UNDER PEER REVIEW

Original Research Article

CONVENTIONAL IDENTIFICATION AND ANTIBIOGRAM OF *E. coli* SEROTYPE 0157:H7 IN ABUTH ZARIA.

Abstract

The emergence and re-emergence of new strains of microorganisms with high virulent traits and resistance to even new generation antibiotics globally is a significant limiting factor to patience recovery in clinical settings. This has indeed created a lot of economic burdens and loss of productive activities at work places especially in developing countries. This study was conducted to evaluate the presence of *E. coli* serotype O157:H7 in Zaria metropolis, the results discussed is in relation to public health implication of *E. coli* serotype O157:H7 and the antibiotics resistance pattern of the isolates. Of the 50 samples (blood, urine and stool) of diarrhea patients for the period of 6months (March - August, 2011), submitted for bacteriological diagnosis at the Medical Microbiology Laboratory of Ahmadu Bello University Teaching Hospital Shika, Zaria, Nigeria randomly collected, 60% (30/50) of the isolates obtained were identified as *E. coli*, with 66.67% (20/30) from stool, 20% (6/30) from urine and 13.33% (4/30) from blood. The incidence of *E. coli* serotype O157:H7 was 36.67% (11/30). The antibiogramm result of *E. coli* serotype O157:H7 (Figure 3) to fourteen (14) antibiotic commonly prescribed at ABUTH showed that the isolates were 70% resistant to ceftazidine (CAZ), 60% to tetracycline (TE), ampicillin-sulbactam (SAM), amoxicillin-clavulanic acid (AMC), 40% to amoxicillin (AML), cefuroxime (CXM), nalidixic acid (NA) and cefalexin (CL), 30% to nitrofurantoin (F), 20% to ofloxacin (OFX), chloramphenicol (C), and ciprofloxacin (CIP), 10% to ceftriaxone (CRO) and all the isolates were sensitive to gentamicin. We conclude that there is an emergence of varying resistant pattern and virulent multidrug resistance isolate of *E. coli* serotype O157:H7 in Zaria metropolis which has influence the result obtain from clinical samples in ABUTH. These calls for significant antibiotic surveillance and development of fast diagnostic techniques for the detection and treatment of diarrhea *E. coli* associated diseases as this identified serotype have been implicated in several deaths around the globe, also encouragement of good hygiene practices to prevent food/water born outbreak of diarrhea.

Kew words: Food/water born disease, E. coli O157:H7, Antibiotics, Zaria metropolis, serotyping

Introduction

E. coli serotype O157:H7 is a rare strain of *E. coli* that produces large quantities of one or more related, potent toxins that cause severe damages to the lining of the intestine. These toxins [verotoxin (VT), Shiga-like toxin] are closely related or identical to the toxin produced by *Shigella dysenteriae* (FDA, 2009), which causes diarrhea disease. Diarrhea disease majorly caused by *E. coli* through water and fresh fruits faecal-oral contamination kills an estimated 1.8 million people each year (WHO, 2005). Among children under five years in developing countries, the prevalence of diarrhea accounts for 17% of all deaths (United Nations, 2006). *E. coli* O157:H7 was first recognized as a cause of illness during an outbreak in 1982 traced to

UNDER PEER REVIEW

contaminated hamburgers (EPA, 2012). Since then, most infections are believed to have come from eating undercooked ground beef; however, some have been waterborne. In 1999, people became sick after drinking contaminated water in Washington County, New York and after swimming in contaminated water in Clark County, Washington (EPA, 2012). Food-borne illnesses in human due to bacterial pathogens and their toxins are well documented worldwide (Hazariwala, *et al.*, 2002). Food-borne illness imposes a substantial economic and quality of life burden on society by way of acute morbidity and chronic squeal (Duff *et al*, 2003). Dairy and beef cattle are primary reservoirs of *E. coli* O157:H7 and they can carry it asymptomatically and shed it in their feces. Food products associated with *E. coli* outbreaks include cucumber, raw ground beef, raw seed sprouts or spinach, raw milk, unpasteurized juice, unpasteurized cheese and foods contaminated by infected food workers via fecal-oral route (FDA, 2007; BBC News, 2011). According to the U.S. Food and Drug Administration, the fecal-oral cycle of transmission can be disrupted by cooking food properly, preventing cross-contamination, instituting barriers such as gloves for food workers, instituting health care policies for food industry employees to seek treatment when they are ill, pasteurization of juice or dairy products and proper hand washing requirement (Vogt and Dippold, 2005). *E. coli* O157:H7 is also notorious for causing serious and even life-threatening complications such as hemolytic-uremic syndrome (Nataro and Kaper, 1998). This particular strain is linked to the *E. coli* outbreak in United State in 2006 due to fresh spinach consumption (Faysal, *et al.*, 2006). Early 2011, *E. coli* O157:H7 strain was said to be the strain behind the deadly June 2011 *E. coli* outbreak in Europe (TLGNE, 2011). Severity of the illness caused by *E. coli* varies considerably; it can be fatal, particularly in young children, the elderly or the immunocompromised. It was established that poor hygienic methods of preparing meat in Scotland killed seven people in 1996 due to *E. coli* poisoning, and left hundreds more infected (Tauschek, *et al*., 2001). Other strains of *E. coli* that cause gastroenteritis in humans can be grouped into six categories: enteroaggregative (EAEC) (persistent diarrhea of more than 14 days, with watery, secretory and not accompanied by fever or vomiting), enterohemorrhagic (EHEC) (diarrheogenic that may range from mild and non-bloody to bloody stools with no leukocytes leading to hemolytic-uremic syndrome in humans due to potent excretion of toxins called verotoxins or Shiga toxins), enteroinvasive (EIEC) (They invade the epithelial cells of the intestine and cause a watery diarrhea. Dysentery caused by EIEC usually occurs within 12 to 72 hours following ingestion of contaminated food), enteropathogenic (EPEC) (EPEC cause either a watery or bloody diarrhea) (Nataro and Kaper, 1998), enterotoxigenic (ETEC) (ETEC strains secrets heat-labile toxin (HLT), heat-stable toxin (HST), or both toxins), and diffuse adherent (DAEC) (DAEC appears to be more pathogenic in preschool-aged children) (Benenson, 1995). Pathogenic *E. coli* are serotyped on the basis of their biochemical byproducts, O (somatic), H (flagellar), and K (capsular) surface antigen profiles. Each of the six categories listed above has a different pathogenesis and comprises of a different set of O: H serotypes, which can only be determined by serological analysis of gene sequences contained by each E. coli using specific primers (Nataro and Kaper, 1998).

UNDER PEER REVIEW

Bacterial infections are usually treated with antibiotics (Joanne, *et al.,* 2008). However, the antibiotic sensitivity of different strains of *E. coli* varies widely. As with most Gram-negative organisms, *E. coli* is resistant to many antibiotics that are effective against Gram-positive organisms. Antibiotics which may be used to treat *E. coli* infection include amoxicillin, as well as other semi synthetic penicillins, many cephalosporins, carbapenems, aztreonam, trimethoprim-sulfamethoxazole, ciprofloxacin, nitrofurantoin and the aminoglycosides (Reid, *et al.,* 2001). Antibiotic resistance is a growing global problem. Some of this is due to overuse of antibiotics in humans, but some of it is probably due to the use of antibiotics as growth promoters in animal feeds. Also prescription of antibiotics for non-bacteria infection (colds, influenza, most upper respiratory infections etc) or prescribing the 'newest' antibiotics in the market when older "brands" may still be effective. These simply increase the rate at which the natural selection for resistance occurs (Soulsy, 2005). This study therefore proposes to evaluate the presence of *E. coli* O157:H7 in ABUTH and also understand their antibiogramme, in other to proffer better treatment to infected patient.

METHODOLOGY

Sample Collection and Isolate Identification

Of the 50 samples (blood, urine and stool) of diarrhea patients for the period of 6months (March - August, 2011), submitted for bacteriological diagnosis at the Medical Microbiology Laboratory of Ahmadu Bello University Teaching Hospital Shika, Zaria, Nigeria, 30 isolates of *E. coli* were identified on eosin methyline blue and inoculated onto nutrient agar at 37°C for 24hrs incubation period for further morphological identification using standard microbiology methods as described by De silva *et al*., (2001); Ellis and Goodacre, (2006); Chakraborty and Nishith, (2008).

Biochemical Test and Principle

Further biochemical test for *E. coli* was carried out as described by Harley, (2002); Cowan and Steel, (1993); Barrow and Feltham, (1993). While serological identification for the isolation of *E. coli* serotype 0157:H7 using Sorbitol-MacConkey medium containing potassium tellurite and cefixime was carried out using manufacturer's (Oxoid) method also described by Cheesbrough, (2000). Unlike typical *E. coli*, isolates of *E. coli* O157:H7 do not ferment sorbitol and are negative with the 4-methylumbelliferyl-beta-D-glucuronide (MUG) assay; therefore, these criteria are commonly used for selective isolation. Sorbitol-MacConkey agar has been used extensively to isolate this organism from clinical specimens. Hemorrhagic colitis agar, a selective and differential medium, is used in a direct plating method to isolate O157:H7 from foods. A third procedure uses Sorbitol-MacConkey medium containing potassium tellurite and cefixime. It includes an enrichment step and is a new method developed as a result of the recent foodborne outbreaks.

UNDER PEER REVIEW

Antibiotic susceptibility test

The antibiotics prescribed at the Ahmadu Bello University, Teaching Hospital for the treatment of infections associated with *E. coli* were used for this test as described by Cheesbrough, (2000) and CLSI (2006).

Determination of Multiple Antibiotic Resistance (MAR) Index

The MAR Index was determined according to the method of Krumperman (1983) and Paul *et al* (1997) by dividing the number of antibiotics to which the isolate is resistant to by the total number of antibiotic groups tested.

$$MAR\ Index = \frac{Number\ of\ antibiotics\ to\ which\ resistant}{Total\ number\ of\ antibiotics\ tested}$$

RESULTS

Morphological Characteristics of *E. coli* Serotype O157: H7 on Sorbitol MacConkey Agar.

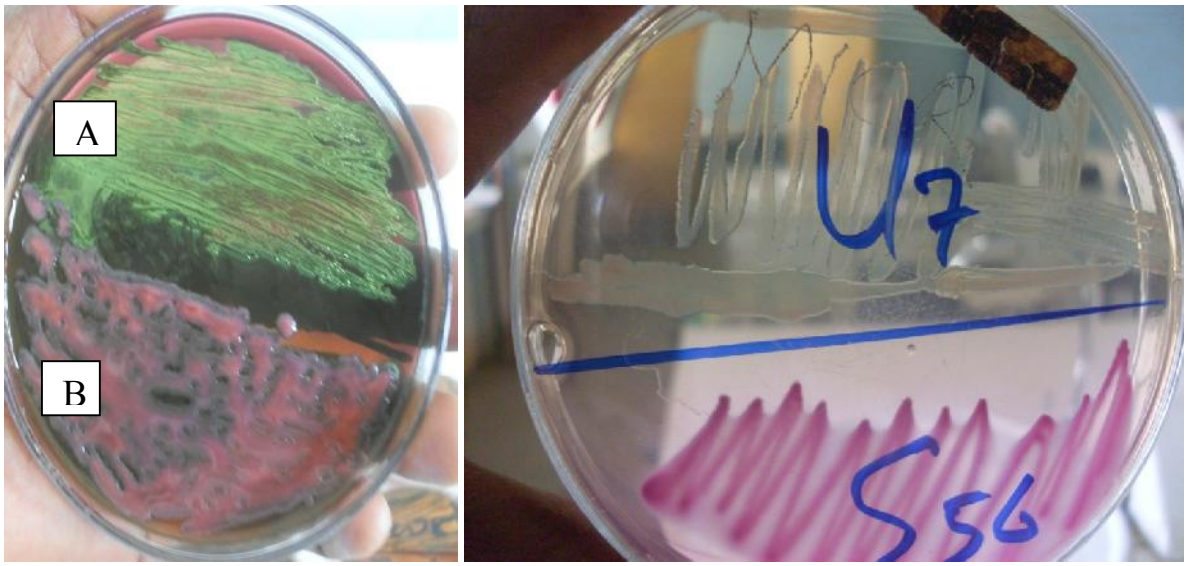

Figure 1: Morphological and phenotypical characteristics of *E. coli* O157:H7 on sorbitol MacConkey agar. *E. coli* O157:H7 appeared colourless on CT-SMA (U_7) while other serotypes of *E. coli* showed pickish colour (negative) of *E. coli* on CT-SMA agar.
Key: U_7 = Positive, S_{56} = Negative, A = Greenish metallic shine of *E. coli* on eosin methyline blue agar, B = *Klebsiella spp.* on eosin methyline blue

Table 1: Biochemical Identification of *E. coli* 015:H7

The result of the morphological and biochemical studies of *E. coli* isolates.

Lab No.	MA	MN	EMB	I	MR/VP	C	CR	H_2S/TSI	UR	O/CA	Organism	CT-SMA
S_8	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
S_{16}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
S_{11}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+

UNDER PEER REVIEW

S_{39}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{52}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
S_{35}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{43}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{44}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
B_{46}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
B_{5}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
B_{18}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
B_{27}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{41}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{42}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{40}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
S_{47}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{48}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{45}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
U_{34}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
U_{31}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
U_{20}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
U_{38}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{37}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
U_{50}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
U_{56}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{57}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-
S_{46}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
S_{54}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
S_{7}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	+
S_{17}	Pink red	-	+	+	+/-	-	-	- /+	-	-/+	*E. coli*	-

Keys: CT-SMA = Cexifime and potassium tellurite –sorbitol MacConkey agar, G = Gas in glucose, TSI = Triple sugar iron, - = Negative result, + = Positive result, S = Isolate from stool, U = urine, B = blood, MR= Methyl red, VP = Voges-Proskauer, EMB = Eosin methylene blue, MA= MacConkey Agar, MN = Mannito salt agar, C= Citrate agar, CA = Catalase test

Table 2: Incidence of *E. coli* O157:H7 in ABUTH, Shika, Zaria.

S/N	Source	No. Isolate	% from sample	*E. coli* O157:H7	*E. coli* O157:H7 %
1	Stool	20	66.67	11	55
2	Urine	6	20	0	0
3	Blood	4	13.33	0	0

Incidence of *E. coli* O157:H7 in the collected Samples

UNDER PEER REVIEW

The result of the incidence of *E. coli* O157:H7 in stool isolates is as shown in figure 2 below.

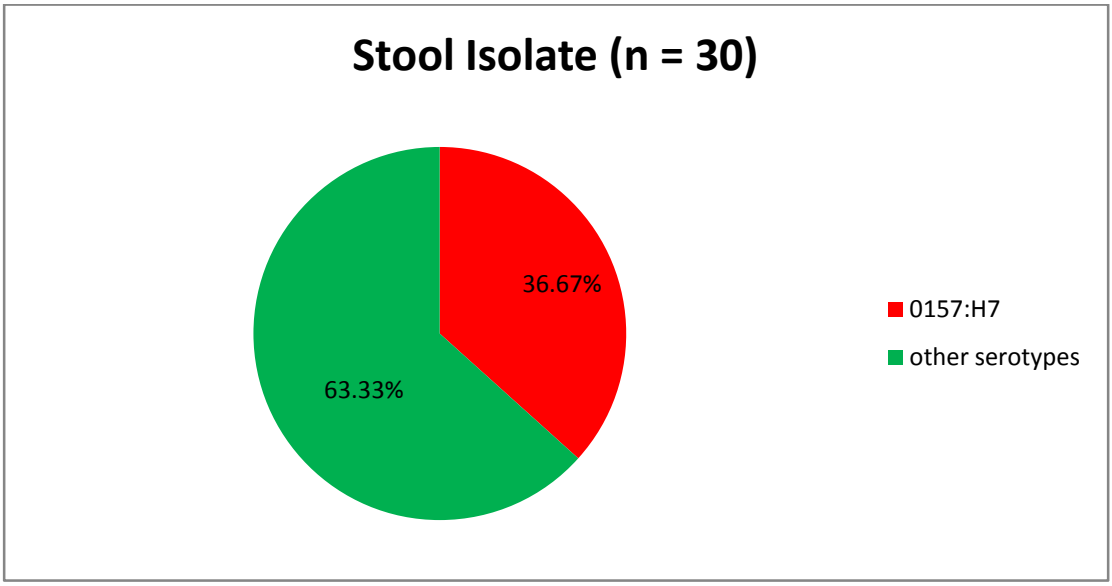

Figure 2: This result shows that in stool *E. coli* isolates (30), *E. coli* serotype O157:H7 is 36.67% while other serotypes amount to 63.33%. This could indicate a serious health risk from our water sources.

Table 3: Antibiogram and MARI of Isolated *E. coli*

Lab Code	Resistant Pattern	MARI	No. Resistance	Resistant category
S_8	AML	0.1	1	NIL
S_{16}	F, TE, SAM	0.2	3	MDR
S_{11}	CAZ, SAM	0.1	2	XDR
S_{39}	CAZ,OFX, CXM, NA, TE, AMC, SAM, C,	0.6	8	MDR
S_{52}	CXM, TE, NA, AML, SAM, C, CL, AMC,	0.6	8	MDR
U_{34}	AMC, SAM, AML,	0.2	3	XDR
S_{46}	TE, AMC, SAM	0.2	3	MDR
S_{43}	CAZ, CXM, AMC, SAM, CL, CRO	0.4	6	MDR
S_{45}	CAZ, CL, AMC, CRO, OFX, CXM, NA, TE, AML, CIP, SAM	0.8	11	MDR
B_{46}	CAZ, OFX, NA, TE, AMC, CIP	0.4	6	MDR
B_5	CAZ, AMC, C	0.2	3	MDR
B_{27}	CAZ,	0.1	1	NIL
B_{18}	CAZ, CN, CXM, AMC, SAM, CL, AML, CRO	0.6	8	MDR
S_{42}	TE, AMC, C	0.2	3	MDR
S_{40}	CAZ,	0.1	1	NIL
S_{47}	CAZ, TE, AMC, SAM	0.3	4	MDR
S_{48}	NIL	0	0	NIL
S_{43}	CAZ, F, TE, AMC, SAM, CL,	0.4	6	MDR
U_{31}	F, AMC, OFX, CXM, NA, TE, AML, CIP, SAM, C,	0.8	11	MDR

UNDER PEER REVIEW

	CL			
U_{20}	CAZ, CRO, CXM, AMC, SAM	0.4	5	MDR
U_{38}	CAZ, CRO, CXM, NA, AMC,CIP,SAM, CL	0.6	8	MDR
S_{37}	CAZ, F, CXM, TE, AMC, SAM, AML,	0.5	7	MDR
U_{50}	CAZ, CXM, TE, AMC, SAM, C, CL, AML	0.6	8	MDR
U_{56}	CAZ, AMC, OFX, CXM, NA, TE, AML, CIP, SAM, C, CL	0.8	11	MDR
S_{57}	CAZ, F, OFX, CXM, NA, TE, AML,CIP,SAM,CL,AMC	0.8	11	MDR
S_{44}	CAZ, F, CXM,AMC,SAM, C, CL	0.5	7	MDR
S_{51}	CAZ, SAM, CL	0.2	3	MDR
S_{7}	CAZ, NA, TE, AMC, CL	0.4	5	XDR
S_{17}	CAZ, CXM, NA, CIP	0.3	4	MDR
S_{54}	NIL	0	0	NIL

The percentage susceptibility and resistance profile of *E. coli* from different sources
Keys: S = Sensitive, I = Intermediate, R= Resistance, Ampicillin-sulbactam (SAM), Amoxicillin (AML), Amoxicillin-Clavulanic acid (AMC), Cefalexin (CL), Ceftriaxone (CRO), Ceftazidine (CAZ), Cefuroxime (CXM), Ciprofloxacin (CIP), Nalidixic Acid (NA), Ofloxacin (OFX), Gentamicin (CN), Tetracycline (TE), Chloramphenicol (C), Nitrofurantoin (F).

Table 4: Resistant Pattern and MARI in Percentages of Isolated *E. coli* 015:H7

Lab code	Resistance Pattern	No of antibiotic resistance	MARI (n/14)
S_{8}	AML	1	0.1
S_{16}	F, TE, SAM	3	0.2
S_{46}	TE, AMC, SAM	2	0.1
S_{52}	CXM, TE, NA, AML, SAM, C, CL, AMC,	8	0.6
S_{44}	CAZ, F, CXM,AMC,SAM, C, CL	7	0.5
S_{11}	CAZ, SAM	2	0.1
S_{7}	CAZ, NA, TE, AMC, CL	5	0.4
S_{40}	CAZ,	1	0.1
S_{45}	CAZ, CL, AMC, CRO, OFX, CXM, NA, TE, AML, CIP, SAM	11	0.8
S_{37}	CAZ, CXM, TE, AMC, SAM, AML,	6	0.4
S_{54}	NIL	0	0

UNDER PEER REVIEW

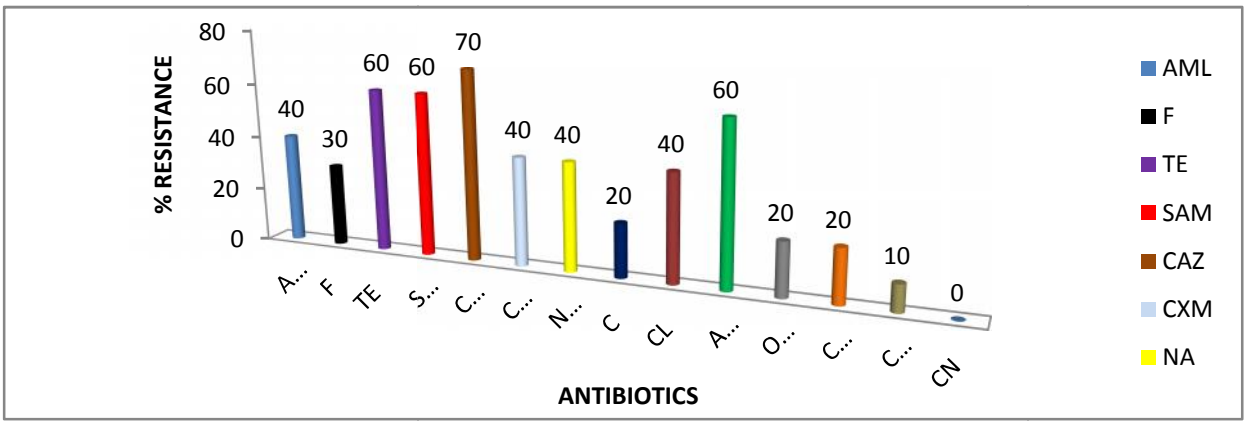

Figure 3: Percentages of resistance of *E. coli 015:H7* to selected antibiotics

Determination of the Different Categories of Antibiotic Resistance in *E. coli* isolates in ABUTH, Shika.

The result of different categories of antibiotic resistance in *E. coli* 0157:H7 isolates in ABUTH, Shika according to the International Expert Proposal for Interim Standard Definitions for acquired resistance adopted from Magiorakos *et al.*, (2012).

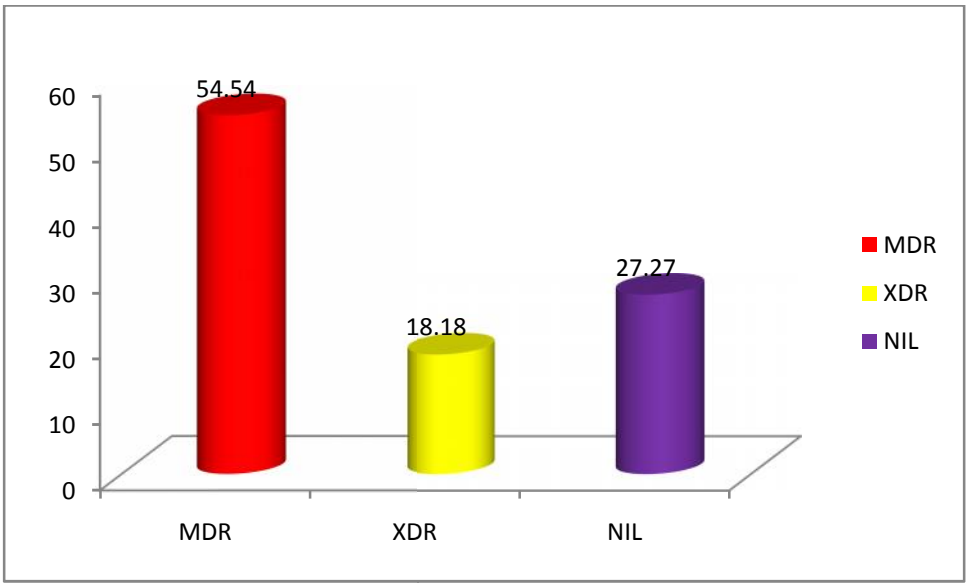

Figure 4: Categories of Antibiotic Resistance in *E. coli* isolates

MDR: Multidrug-resistant, XDR: Extensively drug-resistant NIL: Neither MDR nor XDR

MDR: non-susceptible to ≥1 agent in ≥3 antimicrobial categories.

XDR: non-susceptible to ≥1 agent in all but ≥2 categories.

PDR: non-susceptible to all antimicrobial agents listed.

PDR was not considered because not all the antibiotics contained in the proposal of Magiorakos *et al.,* (2012) are prescribed for infections associated with *E. coli* in A.B.U Teaching Hospital Shika, Zaria.

UNDER PEER REVIEW

DISCUSSION/CONCLUSION

Escherichia coli (*E. coli*) is a Gram-negative, facultative anaerobe, non-sporulating, rod-like in shape and belongs to the family enterobacteriaceae, commonly found in the lower intestine of warm blooded eukaryotes. *E. coli* is commonly found in faeces, urine, sewage and contaminated water (APEC, 2011). Of the 50 samples (blood, urine and stool) of diarrhea patients for the period of 6months (March - August, 2011), submitted for bacteriological analysis at the Medical Microbiology Laboratory of Ahmadu Bello University Teaching Hospital Shika, Zaria, Nigeria randomly collected, 60% (30/50) of the isolates obtained were identified as *E. coli*, with 66.67% (20/30) from stool, 20% (6/30) from urine and 13.33% (4/30) from blood. The incidence of *E. coli* serotype O157:H7 in the total isolates was 36.67% (11/30) and 55% (11/20) in stool sample only (Table 2). The morphological, phenotypical and biochemical characteristics of *E. coli* O157:H7 on sorbitol MacConkey agar is as shown in Figure 1 and Table 1 respectively. *E. coli* O157:H7 appeared colourless on CT-SMA (U_7) while other serotypes of *E. coli* showed pickish colour (negative) of *E. coli* on CT-SMA agar. This calls for critical examination of the ways in which food and water are being treated within Zaria, Nigeria, because previous studies, as observed in Lagos (Aibinu *et al.*, 2007), Lagos and Ibadan (Olatoye *et al.*, 2010), Benin (Ekundayo and Isibor, 2012), Borno and Adamawa (Moses *et al.*, 2012), Zaria (Chigor *et al.*, 2010, Bello *et al.*, 2011) and Kano (Dahiru *et al*., 2008) has implicated *E. coli* 0157:H7 in stool of diarrhea patience resulting from eating unwashed vegetables, undercooked meat or other food sources. According to Josefa *et al.*, (2011), the distribution of *E. coli* 0157:H7 disease are foodborne 183 (52%), unknown 74 (21%), person-to-person 50 (14%), waterborne 31 (9%), animal contact 11 (3%), and laboratory-related 1 (0.3%). But according to Dahiru, *et al.,* (2008); the prevalence rate of *E. coli* serotype O157:H7 in Kano was 53% in fresh beef and 25.3% in roasted beef, which implies that consumption of inadequately cooked beef will pose a serious risk of infection (Schlundt, 2001). However, *E. coli* serotype O157:H7 illness has been reported not to be in outbreak proportions in Nigeria since 1994 (Ogunsanya, *et al.,* 1994; Olorunshola, *et al.,* 2000). Available information indicates that the carriage of *E. coli* serotype O157:H7 in cattle was an important factor in the emergence of this pathogen in Africa (Effler, *et al.,* 2001; Renter, *et al.,* 2003). According to Umeh and Okpokwasili (2009); the prevalence of *E. coli* 0157:H7 in livestock is extrapolated as 20% in cattle, 12.5% in sheep, 7.5% in goat, 5% in chicken and 2.5% in pig feacal samples and increased shedding is usually observed during the months of December- March. However, illness in reared animals has frequently been linked to contaminated irrigation water, with animal faeces from discharged sewage effluent or surface run off (Chigor, *et al.,* 2010, Chalmerset, *et al.,* 2000; Payment and Riley, 2002). In Nigeria, as in most developing countries, surface waters which constitute an important source of water for domestic and agricultural purposes are vulnerable to faecal pollution (Umoh, *et al.,* 2001; Okafo, *et al.,* 2003). The antibiogramm result of *E. coli* serotype O157:H7 (Figure 3) to fourteen (14) antibiotic commonly prescribed at ABUTH showed that the isolates were 70% resistant to

UNDER PEER REVIEW

ceftazidine (CAZ), 60% to tetracycline (TE), ampicillin-sulbactam (SAM), amoxicillin-clavulanic acid (AMC), 40% to amoxicillin (AML), cefuroxime (CXM), nalidixic acid (NA) and cefalexin (CL), 30% to nitrofurantoin (F), 20% to ofloxacin (OFX), chloramphenicol (C), and ciprofloxacin (CIP), 10% to ceftriaxone (CRO) and all the isolates were sensitive to gentamicin. The isolates also showed varying resistance pattern with 63% (7/11) resistant to more than 3 antibiotics commonly prescribed for *E. coli* associated infection/diseases (Table 4). At ≥0.3 MARI, all the *E. coli* isolates showed a total of 55.78% MARI (Table 3), while only serotype O157:H7 showed a MARI of 45.45% (Table 4) respectively. In line with Magiorakos *et al.,* (2012) proposal for resistance pattern, 54.5% of the isolates were multidrug resistant, 18.2% showed extensively drug-resistant, while 27.7% were neither MDR nor XDR (NIL). These express a significant number of antibiotics resistances within Zaria metropolis and of serotype O157:H7. The report of Bell, *et al.,* (2005) and Umolu, *et al.,* (2006) in Lagos supported that *E. coli* showed maximum sensitivity to ceftriaxone and ciprofloxacin (mean score of 85%) while antibiotics like gentamicin are effective than newer antibiotics because of limited use (Olatoye; 2010) with nitrofurantoin and ofloxacin showing the least resistance levels of 6% and 19% respectively to isolates of *E. coli.* Chijioke and Christian (2012) who worked in Enugu using *E. coli* from livestock also supported that *E. coli* isolates showed resistance rates of 85% to ampicillin; 22.5% to ceftriaxone; 18.8% to cefoxitin; 16.3% to nalidixic acid and 12.5% to gentamicin. But the variation in rate of resistance of microganism to antibiotic might be a function of misuse of antibiotics in such location (Ibezim, 2005). It should be understood that irrespective of the efficacy and specificity of any antibiotic, broad spectrum antibiotics are sometimes given in place of narrow spectrum antibiotics as a substitute for culturing and sensitivity tests, with the consequent risk of selection of antibiotic-resistant mutants. This situation is made worse by patients not completing their course of medication, probably as a result of ignorance or poor financial level creating an environment of antibiotic misuse and resistance (Iruka, *et al.,* 1999). We conclude that there is an emergence of varying resistant pattern and virulent multidrug resistance isolate of *E. coli* serotype O157:H7 in Zaria metropolis which has influence the result obtain from clinical samples in ABUTH. These calls for significant antibiotic surveillance and development of fast diagnostic techniques for the detection and treatment of diarrhea *E. coli* associated diseases as this identified serotype have been implicated in several deaths around the globe, also encouragement of good hygiene practices to prevent food/water born outbreak of diarrhea.

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