Magnitude of Antibiotic Resistant Escherichia Coli and Factors associated with Antibiotic Resistance among Adult Patients Attending Public Health Centers in Addis Ababa, Ethiopia

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University for Partial Fulfillment of the Masters Degree of Public Health in Epidemiology and Biostatistics

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MAGNITUDE OF ANTIBIOTIC RESISTANT ESCHERICHIA COLI AND FACTORS ASSOCIATED WITH ANTIBIOTIC RESISTANCE AMONG COMMUNITY ACQUIRED URINARY TRACT INFECTED PATIENTS ATTENDING PUBLIC HEALTH CENTERS IN ADDIS ABABA. ETHIOPIA

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Acronyms

ABR	Antibiotic Resistance
AMR	Antimicrobial resistance
CAUTI	Community Acquired Urinary Tract Infection
DMIP	Department of Microbiology, Immunology and Parasitology
E. coli	Escherichia coli
EDHS	Ethiopian Demographic Health Survey
FQS	Fluoroquinolones
WHO	World Health Organization
UCUTI	Uncomplicated Urinary Tract Infection
UTI	Urinary Tract Infection
WBC	Wight blood cells
Org.	Organism
Lab.	laboratory
UPEC	urinary pathogen Escherichia coli

Abstract

Background: Urinary tract infections (UTIs) are one of the most common bacterial infections in humans both in the community and hospital settings. It has estimated 150 million cases of UTI worldwide. E. coli is the most common Uro-pathogenic organism. Increasing resistance in E. coli has been reported globally and now considered as one of the major public health problem. Studies in Ethiopia frequently retrieve highest rate of antibiotic resistant in Uro-pathogenic E. coli isolates from hospitals. Community acquired urinary tract infection or uncomplicated (UTI) is mostly treated at primary health care empirically. There is scares data on this issue from health center where uncomplicated UTI is usually treated empirically. Therefore, Knowledge of the magnitude of antibiotic resistant in this organism and assessment of some patient's activities related OR risk factors which contribute to antibiotic resistant at the community level is important for empirical treatment and future monitoring of antibiotics resistance at community level. Therefore, this study addresses this gap.

Objective: To assess magnitude and factors associated with antibiotic resistant in E. coli among community acquired urinary tract infected patients at health center in A.A in the 2017.

Methodology: institution based Cross-sectional study was conducted using quantitative methods. Multistage sampling procedure and simple random sampling technique were used to select Sub-cities and health centers. 266 study participants were selected based on their microscopic laboratory Result (urine pus cell count> 10/HPF). Data were collected using interview based questionnaire adopted from different literatures and standardized culture and susceptibility test results record form. Urine sample were collected and analyzed using standard methods. Finally, the collected data were cleaned, entered in to epi-data software and sent to SPSS. Then followed by Analysis of descriptive statistics, bivariate and multivariate respectively

Result: About half of participant develops resistance to at least one of the seven antibiotics tested. Ampicillin was found to be the major resisted antibiotic for about three fourth of the seven antibiotics tested for drug sensitivity. Patients who had reported health service facilities were most accessible compared to pharmacies/drug shops; and patients who had taken antibiotics for less than seven days were found to be significantly associated with antibiotics resistance.

Conclusion and recommendation: In the study area resistance rates to Ampicillin were high. And Ciprofloxacin was the list resistant and recommended to empirical treatment in the area of study.

1. Introduction

1.1 Background:

Urinary tract infection is a common community- acquired bacterial disease. Escherichia coli, the most common member of the family Enterobacteriaceae Accounts for 75-90% of all urinary tract infection in both inpatients and outpatients(1)Urinary tract infections (UTIs) are frequent problems; It affects around 150 million people worldwide each year. Most UTIs are caused by Escherichia *coli (2).* E. coli and other Uro-pathogenic are becoming increasingly resistant to commonly prescribed antimicrobials,(3) Therefore Antibiotic resistant Escherichia coli is considered as one of public health concerns organism worldwide. (4). It is found as a communal in the large intestine of humans and other warm-blooded animals, but some strains may cause intra intestinal or extra intestinal diseases to humans.(5) community acquired or Uncomplicated UTI is one of the extra intestinal infections mostly caused by UPEC which able to affect all age and sex groups,(6).UPEC usually acquired resistant gene from environmental exposures including sexual partners, any interacting with infected household members, pets, food and frequently travel.(7, 8)There is widespread dissemination of resistant Uro-pathogenic E.coli (UPEC) genes nationally and globally(9). The emergence of antibiotic resistance is natural phenomena, but some human activities can aggravate determinants of antibiotic resistance including inappropriate antibiotic use, educational and economic status, living style, age and sex of the patients, etc.(10) The magnitude of resistant gene varies from place to place .The prevalence of antibiotic resistant E coil gene even to new generation antibiotics has been increasing in many areas of the world (4)The. rate of bacterial infection in developing countries is high and timely diagnosing of infection is difficult(11). Continuous surveillance and monitoring of the factors associated with antibiotic resistance at community level are used to stop or reduce the progress. There are scares data on antibiotic resistance especially on E. coli. (4), which is the predominant isolate of urinary tract infection worldwide. (12-15) Studies suggest that knowing the prevalence of antimicrobial resistance (AMR) for antibiotics used to treat infection empirically is crucial to select effective treatment and proper antibiotics.(16) Assessment of risk factors at the community level helps to develop strategies for prevention or reduce the emergence and discrimination of resistant gene. In Ethiopia some studies on ABR are from hospital based survey especially from referral hospital. (12, 13, 17-20) most of hospitals in Ethiopia are referral. Therefore, since Community Acquired Urinary Tract Infection (CAUTI) or

uncomplicated UTIs are treated at primary health care level empirically, the magnitude of antibiotic resistance at HC level is important to give effective empirical treatment.

1.2. Statements of the problem.

In developing countries, acquiring bacterial resistance to antimicrobial agents is common in isolates from healthy persons and from persons with community-acquired infections, (21). E.coli is known to cause UTI worldwide (22).Urinary tract infection is a significant health problem both in the community and hospital settings. It is estimated that 150 million UTIs occur yearly world-wide, accounting for 6 billion USD in health care expenditures. In 2007, in the United States alone, there were an estimated 10.5 million office visits for UTI symptoms (constituting 0.9% of all ambulatory visits) and 2–3 million emergency department visits. Currently, the societal costs of these infections, including health care costs and time missed from work, are approximately 3.5 billion USD per year in the United States alone. UTIs are a significant causes of morbidity in infant boys, older men and females of all ages(23).

In Ethiopia, although epidemiological data on urinary tract infection are scarce, some clinical researches showed increasing cases of UTI mostly caused by E.coli(12, 13, 17-20), as well as increasing rates of ABR E.coli to commonly used antibiotics.

Most antibiotic resistant related data in Ethiopia come from hospital based surveys that often do not define the prevalence and factors associated with community acquired infection. Most community acquired UTI are treated empirically in primary health care centers. Studies that describe prevalence of resistance of E. coli and factors associated with antibiotic resistance in the community in the study area are limited. Thus this study aimed to assess and demonstrate epidemiological data on antibiotic resistance E. coli among un- complicated UTI patients seeking treatment at health centers in Addis Ababa in the year of 2017.

1.3 Significant of the study:

The finding of this study give information on magnitude of antibiotic resistant E. coli among community acquired UTI patients and factors which influence the emergence of ABR and dissemination of antibiotic resistance gene in the community. This information is important to improve recommended empirical treatment which is a common practice for treating community acquired urinary tract infections at the primary health care level. In addition, the results of this study would help as a base line information for monitoring antibiotic resistance E. coli infection at community level. The factors that contribute to antibiotic resistance also assessed for the development of strategy of infection prevention and control at community level.

2. Literature Review

This chapter provides information from different studies on antibiotic resistance of E. coli in isolates from community acquired UTI and its associated factors. Antibiotic resistance to E. coli is one of the public health problems worldwide. It is a predominant isolate of urinary tract infection in many parts of the world including Ethiopia. The following studies give some information about antibiotic resistance in E. coli isolates from urine of community acquired urinary tract infected patients.

2.1. Prevalence of ABR E. Coli Isolated from CAUTI

The prevalence of ABR E. coli varies for different classes of antibiotics and also in different areas in the world. Several studies in African countries have reported the presence of resistant strains of bacteria, including reports from Nigeria, Uganda, Tanzania, Zimbabwe, and Ghana, all showing high levels of resistance to antimicrobial agents. Most of these reports show bacterial resistance to commonly utilized and relatively cheap drugs like ampicillin, tetracycline, and in the study area resistance rates to Ampicillin were high. Since most isolates were sensitive to Trimethoprim-Sulfamethoxazole ceftriaxone and ciprofloxacin , this antimicrobials used for empirical treatment of urinary tract infection which have been the main stay of antimicrobial treatment in Africa for decades (24). In general AMR in microorganism have been reported as being on the rise.

A prospective study conducted in Spain in 2004 on 164 isolates of *E. coli* from community acquired urinary tract infected patients revealed that 57.3% were resistance to ampicillin. In the study area resistance rates to Ampicillin were high. Since most isolates were sensitive to Trimethoprim-Sulfamethoxazole, ceftriaxone and ciprofloxacin these antimicrobials are used for empirical treatment of urinary tract infection. 20.1% to Nalidixic acid, 14% to Norfloxacin and ciprofloxacin, and 0% to Fosfomycin and Nitrofurantoin. (25)

In another study conducted in 2014 in Pakistani antibiotic resistance in E. coli isolates of CAUTI demonstrated resistance rates of (67.5%) for ampicillin, (52.5%) for Nitrofurantoin, (70%)for Gentamicin, (55%) for Amikacin, (65%) for ciprofloxacin, (77.5%) for Augmenting, (32.5%) and high resistance to Augmenting and Gentamicin were also observed. (14).

A study was conducted in Turkey to assess the change in antimicrobial susceptibility of *Escherichia coli* isolates from patients with community-acquired urinary tract infection (UTI) from 1998 through 2003. It was identified that the rate of resistance *E. coli* to ampicillin increased from 47.8% to 64.6% and that to the study area resistance rates to Ampicillin were

high. Since most isolates were sensitive to Trimethoprim-Sulfamethoxazole ceftriaxone and ciprofloxacin, this antimicrobial used for empirical treatment of urinary tract infection 37.1% to 44.6% during the study period. The susceptibility pattern of *E. coli* to Nitrofurantoin and Cefuroxime did not vary significantly for over the 6-years period.(3) Also, in a study carried out in Dakar Senegal, revealed E.coli antibiotic resistance rates ranging from 18.6% for fluoroquinolones to 73.6% for ampicillin (26)

In Ethiopia a study conducted in Gondar hospital reviled that most isolates of E.coli was resistant to more than two antimicrobial agent (MDR), and showed high resistance rates to ampicillin (99%), Cotrimoxazole(69%), Chloramphenicol (58.7%), Gentamicin (56.7%) and Ceftazidime(55.8%).(27).Another study from Dill Chore hospital, Dire Dawn Ethiopia provided information on *E. coli* isolates from urine which were highly resistant to Ampicillin (100%), Erythromycin (100%), and Trimethoprim-sulphamethoxazole (70%). (12) A retrospective study evaluating ten years ABR trend from 2002 -2011conducted in Dessei Regional Laboratory to assess the prevalence of antibiotic resistance pattern on isolates from UTI demonstrated that E.coli were almost resistant to Ampicillin, tetracycline, & Trimethoprim sulfamethoxazole. (19). In 2013 cross-sectional study conducted at Hawassa Referral Hospital demonstrated that E. *coli.* Showed 100% to Ampicillin drug resistance, (81.25%) to Trimethoprim sulfamethoxazole and 43.8%. to both Ciprofloxacin and Chloramphenicol. Multi-drug resistance showed in 81.25% of the isolates. Of those who had history of urinary tract infection, 77.77% exhibited resistance to three or more drugs.(13)

2.2 Risk factor for antibiotic resistance. E. coli among CAUTI

In a study conducted in Dakar-Senegal E. coli isolates from CAUTIP were found to be resistant to ampicillin and men were more resistant than women, and the age group >45 years were associated with E. coli resistance to nalidixic acid and fluoroquinolones. (28). A study from Saudi Arabia demonstrated females were more likely to get UTI and E.coli is the most causative agent(29).

In a study conducted in United Kingdom in 2009 males, and age group > 65 years were found to be risk factors for the development of resistance to E. coli. (30).

The study from turkey in 2005 revealed that age over 50 years, ciprofloxacin use for more than once in a year and the presence of UTI were found to be associated with ciprofloxacin resistance..(26) Studies demonstrate that irrational antibiotic use is on the rise globally (50% to almost 100%). (31).Rampant irrational use of antimicrobials without medical guidance may

result in greater probability of inappropriate or incorrect therapy leading to the emergence of pathogens resistant to antibiotics which is potentially dangerous for both individuals and societies. (32) The major form of irrational use is practiced in the community through self-medication. (31) Self-medication is motivated by a complex set of factors, such as UN checked sales, economic and time constraints, influence of family members and friends, consumer attitudes and expectations and media campaigns. Therefore, this study will assess inappropriate antibiotic practice in CAUTI patients as a major risk factor.

In 2005Study conducted in Senegal Dakar reviled that prior urinary tract infection is probably associated with previous antimicrobial treatment which linked with resistance to nalidixic acid and fluoroquinolones our multivariate analysis. The risk factors identified most probably reflect the frequent and uncontrolled use of antimicrobials in Dakar. In addition, patients frequently do not complete the full course of medication because of lack of resources, facilitating a selection of mutant isolates.(28)

Study conducted in USA from2006-2010 reviled that risk factors for resistance to SMX-TMP included prior antibiotic use ($p=0.04$) and prior diagnosis of UTI ($p= 0.01$). and Significant risk factors for resistance to levofloxacin included: male gender, age, presence of hypertension, diabetes, chronic respiratory disease, nursing home resident, previous antibiotic use, previous diagnosis of UTI,(33)

Study was performed among Senegalese outpatients consulting at the Institute Pasteur of Dakar for urine analysis. Evaluated risk factors were: age, gender, prior hospitalization, antibiotic exposure, urinary tract infection and urinary(28)

Conceptual frame work

Some researches revealed that many factors are associated with antibiotic resistance in the community. The following conceptual farm work is constructed based on factors from the literature review and from common knowledge of the investigator

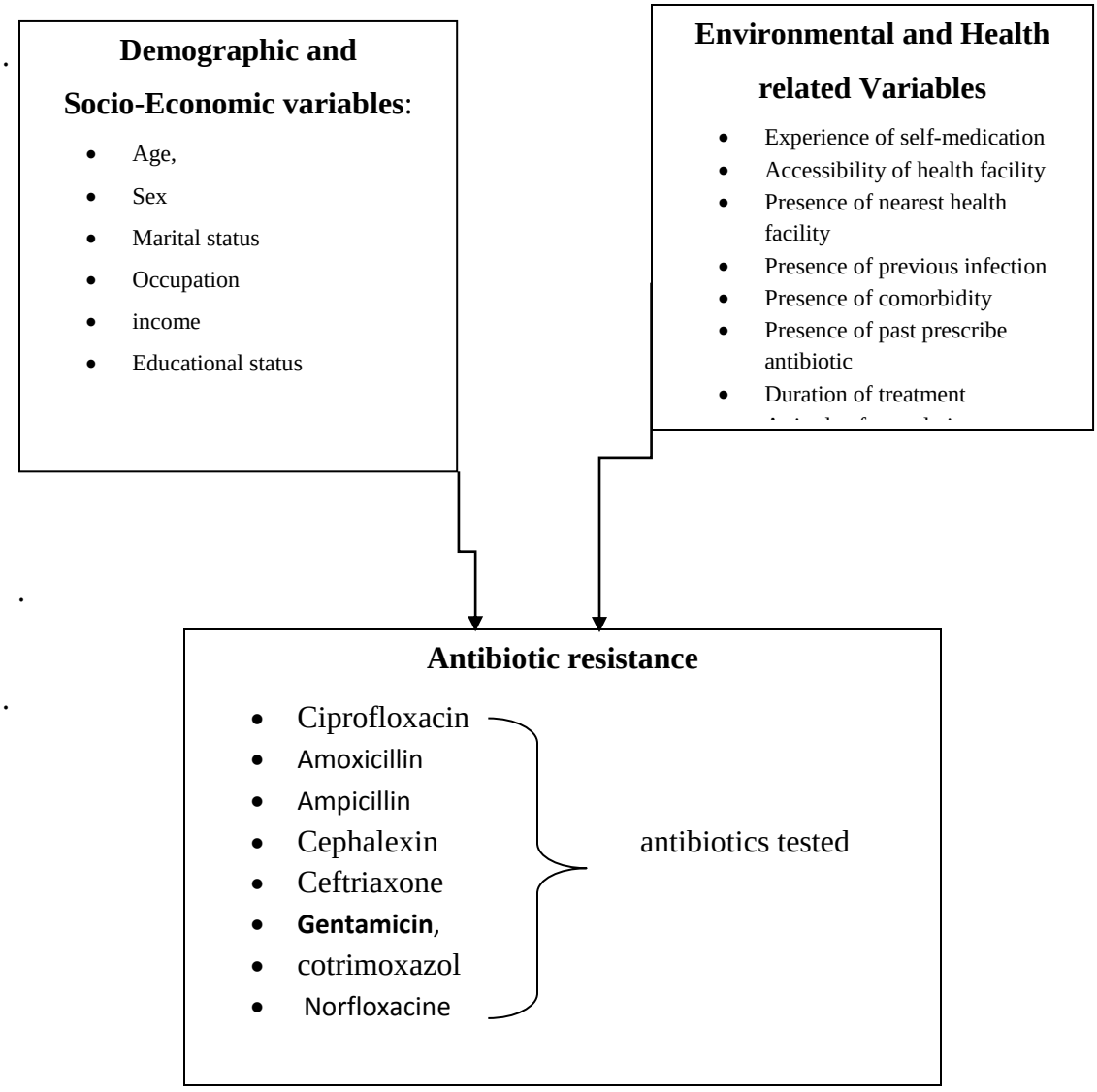


Figure 2. Conceptual Framework extracted from the literature and common Knowledge of the Investigator.

3. Objectives

3.1 General objectives

To determine the magnitude of antibiotic resistant Escherichia coli and factors associated with antibiotic resistance (ciprofloxacin, amoxicillin, ampicillin, Ceftriaxone. Gentamicin, and Cotrimoxazole Norfloxacin) among community acquired urinary tract infected (UTI) Adults at public health centers in Addis Ababa. 2017

3.2 Specific objectives

- To determine the magnitude of antibiotic resistant (Ciprofloxacin, Amoxicillin, Ampicillin, Ceftriaxone, Gentamicin, and Cotrimoxazole, Norfloxacin) in E. coli, among community acquired urinary tract infected (UTI) Adults at public health centers in Addis Ababa. In the study year.
- To assess factors associated with antibiotic resistant in E. coli among community acquired urinary tract infected(UTI) Adults in public health centers at Addis Abba in the study year.

4. Methods and materials

4.1. Study area:

The study was conducted in Addis Ababa the capital city of Ethiopia. Addis Ababa is the seat of the African Union. According to 2007 population census from the central statistical agency of Ethiopia, the total population of Addis Ababa was 2,738,248 of which 1,304,518 are males and 1,433,730 are females which make a proportion of male and female 49% and 51% respectively and the projected estimation for the year 2014 were 3.55 million. Addis Ababa consists of 10 sub cities 116 Woredas (Woredas are administrative divisions within a sub-cities). The health service is rendered by 54 hospitals (Government 13, private 38 and NGOs 3) and 77 health centers (74 public and 3 NGO owned(34). The public health centers in Addis Ababa are expected to provide preventive and curative primary health care services to the population living in their catchment areas and complicated cases referred to nearby hospitals. Even though the health care service has increased in numbers with service coverage by 62% (35) the quality is very low because the ratio of the number of health institutions to population size is low due to the yearly population boom(36).

4.2. Study Design:

This study used Institution based cross sectional study among patients coming to governmental health centers in Addis Ababa.

4.3. Population

4.3.1 Source population

Source population was All Adult UTI patients, seeking health care at public health centers in Addis Ababa.

4.3.2 Study population**:**

All adult patients with symptom of UTI seeking health care at eight selected health centers during the study period and fulfill the inclusion criteria of this research were included.

4.4. Inclusion and Exclusion criteria

Inclusion criteria:

All patients above 18 years old and clinically diagnosed as community acquired Urinary Tract Infected (CAUTI), those who got urine Examination pus cells (WBC) ≥10//high power field were included

Exclusion criteria:

Those who were not cooperative to provide urine for analysis and patients having history of hospitalization in the past three months) were excluded.

4.5. Sample size determination and sampling procedure

Sample size:

The sample size was calculated using a formula to determine sample size for a proportion in a single population by considering the prevalence of antibiotic resistance of E.coli among community acquired UTI patients to be 20% for ciprofloxacin based on recent retrospective survey in Desire area north west Ethiopia(19) with level of confidence 95%,and margin of error of 5%, the sample size was calculated as follows:

Sample size=Z^2x p (1-p)/ d^2

Z= the confidence limits of the survey result.

P= the proportion of study population practicing early sexual intercourse

d= the desired precision of the estimate

n= the total sample size.

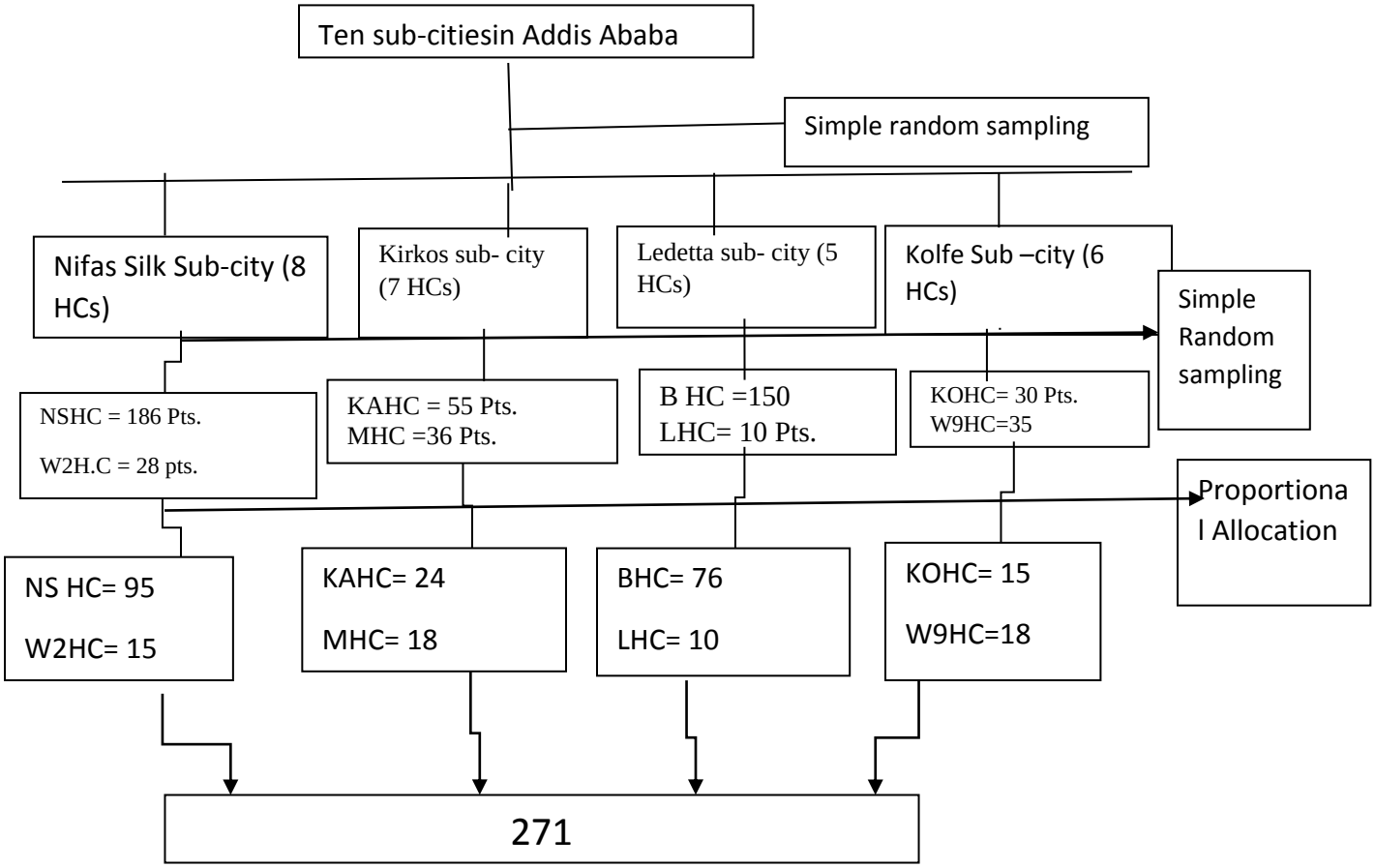
The sample size n= 246

Finally, adding 10% for compensation for non-response and incompleteness of data, the final sample size required for the study was 271.

4.6. Sampling procedure and Sampling Technique**:**

Two-stage sampling procedure was used. Out of the ten sub-cities in Addis Ababa four sub-cities were selected using simple random sampling, taking the list of sub-cities as a sampling frame. From the selected sub-cities eight health centers (two from each selected sub-city) were selected using simple random sampling technique, after taking list of all health centers in each sub-city, as a sampling frame. The sample size of 271 participants were proportionally allocated to each selected health center taking the average number of patient visits of each selected health facility during the preceding six months. Eligible patients fulfilling the inclusion criteria in each health facility were included, and study subjects visiting the facility consecutively based on their microscopic laboratory result were included until the sample size allocated for each health center were completed.

Fig1. Schematic presentation of sampling Procedure and Sampling Technique



NB: NSHC= Nefas Silk health Center; W2HC= Woreda2HC= Worde 2 Health Center, KAHC= Kazanchis Health Center, MHC=Meshalokia Health Center, BHC= Beletshachew Health Center; LHC= Lideta Health Center, KOHC= Kolfe Health Center; W9HC= Worde 9 Health Center

4.7. Data collection Methods.

4.7.1. Data collection tools:

Two types of data collection tools were used; a structured questionnaire to assess demographic, socioeconomic, environmental and health related factors, As well as culture and susceptibility test result record form.

4.7.2. Data Collection Procedure and Data Collectors:

Two days training was given to the health professionals selected from all assigned HC on the content of the questionnaire and the procedure of collecting and transporting of urine sample. Pre-test was made among 27 eligible patients from two public health centers not included in the study. Face to face interview was conducted in a convenient place by trained and experienced 8 health professional using structured questionnaire. After obtaining informed consent, Participants who fulfilled the criteria were interviewed and were asked to provide urine sample. Medical laboratory personnel were assigned to receive midst rim urine samples in proper contender and place it in a cold ice-box during working hours. At the end of the day mostly in the afternoon the collected samples were transported to Tikur Aneesa Specialized Hospital teaching laboratory (TASHTL.) In TASHTL, an experienced medical laboratory technologist and a microbiologist were deployed to undertake culture and sensitivity test and record the result using standard procedure.

Culture and Identifications:

In the laboratory, urine sample was inoculated on blood agar, MacConkey agar, with a calibrated loop of 0.001 ml(37), and incubated for 18-24 hours at 37^{o}_{C}. After incubation the respective media was observed, and total colony count was done for significance. Bacteriuria (identified E.coli) was considered as a significant, if the colony counted was$\geq 10^5$ CFU/mL of urine(38). All positive urine cultures showing significant bacteriuria were sub-cultured and further identified by their characteristic appearance on their respective media (colony morphology) and confirmed by the pattern of biochemical reactions using the standard procedures(37, 38). The Enterobacteriaceae were identified by indole production, citrate utilization, motility test, unease test, and oxidize test as shown on the following table for E. coli. *E. coli* ATCC 25922 was used as reference strains as control culture and sensitivity testing throughout the study(39).

Biochemical tests result for E. coli identification.

Organisms	Lactose	Oxidase	Indole	Urease	Motility	Citrate
E. coli	+	-	+	-	+	-

Antimicrobial Susceptibility Testing

Disk diffusion method was conducted for antibiotic susceptibility testing (AST) as recommended by CLSI. Mueller-Hinton agar (Ovoid) media was used for susceptibility testing. Antibiotics discs (Oxide Ltd) used for test included the following antibiotics, Cotrimoxazole, Gentamicin, Ampicillin, Amoxicillin, Ciprofloxacin, Ceftriaxone and Norfloxacin.

Pure bacterial culture was transferred into a tube containing 5 ml sterile normal saline (0.85 % NaCl) and was mixed gently until it forms a homogenous suspension. The turbidity of the suspension was adjusted to the optical density 0.5 McFarland. Inoculums adjusted to 0.5 McFarland was swabbed onto Muller-Hinton agar (Oxide) and antibiotic disc was dispensed after drying the plate for 3-5 min then incubated at 37^{o}c for 18- 24 hours.

At the end of incubation hours Diameter of the zone of inhibition around the disc was observed and measured to the nearest millimeter using a calibrator. The measurement was classified as sensitive , intermediate or resistant (39),

for the purpose of this study intermediate measures were considered as resistant. And was computed to the standard measure for each antibiotic disk .(38) recorded on the following result record form.

Culture and Antimicrobial Susceptibility test Laboratory Report form**.**

	Antimicrobial Susceptibility Reading									
Bacterial isolates	Ciprofloxacin	Amoxicillin	Cefadroxil	Ampicillin	Cephalexin	Ceftriaxone	**Gentamicin,**	cotrimoxazol	Norfloxacine	**S=sensitive R=Resistant**
E.coli										**Result the test**

4.8. Study Variables

4.8.1 Dependent Variables:

Presence of antibiotic resistance E. coli to commonly used Antibiotics (Gentamicin (GN), Ceftriaxone (CRO), Ampicillin (AMP), Amoxicillin (AMO), TMP-SXT and Norfloxacin).

4.8.2 Independent variables:

Demographic and Socioeconomic variables:

- Age,
- Sex
- Marital status
- Occupation
- Educational status
- Monthly Family income

Environmental and health related variables

- Accessibility of health facility,
- Availability of health facility
- Presence of previous illness or infection,
- Information wither they know presence of antibiotic resistance,
- Presence of antibiotic treatment in the past three month,
- Complete usage of prescribed antibiotic
- , Number of course of treatment in the past three months,
- Duration of treatment,
- Presence of self-medication,

Operational definitions

- **Community acquired urinary tract infection**: infection that acquired from the community source not from hospital contact.
- **Uncomplicated UTI**: patient with no suggestive history of anatomical or functional abnormality of the urinary tract
- **Multi drug resistance**: Resistant to more than one antibiotics.
- **Health facility**: any institution which gives diagnostic and health care service.
- **Pharmacy or drug shop**: Drug sellers
- **Accessibility of health facility**, suitable or ready for use
- **Availability of health facility**: having sufficient or effective health care facility (public health center or hospitals)
- **Non money earning jobs**: housewife, student and non-employed

4.9. Data Analysis:

Each questionnaire was collected and checked for its completeness before entry, then data was entered into Epi Data version 3.1 and cleaned to eliminate errors and finally it was transported to SPSS version 21.A frequency distribution, percentage and cross-tabulation of pre-selected variables was calculated and logistic regression analysis was performed to identify variables associated with dependent variables (antibiotic resistance *E. coli*). Independent variables were first evaluated using bivariate logistic regression. Variables with $p < 0.25$ in the bi-variant analysis were included in the multivariate logistic regression analysis to determine the factors that are independently associated with the dependent variable. Significant results of multivariate logistic regression analysis were reported. Odds ratio (OR), 95% confidence intervals (CI), and *p*-values was calculated for each independent variable. A *p*-value less than 0.05 were considered as statistically significant**.**

4.10 Data Quality control:

Data quality was ensured through reliable, accurate and reproducible data collection process. Training was given for data collectors and supervisors to enable them to acquire basic skills necessary for data collection and supervision. Pre-test was conducted in public health centers not selected for this study in order to standardize the data collection tools and to get the required information and necessary adjustments made, prior to data collection. Short time meetings were held to address problems and clarify issues that could hamper collection of good data with the supervisors found to have problems. The English version questionnaire was translated to Amharic language and back to English language by another linguistic expert to improve the reliability of the tool and to make the questions clear and easily understandable for respondents.

4.11 Ethical considerations:

First permission to undertake the study was obtained from Ethical Review Committee of the School of public health, College of Health Science, Addis Ababa University. A letter of permission and cooperation was written to the Regional Health Bureau of Addis Ababa and obtained. All participants got information about the purpose of the study, confidentiality of the information, and the right not to participate or withdraw from the study at any time. Participants were informed that participating in the study will not have harm for anyone rather, the evidence obtained from their participation to bring an improvement on the implementation for the health of general population.

5. Results

5.1: Descriptive Analysis:

5.1.1: Socio-demographic Characteristics of participants

Among the study participants who had visited the public health centers during the study period, a total of 266 patients were enrolled in the study with age ranging between 18-87 years with median age of 29 years. Majority 98 (36.8%) of the participants were in the age groups between 25-34 years of age; 225 (84.6%) were females and 149 (56%) were married. Patients who had completed high school and above were 153 (57. 5%).Most of the patients 141 (53.0%) were involved in non-money earning jobs and 145 (54.5%) of the respondents reported of having monthly household income of over 3000 Birr (Table 1)

Table 1: Socio-demographic Characteristics of study participants who had Attended Public Health Centers in Addis Ababa City Administration, 2017

Characteristics	Number	Percent
Age		
18-25	76	28.6
25-34 years	98	36.8
35 years or more	92	34.6
Mean $\pm$ SD		
Sex		
Male	41	15.4
Female	225	84.6
Marital status		
Never married	85	32.0
Married	149	56.0
Divorced/ Widowed/ Separated	32	12.0
Education		

Elementary	113	42.5
High school or more	153	57.5
Occupation		
Money Earning work	125	47.0
Non-money Earning	141	53.0
Monthly HH income		
Below 3000 Birr	121	45.5
3000 Birr or more	145	54.5

5.1.2: Health Service related Characteristics of the participants.

The study has revealed that 188 (70.7%) of patients have more access to health service facilities than 78 (29.3%) patients reported to have access to pharmacies and drug shops. Health facilities including pharmacies and drug shops were reported to be easily accessible by 89 (33.5%), moderately accessible by 160 (60.1%) and not accessible by 17 (6.4%) of the participants (Table 2). During the past three months preceding the data collection period,28 (10.5%) reported they had symptoms of urinary tract infection, 46 (17.3%) reported to have illnesses other than UTI, however, the rest 192 (72.2%) did not have any illness. One hundred forty of the participants (52.6%) reported they had knowledge about resistance to bacterial illnesses. Eighty-eight (33.1%) said that they had taken antibiotics during three months prior to the data collection period. Among the 88 patients who had taken antibiotics 77 (87.5%) had reported that the duration of treatment was seven or more days. Sixty-two (72.1%) of the patients reported they had completed their treatment; while self- medication was reported by 59 (22.2%) of the participants (Table 2).

Table 2: Health Service Related Characteristics of Patients with UTI Visiting Public Health Centers in Addis Ababa City Administration,2017.

Health Service Related characteristics of Study Participants	Number	Percent
Most accessible facility		
Pharmacy/ drug shop	78	29.3
Health service facility	188	70.7
Accessibility to the nearest health facility		
Easily accessible	89	33.5
Moderately accessible	160	60.1
Not accessible	17	6.4
Easily or moderately accessible (n=249)		
Pharmacy/ drug shop	71	28.5
Health service facility	178	71.5
Presence of any Infection in the 3 months		
No	192	72.2
UTI	28	10.5
Others	46	17.3
Knowledge of resistance to bacteria illness		
No	126	47.4
Yes	140	52.6
Took antibiotic in last 3 months		
No	178	66.9
Yes	88	33.1
Duration of treatment (n=88)		
Less than 7 days	11	12.5

Seven or more days	77	87.5
Completion of medication		
No	24	27.9
Yes	62	72.1
Presence of self-medication		
No	207	77.8
Yes	59	22.2

5.1.3: Socio-demographic Characteristics and Resistance of Antibiotic drugs to UTI

Sensitivity test of urinary tract infected patients was conducted on seven antibiotics. Out of 266 adult patients who had participated in this study 143 (50.4%) had developed antibiotic resistance 45 (16%) for single drug and 89 (33.5%) for multidrug resistance (Table 3).

Ampicillin was found to be the major cause of resistance for 76% of the patients followed by Norfloxacin (37.5%). In addition, 30% of the culture were resistant to Amoxicillin, 30% to Gentamicin, 23.7% to Ciprofloxacin, 20.3% to Ceftriaxone, and 20.3% for Cotimoxazole (Table 4). Among the different age groups, patients 25-34 years of age (53.9%) had the highest resistance rate to antibiotics followed by those 35 years and above (51.1%) and 18-24 years of age (46.1%). The resistance rate among the sex groups was found to be almost the same; 51.2% of the males and 50.2% of the females were found to have developed resistance (Table 5).

Although variations among the different marital status groups were small, highest resistance rate was observed on married patients (53%), and lowest among never married patients (45.9%). Antibiotic resistance regarding educational status was also found almost the same; those whose educational status was high school and above (50.3%) and of those below high school (50.4%) developed resistance to antibiotics. Fifty-six percent of patients involved in money earning jobs and 45.4% of those involved in non-money earning activities were found to have resistance. Patients whose monthly household income was 3000 Birr and above (49.7%) and those below 3000 Birr (51.2%) developed resistant to at least one of the antibiotics (Table 5).

Table 3: Resistance Status of patients with Urinary Tract Infection by Escherichia coli to Seven Antibiotics in Public Health Facilities in Addis Ababa City Administration, 2017

Resistance Status	Frequency	Percent
Sensitive	**132**	**49.6**
Single Drug resistance	**45**	**16.9**
Multidrug resistance	**89**	**33.5**
Total	**266**	**100.0**

Table 4: Resistance Status of Seven Antibiotic Drugs to Urinary Tract Infection by E. coli among patients who had Visited Public Health Centers in Addis Ababa City Administration, 2017

Organism	Cip	Amox	Amp	Gent	Ceftri	Cotri	Nor
E. coli	**Resistant**	**Resistant**	**Resistant**	**Resistant**	**Resistant**	**Resistant**	**Resistant**
N=266	23.7%	30%	76%	30%	20.3%	20.3%	37.5%
	36	80	202	80	54	54	100

N.B: Cip = Ciprofloxacin, Amox = amoxicillin, Amp = Ampicillin, Gent = Gentamicin Ceftri = Ceftriaxone, Cotri = Cotrimoxazole, Nor = Norfloxacin

Table 5: Socio-demographic Characteristics and Antibiotic Resistance to Urinary Tract Infection by E. coli among Adult Patients Who Visited Public Health Centers in Addis Ababa City Administration, 2017

Characteristics	Resistance		Total
	Present	Absent	
	Number (Percent)	Number (Percent)	
Age			
18 -24years	35 (46.1)	41 (53.9)	76
25-34years	52 (53.1)	46 (46.9)	98
35 years or more	47 (51.1)	45 (48.9)	92
Sex			
Male	21 (51.2)	20 (48.8)	41
Female	113 (50.2)	112 (49.8)	225
Marital status			
Never married	39 (45.9)	46 (44.1)	85
Married	79 (53.0)	70 (47.0)	149
Divo/ Wido/ Separated	16 (50.0)	16(50.0)	32
Education			
Below High School	57 (50.4)	56 (49.6)	113
High school or more	77 (50.3)	76 (49.7)	153
Occupation			
Money Earning jobs	70 (56.0)	55 (44.0)	125
Non-money Earning	64 (45.4)	77 (44.6)	141
Monthly HH income			
Below 3000 Birr	62 (51.2)	59 (48.8)	121
3000 Birr or more	72 (49.7)	73 (50.3)	145

5.2: Analysis

5.2.1: Bivariate Analysis of Socio-demographic correlates of Antibiotic Resistance E. coli

Bivariate analysis was performed on socio-demographic variables of participants including age, sex, marital status, educational status, occupational status and monthly household income. P-Value <0.2 was considered to determine significance of association.

Based on the analysis age and occupation were found to have no association with resistance to antibiotics. The age group 25-34 years were 1.32 times (CI=0.73, 2.24) and those 35 years and above 1.22 times (CL=0.67, 2.25) likely to acquire resistance to E. coli compared to age group 18-24 years. Participants who were involved in non-money earning activities (jobs) were 35.0% less likely to develop resistance as compared to those involved in money earning jobs. However, significant association was not observed on sex, marital status, educational status and monthly household income (Table 6)

Table 6: Socio-demographic correlates of Antibiotic resistance to Urinary Tract Infection by Escherichia coli, in Health centers in Addis Ababa, 2017.

Characteristics	Resistance		Crude OR (95% CI)
	Present	Absent	
	Number (Percent)	Number (Percent)	
Age			
Below 25 years	35 (46.1)	41 (53.9)	1.00
25-34 years	52 (53.1)	46 (46.9)	1.32 (0.73, 2.42)
35 years or more	47 (51.1)	45 (48.9)	1.22 (0.67, 2.25)
Sex			
Male	21 (51.2)	20 (48.8)	1.00
Female	113 (50.2)	112 (49.8)	0.91 (0.49, 1.87)
Marital status			
Never married	39 (45.9)	46 (54.1)	1.00
Married	79 (53.0)	70 (47.0)	1.33 (0.78, 2.27)
Divorced/ Widowed/ Separated	16 (50.0)	16 (50.0)	1.18 (0.52, 2.66)

Education			
Elementary	57 (50.4)	56 (49.6)	1.00
High school or more	77 (50.3)	76 (49.7)	0.98 (0.61, 1.62)
Occupation			
Money Earning Jobs	70 (56.0)	55 (44.0)	1.00
No Money Earning Jobs	64 (45.4)	77 (54.6)	0.65 (0.40, 1.00)
Monthly HH income			
Below 3000 Birr	62 (51.2)	59 (48.8)	1.00
3000 Birr or more	72 (49.7)	73 (50.3)	0.94 (0.58, 1.52)

5.2.2: Health Service Related Correlates of Antibiotic Resistance to UTI by E. coli

The bivariate analysis has also revealed that participants who reported health service facilities were most accessible to them were 2.14 times (CL=1.24,3.68) more likely to develop antibiotic resistance than those who said Pharmacy and Drug shops were most accessible (Table 7).

Patients who had reported of having any type of infection (illness) during the three months preceding the data collection period were 1.43 times (CL= 0.83, 2.45) than those who didn't report, indicating no association. Participants who had reported that they had taken antibiotic drugs during the preceding three months were 1.81 times (CL= 1.08, 3.05) more likely to develop resistance to antibiotic drugs than those who did not take any antibiotics. Patients who had taken their treatments for 7 days or more were 8.09 times (CL= 1.09, 72.5) more likely to develop antibiotic resistance (Table 7).

Table 7: Health Service Related Correlates of Antibiotic Resistance to Urinary Tract Infection by Escherichia coli Health centers in Addis Ababa, 2017.

Characteristics	Resistance		Crude OR (95% CI)
	Present	Absent	
	Number (Percent)	Number (Percent)	
Most accessible facility			
Pharmacy/ drug shop	29 (37.2)	49 (62.8)	1.00
Health service facility	105 (55.9)	83 (44.1)	**2.14 (1.24, 3.68)**
How accessible to facility			
Very easily	41 (46.1)	48 (53.9)	1.00
Moderately accessible	85 (53.1)	75 (46.9)	1.33 (0.79, 2.23)
Not accessible	8 (47.1)	9 (52.9)	1.04 (0.37, 2.94)
Presence of any Infection 3 months			
No	92 (47.9)	100 (52.1)	1.00
Yes	42 (56.8)	32 (43.2)	**1.43 (0.83, 2.45**)
Non-UTI Infection last 3 months			
No	108 (51.4)	102 (48.6)	1.00
Yes	26 (46.4)	30 (53.6)	0.82 (0.45, 1.48)
Knowledge of resistance to bacteria			
No	68 (54.0)	58 (46.0)	1.00
Yes	66 (47.1)	74 (52.9)	0.76 (0.47, 1.23)
Took antibiotic in last 3 months			
No	81 (45.5)	97 (54.5)	1.00
Yes	53 (60.2)	35 (39.8)	**1.81 (1.08, 3.05)**
Duration of treatment (n=88)			
Less than 7 days	11 (91.7)	1 (8.3)	1.00

Seven or more days	42 (54.5)	35 (45.5)	**8.09 (1.09, 72.5)**
Completion of medication			
No	15 (62.5)	9 (37.5)	1.00
Yes	37 (59.7	25 (40.3)	0.89 (0.34, 2.34)
Presence of self-medication			
No	102 (49.3)	105 (50.7)	1.00
Yes	32 (54.2)	27 (45.8)	1.22 (0.68, 2.18)

5.2.3. Factors Associated with Antibiotic Resistance to UTI by Escherichia coli

Variables which have P-Value <0.2 in bivariate logistic analysis were transferred to multivariate analysis. According to this, age, occupation, most accessible facility, presence of Infection (illness), intake of antibiotics, and duration of treatment taken within the last three months of the data collection period were analyzed.

The multivariate analysis did not show significant association with age and presence of any infection during the last three months preceding the data collection period. However most accessible facility and duration of treatment within three months before the data collection period was found to be associated with antibiotic resistance. Patients who were involved in non-money earning activities (jobs) were 30% less likely to develop antibiotic resistance than those who were involved in money earning occupation. Participants who reported Health Service Facilities were most accessible were 2.04 times (CL= 1.17, 3.54) more likely to develop antibiotic resistance than those who said Pharmacies and Drug shops were most accessible to them (Table 8). Patients who had reported they had taken antibiotic drugs during the preceding three months were 1.70 times (CL=0.92, 3.01) no association. Patients who had taken their treatments for 7days or more were 11.07 times (CL= 1.30, 94.3) more likely to develop antibiotic resistance than those who had taken antibiotics for less than seven days (Table 8).

Table 8: Factors associated with antibiotic resistance to E. coli in UTI patient after adjusting for correlates of resistance,

Characteristics	Crude OR (95% CI)	Adjusted* OR (95% CI)
Age		
Below 25 years	1.00	1.00
25-34 years	1.32 (0.73, 2.42)	1.15 (0.62, 2.15)
35 years or more	1.22 (0.67, 2.25)	1.05 (0.49, 1.81)
Occupation		
Money earning job	1.00	1.00
Non-money earning work	0.65 (0.40, 1.00)	0.70 (0.43, 1.16)
Most accessible facility		
Pharmacy/ drug shop	1.00	1.00
Health service facility	2.14 (1.24, 3.68)	**2.04 (1.17, 3.54)**
Presence of any Infection 3 months		
No	1.00	1.00
Yes	1.43 (0.83, 245)	1.04 (0.55, 1.97)
Took antibiotic in last 3 months		
No	1.00	1.00
Yes	1.81 (1.08, 3.05)	**1.70 (0.92, 3.05)**
Duration of treatment (n=88)		
Less than 7 days	8.09 (1.09, 72.5)	**11.07 (1.30, 94.3)**
Seven or more days	1.00	1.00

Adjust* = The model, adjusted for age group, occupational status, most accessible facility, presence of any infection in the last three months, taking of antibiotics in the last three months and duration of medication.

6. Discussion

In this study, about half (50.4%) of the participants had developed resistance to Escherichia coli (16% for single and 35.5% for multiple drugs). Ampicillin was found to be the major resistant antibiotic (76%), while Ciprofloxacin and Ceftriaxone were the least resistant (20.3% each) antibiotics. The study also found that participants who had more access to health service facilities and those who took antibiotics less than 7 days were more likely to develop resistance than their referents.

The magnitude of resistance to Escherichia coli in this study is comparable to a prospective study conducted in Spain in 2004 from 164 isolates of *E. coli* from community acquired urinary tract infected patients revealed that 57.3% of the isolates were resistant to antibiotics. In the study area resistance rates to Ampicillin were high(25).The finding of this study was also lower compared to another study conducted in Pakistani, and antibiotic resistance for E.coli isolates of community acquired urinary tract infection demonstrated resistance rates reaching up to 67.5%, and the resistance was high for ampicillin, for Nitrofurantoin, for Gentamicin, and others .(14)Our finding was also much lower than the study conducted at Gondar University Hospital (99%), and Dire Dawa, DilChora Hospital (100%), respectively (10,22). However, it lower resistance rates were recorded in other studies conducted in Spain (57.3%), Pakistan (67.5%), and Dakar Senegal (73.6%). (18, 19)

In this study, participants who had reported health service facilities were most accessible were more likely to develop resistance than those who had reported pharmacies/ drug shops. This could be due to the higher formal and informal contact of participants to antibiotics among people who had access to health facilities may result on multi drug resistance. This is in accordance to study done by Kafle and Pokhran, in Nepal, demonstrating that people being treated at different health facilities have difference in magnitude of resistance to Antibiotics (40). Major explanation for such association could be people having high access to health facilities may be prone to get infected by resistant microbes or may be in contact to antibiotics that may develop resistance to such microbes.

Patients who had taken antibiotic treatment for less than 7 days were strongly associated to develop resistance to E. Coli than those who had taken for7 or more days. This indicates that indiscriminate use of antibiotics and inadequate dose would lead to resistance. This finding was consistent to many researches, including a study from turkey conducted in 2005 that revealed

that ciprofloxacin use for more than once in a year and the presence of UTI were found to be associated with ciprofloxacin resistance .(20) Other study also demonstrate that irrational antibiotic use is on the rise globally (50% to almost 100%).(31) and rampant irrational use of antimicrobials without medical guidance may result in greater probability of inappropriate or incorrect therapy leading to the emergence of pathogens resistant to antibiotics which is potentially dangerous for both individuals and societies.(32) The major form of irrational use is practiced in the community through self-medication.(31)Self-medication is motivated by a complex set of factors, such as UN checked sales, economic and time constraints, influence of family members and friends, consumer attitudes and expectations and media campaigns. Therefore, the findings of this study showed that inappropriate medication including medication less than 7 days may result in development of resistance to E. Coli, including many microbes.

6.1 Strength/ Limitation

6.1.1 Strength

- The study has a hard outcome that is properly measurable using scientifically proven and validated measure.
- The study also involved primary health care facility prone to the public at large illustrating proper community acquired urinary tract infection is strength the study has.
- Use of proper methodology, recruiting laboratory technicians, with a proper training and supervision and pretesting are some of the strength the study made

6.1.2 Limitation

- Cross-sectional nature of the study may lack to show temporal relationship between the explanatory and the outcome variables
- Inadequate sample size of the study has hindered to show proper significance of associations, and was due to resource deficiency.
- Due to inadequacy of patients with UTI, the research took longer time than the given period of research

7. Conclusion

- This study has revealed about half of the participants developed resistance at least to one of the seven antibiotics tested.
- Ampicillin was found to be the major resisted antibiotic for about three fourth of the patients among seven antibiotics tested for drug sensitivity.
- Patients who had reported health service facilities were most accessible compared to pharmacies/drug shops; and patients who had taken antibiotics for less than seven days were found to be significantly associated with antibiotics resistance.

Recommendations

- Multidrug resistance for routinely used antibiotics was high. Therefore, understanding the effect of different factors on UTI and their drug resistance has to be considered for the proper management of cases.
- Clinicians should base their decisions for UTIs chemotherapy on positive culture and drug susceptibility.
- Proper guidance of patients receiving antibiotics should be restrictedly followed at drug encounter sites of pharmacies.
- Guidelines for UTI management may have to be prepared for rational utilization of antibiotic drugs.
- Tailored education may be needed to patients using health facilities frequently.

The use of Ampicillin for UTI therapy has to be considered and replacement of antibiotics have to be thought

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9. Annexes and fingers

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE
SCHOOL OF PUBLIC HEALTH

Annex-II. Participant Information Sheet and Informed Consent Form

Good morning/afternoon! My name is _____. I am a data collector for a research project being conducted by Simegn Terefe, a student of master of public health in Addis Ababa University. She is conducting a study with the aim of assessing the prevalence and risk factors associated with antibiotic resistant E. coli isolated from community acquired urinary tract infected adult patients in selected health centers in Addis Ababa. The result of this study will help the sub cities of Addis Ababa and the government at large to plan effective curative treatment and infection prevention strategies. The study will also serve as a Thesis of graduation for Partial fulfillment for the requirement of the Degree of Master of Public Health (Epidemiology Track) at Addis Ababa University. The questions usually take about 15 to 20 minutes.

Objectives: To assess the prevalence and risk factors associated with antibiotic resistance in E. coli isolated from urine of community acquired urinary tract infected patients in public health centers of Addis Ababa.

Benefit of the study: The study will have long and short term benefits. In the long term the result of the study will be useful for the development of a strategy to reduce the rate of antibiotic resistance which consequently would prolong the life of present drugs, which could be beneficial for the overall community. In the short term the study participants will benefit by getting appropriate and effective treatment through urine culture and susceptibility test.

Risk of the study: Participating in this study might have minimal risk if you consider for the inconvenience of taking some of your extra minutes for this study.

Rights of Participants: You have full right either to Participate or decline in this study. You may respond to all the questions or you may not answer to questions you don't want to answer. You may end the interview at any time you want. You can ask any question which is not clear for you.

Confidentiality: The information which you will provide will be kept confidential. There will not be any information that will identify you in particular. The finding of the study will be general for the study population and will not reflect anything in particular to you. The questionnaire for interview and the check list for laboratory result will be coded to exclude showing names.

Contact Address**:** Name of PI: Simegne Terefe

Name of health center_____

Declaration of informed voluntary consent:

I have read/was read to me the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating and contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to stop the study at any time or not to answer any question that I do not want. Therefore, I declare my voluntary consent to allow this study to be conducted with my initials (signature) as indicated below.

Name and signature of the participant: _____

Name and Signature of data collector: _____ Date: _____

Annex IV: English Questionnaire

Part 1 Socio demographic factors

Annex IV: English Questionnaire

Q.N^0	**questions**	coding categories	skip to
101	How old are you?	|____|_____|	
102	Sex	1. male 2. female	
103	Current Marital status?	1. unmarried 2. Married 3. Divorced 4. Separated 5. Widowed	
104	Occupation	1. Government employee 2. Merchant 3. Daily worker 4. House wife 5. Student 6. non employed 6.Others specify)_____	
105	Educational status?	|____|_____| Number of years' study (00) for uneducated	
106	How much is the average monthly income of your family in E.B?	|___|___|___|___|____|	

Environmental and Health related Variables

201	Which one is easily accessible to you?	1. Drug shop/pharmacy 2. Health facility.	
202	How much accessible is the nearest health facility/ drug shop to you?	1. Easily available 2. Moderately available 3. Not accessible	
203	Have you had any infectious illness in the last 3 months?	1. Yes 2. No	
204	If yes, please specify the illness why you were given the antibiotics?	1. TB 2. UTI 3. Pneumonia 4. Diarrheal Disease 5. STI 6. Malaria 7. Others (Specify)_____	
205	Do you have any health problem other than the illness you come for (UTI)?	1. Yes 2. No	
206	If yes, please specify the illness acquired other than the current illness?	1. TB 2. Pneumonia 3. GI Disease 4. Diabetes 5. Others (Specify)_____	
207	Do you know that some bacteria can develop resistance to antibiotics?	3. Yes 4. No	
208	Have you taken any antibiotic (prescribed) (by doctor) in the last 3 months?	1. Yes 2. No	
209	If yes, what was the name of the medication (antibiotics) please show the type of	1.Gentamicin (CN),	

	antibiotics?	2.Ceftriaxone (CRO), 3. Ampicillin (AMP), 4. Nitrofurantoin (F), 5.Agumentine 6. Penicillin (P), 7. Norfloxacin 8. Cotrimoxazole 9. Other	
210	How much of your prescribed antibiotics did you completed?	1.Fully 2. Partially 3. Under going	
211	How much courses of antibiotics treatment have you taken in the last three months?	1. No I 'don't take 2. One 3. Two 4. Three or more	
212	How much was the duration of treatment for your last prescription?	1. Less than 7 days 2. For about seven 3. More than 7 days	
213	Have you completed the course of antibiotics that was prescribed to you?	1. Yes 2. No	
214	Have you taken antibiotics without prescription by a doctor?	1. Yes 2. No	

አዲስ አበባ ዩኒቨርሲቲ የጤና ሳይንስ ኮሌጅ
የሕብረተሰብ ጤና ት/ቤት

ስለ ጥናቱ ዓላማና ጥቅም ማሳወቂያ ቅፅ

እንደምንዋሉ / እንደምን አደሩ? ስሜ_____ይባላል። ወደዚህ የመጣሁት በአዲስ አበባ ዩኒቨርስቲ የሕብረተሰብ ጤና ት/ቤት የድህረ-ምረቃ ትምህርት ፕሮግራም በመከታተል ላይ ለምትገኘው ስመኝ ተረፈ የመመረቂያ ፅሑፍ ለምታከነውነው ጥናትና ምርምር መረጃ ለመሰብሰብ ነው።

የጥናቱ አላማ፦ የሽንት መተላለፊያ ቧንቧ በሽታን ለመፈወስ የሚሰጡ ፀረ ባክቴሪያ መድሃኒቶች የመቋቋም አቅም ያላቸውን ኢ. ኮላይ የተባለ የባክቴሪያ አይነት ስርጭቱን በምርመራ ለይቶ ለማወቅ እና መድሃኒቶችን እንዲቋቋም የሚያደርጉ ምክንያቶችን ለይቶ ለማወቅ ነው።

<u>የጥናቱ ጥቅም፦</u> ጥናቱ የረጅምና የአጭር ጊዜ ጥቅም አለው። የረጅም ጊዜ ጥቅሙ ባክቴሪያው መድሃኒቶችን ለመቋቋም የሚረዱት ምክንያቶን ለይቶ ለማወቅ፤የመቋቋም አቅሙን በመቀነስ ዘላቂ የሆነ እቅድ ለመንደፍ ይረዳል። ስለሆነም ፀረባክቴሪያ መድሃኒቶች ለረጅም ጊዜ ፍቱን የሕክምና አገልግሎት እንዲሰጡ ይረዳል።የአጭር ጊዜ ጥቅም ደግሞ የጥናቱ ተሳታፊዎች ለላቦራቶሪ ምርመራ የሽንት ናሙና በመስጠት የበሽታ መንስኤ የሆነውን ባክቴሪያ በማወቅ ተገቢውን ፍቱን የሆኑ ፀረባክቴሪያ መድሃኒቶችን እንዲያገኙ ይረዳል። እነዚህን ጥያቄዎች ለመመለስ ከ15-20 ደቂቃ ሊወስድ ይችላል።

የጥናቱ ተሳታፊዎች መብት፦በጥናቱ መሳተፍ በፈቃደኝነት እንጂ ግዴታ አይደለም። በጥናቱ ለመሳተፍ ፍቃደኛ ከሆኑም ምናልባት ለመመለስ ያልፈለጉት ጥያቄ ካለም ለመመለስ አይገደዱም። ሁኔታው ካልተስማማዎት በፈለጉት ጊዜ ጥናቱን ማቋረጥ ይችላሉ። ያልገባዎት ጥያቄ ካለም የመጠየቅ መብት አለዎት።

የጥናቱ ሚስጢራዊነት፦ እርስዎ የሚሰጡት መረጃ በሚስጢር እንዲጠበቅ ይደረጋል። የጥናቱ ውጤት በአጠቃላይ በጥናቱ ተሳታፊዎች ያለውን ሁኔታ ከመግለጽ በስተቀር የእርስዎን የግል ሁኔታ በግልጽ የሚያሳይ ውጤት አይኖርም። የላቦራቶሪ እና የቃለመጠይቅ ቅጾች የርስዎን ስም ሳይሆን የርስዎን ስም በሚወክል የሚስጢር መታወቂያ (ኮድ) እንዲተካ ይደረጋል።

የጥቱ ባለቤት፤ስመኝ ተረፈ ።ስልክ ቁጥር፤25109 11 60 69 39

የጤና ጣቢያው ስም፤_____

የፈቃደኝነት ማሳወቂያ ቅጽ

የተሰጠኝ መረጃ በሚገባ አንብቤዋለው/ተነቦልኛል። የጥናቱ ምክንያት፣ አካሄድ፣ ጥቅም እና ጉዳቱን፣በጥናቱ የመሳተፍ መብት እና ሚስጢራዊነት በተመለከተ የተሰጡ መረጃዎች በሚገባ ተረድቼዋለሁ። በጥናቱ ላይ ለመሳተፍ መብት እንዳለኝ እና ከተሳተፍኩም ለመመለስ ለማልፈልገው ጥያቄ ላለመመለ ስእንዲሁም የሚያስቸግር ሁኔታ ካጋጠመኝ ጥናቱን ለማቆም መብት እንዳለኝ ተገንዘቤአለሁ። ስለሆነም በጥናቱ ለመሳተፍ ፈቃደኛ መሆኔን በፊርማዬ አረጋግጣለሁ።

የጥናቱ ተሳታፊ ስምና ፊርማ፤_____

የመረጃ ሰብሳቢው ስምና ፊርማ፤_____ቀን_____

የአማርኛቃለ- መጠይቆች
የጥናት ቁጥር|__|__|__|__|
<u>ክፍል 1 የስነ ሕዝብ ማህበራዊ እና ኢኮኖሚያዊ በተመለከት</u>

ተ.ቁ.	ጥያቄ	የኮድ ምድብ	የተዘለለውቁ.
101	ዕድሜዎ ስንት ነው;	----------	
102	ጸታ	1. ወንድ 2. ሴት	
103	የጋብቻ ሁኔታ?	1. ያላገባ/ች 2. ያገባ/ች 3. የፈታ/ች 4. የተለያየ/ች 5. የሞተበት/ባት	
104	ሥራ	1. የመንግስት 2. ነጋዴ 3. የቀን ሠራተኛ 4. የቤት እመቤት 5. ተማሪ 6. ሥራ የለለዉ 6.(ሌላ ካለ)_____	
105	የትምህርት ደረጃ?	|_____|_____| ስንተኛ ክፍል አጠናቀዋል? ምንም የትምህርት ክፍል ለለለዉ (00)ን ይሙሉ፡፡	
106	የቤተሰብዎ አማካይ ወርሃዊ ገቢ ምን ያህል ነው? በኢ.ብር	|___|___|___|___|____|	

ከአካባቢ እና ጤና ጋር የተያያዙ ጉዳዮች

201	ለእርስዎ በቅርበት የሚገኘው ዬትኛው ነው?	1. መድሃንት መሸጫ መደብር ወይም ፋርማሲ 2. አገልግሎት ሰጪ የጤና ተቋም	
202	አገልግሎት ሰጪ የጤናተቋም ወይም ፋርማሲ ምንያህል ለቤቶ ይቀርባል?	1.በጣምቅርብነዉ 2. በትንሽ ቅርበት ይገኛል 3. በቅርበት የለም	
203	ባለፉት3 ወራት በባክቴርያ ወይም በጀርም አማካኝነት በሚመጣ በሽታ ታመዉ ያዉቃሉ?	1. አዎ 2. የለም	
204	መልሶ አዎ ከሆነ አባኮትን በሽታዉ ምን እንደነበር ይንገሩኝ፡፡	1. ቲቢ 2. የሽንት መተላለፊያ ቧንቧ በሽታ 3. የመተንፈሻ አካል በሽታ 4. ተቅማጥ 5. የአባለዘር በሽታ 6. ወባ 7. ሌሎች (ይጥቀሱ)_____	
205	አሁን ከመጡበት የሽንት መተላለፊያ ቧንቧ በሽታ ሌላ በተጨማሪ የታወቀ በሽታ አለብዎት?	1. አዎ 2. አይ	
206	መልስዎት አዎ ከሆነ በሽታዉ ምን ነበር?	1. ቲቢ 2. የመተንፈሻ አካል በሽታ 3. የሆድ ዉስጥ ህመም 4. የስኳር በሽታ 5. (ሌሎች (ይጥቀሱ)-------	
207	ባክቴሪያዎች ወይም ጀርሞች መዳኒቶችን እንደሚላመዱ ወይም እንደሚጀጀሙ ሰምተዉ ያዉቃሉ?	1. አዎ 2. የለም	
208	ባለፉት ሦስት ወራት ፀረ-ባክቶሪያ መድሐኒት ወይም አንቲባዮቲክ (በሐኪም የታዘዘ) ወስደዋል?	1. አዎ 2. የለም	

209	መልስዎ አዎ ከሆነ የመዳኒቱ ሥም ምንይባላል? ከመደኒት ናሙናዉ ያሳዩ። .	1. ጅንታማይሲን (Gentamicin) 2. ሴፍትሪያክሲን(ceftriaxone) 3. አምፒስሊን (ampicillin) 4. ኒትሮፋራንቲን(Nitrofurantoin) 5. አጉመንቲን(Augmentin) 6. ፕኒሰሊን (penicillin) 7. ኖርፍሎክሳሲን (Norfloxacin) 8. ኮትሪሞክሳዘን (Cotnimoxaze 9. ሌላ ይጥቀሱ---------	
210	ከታዘዘሎት መዳኒት ምንያሕል ተጠቅመዋል?	1.ሙሉዉንተጠቅሜጨርሻለሁ 2. ግማሹን ተጠቅሜአለሁ 3. በመዉሰድላይነኝ	
211	ባለፉት ሶስት ወራት ዉስጥ ለምን ያህል ጊዜ የመዳሀኒት ትዛዝ ተቀብለዋል?	1. የለም ወስጄ አለቅም 2. አንዴ 3. ሁሌቴ 4. ሦስቴ እና ከዛበላይ	
212	የመጨረሻዉ የመዳኒት ትዛዝ ለስንት ቀን ነበር?	1. ከ 7 ቀን በታች 2. ለ 7 ቀን 3. ከስባት ቀን በላይ	
213	የታዘዘልዎትን መድሐኒት በታዘዘልዎት ጊዜ ተጠቅመዉ ይጨርሳሉ?	1. አዎ 2. የለም	
214	ያለሐኪም ትእዛዝ ፀረባክቴሪያ መዳኒት ወይም አንቲባዮቲክ ወስደዉ ያዉቃሉ ?	1. የለም 2. አዎ	

Laboratory Report form.

	Antimicrobial Susceptibility Reading									
Bacterial isolates	Ciprofloxacin	Amoxicillin	Cefadroxil	Ampicillin	Cephalexin	Ceftriaxone	**Gentamicin,**	cotrimoxazol	Norfloxacine	**S=sensitive R=Resistant**

CERTIFICATES ON

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EDUCATION

1990 **Diploma in Junior Laboratory Technician Course**, National research Institute of Health, Addis Ababa, Ethiopia

2004 **Diploma in Medical Laboratory Technology**, Addis Ababa University, Addis Ababa, Ethiopia

2007 BSc **in Medical Laboratory Technology**, Addis Ababa University, Addis Ababa, Ethiopia

2012**B.Sc in Public Health Professional**, Keya med University College, Addis Ababa, Ethiopia

2016 **Masters' student in epidemiology and biostatistics** at school of public health. Addis Ababa University

SHORT-TERM TRAININGS

January 17, 2004	**Good Laboratory Practice Training**, National Institute of Allergy and Infectious Diseases, NIH, Clinical Research Operations and Monitoring Center, Addis Ababa, Ethiopia
December 21-25, 2009	**Molecular Biology Techniques Workshop**, American Society for Microbiology International Professorship Program, Georgia Southern University, Addis Ababa, Ethiopia
October 18-19, 2010	**QIACUBE**, Bio-Zeq Kenya LTD, Addis Ababa, Ethiopia
October 28-30, 2010	**ROTOR GENE Q**, Bio-Zeq Kenya LTD, Addis Ababa, Ethiopia

PROFESSIONAL EXPERIENCE

1994-1998 **Senior Laboratory Technician**, Addis Ababa University Faculty of Science Department of Chemistry, Addis Ababa,

1998-2004 **Chief Laboratory Technician**, Addis Ababa University School of Medicine, Department of Microbiology, Immunology and Parasitology, Addis Ababa, Ethiopia

2007-2011 **Senior Medical Laboratory Technologist**, Addis Ababa University School of Medicine, Department of Microbiology, Immunology and Parasitology, Addis Ababa, Ethiopia

2011- Present **Expert Medical Laboratory Technologist**, Addis Ababa University School of Medicine, Department of Microbiology, Immunology and Parasitology, Addis Ababa, Ethiopia

LIST OF PUBLICATIONS

BirknehTilahun, Bogale Worku, ErdawTachbele, **Simegn Terefe**, Helmut Kloos, WorkuLegesse.High load of multi-drug resistant nosocomial neonatal pathogens carried by cockroaches in a neonatal intensive care unit at TikurAnbessa specialized hospital, Addis Ababa, Ethiopia. *Antimicrobial Resistance and Infection Control* 2012, **1**:12 doi: 10.1186/2047-2994-12

PROFESSIONAL MEMBERSHIPS

Ethiopian Public Health Association

Ethiopian Medical Laboratory Association

LANGUAGES

Amharic, Afan Oromo and English