and total waiting times of the other days of the week (Table 5).

Table 5: Waiting Time and hospital characteristics

Characteristics	Effective time Median (IQR)	*Significance Test (p Value)*	Idle Time Median (IQR)	*Significance Test (p Value)*	Total Time Median (IQR)	*Significance Test (pValue)*
Week day of Visit						
Monday	34.0 (22.0 – 46.5)	4.17	82.0 (65.5 – 104.0)	10.31	116.0 (94.5 – 135.0)	8.54 ***
Tuesday	39.0 (30.0 – 47.0)	(0.383)	71.5 (53.0 – 95.8)	(0.036*)	113.5 (89.8 – 148.5)	(0.074)
Wednesday	34.5 (24.3 – 51.5)		67.0 (49.3 – 94.8)		112.5 (76.5 – 148.5)	
Thursday	38.0 (31.0 – 46.0)		83.0 (63.5 – 121.8)		128.5 (92.3 – 160.3)	
Friday	33.0 (21.5 – 41.0)		60.0 (46.0 – 80.5)		95.0 (79.5 – 123.0)	
Payment Mechanism						
Insured	41.5 (30.8 – 51.8)	2079.0	92.0 (66.0 – 121.8)	1681.0	135.0 (108.8 – 163.5)	1352.0**
Fee-paying	31.5 (23.8 – 39.0)	(0.001*)	60.0 (47.8 – 81.0)	(0.001*)	91.5 (78.0 – 116.5)	(0.001*)
Patient type						
New patients	35.0 (27.0 – 43.0)	2802.0	68.0 (45.0 – 89.0)	3305.5	101.0 (85.0 – 129.0)	3308**
Returning patients	37.0 (24.5 – 46.0)	(0.849)	80.0 (58.0 – 106.5)	(0.043*)	121.0 (87.0 – 151.0)	(0.042*)

*Statistically significant; IQR – Interquartile range; Mann-Whitney U test (MU**) was used in comparing the categories of these variables; Kruskal-Wallis' test (KW***) was used test the mean rank of more than two variables.

DISCUSSION

This study investigated socio-demographic characteristics, household characteristics, hospital visit characteristics and waiting time in the general outpatient clinic of a tertiary hospital in south-South Nigeria.

Findings from this study showed more females (65.2%) than males (34.8%). This is similar to what was found Sokoto North west Nigeria 62.5% females and 37.5% males [3], and also at National hospital Abuja 54.1% females and 45.9% males [7], and in Port

Harcourt females 58.6% and males 41.4% [9]. This may be an indication of poor health seeking behaviour of men in this area. Evidence from literature suggests men are less likely to seek health services compared to women [21,22].

In two Ethiopian study, 60.8% males and 39.2% females and 54.4% males and 45.6% females were found[15, 13]. In India, a ratio of 56% males and 44% females was found[16]. From this study, gender was not significantly associated with waiting time ($p>0.05$). Some studies in north western Nigeria[3], in Kenya[17] and in India[18] found that women spend significantly more time waiting in the OPD than men. The Indian gender bias was attributed to the misogynist culture of India; where men are given preference everywhere over women.

Total waiting time among participants was significantly higher among participants who were married than their counterpart who were single. The reason for this difference is not certain but may be related to the encumbrances or burden associated with each status. The single or never married is less encumbered by family matters and therefore could go early to the clinic to be attended to early too. This may account for the less waiting time and less total clinic times. The married and widowed/separated have family attachments that may prevent them from going early to the clinic. Majority of the patients in these categories are also older and less smart in carrying out their clinic activities.

There was no significant difference in effective time, idle time ant total time among patients from different residential areas. Where a patient resides has no effect on waiting time. A study in Ethiopia, found that patients who came far from the hospitals were 1.93 times more likely to spend longer waiting time when compared to those who came from the hospital's area[13]. The location of the hospitals and the transport logistics available to the patients may account for this finding.

A majority of the study participants had post-secondary education. The reason for the high number of respondents with post-secondary education was because half of the respondents were civil servants under the state health insurance scheme (BHIS). The educational status of participants significantly influenced (KW test = 8.47; $p = 0.037$) the length of time spent in the GOP department. Participants with no formal education spent less time than participants with tertiary level of education in the GOP department. Someone who has post-secondary education is more likely to spend longer time in the GOPD than someone with no formal education. One of the reasons for this result may be because of the sample size. Those with no formal education were fewer in number 9 (5.5%), compared to 89 (54.3%) for those with post-secondary education. Again, more than 50% of those with post-secondary education were insured patients and civil servants. They need to get clearance from the BHIS desk office before moving from one clinic station to another. The clearance takes time and affects their total clinic time.

A study in north western Nigeria, found there was no statistically significant association between total clinic waiting time and education [3]. However, a study in Ethiopia [13] and south-east Nigeria[19] found that patients who were unable to read and write were about two times more likely to spend longer waiting time at hospital as compared to those with tertiary education. This could be due to the difficulty they may have in reading

and understanding directional signs and communicating effectively leading to time wasting and increased clinic time.

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Household features and waiting time in the GOPD

On house hold features of patients and waiting time, only socio-economic status showed significant difference. There were significant differences in the service time (KW test – 9.86; p = 0.043), waiting time ((KW test – 18.85; p = 0.001) and total time (KW test – 21.21; p =0.001) of the patients according to their socio-economic status. The very poor spent the least service, 31.0minutes, waiting time 66.0 minutes and total time 101.0 minutes respectively. The very rich spent for service time 46.5 minutes, idle (waiting) time 95.0 minutes and total time 159.0 minutes. In this study, socio-economic status was a significant determinant of waiting time. The very rich and the rich, are more likely to experience longer waiting time in the GOPD than the poor and very poor. One of the reasons for this may be because the rich and very rich could be more enlightened and may engage the service providers longer, as seen in the duration of their service time, 38.0 minutes and 46.5 minutes than the very poor and the poor. It was also possible that the poor and very poor exited early because they did not have money to purchase drugs from the pharmacy.

Weekday of visit, Payment method, Patient type and Waiting time in the GOPD

On weekday of visit, there was significant differences in the waiting time and total time spent in the GOPD according to days of visit (p= 0.036). Patients that visited the general outpatient clinic on Thursdays experienced longer waiting time than other days while those that visited on Fridays experienced less waiting time than other days. Therefore, the day of visit is significantly associated with waiting time in the GOPD. The specialist clinics that operate on Thursdays may be responsible for the longer time experienced by patients' as well as the efficiency and number of staff on duty on Thursdays. These factors need to be investigated further.

In a similar study, in Ethiopia and India, it was found that patients who visited the hospital on Monday were 2.64 times more likely to experience longer waiting time at the hospital facility as compared to those who visited the hospital on other days [13,14]. They attributed it to the increased patient load experienced on Mondays because of closure of clinics on Sundays.

The insured patients spent significantly more time than the fee-paying patients across the three times (p = 0.001). The reasons for this inequity in waiting time between the insured and fee-paying can be partly explained by the administrative and registration processes in the health insurance section which are time consuming and often repetitive. Revisit patients will have to go to the records station first for retrieval of the folder. The patient now moves on to the desk room (administrative) section to obtain prescription paper. After consulting with the doctor, the patient goes back to the desk room for clearance to go to the pharmacy for drugs or laboratory for tests. Depending on the nature of the laboratory investigation requested by the doctor, clearance must be obtained from the state headquarters of the health insurance scheme. This may take hours or even days if the telecommunication network is poor. Secondly, the longer time spent by the insured in the GOPD could be attributed to the larger average daily number of insured patients seen which infers a higher case load for the attending health workers.

This scenario extends to the pharmacy section for insured patients with average daily attendance of 46 compared to the non-insured pharmacy section with a daily average of 11. There are also indications that most of the fee-paying patients do not patronize the hospital pharmacy which reduced their total time spent. Finally, there is relative shortage of nurses and doctors in the insured section of the GOPD compared to the fee-paying section of the GOPD with a current ratio of 1:2. These increase the patients load on the healthcare staff and increase the average waiting time and total clinic time of patients.

A study in Vietnam, found that outpatient waiting time was much higher among patients having health insurance compared to their counterparts without health insurance[20]. They attributed this to the complex health insurance-related administrative procedures and suggested the process should be simplified. In Germany, a sizeable difference in waiting times favouring private patients compared to statutory health insurance holders (SHI) was found[12]. They observed that if a private health insurance (PHI) patient is treated, reimbursement rates are about 3 times higher.
Revisit patients experienced longer waiting time and total clinic time than the new patients. The difference in waiting time was statistically significant (MU= 3305.5; p=0.043). In this study, revisit patients experienced a longer waiting and total clinic time in the GOPD than new patients. The reasons for this include the delay in retrieving patients' folders by the records staff. The hospital still operates the manual recording system. Also, the cases of missing or misplaced patients' folders cause delay as these folders are searched for extensively before being found or the patient issued a temporary folder after hours of unsuccessful search. This situation will certainly increase the waiting and total clinic times.
However, new patients were found to spend longer time 57.6 minutes than revisit patients 55.4 minutes at the OPD in a study in India[14]. The reason they found was because of more time needed for history taking and examination of the new patient by the doctor.

Limitation of the Study
This was a cross sectional single-facility-based study and so, a cause-and-effect relationship between waiting time and patient characteristics could not be established and findings may not be generalizable to other health facilities in Bayelsa state. It may however be applicable in similar settings
The study focused only on general out-patients, excluding other outpatient clinics and so findings cannot be generalized as factors that contribute to long waiting time in other outpatient clinics of the hospital.

The findings on socio-economic status (properties owned and income) may not reflect the true status of the respondents because of security, cultural and socio-political circumstances of the study area. Some of those categorised as poor or very poor may not have actually disclosed all their house hold properties which was used to categorise them.

Finally, the sample size used in this study was not sufficient for the robust statistical analyses conducted to identify predictors of waiting time

Implications of the findings
The findings have exposed existing gaps in service experience between different categories of general outpatients. The policy implication here is that hospital managers must develop patient centered strategy to

guide and track efforts at quality improvement for equitable service experience of all general outpatients. A further study is needed to determine factors associated with long waiting time in other outpatient clinics in the hospital, within the context of sociodemographic features and other patient characteristics. This will help policy makers and hospital managers in the development and integration of quality improvement methods that will be all encompassing.

Conclusion

Sociodemographic characteristics and socio-economic status of patients, insurance status and day of hospital visit are associated with waiting time of patients attending the GOPD of Niger Delta University Teaching hospital, Okolobiri.

These indicate service inequity and could be barriers to access to healthcare. A better understanding of these factors, that influence patient waiting time, will help develop intervention that will be effective in reducing waiting time in the OPD.

REFERENCES

1. Shahzadi S, Annayat S. Factors Associated with Patient Waiting Time at Outpatient Department in Allied Hospital Faisalabad. *J Bio Agri Healthcare;* 2017 Vol.7, No.17; (Paper) ISSN 2225-093X (Online)
2. Idowu PA, Adeosun OO, Williams OK. Dependable Online Appointment Booking System for NHIS Outpatient in Nigerian Teaching Hospitals. *Inter J Comp Sci Info Tech.* 2014 *6*(4), 59-73. https://doi.org/10.5121/ijcsit.6405
3. Oche M., Adamu H. Determinants of patient waiting time in the general outpatient department of a tertiary health institution in North Western Nigeria. *Ann Med Health Sci Res.* 2013; 3(4), 588–592.
4. National Department of Health, (NDH) Pretoria, South Africa. National Policy on Management of Patient Waiting Time in Outpatient Departments. 2015 Available at www.idealhealthfacility.org.za › docs › policies › 01/10/2020. Accessed on 15/04/2022
5. Pandit AP, Kulkarni M, Kamthe A. Defects in OPD Process Leading to Patient Dissatisfaction. Int E J 2016; 2 (6) No:2454-9916:
6. Patel R, Patel HR. A study on waiting time and out-patient satisfaction at Gujarat medical education research society hospital, Valsad, Gujarat, India. Int J Community Med Public Health [Internet]. 2017 Feb.22; 4(3):857-63. Available at https://www.ijcmph.com/index.php/ijcmph/article/view/1136. Accessed on 10/05/2022
7. Ogunfowokan O, Mora M. Time, expectation and satisfaction: Patients' experience at National Hospital Abuja, Nigeria. *Afr J Prim Health Care Fam Med.*2012 4(1): 398. doi: 10.4102/ phcfm. v4i1.398
8. Lailomthong N, Prichanont S. Patient's Waiting Time Reduction in Outpatient
Department. International Conference on Advances in Engineering and Technology (ICAET'2014) 2014, March 29-30, Singapore. http://iieng.org › images
9. Ogaji DS, Mezie-Okoye M M. Waiting time and patient satisfaction: Survey of patients seeking care at the general

outpatient clinic of the University of Port Harcourt Teaching Hospital. *Port Harcourt Med J*. 2017; 11 (3):148-155.

10. Adindu A, Esu E. Waiting for health care: clients' response to waiting time at the outpatient department of a general hospital in Nigeria. *Continental J. Tropical Medicine* 2012, 6 (2): 16 - 21: doi:10.5707/cjtm.6.2.16.21
11. Enabulele O, Ajokpaniovo J, Enabulele JE. Patient Waiting and Consultation Time in the General Practice Clinic of the University of Benin Teaching Hospital, Edo State, *Nigeria. J Family Med Community Health*. 2018, 5(2): 1146.
12. Heinrich N, Wübker A, Wuckel,C. Waiting times for outpatient treatment in Germany: New experimental evidence from primary data, Ruhr Economic Papers, 2017, No. 683, ISBN 978-3-86788- 792-2, RWI-Leibniz-Institutfür Wirtschaftsforschung, Essen, http://dx.doi.org/10.4419/86788792
13. Biya M, Gezahagn M, Birhanu B, Yitbarek K, Getachew N, Beyene W. Waiting time and its associated factors in patients presenting to outpatient departments at Public Hospitals of Jimma Zone, Southwest Ethiopia. *BMC Health Services Res*. 2022, 22 (1): 107.
14. Chopade RR, Sharma NK, Sundar SM. A time and motion study in outdoor patient department of rural health training centre of tertiary medical college in Konkan region, India. *Int J Community Med Public Health* [Internet]. 2019 Jul. 26;6(8):3242-5. Available at: https://www.ijcmph.com/index.php/ijcmph/article/view/5165. Accessed on 01/06/2022
15. Belayneh M, Woldie M, Berhanu N, Tamiru M. The determinants of patient waiting time in the general outpatient department of Debre Markos and Felege Hiwot hospitals in Amhara regional state, North West, Ethiopia. *Glob J Med Pub Health* 2017, Vol. 6, No. 5
16. Naaz F, Mohammed I. A time motion study to evaluate the average waiting time in OPD with reference to patient satisfaction in the setting of state-level AYUSH Hospital (India). *Med J lamic World Acad Sci*. 2019; 27(3): 71-76
17. Wafula RB, Ayah DR. Factors Associated With Patient Waiting Time at a Medical Outpatient Clinic: A Case Study of University of Nairobi Health Services. *Int J Innov Res Med Sci* 2021;6 (12):915-8. Available from: https://ijirms.in/index.php/ijirms/article/view/1307
18. Sriram S, Noochpoung R. Determinants of hospital waiting time for outpatient care in India: how demographic characteristics, hospital ownership, and ambulance arrival affect waiting time. *Int J Community Med Public Health*; 2018, 5(7):2692-2698
19. Aloh HE, Onwujekwe O E, Aloh OG, Okoronkwo IL, Nweke CJ. Impact of socioeconomic status on patient experience on quality of care for ambulatory healthcare services in tertiary hospitals in Southeast Nigeria. *BMC health services research*, 2020; 20(1), 473. https://doi.org/10.1186/s12913-020-05332-0
20. Tran T D, Nguyen UV, Minh Nong V, Tran BX. Patient waiting time in the outpatient Clinic at a central surgical

hospital of Vietnam: Implications for resource allocation. F1000 Res 2017, 6:454. PMC5482327. https://doi.org/10.12688/f1000research.11045.3

21. Ogunyemi A O, Egemba T O, Onigbogi O O. Health-seeking Behaviour and Self-rated Health of Adult Men in an Urban Local Government Area in Lagos, Nigeria. *Ann Health Res.* 2021;7: 2: 153-164.

22. Thompson A E, Anisimowicz Y, Miedema B, Hogg W, Wodchis W P, Aubrey-Bassler K. The influence of gender and other patient characteristics on health care-seeking behaviour: a QUALICOPC study. *BMC family practice*, 2016. *17*, 38. https://doi.org/10.1186/s12875-016-0440-0

23. Vyas S, Kumaranayake L. Constructing socio-economic status indices: how to use principal components analysis, *Health Policy Plan* 2006;21, (6):459–468.

THE RETROSPECTIVE AUDIT OF CLINICAL PRESENTATION AND OBSTETRIC OUTCOMES OF PREGNANCIES COMPLICATED BY PLACENTA PREVIA: A FIVE-YEAR REVIEW IN THE NIGER DELTA

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ABSTRACT

Background.

Placenta previa is a significant source of anxiety for Obstetricians because of the difficulties associated with its management: The placenta previa is the term used when the placenta is sited in the lower uterine segment, wholly or partially covering the internal os. At term when the cervix begins to efface and dilate in preparation for labor, the placenta dethatches from its attachments thereby provoking massive obstetric hemorrhage, warranting a cesarean delivery (CS). The objective of this study was to audit the management of pregnancies complicated by placenta previa and their outcomes including morbidity and mortality at the Niger Delta University Teaching Hospital Okolobiri over a period of five years.

Methodology

This study was a retrospective analysis of all women whose pregnancies were complicated with placenta previa and was delivered at the Niger Delta University Teaching Hospital, Okolobiri Nigeria from January 1st, 2016 to December 31st, 2020. Relevant information was extracted from patient folders using a proforma including sociodemographic factors and other relevant factors such as, age, marital status, parity, gestational age at delivery, mode of delivery, blood loss at delivery, the hierarchy of the Surgeon and others. The Data obtained were analyzed using SPSS statistical software Version 25

Results.

There were 1,876 deliveries during the study period, 661 patients had Caesarea sections of whom 35 of them had placenta previa, giving a hospital prevalence of placenta previa to be 1.9 %. Placenta previa was accidentally diagnosed in 47.1 % of patients. Type 3 placenta Previa (40.8%) was the most common variety. Emergency CS constituted 55.6%, and elective Cesarean made up 44.4% of cases. The most

common risk factors identified in the study were the previous termination of pregnancies by dilatation and curettage which made up 29.1% of patients; previous CS and multiparty were found in 24.6% each of the study population.

Conclusion. *Obstetricians should srtive to save maternal life in the dire emergencies of placenta previa. Care givers should use every tool at their disposal to nurture the fetus to a gestational age of independent survival at birth.*

Keywords: *Placenta Previa, Obstetric hemorrhage, Cesarean Section. Conservative* management*, Maternal/Infant morbidity and Mortality.*

INTRODUCTION

Placenta previa is defined as one that lies partially or wholly sited in the lower uterine segment after 20 weeks of pregnancy.[1] In early pregnancy, the uterus is a pelvic organ, the placenta edge at this time may touch the internal os and is known as a low-lying placenta. With increasing gestation and uterine enlargement, the latter becomes an abdominal organ and the low-lying placenta in early pregnancy moves into the upper uterine segment as the latter is formed and is regarded as a normal-sited placenta. These physical developmental changes of the placenta are known as placenta migration or spontaneous resolution of a low-lying placenta. With placenta migration also, the latter moves a distance away from the internal os: if more than 20mm away it is known as marginal placenta previa, but if less than 20mm, it is known as major degree placenta previa. Placenta previa risks of management follow these characterizations. [2, 3] Due to these changes in placenta migration, confirmatory repeat ultrasound is requested from subjects at 32 weeks of gestation for the diagnosis of placenta previa. [3,4,6,]

All major degree placenta previa should be delivered by Cesarean sections because at the onset of labor and as uterine contractions ensue, there is cervical effacement and dilatation and this may make the placenta previa detach from its uterine attachments thereby provoking massive obstetric hemorrhage. [7,8]

The risk factors of placenta previa include previous Caesarean sections, multiparity, advanced maternal age, invitro-fertilization pregnancies, and previous termination of pregnancies by dilatation and curettage. In most of these scenarios, the embryo has difficulties implanting in the uterine decidua leading to abnormal placentation.[3]

The objective of this study was to audit the management of pregnancies complicated by placenta previa and their outcomes at the Niger Delta University Teaching Hospital Okolobiri over a five year period. The findings may be useful to clinicians, health care planners and stakeholders in determining prioritization of clinical care and funds while trying to close the gaps in maternal mortality.

MATERIALS AND METHOD

This was a retrospective study of all cases of placenta previa complicated pregnancies that were managed at the Niger Delta University Teaching Hospital, Okolobiri during the period spanning from January 1st, 2016, to December 31st, 2020. The folders of all the cases managed were retrieved from the medical records department of the hospital. The relevant data were retrieved using a proforma. The data extracted from the patients'

folders included the demographic characteristics of subjects, previous terminations of pregnancies by dilatation and curettage, previous Caesarean sections and previous myomectomies, Data collected were entered into SPSS version 25 and analysed using frequencies tables. See results below.
Ethical clearance was obtained from the hospital's research and ethical committee.

RESULTS.
There were 1,876 deliveries during the study period, and 661 of the subjects had caesarean sections: giving a hospital caesarean section rate of 35.23 %. Amongst those who had caesarean deliveries, 35 of them were complicated by placenta previa: giving a hospital placenta previa prevalence rate of 1.9.%. The majority of the subjects (66.7%) were booked for antenatal care, while 33.3% were unhooked. The results are summarized in the tables below.

Table 1 shows the sociodemographic characteristics of the studied subjects. The most common group affected by placenta previa were subjects aged between 35-39 years which made up 28.6% of the subject's population. The mean age of women in the study was 31.8 years. All the patients studied were Christians and married. The study also revealed that 48.2% of placenta previa was seen in patients with secondary levels of education and 55.6% in multiparous women. More than two-thirds (66.7%) of the cases were diagnosed on routine ultrasound scan.

Table 1: Sociodemographic Characteristics of Subjects.

Age group	Frequency	Percentages
20-24	3	8.6
25-29	9	527
30-34	9	527
35-39	10	28.6
≥40	4	11.4
Total	35	100
Marital Status		
Single	–	–
Married	35	100
Religion		
Christianity	35	100
Islam	–	–
Educational Status		
Primary	6	17.1
Secondary	16	45.8

Tertiary	13	37.1
Total	35	100
Parity		
Nullipapara	4	11.4
Primipara	8	22.9
Multipara	19	54.3
Grandmultipara	4	11.4
Total	35	100
Booking Status		
Booked	22	62.9
Unbooked	13	37.1
Total	35	100

Table 2: Frequency of risk factors for placenta previa among the study participants (may be one or multiple) N = 35

Risk Factors	Frequency	Percentage
Unknown	2	5.7
Previous D/C	19	54.3
Previous placenta previa	2	5.7
Previous myomectomy	4	11.4
Previous C/S	16	45.7
Multiparity	16	45.7
Diabetes mellitus	2	5.7
Uterine fibroid	4	11.6

D/C = dilatation and curettage, C/S= caesarean section

The most common risk factor for placenta previa from this study was the previous history of dilatation and curettage 19(29.2%); previous CS and multiparty were seen in16 (24.6%) apiece, Reports of other risk factors (frequencies and percentages) are shown in Table 2 above.
Table 3 shown below revealed the pattern of presentation, types of placenta previa, and the gestational age at delivery.

Many of the patients had more than one symptom. Almost half of the cases (47.1%) were asymptomatic and diagnosed with a scan while 32.4% had painless vaginal bleeding. The most common type of placenta previa was type 3 seen in 40.8%. while type 1 occurred in 7.4% of cases. The study also showed that 92.6% of the patients presented at ≥34 weeks gestation. Most (88.9%) of the patients were actively managed at presentation while expectant management was applied in 11.1% of the cases managed. All the cases managed in this study had caesarean delivery, with over half (55.6%) of the cases having an emergency CS. About one-third (29.6%) of the patients presented with anemia, while 70.4% had post-operative anaemia.

Table 3: Clinical and Management attributes of Pregnancies Complicated by Placenta Praevia (maybe one or multiple symptoms.). (N = 35).

Presentations	Frequency	Percentage
Asymptomatic (accidental finding on USS)	16	45.71
Painless vaginal bleeding	19	54.29
Total	35	100
Type of placenta previa		
Type 1	4	11.4
Type 2	7	2 0
Type 3	13	37.1
Type 4	11	31.4
Total	35	100
GA at presentation/ delivery		
< 34 weeks	6	17.1
≥ 34 weeks	29	82.9
Type of management		
Expectant	28	80
Active	**7**	20
Mode of delivery		
Vaginal	0	0
Elective C/S	16	45.7
Emergency C/S	19	54.3
Type of Anaesthesia		
SAB	25	71.4
Gestational Age	10	28.6
Pre-operative PCV		
<30	13	34.3
≥30	23	65
Post operation PCV		
<30	23	65.7
≥30	12	34.3
Units of Blood Transfused		
1	3	8;6
2	9	25.7
3	3	8.6
4	2	5,7

GA=Gestational Age, PCV= Packed Cell Volume

Table 4 consists of the feto-maternal outcome. The fetal complications noted in this study were low birth weight 13.5%, birth asphyxia 10.8%, and intrauterine fetal death at 2.7%. More than half (59.5%) of the babies had normal birth weight; while 13.5% of the babies were admitted into SCBU for neonatal sepsis, neonatal jaundice, low birth weight, hypoglycaemia, and birth asphyxia. These babies were all discharged home in good clinical condition.

The maternal complications noted were postoperative anaemia 47.4%, PPH 37.0%, shock 10.4%, peripartum hysterectomy, and wound infection 2.6% each. There was no maternal mortality noted in the study.

Table 4: Feto-maternal outcomes

Fetal Outcome	**Frequency**	**Percentage**
SCBU Admission	5	13.5
Birth asphyxia	4	10.8
IUFD	1	**2.7**
LBW (<2.5kg)	5	13.5
Normal birth weight	22	59.5
Maternal outcome	**Frequency**	**Percentage**
PPH	15	37.0
Peripartum hysterectomy	1	2.6
Anaemia	18	47.4
Wound infection	1	2.6
Shock	4	10.4
Maternal mortality	_	_

SCBU= Special Care Baby Unit, PPH-=Post-Partum Hemorrhage, IUFD= Intrauterine fetal LBW = low birth weight

DISCUSSION

The management of pregnancies complicated by placenta previa is one of cautious optimism because of the difficulties associated with its management including the delivery. This is because these pregnancies are marred by obstetric hemorrhage. However, for the Obstetrician, the antenatal woman and her baby should be alive and well at the end of pregnancy, especially for her expectant family as it was in this study. It is an enormous and difficult task placed in the hands of the Obstetrician.[9]

In the course of 5-years of obstetric practice in our center, we managed 35 pregnancies complicated by placenta previa. It is noteworthy that almost half of the cases of placenta previa in our study had primary post-partum hemorrhage during cesarean delivery. This result is similar to a 5- year review in Southwest Nigeria (Sagamu) where primary post-partum hemorrhage was the most common complication.[10]

This is why it is important for obstetricians to include in their preoperative preparation the

act of reserving at least 2 units of blood for transfusion in case the need arises for blood transfusion to replace loss either during the antenatal, intrapartum or in the post-postpartum periods.

Due to the exigencies of placenta previa, we used Cesarean sections to deliver all the pregnancies that were complicated by placenta previa. in our study, at this time, we transfused 38 units of blood during the Cesarean procedures, meaning we transfused a 1.1:1 ratio of units of blood for every woman that had operative delivery. This blood usage is happening in a region (sub-Saharan Africa) where there is a scarcity of blood/cum donors for transfusion. [11]

The prevalence of placenta complicated pregnancies was 1.9% in our study and this was similar to other studies in in Sagamu and Ilorin Nigeria where their prevalence of placenta previa was 0.92 % and 1.6 respectively.[10, 12] These rates are also comparable to world prevalence of placenta previa which is put at about 5,2 %.[13] This low prevalence in the three studies in Nigeria and most parts of the world is because all prospective placenta previa known in early pregnancy as low-lying placenta resolves spontaneously before term in a process known as placenta migration or resolution. This placental developmental change reduces drastically the prevalence of placenta previa in term pregnancies.[2,3]

A large proportion of pregnancies complicated by placenta previa in our study were diagnosed accidentally on ultrasound, and as such were asymptomatic (no bleeding). This pattern of presentation may have helped them enjoy relatively good health to advance their pregnancies to fetal survival of ≥34 weeks when they were delivered.[14] Also, symptomatic placenta previa with all the dire emergencies associated with it is more likely to have less adverse fetal outcomes [14.]

The management of pregnancies complicated by placenta previa has undergone a revolution since a study done in the forties. Before this study, the majority of pregnancies complicated with symptomatic placenta previa were delivered prematurely leading to high infant mortality. This study introduced the modern idea of expectant management of symptomatic placenta. The authors of this study recommended that mothers whose pregnancies are complicated by symptomatic placenta previa be admitted to the lying in-ward and closely monitored, watching for fresh bleeds. At least, 2 units of blood are grouped and cross-matched for the patient and kept in the blood bank for top-up transfusion to replace any amount of blood loss and this process is known as expectant management of pregnancies complicated by placenta previa. [15] [16]. This process is known to improve both maternal and infant survival, especially in developing countries with poor health systems. [2,3,15,16]

Our cesarean rate was 100 % for pregnancies complicated with placenta previa. This was similar to another study done in India on the same subject of pregnancies complicated by placenta previa where the cesarean section rate was also 100 %. [16] The safety of the mother and child may have been paramount in the mind of Obstetricians on why they chose to operate on the mother.

Conclusion

The difficulties associated with the management of pregnancies complicated by

placenta previa, especially hemorrhage remain an enigma. In this situation, cautious and rightful decisions by care providers will save maternal lives. As cesarean sections are often required in the management of these cases, the most experienced Obstetrician on the ground should perform these operations.

REFERENCES

1, Okafor I. Antepartum hemorrhage: In our teachers: A comprehensive textbook of Obstetrics and Gynecology: Umeora OAU, Egbuji CC, Onyebuchi AK eds. 1st ed 2017: 205-208. St Benedict Printing and Publishing, Abakaliki. 2 017.

2. Heller HT, Mullen KM. Gordon RW, Reiss RE, Benson CB. Outcomes of pregnancies with low-lying placenta diagnosed on second-trimester sonography. *CJ Ultrasound Med* 2014; **33** (4): 691-6.

3. Anderson –Bagga FM, Sze A. Placenta Previa. In: Stat Pearls, Dulebohn S (ed). Treasure Island (FL), USA. Stat Pearls Publishing 2022.

4. Oppenheimer L, Holmes P, Simpson N, Dabrowski A. Diagnosis of low-lying placenta: can migration in the third trimester predict the outcome? *Ultrasound Obstet Gynecol* .2001 (2):100-2.

5. Jour TY, Oppenheimer AUL, Farine DAU, A new classification of Placenta previa: measuring progress in obstetrics. *Am J Obstet Gynecol* 2009;**1** (3): 227-9.

6. Xing Wu, Fab Guo. Tao Ying, Guo-Fang-Shen. Correlation of placenta previa type with Caesarean blood loss and predictors of hysterectomy. *Chin Med (Engl)*, 2021; **134**: 501-502).

7 Omaghi S, Colciago and Vergani P Mode of birth in women with low lying placenta: protocol for a prospective multicenter 1:3 matched case-control study in Italy (the MODEL PLACENTA study. *BMJ Open*. 2021; **11** (12): e052510.

8 Jain V, Bos H, Bujold E. Guideline 402: Diagnosis and management of placenta previa. *J Obstet Gynecol Can* 2020; **7**: 906-917.

9 Nnagbo JE, Eze MI. Ezugworie JO, Ilogbalo EL, Ezenkwele EP, Onwudiwe EN, Okoro OS, Ajakh LO et al. Prevalence, outcomes and predictors of antepartum hemorrhage due to placenta previa in Nigeria. *Int J Med Health Dev* 2023; **28** (1): 1-80

10, Odelola OI, Akadiri AA. Ogunsowo KM, Placenta previa: A retrospective experience at Olabisi Onabanjo University Teaching Hospital, Sagamu, West Africa. *West Afr J Med.* 2019; **36**(3): 217-221.

11. Bates I, Chapotera GK, McKew S, Van den Broek N. Maternal mortality in sub-Saharan Africa: the contribution of ineffective blood transfusion services. *BJOG* 2008; 11 **5**(5): 1331-9.

12. Omonkanye LO, Olatinwo WO, Salaudeen AS, Durowade KA. A-5-year review of the pattern of placenta previa in Ilorin, Nigeria. *Int J Health Sci* 2017;**11**(2): 35-40.

13. Rowe T. Placenta previa *JOGC* 2014; **36** (8): 667-668.

14. Genovese F, Carbonaro A, Leananaza V. Vizzini S, Leananza G, Pafumi C. Management and time of delivery in asymptomatic complete placenta previa: A case report and review of literature. *Gynecol Obstet* 2012; **2**(4): Available @: ...

15. MacAfee CH, A. Placenta previa. A study of 174 cases. BJOG: *Am Int J Obstet Gynaecol*. 1945; **52** (4): 313-324.

16. Dwivedi S, Verma K, Jahan U, Malhotr ,V Gupta S. Implication of Placenta previa on pregnancies outcomes: A prospective study. *Ind J Obstet Gynecol Res* 2018; **5** (1): 93-97.

REVIEW ARTICLE: MANAGEMENT OF ACUTE APPENDICITIS: A REVIEW

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ABSTRACT
The diagnosis and treatment of acute appendicitis is a rapidly changing landscape.
This review article takes a panoramic look at the appendix and appendicitis along with the various treatment approaches which have been utilized. Non operative management is discussed and the challenges and pitfalls inherent in this approach in a resource challenged environment are examined. Appendicitis in special populations is highlighted and newer surgical options for appendectomy are outlined.

Key Words: *Modern, Management, Appendicitis, Adults, Children.*

Introduction

Acute appendicitis remains the most common acute abdominal condition which a medical practitioner will encounter in his career[6]. While management follows an ever evolving set of principles, proper diagnosis is the sheet anchor and *sine qua non* of treatment. Management options for appendicitis have evolved and multiplied in recent times resulting in a more complex clinical, diagnostic and therapeutic landscape. [20]

Historical Perspective

Leonardo da Vinci first depicted the appendix in anatomic drawings in 1492 [3] while Berengaria da Carpi was the first to describe the appendix in 1521.[4] Philippe Verheyen coined the term appendix vermiformis in 1710[45] while Giovanni Morgagni provided the first detailed anatomic description of the appendix in 1719 [3, 4.] Claudius Amyand in 1736 successfully removed an inflamed appendix from a hernia sac from a 14-year-old boy[3,4,6]. Lawson Tait in 1880 performed the first deliberate appendectomy for appendicitis.[3] Reginald Fitz in 1886 correctly identified the appendix as the primary cause of right lower quadrant inflammation. He coined the term appendicitis and recommended early surgical treatment [3,4.]

Chester McBurney in 1889 described characteristic migratory pain and localization of the pain along an oblique line from the anterior superior iliac spine to the umbilicus.[4]. Later in 1894 he described a right lower quadrant muscle splitting incision for removal of the appendix [3, 4] while R.H. Dawbarn in 1895 advocated invagination of the appendiceal stump to prevent fistula [3,4].
A.J Ochsner in 1902 advocated non-operative treatment to localize spreading peritonitis [4,5].
H.A. Kelly in 1905 advocated against "ligating, amputating and burying the little stump" [3,4].
The introduction of broad-spectrum antibiotics in the 1940's improved the

mortality rate from appendicitis. De Kok in 1977 carried out laparoscope aided appendectomy with a minilaparotomy before Kurt Semm in 1982 carried out the first full laparoscopic appendectomy. [4] This has since become the surgical modality of choice in most practice environments.

Anatomy

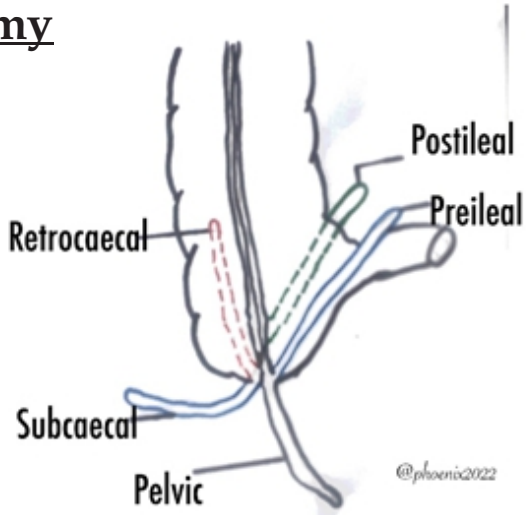

Figure 1-Common positions of the Appendix.

The appendix arises from the posteromedial aspect of the caecum about 2.5cm from the ileocaecal valve. It varies in length from 12mm to 25cm and varies in position, most commonly being retrocaecal.

The appendicular artery, a branch of the ileocolic artery, represents the entire vascular supply of the appendix. It runs first in the edge of the mesoappendix and then distally along the wall of the appendix. An accessory appendicular artery can arise from the posterior caecal artery and may be damaged during appendectomy causing significant bleeding. It should be searched for and ligated once the main appendicular artery has been controlled [1].The appendicular vein drains blood from the appendix. It is located in the mesoappendix and accompanies the appendicular artery. It drains into the ileocolic vein [1].

Lymphatic drainage of the appendix is into lymph nodes in the mesoappendix and from there into the ileocolic lymph nodes running along the ileocolic artery and via coeliac nodes into the cisterna chyli [1].The appendix is innervated by sympathetic and parasympathetic nerves from the superior mesenteric plexus. Afferent fibres for pain accompany the sympathetic nerves and enter the spinal cord at the level of the 10th thoracic segment [1].

Embryology.

The appendix arises from the midgut. The caecal diverticulum appears at the sixth week of life and is the precursor of the caecum and appendix [1].The appendix is histologically visible by the eighth week of life.

Histology.

The inner lining facing the lumen is covered by a glandular epithelium with intestinal mucus glands that extend into the deeper layers of the mucosa. The glands are lined with epithelial cells (simple columnar epithelium) and a high number of mucus producing goblet cells. The lamina propria usually contains lymphocytes that partly obscure the muscularis mucosa which separates the mucosa from the submucosa. The submucosa is largely occupied by lymphoid tissue arranged in primary and secondary lymphoid follicles.

An inner circular muscular layer and a thin external longitudinal muscle layer make up the muscularis externa which encircles the appendix. Outside the muscularis externa is a serosa containing blood vessels and nerves [2,6].

Functions of the Appendix.

- The Safe House Theory: The appendix protects a collection of beneficial gut bacteria when diarrhoea and other diseases wipe them out elsewhere in the gut. Once the immune system has addressed the infection, the bacteria emerge from the appendix biofilm and recolonize the gut [7].

- Immune Function: The appendix has a distinct abundance of natural killer (NK) lymphocytes that produce cytokines and chemokines rapidly following activation [7].

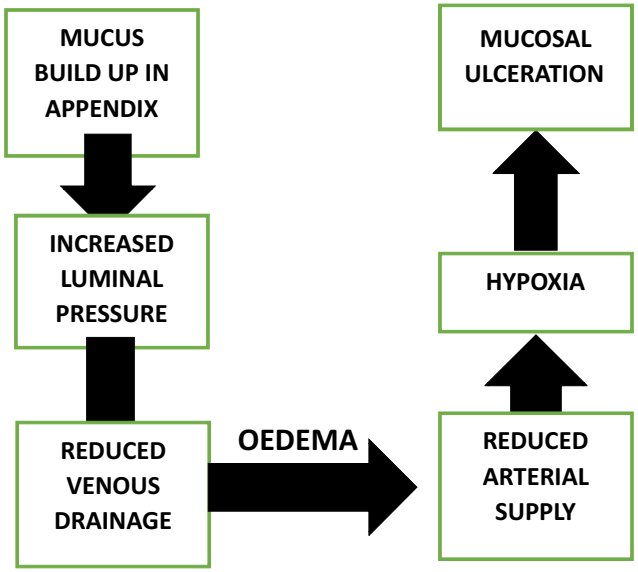

Figure 2- Pathophysiology of Acute Appendicitis[3,4,6,8].

Clinical Features.

History.

- Pain: Initial periumbilical, epigastric or generalized abdominal pain which is due to hyperperistalsis of the appendix to overcome obstruction. It is visceral in origin. After some hours the pain shifts and becomes localized in the right lower quadrant with tenderness on palpation. This pain is somatic in origin.

The position of the appendix may affect the manifestation of pain with a retrocaecal appendix causing minimal or no symptoms. A pelvic appendix may cause suprapubic pain, urinary symptoms or even pain on defecation [3, 4].Other features include

Anorexia

Nausea and vomiting: This is due to bowel wall distension.

Constipation: This is usual but diarrhea may also occur

Fever

Frequency and dysuria: This may be due to an inflamed pelvic appendix.

Physical Examination.

- Fever: This may be absent in the early stages or modified by intake of analgesics, antipyretics and antibiotics especially in our environment where self-medication is the norm.
- Tachycardia: This is due to fever and sympathetic response to pain.
- Hypotension: This may be due to sepsis following perforation.
- Tenderness in the right lower quadrant at McBurney's point
- Rebound tenderness **(**Blumberg's sign).
- Rovsing's sign: Palpation in the left lower quadrant causes pain in the right lower quadrant.
- Obturator sign: Internal rotation of the right hip results in pain.
- Dunphy's sign: Increased pain in the right lower quadrant on coughing, hopping or shaking the bed.
- Iliopsoas sign: Extending the right hip causes pain along the posterolateral back and hip and may indicate retrocaecal appendicitis.
- Rosenstein (Sitkovskiy) sign: Increased pain in the right lower quadrant when the patient lies on the left side [3,4,5,6].

Investigations.

- Full Blood Count: This may be normal in the early stages or may show a polymorphonuclear leukocytosis. It may be modified by medication [3,4,5].
- Urinalysis.
- C - reactive protein (CRP) **-** This may be elevated.
- Bilirubin**-** This may be elevated.
- Fibrinogen- This may be elevated.
- Lactoferrin**,** Calprotectin and Serum Amyloid A**-** Significantly elevated in acute appendicitis [16,18].
- Pregnancy Test in females of child bearing age.
- Electrolytes, Urea and Creatinine
- Plain Abdominal radiograph: This is rarely helpful but a faecolith may be visualized in the right lower quadrant. Other findings may include loss of the psoas shadow and deformity of the caecal outline. Free air under the diaphragm may be seen in perforated appendicitis [3,4,5].
- Ultrasound: This is operator dependent and might affect diagnostic accuracy. There is however zero radiation exposure. Typical findings consistent with acute appendicitis

include [4]:
Distended appendix of 7mm or more in anteroposterior diameter.

A thick walled non-compressible luminal structure seen in cross section (Target sign).
Increased wall vascular flow on colour enhancement (Ring of fire sign).

Presence of a faecolith.

- Computed Tomography: Contrast enhanced low dose tomography is the investigation of choice. It provides less radiation exposure and diagnostic yield is equivalent to conventional CT. Classic findings include [4]:

  Distended appendix of 7mm or more in anteroposterior diameter.

  Circumferential wall thickening and enhancement (Target or Halo sign).

  Peripheral fat stranding as the disease progresses.

  Oedema, peritoneal fluid or a periappendiceal abscess.

  Presence of a faecolith.

CT scan is not a routine investigation in all cases of acute appendicitis and is of greatest value in older patients in whom the differential diagnosis is complex, clinical findings are equivocal and surgery carries more risk [18].
Magnetic Resonance Imaging: Findings are similar to those found on computed tomography. It is of greatest value in diagnosis of acute abdominal pain in pregnant women [3,4]
Scoring systems in acute appendicitis.
In an attempt to improve diagnosis and reduce the negative appendectomy rate, several scoring systems have been proposed. The first of these was the Alvarado scoring system which was introduced in 1986 by Alfredo Alvarado, an American general surgeon [35, 36]. This has since been further refined into the Modified Alvarado Score [36]

The Alvarado score is not reliable in differentiating complicated from uncomplicated appendicitis in elderly patients and is less sensitive in patients with HIV. [4]

Table 1-Modified Alvarado Score.

Parameters	**Points**
Migratory Right iliac fossa pain	1.0
Anorexia	1.0
Nausea and Vomiting	1.0
Tenderness Right Iliac fossa	2.0
Rebound Tenderness Right Iliac fossa	1.0
Fever	1.0
Leucocytosis	2-0
Total Score	**9.0**

<3-Low likelihood 4-6-Consider further imaging >7-High likelihood

Appendicitis Inflammatory Response (AIR) Score.

This resembles the Alvarado Score but uses more graded variables and includes C-reactive protein estimation [3,4]. Studies have shown it to perform better than the Alvarado score in predicting acute appendicitis.[3,4].

Parameters		**Points**
Vomiting		1.0
Pain in the Right iliac fossa		1.0
Rebound Tenderness		
	Light	1.0
	Medium	2.0
	Strong	3.0
Body Temperature>38.5^{o}C		1.0
Polymorphonuclear Leucocytosis		
	70-84%	1.0
	≥85%	2.0
White Blood Cell Count		
	10.0-14.9 x10^{9}/l	1.0
	≥15.0 x10^{9}/l	2.0
C-Reactive Protein concentration		
	10-49g/l	1.0
	>50g/l	2.0

0-4: Low Probability 5-8: Indeterminate Group 9-12: High Probability

The AIR score along with the Adult Appendicitis Score (AAS) are currently the best performing clinical prediction scores and have the highest discriminating power in adults with suspected appendicitis[18].

Parameters		**Scores**
Pain in Right Lower Quadrant		2.0
Pain Relocation		2.0
Right Lower Quadrant Tenderness		3/1*
Guarding		
	Mild	2.0
	Moderate or Severe	4.0
White Blood Cell Count		
	>7.2 and < 10.9 x10^{9}/l	1.0
	>10.9 and < 14.0 x10^{9}/l	2.0
	>14.0 x10^{9}/l	3.0
Proportion of Neutrophils		
	>62 and <75%	2.0
	>75 and <83%	3.0
	>83%	4.0
CRP (mg/l), Symptoms< 24hours		
	>4 and <11mg/l	2.0
	>11 and <25mg/l	3.0
	>25 and <83mg/l	5.0
	>83mg/l	1.0
CRP (mg/l), Symptoms >24hours		
	>12 and <53	2.0
	>53 and <152	2.0
	>152	1.0

*Men and Women aged 50^{+}/Women aged 16-49
Table 3-Adult Appendicitis Score (AAS).
In children the Paediatric Appendicitis Score is the most helpful scoring system [18].

Parameters	**Scores**
Right Lower Quadrant pain with cough, percussion or hopping.	2.0
Right Lower Quadrant tenderness on light palpation.	2.0
Migration of pain to the Right Lower Quadrant.	1.0
Anorexia.	1.0
Nausea or Vomiting	1.0
Fever >38^{o}C.	1.0
Leucocytosis (>10 x10^{9}/l).	1.0
Shift to the Left (>75% Neutrophilia).	1.0
	10.0

1-3: Low Risk 4-7: Intermediate Risk 7-10: High Risk
Table 4-Paediatric Appendicitis Score (PAS)
RIPASA Score.
The Raja Isteri Penigran Anak Saleha Appendicitis (RIPASA) score was developed in 2008 at the hospital of the same name in Brunei Darussalam. The score has 18 parameters with a high sensitivity, specificity and diagnostic accuracy especially in Asian and Middle Eastern populations [11, 18].

Appendicitis in special populations.

Children.
Diagnosis may be difficult in this age group since they cannot explain their symptoms properly. Perforation is thus a very common sequel. Lethargy, irritability and anorexia may be present in the early stages with fever, vomiting and abdominal pain manifesting as the disease progresses.
In equivocal cases ultrasound is useful in differential diagnosis. Appendicitis tends to be more florid in children because of the relatively large size of the appendix and the underdeveloped omentum which is unable to localize infection [3,4,5,10,15,21,30,31].

The Elderly.
Diagnosis may be difficult in this age group because the history is usually atypical. The pain may be vague and diffuse, localizing in the right lower quadrant only after several days. Tenderness may also not be very marked. Diagnosis is thus usually delayed and given the atrophic nature of the omentum, perforation and other complications are relatively frequent [3,4,5].

Pregnancy.
Appendicitis is more common in the first two trimesters and diagnosis is relatively straightforward[20,39]. In the third trimester there may be a diagnostic challenge due to upward displacement of the caecum and appendix by the enlarging uterus with the pain thus manifesting in the right hypochondrium [20,39].

Immunocompromised patients.
The incidence of appendicitis is increased in HIV positive patients [4]. Clinical presentation is similar to that of uninfected patients but it is important to note that most HIV positive

patients will not present with leukocytosis [4]. The incidence of perforation is also higher and this may be related to a low CD4 count. In the differential diagnosis of right lower quadrant pain in HIV positive patients the differential diagnostic window should be widened to include opportunistic infections.

Differential Diagnosis of Acute Appendicitis.

The differential diagnosis of appendicitis includes a wide range of surgical, gynaecological and medical diseases which the clinician needs to be aware in order to enable proper patient management.

a. Intra-abdominal diseases [3,4,5,6].

- Typhoid perforation.
- Perforated peptic ulcer.
- Acute cholecystitis.
- Acute intestinal obstruction.
- Amoebic perforation of large bowel.
- Acute diverticulitis.
- Non-specific mesenteric adenitis in children.
- Intussusception.
- Acute Crohn's disease.
- Meckel's diverticulitis
- Non-specific abdominal pain.
- Leaking aortic aneurysm.
- Mesenteric infarction
- Colonic carcinoma
- Torsion of the appendices epiploicae.

b. Gynaecological diseases [3,4,5,6].

- Salpingitis.
- Ruptured ectopic gestation.
- Twisted ovarian cyst.
- Ruptured Graafian follicle (Mittelschmerz).
- Endometriosis.

c. Urological diseases [3,4,5,6].

- Right ureteric colic.
- Right pyelonephritis.
- Right acute epididymo-orchitis

d. Medical conditions [3,4,5,6].

- Gastroenteritis.
- Diabetic ketoacidosis
- Herpes zoster.
- Sickle cell crisis.
- Right lobar pneumonia.
- Malaria.
- Tonsillitis.
- Pancreatitis.
- Henoch-Schonlein purpura.
- Acute intermittent porphyria

Treatment of Acute Appendicitis.

The conventional treatment for appendicitis is appendectomy.

Recent studies [wewtn] have however revealed the benefits of non-operative management (NOM) in patients with uncomplicated, non-obstructive appendicitis. Uncomplicated appendicitis is defined as appendicitis without perforation, abscess or mass formation.

NOM consists of:

- Nil per oral regime.
- Intravenous fluids.
- Intravenous antibiotics.

There is resolution in 80-90% of cases but 15-20% will recur within one year [6].

NOM is contraindicated in:

- Complicated appendicitis (perforation, abscess, mass).
- Appendicitis with faecolith obstruction.
- Patients with severe co-morbidities (diabetes, hypertension, COPD).
- Elderly patients.
- Immunosuppressed patients.

It should however be stated without

equivocation that NOM is a proposition fraught with risk in resource challenged environments of the tropics and subtropics. Most of those patients do not present early and usually have complicated appendicitis on hospital review.

In addition to this a large number of them have already commenced antibiotics obtained from various sources. Proper case selection is necessary in implementing NOM and the surgeon must be ready to change his treatment approach if the patient no longer satisfies the above inclusion criteria.

Appendectomy.

Open Appendectomy.

This is done via a gridiron or Lanz incision, the latter being preferred because exposure is better, extension is easier and cosmesis is superior. The incision is carried down through the layers of the anterior abdominal wall and the peritoneal cavity is entered. The caecum is identified by the presence of taeniae coli and the appendix delivered. The appendicular vessels are clamped and ligated in the mesoappendix and the base of the appendix is crushed, clamped and ligated. Purse string inversion of the appendix stump does not offer any additional advantages in outcome [9,17, 18,19].

Laparoscopic Appendectomy.

This is the current gold standard in the operation of appendectomy, offering less morbidity and reduced hospital stay, reduced wound infection, less post-operative complications and a faster return to work [6,8,9,17,18, 43].

Contraindications to laparoscopic appendectomy.

- Lack of surgical expertise and necessary equipment.
- Severe pulmonary disorders (COPD, interstitial lung disease)
- Bleeding diatheses
- Severe heart failure.
- Portal hypertension.
- Intolerance of Trendelenburg positioning.
- Severe adhesions from previous abdominal surgery.
- First trimester of pregnancy.
- Radiation therapy.
- Immunosuppressive therapy.

Single incision laparoscopic surgery (SILS).

This technique uses one incision to enter the peritoneal cavity and to deploy various operative ports and instruments as needed. The primary reason for this surgery is cosmesis but it also results in a longer procedure and is more expensive [8, 9].Post-operative pain is also more significant than in mainstream laparoscopic appendectomy.

Natural Orifice Transluminal Surgery (NOTES).

This is a procedure where the peritoneal cavity is accessed via a natural orifice such as the mouth, vagina or rectum. Once the peritoneum is accessed in this fashion the appendectomy is performed. Hybrid NOTES is a procedure where in addition to entry via a natural orifice additional abdominal trocars are deployed.Advantages include decreased risk of wound infections, trocar hernias and neuropathic scar pain [8,9,44].

Endoluminal Appendectomy.

A modified colonoscope is passed via the rectum or a colostomy until the appendicular orifice is visualized and cannulated with a shark tooth grasping forceps. The appendix is then inverted into the bowel lumen, an endoloop placed at the base and the appendix

transected with a snare loop. Haemostatic clips are used to reinforce the closure of the appendicular lumen [9,44].

Appendectomy and special situations.
Appendix not found: The caecum is mobilized and the taeniae coli are traced to their point of convergence on the caecum. Only if the appendix cannot be located after this maneuver is the diagnosis of absent appendix made [6].
Appendicular Tumour**:** Small tumours (<2cm) can be treated by appendectomy. Larger tumours will require a right hemicolectomy [6].
Appendix Abscess: If found by imaging percutaneous drainage and intravenous antibiotics are the modalities of choice. If found at operation the abscess is drained and intravenous antibiotic therapy commenced. In the face of a frankly necrotic appendix or caecum a right hemicolectomy may be required. An appendix abscess presenting during management of an appendix mass will usually not resolve via percutaneous drainage and will need a laparotomy for proper resolution [6].

Appendix Mass**:** If the patient's condition is satisfactory the Ochsner-Sherren regime is instituted.[6] This consists of:

- 4 hourly measurement of pulse and temperature.
- Intravenous fluids with maintenance of proper fluid balance.
- Intravenous antibiotics.
- Daily monitoring of the size of the mass by marking the limits with a skin pencil.

Clinical improvement is usually apparent within 48 hours. Using this regime >90% of cases will resolve and it is no longer mandatory to carry out an interval appendectomy after 6-8 weeks.
Appendectomy should however still be considered in vulnerable populations like very young children and the elderly who are likely to present with perforation and will tolerate a new episode of appendicitis poorly. Patients over the age of 40 years should have colonoscopy and follow up imaging to ensure resolution since about 5% may have an underlying appendicular or colonic malignancy [6].
There are specific indications for abandoning this regime [6]:

- A rising pulse rate.
- Increasing or spreading abdominal pain.
- Increasing size of the mass.

<u>Appendicitis in Pregnancy</u>
Appendicitis is the most common non-obstetric emergency in pregnancy, occurring in 1 in 500 pregnancies[39]. Diagnosis may pose a challenge because the history and physical examination may be equivocal, some laboratory parameters like leucocytosis are normal in this state and imaging modalities like CT scan are contraindicated [12,16,17].Ultrasound and MRI of the abdomen without contrast are the imaging modalities of choice [20].

Rapid diagnosis of acute appendicitis in pregnancy is very necessary because of the adverse effects of complications. It is important to note that there is no room for non-operative management of appendicitis in pregnancy [39].
Appendectomy in pregnancy may be by the open or laparoscopic route even though concerns have been raised about the possible effects of pneumoperitoneum on the pregnancy. [39]

Conclusion
Appendicitis remains the most common abdominal emergency.
Prompt and accurate diagnosis is key in treatment.

Management has undergone a seismic change in recent years with nonoperative management gaining currency. This however requires proper case selection to ensure that the patient meets the laid down criteria and will indeed benefit from it.

NOM remains a challenge in the tropics, subtropics and other low income practice environments. This is because most patients will only present to orthodox care after exhausting other options. Most will show definite and florid features of appendicitis, thus narrowing the treatment options to surgery. In summary therefore, widespread use of NOM in our environment will have to await improved patient awareness, education, and improvement in imaging and other diagnostic services
History and physical examination are very important in diagnosis and will remain so for the foreseeable future.

MANAGEMENT OF ACUTE APPENDICITIS: A REVIEW.

References.

1 Ellis H,Mahadevan V Clinical Anatomy: Applied Anatomy for Students and Junior Doctors, 14th Edition John Wiley and Sons, August 2018 p 79-81

2 Kumar V, Abbas KA, Aster JC, Perkins JA, Robbins SL. Robbins Basic Pathology. Elsevier, Philadelphia, PA 2018 p 800-816

3 Townsend CM,Beauchamp RD,Evers BM,Mattox KL Sabiston Textbook of Surgery: The Biologic Basis of Modern Surgical Practice, 19th Edition. Elsevier 2017 p 1287-1300

4 Brunicardi FC, Hunter JG, Billiar TR, Andersen DK, Matthews JB, Dunn DL et al Schwartz's Principles of Surgery 10th Edition McGraw Hill Education, 2014 p 1269-1290

5 Archampong EQ,Naaeder SB,Ugwu B Baja's Principles and Practice of Surgery (Including Pathology in the Tropics) 5th Edition Repro India Limited 2009 p598-609.

6 O'Connell PR,McCaskie AR, Williams NS. Bailey and Love's Short Practice of Surgery 27th Edition. CRC Press 2018 p 1320-1338

7 Kooij IA, Sahami S, Meijer SL, Buskens CJ, Te Velde AA. The immunology of the vermiform appendix: a review of the literature. *Clinical & Experimental Immunology.* 2016 Oct; **186**(1):1-9.

8 Wagner M, Tubre DJ, Asensio JA. Evolution and current trends in the management of acute appendicitis. *Surgical Clinics.* 2018 ; 98(5):1005-1023.

9 Sohn M, Agha A, Bremer S, Lehmann KS, Bormann M, Hochrein A. Surgical management of acute appendicitis in adults: A review of current techniques. *Int J Surg* 2017; **48**:232-239.

10 Nepomuceno H, Pearson EG. Nonoperative management of appendicitis in children. *Transl Gastroenterol Hepatol.* 2021; 6:47 doi: 10.21037/tgh-20-191.

11 Karami MY, Niakan H, Zadebagheri N, Mardani P, Shayan Z, Deilami I. Which one is better? Comparison of the acute inflammatory response, Raja Isteri Pengiran Anak Saleha Appendicitis and Alvarado scoring systems. *Ann Coloproctol* 2017;**33**(6):227.

12 Bhangu A, Søreide K, Di Saverio S,

Assarsson JH, Drake FT. Acute appendicitis: Modern understanding of pathogenesis, diagnosis, and management. *The Lancet.* 2015 ; **386**(10000):1278-1287.

13 Ouedraogo NA, Ouedraogo S, Kambou BM, Ouedraogo A, Sanou A. Diagnosis of Acute Appendicitis in Sub-Saharan Africa. *Open J Med Imaging.* 2018; **8**(1):1-9.

14 Werner S, Grock A, Mason J. Antibiotics only for appendicitis? *Ann Emerg Med.* 2017; **70**(1):12-14.

15 Di Cesare A, Parolini F, Morandi A, Leva E, Torricelli M. Do we need imaging to diagnose appendicitis in children? *Afr. J. Paediatr Surg* 2013; **10**(2):68-73

16 Hennelly KE, Bachur R. Appendicitis update. *Curr.Opin Pediatr* 2011; **23**(3):281-285.

17 Poon SH, Lee JW, Ng KM, Chiu GW, Wong BY, Foo CC et al The current management of acute uncomplicated appendicitis: Should there be a change in paradigm? A systematic review of the literatures and analysis of treatment performance. *World J.Emerg Surg.* 2017 Dec; **12**(1):1-10

18 Di Saverio S, Podda M, De Simone B, Ceresoli M, Augustin G, Gori A et al Diagnosis and treatment of acute appendicitis: 2020 update of the WSES Jerusalem guidelines. *World J. Emerg.Surg.* 2020; 15(1):1-42.

19 Blake L, Som R. Best evidence topic: What is the best management of the appendix stump? Simple ligation or stump invagination? *Int J Surg.*2015 ; **24**:20-23

20 Burke LM, Bashir MR, Miller FH, Siegelman ES, Brown M, Alobaidy M et al Magnetic resonance imaging of acute appendicitis in pregnancy: a 5-year multi-institutional study. *Am.J Obstet Gynecol* 2015 Nov 1; **213**(5):693-e1.

21 Mandeville K, Pottker T, Bulloch B, Liu J. Using appendicitis scores in the pediatric ED. *Am. J Emerg.Med.*2011 Nov 1; **29**(9):972-977.

22 Andersson M, Rubér M, Ekerfelt C, Hallgren HB, Olaison G, Andersson RE. Can new inflammatory markers improve the diagnosis of acute appendicitis? *World J. Surg* 2014 ; **38**(11):2777-2783.

23 Varadhan KK, Neal KR, Lobo DN. Safety and efficacy of antibiotics compared with appendicectomy for treatment of uncomplicated acute appendicitis: meta-analysis of randomised controlled trials. *BMJ.* 2012; 344:e2156. doi : 1136/bmj.e2156.

24 Salminen P, Paajanen H, Rautio T, Nordström P, Aarnio M, Rantanen T et al. Antibiotic therapy vs appendectomy for treatment of uncomplicated acute appendicitis: the APPAC randomized clinical trial. *JAMA.* 2015 ; **313**(23):2340-2348.

25 Findlay JM, El Kafsi J, Hammer C, Gilmour J, Gillies RS, Maynard ND. Nonoperative management of appendicitis in adults: a systematic review and meta-analysis of randomized controlled trials. *J Am. Coll Surg* 2016; **223**(6):814-824e2.

26 Sallinen V, Akl EA, You JJ, Agarwal A,

Shoucair S, Vandvik PO et al Meta-analysis of antibiotics versus appendicectomy for non-perforated acute appendicitis. *Br J. Surg* 2016 ; **103**(6):656-667.

27 Varadhan KK, Neal KR, Lobo DN. Safety and efficacy of antibiotics compared with appendicectomy for treatment of uncomplicated acute appendicitis: meta-analysis of randomised controlled trials. *BMJ.* 2012 ; 344:e2156. doi : 1136/bmj.e2156.

28 Podda M, Cillara N, Di Saverio S, Lai A, Feroci F, Luridiana G et al Antibiotics-first strategy for uncomplicated acute appendicitis in adults is associated with increased rates of peritonitis at surgery. A systematic review with meta-analysis of randomized controlled trials comparing appendectomy and non-operative management with antibiotics. *Surgeon*, 2017:**15**(5) : 303-314.

29 Sakran JV, Mylonas KS, Gryparis A, Stawicki SP, Burns CJ, Matar MM et al.. Operation versus antibiotics ––The "appendicitis conundrum" continues: A meta-analysis. *J Trauma Acute Care Surg.* 2017; **82**(6):1129-1137.

30 Hartwich J, Luks FI, Watson-Smith D, Kurkchubasche AG, Muratore CS, Wills HE, Tracy Jr TF. Non-operative treatment of acute appendicitis in children: a feasibility study. *J Pediatr Surg* 2016; **51**(1):111-116.

31 Svensson JF, Patkova B, Almström M, Naji H, Hall NJ, Eaton S et al. Non-operative treatment with antibiotics versus surgery for acute nonperforated appendicitis in children: a pilot randomized controlled trial. *Ann Surg.* 2015; **266**: 67-71.

32 Huang L, Yin Y, Yang L, Wang C, Li Y, Zhou Z. Comparison of antibiotic therapy and appendectomy for acute uncomplicated appendicitis in children: a meta-analysis. *JAMA Pediatrics.* 2017; **171**(5):426-434.

33 Telem DA. Shared decision making in uncomplicated appendicitis: It is time to include nonoperative management. *JAMA. 2016;* **315**(8):811-812.

34 McCutcheon BA, Chang DC, Marcus LP, Inui T, Noorbakhsh A, Schallhorn C et al Long-term outcomes of patients with nonsurgically managed uncomplicated appendicitis. *J Am Coll Surg* 2014 ;**218**(5):905-913.

35 Alvarado A. A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med. 1*986; **15**(5):557-564.

36 Ohle R, O'Reilly F, O'Brien KK, Fahey T, Dimitrov BD. The Alvarado score for predicting acute appendicitis: a systematic review. *BMC Medicine.* 2011; **9**(1):1-3.

37 McKay R, Shepherd J. The use of the clinical scoring system by Alvarado in the decision to perform computed tomography for acute appendicitis in the ED. *Am J Emerg Med* 2007; **25**(5):489-493.

38 Goldman RD, Carter S, Stephens D, Antoon R, Mounstephen W, Langer JC. Prospective validation of the Pediatric Appendicitis

Score. *J Pediatr* 2008; **153**(2):278-282.

39 Zingone F, Sultan AA, Humes DJ, West J. Risk of acute appendicitis in and around pregnancy: a population-based cohort study from England. *Ann Surg* 2015; **261**(2):332-337.

40 Carr NJ.The pathology of acute appendicitis. *Ann. Diagn. Pathol* 2000; **4**(1):46-58.

41 Kollár D, McCartan DP, Bourke M, Cross KS, Dowdall J. Predicting acute appendicitis? A comparison of the Alvarado score, the Appendicitis Inflammatory Response Score and clinical assessment. *World J.Surg* 2015; **39**(1):104-109.

42 Adisa AO, Alatise OI, Arowolo OA, Lawal OO. Laparoscopic appendectomy in a Nigerian teaching hospital. *JSLS* 2012 ; **16**(4):576.

43 Bingener J, Ibrahim-Zada I. Natural orifice transluminal endoscopic surgery for intra-abdominal emergency conditions. *Br J Surg* 2014; **101**(1):e80-e89.

44 Moris D, Paulson EK, Pappas TN. Diagnosis and Management of Acute Appendicitis in Adults: A Review. *JAMA*. 2021; **326**(22):2299-2311.

45 Skandalakis JE, Skandalakis' Surgical Anatomy: The Embryology and Anatomic Basis of modern Surgery Volume 1 Paschalidis Medical Publication Ltd.2004 pp 371-389

PEER REVIEWERS FOR YEAR 2022

The Niger Delta Medical Journal is immensely grateful to the underlisted for painstakingly taking time from their busy schedules to do a thorough peer review of the manuscripts they received for the year 2022. We herby acknowledge their valuable contribution to the advancement of medical education

Abasi, Isaac
Adejumo, Oluseyi
Adesanya, Adewole
Adesina, Adedotun
Alagoa, Paingha
Alenoghena, Innocent
Altraide, Dasetima
Akinbami, Felix
Akhemokhan, Kennedy
Bozimo, Gesiye
Dinyain, Amatare
Duru, Chika
Eguvbe, Anthony
Erekosima, Ibi
Fente, Beleundanyo
Okpokowuruk, Frances
Ikobho, Ebenezer
Ikuabe, Peter
Jumbo, Johnbull
Kasia, Benedicta
Kombo, Bismarck
Kunle Olowu, Onyaye
Madubuko, Roli
Mariere, Ulenma
Obiabo, Yahaya
Obilahi Abhulimen
Okafor, Ume
Offorma, Ikechukwu
Okugbo, Stanley
Okwara Benson
Osagie, Osasumwen
Osaikhuwuomwan, James
Osinowo, Olugbenro
Otaigbe, Barbara
Oyeyemi, Abisoye
Oyeyemi, Nuvie
Peterside, Oliemen
Rotifa, Stella
Sawyer, Wisdom
Tabowei, Benjamin
Waritimi, Ebi