IJRD International Journal of Research & Development Organisation ISSN: 2455-7676

Journal of Biological Science

AETIOLOGIC AGENTS AND ANTIMICROBIAL SUSCEPTIBILITY PATTERN ASSOCIATED WITH URETHRAL CATHERTERISED PATIENTS AT THE FEDERAL MEDICAL CENTRE, UMUAHIA ABIA STATE, NIGERA

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ABSTRACT

The increasing rate of catheter associated urinary tract infection (CAUTI) and the resistance in empirical antibiotic therapy became a threat to mankind. This study therefore identify microbial pathogens associated with bacteriuria and UTI in patients with indwelling urethral catheters and determine their susceptibility patterns to commonly used antimicrobial agents. A total of 1000 urine specimens from 1000 patients were used in the study and analyzed for white blood cell count and bacteria count. The specimens were cultured on Blood, MacConkey and CLED agar plates. Pure colonies of the isolated organisms were biochemically characterized and antibiogram was performed on each of the bacterial isolate. The commonest indication for catheterization is bladder outlet obstruction (BOO, 30%) followed by Congestive cardiac failure (CCF, 15%). Seven hundred and eighty patients were urine culture positive for microbial pathogens with 684 bacterial isolates, 96 (9.6 %) yeast while 220 (22%) were bacteriologically sterile. Patients above 80years had the highest total bacterial count of 13.1 x 10^4 Cfu/ml followed by patients between the age of 61 – 80 and 41 – 60 with total heterotrophic bacterial count of 12.1 x 10^4 Cfu/ml and 13.1 x 10^4 Cfu/ml, respectively. *Staphylococcus* spp. were the commonest pathogens with 584 isolates (85.4%), followed by *Pseudomonas* spp. 48 (7.0%), *Klebsiella* spp. 30 (4.4%), *Escherichia* spp. 15 (2.2%) and *Proteus* spp. 7 (1.0%). The invitro antibiotic susceptibility pattern of the organisms presents a mixed response (susceptible / resistance) to commonly used antibiotic s such as Ceftazidine, Cefurosime. Gentamycin, Cefuroxime, Nitrofurotoin, Ciprofloxacin, Cofrimoxazola, Cloxacilline, Erythromycin, Streptomycin, Tetracycline, Chloramphenicol, Augmentin, Ofloxacin. There is high level of resistance to antibiotics by the organisms isolated and no single antibiotic used in the study was able to eliminate all the isolates identified. There is 100% resistance by all the organisms to Cotrimoxazole. Analysis of Variance (ANOVA) showed insignificant difference between means for the various parameters examined at $P \leq 0.05$.

Keywords: Urinary catheter, Bacteriuria, Urinary tract infection, Health care acquired infection, antibiogram, catheterized patients

1. INTRODUCTION

Indwelling urinary catheters, although an essential component of modern medical care, are also the leading cause of nosocomial infections in both acute and chronic care facilities. Catheters provide microorganisms with direct access to the normally sterile urinary tract, thereby predisposing to both bacteriuria and funguria (Robert, 2008). Urinary tract infection (UTI) develops in 10% to 25% of patients with short-term catheter use (~ 3% per day) and in essentially all chronically catheterized patient. In the acute care setting, although catheter-associated UTI (CAUTI) rarely causes urinary symptoms or fever, it is associated with a 1-3% incidence of bacteremia and with prolonged hospital stays and increased costs. The associated morbidity and mortality are major drains on hospital resources. The overall health care costs caused by urinary catheter- related infections are sizable given how often urinary catheters are used in acute care settings, extended care facilities, and in persons with injured spinal cords (Saint and Chenoweth, 2003). CAUTI also provides a reservoir of resistant organisms for possible nosocomial spread. Inappropriate and unrecognized catheter use is common and potentially avoidable. Urinary tract infections associated with indwelling urethral catheterization have become the most common cause of bacteriuria and related sepsis in hospitalized patients.

Further progress in the prevention of CAUTI requires a better understanding of its pathogenesis. Bacteria may enter the bladder through contamination of the tip during insertion with the flora of the distal urethra or from bacteria ascending the out side or the inside of the catheter (Moges, 2008). Residual urine in the bladder of catheterized patients increases the risk of bacteriuria. In a prospective study (Tissot *et al.*, 2001) including 137 consecutive catheterized patients in a medical intensive care unit, the following variables were analysed as possible risk factors for catheter associated bacteriuria, defined as a quantitative culture with > or = 10^5 organisms /ml: age, sex, simplified acute and physiologic score at admission, duration of catheterisation, diabetes mellitus, immune-suppression, neurologic disorders and prior systemic antibiotic exposure during hospitalization. The etiology and persistence of this bacteriuria are related to bacterial adhesion and the formation of bacterial biofilms on the catheter surface (Marie *et al.*, 1983, Morris *et al.*, 1999), and it plays an important role in the pathogenesis, treatment and prevention of urinary tract infections (Trautner and Darouiche, 2004). During the process of infection, bacteria need first to adhere to the epithelial cells of the urinary tract and / or the surface of the catheter. They will then develop into biofilms on the catheter surface and are resistant to the immune system and antibiotics. A biofilm on an indwelling urinary catheter consist of adherent microorganisms, their extracellular products, and host components deposited on the catheter. The biofilm conveys a survival advantage to the microorganisms associated with it and, thus, biofilm on urinary catheters results in persistent infections that are resistant to antimicrobial therapy (Dimitri *et al.*, 2008). Biofilms on indwelling medical devices may be composed of gram-positive or gram-negative bacteria or yeasts. Bacteria commonly isolated from these devices include the gram positive *Enterococcus faecalis, Staphylococcus aureus Staphylococcus epidermidis, and Streptococcus* viridans; and the gram-negative *Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis,* and *Pseudomonas aeruginosa* (Benge, 1998). These organisms may originate from the skin of patients or healthcare workers, tap water to which entry ports are exposed, or other sources in the environment. Biofilms may be composed of a single species or multiple species, depending on the device and its duration of use in the patient. Urinary catheter biofilms may initially be composed of single species, but longer exposures inevitably lead to multispecies biofilms (Foxman, 2002). The type of organisms associated with catheter associated urinary tract infections (CAUTIs) have changed over time, as have the patterns of antibiotic resistance. Many infecting strains isolated from CAUTIs display markedly greater antimicrobial resistance than organisms that cause community- acquired UTIs (Braunwald *et al*., 2001). In Nigeria, Taiwo and Aderonumu (2005), reported a high incidence of resistance to the commonly prescribed antimicrobial agents as observed at Akintola University Teaching Hospital, Oshogbo. Likewise, a study conducted in Gondar indicated that above 68% of the isolated pathogens showed resistance from two to nine antimicrobials and 15.7% were resistant to one antibiotic. In general, because of the continued evolution of antibiotic resistance, regular monitoring of this phenomenon appears to be necessary to improve guidelines for empirical antibiotic therapy, which must consider the most probable microorganisms, their susceptibility according to the characteristics of the population concerned, without forgetting side effects, ecological and economic consequences. In this study, we therefore identified the microbial pathogens associated with bacteriuria and UTI in catheterized patients and determined their susceptibility patterns to commonly used antimicrobial agents. This will serve as a guide in the selection of appropriate antimicrobial agents for prophylaxis and empirical treatment of uretrhra catheterized patients.

2. MATERIALS AND METHODS

2.1 Study area

This study was carried at Federal Medical Centre, Umuahia, Abia State. Umuahia is cosmopolitan city located in the South East region of Nigeria mostly populated by indigenes and people from other parts of the country. The Federal Medical Centre, Umuahia remains the most attended public health facility in the state. Amongst other infections, urinary tract infections account among the major causes of hospital attendance in the state.

2.2 Subjects

This study is cross sectional involving 1000 patients (800 males and 200 females) attending or admitted into different wards of Federal Medical Centre, Umuahia. They all had indwelling urethral catheters inserted under aseptic condition for various medical and surgical indications (Table 1).

2.3 Ethical Approval

Ethical approval was sought from the ethical committee of the institution; verbal consent was also sought from all the participants in this study.

2.4 Sample size / Sample Collection

The sample size was determined using the statistical formulae $N=z^2pq/d^2$ as described by Olabisi (2004) where N = the desired sample (when population is greater than 10,000), z = the standard normal deviation usually set at 1.96 which correspond to 95% confidence level, p = the proportion in the target population estimated to have a particular characteristic, q=1.0-p, d= the degree of accuracy desired usually set at 0.05.

One thousand (1000) urine samples were collected using universal sterile bottle from patients on urethral catheter, under strict aseptic procedure. Specimen(urine, 10m/s) was collected from either the catheter tubes or the urine bag to avoid missing organisms associated with the catheter. The urine samples were transported immediately to the laboratory for analysis.

2.5 Sample processing:

(i) Urine microscopy (wet mount) and culture isolation

About 10ml of well mixed urine was dispensed into a centrifuge tube. The tube was centrifuge at 3,000rpm for 10 minute using 800 Electronic Bench Top centrifuge/ the supernatant was discarded and the deposit placed on a clean and dry slide. The urine deposit was covered with a coverslip and examined under X40 objective. The number of pus cell and epithetal cells per high power field [HPF] was estimated. The presence of bacteria, yeasts and any other abnormal constituents were recorded. (Cheesbrough, 2000).

The sample were examined macroscopically and microscopically, samples showing turbidity, high numbers of epithelial cells and pus cells were cultured on blood agar, cysteine lactose electrolyte deficient CLED agar plates and incubated aerobically at 37^{o}C overnight.

Pure colonies of isolated organism on the culture plates were biochemically characterized to identify the species using recommended guidelines (Barrow and Feltham, 1993).

(ii) Estimation of bacterial load in urine specimens

The number of colonies was counted on overnight culture of CLED ager plate, using electronic counter machine. The number of bacteria estimated as colony-forming unit (Cfu) per unit was determined as follows: A total of 0.1 ml of the urine sample was spread on the culture media using a hockey stick, this was incubated for 24hrs at 37 degrees Celsius. Total number of colonies was counted after 18 - 24hrs using electronic counter machine. Colonies less than 30 were not recorded and colonies more than 300 were also not recorded. The interpretation of the bacteria counts was made as follows: Less than 1,000 organisms /ml (10^3Cfu/ml), was regarded as not significant while 10,000 /ml (10^4) was regarded as doubtful significant. 100,000/ml (10^5/ml) was regarded as significant bacteriuria.

2.6 Antibiogram of bacterial isolates

Antibiotic susceptibility was performed on pure colonies of each species to commonly used antimicrobial agents using the disc diffusion method (Bauer *et al*, 1966) on Mueller-Hinton agar. The zone diameter of inhibition for each antimicrobial agent was compared with the NCCLS interpretive table (NCCLS, 1997) to determine sensitivity or resistance. Using the clinical laboratory standard institute (CLSI) interpretative manual (2011 version), the zone sizes of each antimicrobial was reported as Resistant (R), Intermediate (I) or Sensitive (S) (susceptible).

2.7 Bio - data analysis

Relevant bio – data of the patients were obtained using a prepared standard performa that include demographic data such as age, gender, occupation, marital status, religion and occupation. Other data obtained were underlying illness, indication of catheterization, length of catheterization, symptoms attributed to catherterization and prophylactic antibiotics used. Analysis was done using SPSS Version 20….statistical package.

3. RESULTS AND DISCUSSION

A total of 1000 patients with indwelling urinary catheters were studied, 800 were males while 200 were females, giving a male to female ratio of 4 to 1. The age range is 10 - 80 years with a mean age of 50.5 years. The age group 41 - 60 (30%) and 61 - 80 (30%) years constitutes the largest group with 30% followed by the age group 21- 40 (26.2%), 10 - 20 and age group >**80** (18.0% respectively). Over 90% of patients are above 50 years of age (Table 1).

All patients had indwelling urethra catheter inserted for a period ranging from 48 hours to 30 days before change or removal (Table 1) and all the patients were routinely placed on prophylactic systemic antibiotic following catheterization. The commonest indication for catheterization were; bladder outlet obstruction (BOO) due to benign prostatic hyperplasia (BPH) in 300 (30%) patients, Diabetic coma 50 (5%), Urinary incontinence 50 (5%), Head injuries 50 (5%), Acute Abdomen 100 (60%), Shock 60 (6%), CVA (Cerebrovascular accident) 90 (9%), Pelvic /femoral fractures 50 (5%), Obstructed labour 50 (5%), Caesarian section 50 (5%) and CCF (Congestive cardiac failure) 150 (15%) as shown in table 2.

Of the 1000 patients, 684 had significant bacteriuria, 220 had no bacteriuria ,while 96 had yeast in urine probably the females (Table 4a and b). Out of the 684 that had significant bacteriuria,, none had symptoms of UTI. Also among the 1000 samples, 200 contain 20% (0 – 2) of WBC, 350 contain 35% (3 – 5) while 450 contain 45% (6 - 8) white blood cells (Table 3).Distribution of bacterial isolates by age and gender are shown in Tables 5and 6 .

A total of 684 bacterial species were isolated from 1000 patients with significant bacteriauria. Five hundred and eighty four *Staphylococcus* spp., 48 *Pseudomonas* spp., 30 *Klebsiella* *pneumonia*, 15 *E. coli* and 7 *Proteus* spp. *Staphylococcus* spp.584 (84.5%) were the dominant pathogen isolated, followed by *Pseudomonas* spp.48 (7.0 %), *Klebsiella pneumonia* 30(4.4%), *E. coli* 15 (2.2%)and *Proteus* 7 (1%) (Table 7). Total percentage resistance and susceptibility of the organisms to each drug is shown in Table 8

The *in vitro* antibiotic susceptibility pattern of the bacterial showed high resistance to commonly used antibiotics such as Ampicillin, Amoxicillin, Nitrofurantion, Augumetin and Ciprofloxacin and also no single antibiotic used in the study was able to eliminate all the isolates identified. There is 100% resistance by all the organisms to Cotrimoxazole (Table 9)

Common organisms isolated from the study were *Staphylococcus* spp., *Klebsielle* spp., *E. coli Proteus* spp. *Serretia* spp., *Enterobacter and Providentia rettegeri* . Similar bacteria was also isolated by Benge,(1998); Johnson *et al.*, *(*1999); Braunwald *et al.*, (2001).

The predominant organism found in the study was Gram positive *cocci* (*Staphylococcus* spp.). though this is in agreement with the work done by Hynicwiez and Hynicwiez, (2001); Wilson and Gaido, (2004), but in their work, the predominant organism was *Enterococcus* spp. According to Braunwald *et al*.,(2001), many catheter associated urinary tract infection (CAUTI) isolated organisms display greater anti-microbial resistance than organisms that cause community acquired urinary tract infections (UTIS). This is in accordance with our study as shown in table 8 and 9. Taiwo and Aderomumu,(2005) reported that above 68% of the isolated pathogens showed resistance from two to nine antimicrobials, table 8 and 9 reflects similar occurrence in this study. Moges,(2008) reported that there is 100% risk of infection for patients with indwelling urinary catheter draining for up to 4 days or more. The above finding by Moges,(2008) was agreement with our study as significant bacteriuria (60%) was noted as observed in table 4a and b. CAUTI increases amongst advanced age according to Lindsay,(2008) but are often benign and asymptomatic, similar effect was also noted in our study (Table 4b). Hucuny and Stafford,(2002) defined significant bacteriuria as $\geq 10^5$ cfu/ml while Razatos, (2003) reported that concentrations > 10^3Cfu/ml in urine collected from the sampling port of the catheter to be indicative of true CAUTI, meanwhile table 4 showed $\geq 10^4$ which is also in agreement with findings by Razatos,(2003)and Hucuny and Stafford, (2002). Table 1 and 4b showed that the risk of CAUTI increases with age and catheter duration which is in line with the findings by Kavathar and Kovazomuis,(2003).

Maki and Tambyah, (2000) reported that the enteric gram negative organisms found in the catheterized urinary tract are those that are commonly associated with multidrug resistance. In this study, table 8 and 9 reveals similar occurrence. Marie *et al.*, (1983) asserted that once organism gain access to catheterized urinary tract, the level of bacteriuria usually increases to more than 10^5cfu/ml within 24 to 48 hours in the absence of antimicrobial. This is also in accordance with our study (Table 4ab) only that most of the patients were already on antibiotics. According to Oelschlaeger *et al.*,(2002) most frequent gram negative *Enterobacteriacea* were *E. coli, Klebsiella pneumoniae, Citrobacter spp.* and urease producing organisms such as *Proteus mirabilis, Morgenella aeruginosa, Acintobacter* spp. *or Stenotrophomonas maltophilia.* From this study, almost 68.4% of the patients had bacteriuria which approximates the report of Masters and Joshi,(2003) (Table 4a).

The antimicrobial susceptibility pattern confirms that most of the urinary isolates are resistant to the commonly used antibiotics including the Quinolones and Cephalosporins.

This high resistant pattern could have resulted from poorly guided antibiotic prophylaxis after catheterization and empiric therapy of catheter associated UTI. In particular, the high resistance of the Gram negative isolates to the Cotrimozazole.

The rate of resistance to widely used antibiotics was high for gram negative bacteria as shown in table 8 and 9 which corresponds to the report of lagarlo and Loab, (2000). Since the urine specimens were collected from different wards, the antibiotic resistance pattern varies as seen in table 8 and 9. This is also in agreement with report of Vogel and Rochette, (2004). Drug abuse could account for the high degree resistance by these organisms as seen in Cotrimoxazole (100%) tetracycline(97.51%), Cloxacillin(97.85%) which are more commonly available and according to Castanon, (2007), a single dose of antibiotic leads to a greater risk of resistant organisms to that antibiotics in the person for up to a year. Also Nelson *et al*., (2007) supported this finding as he reported that patients taking less recommended dosage or failing to take their doses within the prescribed timing results in decreased concentrations of antibiotics in the blood stream and tissues and exposure of bacteria to suboptimal antibiotics concentrations increase the frequency of antibiotics resistant organism. Also the report of John, (2012) stated that insufficient long course of antibiotics causes a more severe infection that is more difficult to treat. Resistance to vacomycin and Methicillin (Table 8) were noted hence the first documented strain with complete resistance to Vancomycin according to Charishvili *et al.*, (2001) appeared in the USA in 2002, While Dabrowska *et al., (*2003) reported about community acquired methicillin resistance *Staphylococcus aereus* (MRSA). A steady increase in resistance to cephalosporins has been reported by Bradford, (2006) which is also a reflection on tables 8 and 9.

CONCLUSION

Bacteriuria is almost inevitable on long term catheterization as reported by previous researchers , and as shown in our study. Based on this fact, we therefore suggest that patient's catheters should be changed periodically to prevent formation of concretions and obstruction that can lead to infection. Although prophylactic systemic antibiotics have been known to delay onset of bacteriuria in catheterized patients, there is no justification for routine use as this practice has been shown to be associated with emergence of resistant pathogens . Treatment of catheter associated UTI in this institution should be guided by the result of susceptibility test of isolated organisms .

However, this study has established the fact that no single antibiotic used was potent enough to eliminate all the organisms isolated. Drugs like Cotrimoxazole and tetracycline should no longer be used in treating CAUTI as they present100% resistance by all the isolates. CAUTI organisms are highly resistance to the commonly used available antibiotics even to the more potent ones and therefore, could be enlisted as super bug.

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Table 1: Age and sex distribution of the patients in relation to length of catheterization among patients

Age Range	Gender		Length of catheterization (Days)
Years	Males (%)	Females (%)	
10 – 20	50(5)	0 (0)	1 - 3
21 – 40	120 (12)	80 (8)	4 – 7
41 - 60	300 (30)	60 (6)	8 – 14
61 – 80	300 (30)	40 (4)	15 – 21
>80	30 (3)	20 (2)	22 - 30
Total	800 (80%)	200 (20%)	

Table 2: Indication for catheterization

Indication	Frequency	Percentage (%)
Bladder outlet obstruction (BOO)	300	30
Diabetic coma	50	05
Urinary incontinence	50	05
Head injuries	50	05
Acute Abdomen	100	60
Shock	60	06
CVA (Cerebrovascular accident)	90	09

Pelvic /femoral fractures	50	05
Obstructed labour	50	05
Ceaserian section	50	05
CCF (Congestive cardiac failure)	150	15
Total	**1000**	**100**

Table 3: White blood cell (WBC) counts

Number of samples	**Percentage (%)**	**WBC (Hpf)**
200	**20**	**0 – 2**
350	**35**	**3 – 5**
450	**45**	**6 – 8**
Total 1000	**100**	

Table 4a: Bacteria count (Cfu/ml)

	Number of samples	**Percentage (%)**	**Bacteria count (Cfu/ml)**
	600	60	11.1×10^4
	60	6.0	12.1×10^4
	24	2.4	13.1×10^4
	220	22	NG
	96	9.6	YEAST
Total	**1000**	**100**	

Table 4b: Bacterial count according to age and sex

Age range	Sex		Bacterial count	Sub total
	Male	Female		
10 – 20	0	0	-	0
21 – 40	90	60	$11.1x10^4$	150
41 – 60	250	60	$11.1x10^4$	310
61 – 80	134	40	$12.1x10^4$	124
>80	30	20	$13.1x10^4$	50
Sum Total	**504**	**180**		**684**

Table 5: Distribution of Bacterial Isolates by age

Age (years)	Organism				
	Staphylococcus	***Pseudomonas***	***Klebsiella pneumonia***	***Escherichia Coli***	***Proteus***
10 – 20	5 (0.90%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
21 – 40	100 (17.10%)	10 (20.8%)	4 (13.30%)	0 (0%)	0 (0%)
41 – 60	201 (34.40%)	22 (45.80%)	6 (20%)	4 (26.7%)	0 (0%)
61 – 80	170 (29.10%)	8 (16.70%)	18 (60%)	10 (66.70%)	2 (28.60%)
≥ 80	28 (4.80%)	8 (16.70%)	2 (6.70%)	1 (6.70%)	5 (71.40%)
Total	**584**	**48**	**30**	**15**	**7**

Table 6: Distribution of Bacterial Isolates by gender

Organism	Sex		Total
	Male	**Female**	
Staphylococcus	400 (68.50%)	184 (31.50%)	584
Pseudomonas	40 (66.70%)	8 (33.30%)	40
Klebsiella pneumonia	6 (20%)	24 (80%)	30
Escherichia Coli	0 (0%)	15 (100)	15
Proteus	1 (14.3%)	6 (85.70%)	7

Table 7: Percentage occurrence of the isolates

Isolates	Frequency	Percentage (%)
Staphylococcus	584	85.4
Pseudomonas	48	7.0
Klebsiella	30	4.4
E.coli	15	2.2
Proteus	7	1.0
TOTAL	684	100

Table 8: Total percentage resistance/susceptibility of the organisms to each drug.

Drug	Total Resistance	Total Susceptibility	Total organism
Caz	636(92.98)	48(7.02)	684
CRX	639(93.42)	45(6.58)	684
GEN	457(66.81)	227(33.19)	684
CXM	677(98.98)	7(10.23)	684
NIT	609(89.04)	75(10.96)	684
CPR	523(76.46)	161(23.54)	684
COT	684(100)	0(0)	684
CXC	683(99.85)	1(0.15)	684
ERY	551(94.35)	33(5.65)	684
STR	544(94.15)	40(5.85)	684
TET	667(97.51)	17(2.49)	684
CHL	565(82.60)	119(17.40)	684
Aug	653(95.47)	31(4.53)	684
OFL	368(53.80)	316(46.20)	684

Table 9: Percentage *in vitro* susceptibility pattern of the bacterial pathogens in Catherter – associated UTI in Federal Medical Centre, Umuahia

	E.coli		*Pseudomonas. Spp.*		*Klebsiella. Spp*		*Proteus spp.*		*Staphylococcus. Spp*	
Drug	R	S	R	S	R	S	R	S	R	S
Ca2	15(100)	0(0)	48(100)	0(0)	27(90)	3(10)	7(100)	0(0)	545(93.32)	39(6.68)
CRx	15(100)	0(0)	48(100)	0(0)	30(100)	0(0)	7(100)	0(0)	540(92.47)	44(7.53)
GEN	13(86.67)	2(13.33)	42(87.50)	6(12.50)	20(66.67)	10(33.33)	6(85.71)	1(14.29)	361(61.82)	223(38.18
CXM	15(100)	0(0)	48(100)	0(0)	30(100)	0(0)	6(85.71)	1(14.29)	584(100)	0(0)
NIT	15(100)	0(0)	44(91.67)	4(8.33)	24(80)	6(20)	7(100)	0(0)	524(100)	60(10.27)
CPR	14(93.33)	1(6.67)	41(85.42)	7(14.58)	30(100)	0(0)	7(100)	0(0)	439(75.17)	145(28.83
COT	15(100)	0(0)	48(100)	0(0)	30(100)	0(0)	7(100)	0(0)	584(100)	0(0)
CXC	15(100)	0(0)	47(97.92)	1(2.08)	30(100)	0(0)	7(100)	0(0)	584(100)	0(0)
ERY	-	-	-	-	-	-	-	-	551(94.35)	33(5.65)
STR	15(100)	0(0)	48(100)	0(0)	30(100)	0(0)	7(100)	0(0)	544(93.15)	40(6.85)
TET	15(100)	0(0)	48(100)	0(0)	30(100)	0(0)	7(100)	0(0)	567(97.09)	17(2.91)
CHL	15(100)	0(0)	34(70.83)	14(29.17)	21(70)	9(30)	6(85.71)	1(14.29)	481(82.36)	103(17.64)
Aug	14(93.33)	1(6.67)	47(97.92)	1(2.08)	26(86.67)	4(13.53)	7(100)	0(0)	559(95.72)	25(4.28)
OFL	9(60)	6(40)	33(68.75)	15(31.25)	22(73.33)	8(42.37)	3(42.86)	4(57.14)	291(49.83)	293(50.17)