Sushant University

Key Indicator – 1.3 Curriculum Enrichment (50)

1.3.3 Percentage of Programmes that have components of field projects / research projects / internships during last five years
(5)

Criterion 1 – Curricular Aspects (150)

Sushant University

Evaluated project report/field work report submitted by the students

APPENDIX- IV

SCHOOLWISE SAMPLE

SSHS

URINARY TRACT INFECTION (UTI) IN THE PREGNANT WOMEN VISITING LUMBINI PROVINCIAL HOSPITAL, BUTWAL, NEPAL

DEPARTMENT OF OBS/GYNAE, DEPARTMENT OF MICROBIOLOGY AND DEPARTMENT OF PARASITOLOGY

A Thesis
Submitted in Partial Fulfillment of the Requirements
Fhe the Degree [B.Sc. MLT]
In year 2019-23

Submitted By
Manju Gaire

Department of Medical Laboratory Technology
SCHOOL OF HEALTH SCIENCE
Sushant University, Gurugram

Urinary Tract Infection (UTI) in the pregnant women Visiting Lumbini provincial Hospital, Butwal, Nepal.

Department of OBS/Gynae, Department of Microbiology

And department of Parasitology

Lumbini Provincial Hospital (LPH), Butwal Nepal.

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SUBMITTED BY:

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190BSCMLT005

Bsc.MLT

42/50

Urinary Tract Infection (UTI) in the pregnant women Visiting Lumbini provincial Hospital, Butwal, Nepal.

Department of OBS/Gynae, Department of Parasitology and Department of Microbiology

A dissertation submitted in partial fulfillment for the award of

Bachelors of "Medical Laboratory"

Degree to

"MANJU GAIRE"

2019-2023

Sushant University

Under the Guidance of

Guide: Mrs. Shweta Thusoo

Program Coordinator & Assistant Professor

School of Health Sciences

Sushant University

Gurugram, Haryana

CERTIFICATE

This to certify that the project work of Mrs. MANJU GAIRE entitled **"Urinary Tract Infection in the pregnant women"** for the degree of Bachelor of Medical Laboratory was conducted by herself. Research project was done by **Mrs. Manju Gaire (Reg. No. 190BSCMLT005)**

.....

Mrs. Shweta Thusoo

Program coordinator &Assistant Professor

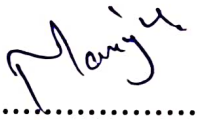
School of health science, Sushant University

(Guide)

DECLARATION SHEET

This research project work entitle "**Urinary Tract Infection in Pregnant Women**" is being submitted to the School of Health Science, Sushant University, Sector- 55, Gurugram, Delhi, for the partial fulfillment of the requirement to the project work in Bachelor Degree of Medical Laboratory (Bsc. MLT).This project work is carried out by me under the supervision of assistant professor **Mrs. Shweta Thusoo** in the Department of Medical laboratory.

This work is original and has not been submitted earlier in part or full in this or any other form to any University or institute, here or elsewhere, for the award of any degree.



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School of Health Science

ACKNOWLEDGEMENT

I would like to express my sincere regards and gratitude to honorable teacher and supervisor assistant professor **Mrs. Shweta Thusoo** of **Sushant University**, Gurugram Haryana for her constant support and guidance throughout my work.

I am much obliged to her for her permission to complete this Research project.

A special thanks goes to the Lumbini Provincial Hospital (LPH) family for allowing me to conduct research study. Most crucially, I am indebted to all the staffs of LPH for consenting to participate in the study.

The study would not have been possible without their presence.

ABSTRACT

✧ Background & Objectives:

Urinary tract infections are the most common infectious disease during pregnancy. Numerous physiological and hormonal changes during pregnancy can increase the risk of infection in pregnant women. Urinary tract infection in pregnancy increases during the gestational period. It begins from the sixth week of the first trimester and peaking in the 22nd to 24th week of the second trimester. At this period, approximately 90% of pregnant women develop ureteral dilatation which remains until delivery, leading to increase in bladder volume and decreased bladder and ureteral tones, leading to increase in urinary stasis and ureterovesical reflux. UTIs can be symptomatic or Asymptomatic. Asymptomatic bacteriuria can lead to the development of cystitis or pyelonephritis.

✧Materials and method:

A cross-sectional prospective study on 120 pregnant women was carried out from November 2022 to January 2023 to determine the urinary tract infection in pregnant women. Clean catch midstream urine samples were collected from each patient in a sterile container. The urine sample was examined under a microscope, then urine culture was perform to isolate and identify the organisms present on Cysteine- Lactose Electrolyte Deficient (CLED) agar and Mac- Conkey agar under aerobic condition, followed by biochemical testing (SIM test, catalase test, coagulation test, urease test, citrate utilization test, and triple sugar iron test was performed to identify of the bacteria.

✧ Results:

In this study a total of 120 samples where 26 samples showed UTI negative and 94 samples showed UTI positive. Most women **(53.3%)** were in the age group of **25-30** years, **27.6%** were in the age group of **18-25** and **17.0** were in the **30-38 group were** included in this study. Gram negative bacteria were isolated organisms, with **Escherichia coli** being the most commonly isolated bacteria at **58%** followed by **Klebsiella spp.18%, Proteus spp. 7%, Pseudomonas spp. 7% and Enterobacter spp. 4%.**The Kirby-Bayer disc diffusion antibiotics susceptibility test showed that **Meropenem and Nitrofurantoin** were highly sensitive against gram-negative and other bacteria. Imipenem**, gentamicin, levofloxacin, co-trimoxazole, ciprofloxacin** were sensitive and **ceftriaxone, ampicillin** and **Ceftazidime** were less sensitive.

✧ Conclusion:

According to the study, a urinary tract infection is one of the most common complications during pregnancy. Culture positive women should be managed based on the antibiotic susceptibility patterns of the bacteria which are isolated from their specimens, to prevent pregnancy-related obstetric complications and maternal and fetal disease.

✧ **Keywords:** Urinary Tract Infection, Antimicrobial Sensitivity, pregnant women.

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LIST OF ABBREVIATIONS

1. UTI: Urinary Tract Infection
2. CLED: Cysteine – Lactose -Electrolyte Deficient Agar
3. SIM: Sulfur Indole Motility Test
4. TSI: Triple Sugar Iron
5. CLSI: Clinical Laboratory Standard Institute.
6. ZOI: Zone Of Inhibition
7. AST: Antimicrobial Sensitivity Test

INTRODUCTION

Urinary tract infection (UTI) is a disease in which microbes grow in the urinary tract and cause inflammation. The urinary tract consists of kidneys, ureters, bladder, and urethra. UTI can cause inflammation of the urethra that is called urethritis, inflammation of kidneys called **pyelonephritis**, and inflammation of the bladder called **cystitis.** It is the most common type of infection to occur in the human body at any age. It is especially common during the gestation period. Urinary tract infection is the one of the most common infection seen in Nepal with a high rate of morbidity financial cost.[1]Most of the key factors predisposing to UTI have been attributed to poor personal hygiene and urinary tract abnormalities.[2]UTI is one of the widely studied health problem during pregnancy, it has been reported among 20% of the pregnant women and it is the most common cause of admission in obstetrical wards.[3]

The risk of UTI in pregnancy increases during the gestational period. It begins from the 6th week of the first trimester and peaks during the 22-24th week of the second trimester.[4].various factors tend to increase the risk of UTI during pregnancy. As the uterus resides directly on top of the bladder, during pregnancy the uterus grows and its increased weight can block the drainage of urine from the bladder and thus cause infection. Higher levels of progesterone decrease the muscle tone of the uterus, causing them to dilate in turn reducing the flow of urine. As the uterus enlarges it may compress the ureters, at the end result of these changes is that it takes longer for urine to pass through the Urinary tract giving bacteria more time to multiply. It becomes easier for the bacteria to travel up to the kidneys.

In recent years UTI in pregnancy has got more attention among obstetricians all over the world because of its maternal and perinatal effects[5].Untreated UTI during pregnancy can cause premature delivery, growth abnormalities of the fetus, anemia, and low birth weight of the infant. Upper urinary tract infection i.e. pyelonephritis can progress into renal failure and maternal sepsis. Reoccurring infection during pregnancy is managed by prophylactic treatment. UTIs are the most common cause of morbidity during pregnancy and a burden on the health care system[6].During pregnancy urinary tract infection classified into two categories symptomatic and asymptomatic[7].

Symptomatic urinary tract infections are divided into lower tract (acute cystitis) or upper tract (acute pyelonephritis) infections. Cystitis is defined as significant bacteriuria with associated bladder mucosal invasion, whereas pyelonephritis is defined as significant bacteriuria with associated inflammation of the renal parenchyma and pelvis[8].one of the biggest risk factors for symptomatic infection is asymptomatic bacteriuria which occur 2-10% of all pregnancies. If asymptomatic bacteriuria is left untreated 30% of mothers develop acute pyelonephritis[9].

✧ Asymptomatic Bacteriuria

Asymptomatic bacteriuria is defined as the presence of significant bacteriuria without the symptoms of an acute urinary tract infection. Asymptomatic bacteriuria in pregnancy increases the risk of adverse outcomes, progression to pyelonephritis[10,11],and without treatment nearly 40% of pregnant women will develop symptomatic UTI[12] . It commonly occurs during the early pregnancy, period in which screening is indicated [13]. Prevalence of bacteriuria during pregnancy varies between 2-10% [14], remaining constant even in the developing countries [15,16]. And it could be associated with a previous story of UTI, diabetes mellitus, multiparity, low socioeconomic status and illiteracy [9].

✧ Cystitis

Symptomatic infection of the bladder is called cystitis and clinical symptoms are the same in pregnant and non-pregnant women: dysuria, hematuria, pyuria, urinary urgency and frequency. Acute cystitis should be suspected in pregnant women who complain about dysuria, and urinalysis and urine culture should be performed in order to guide the best antibiotic treatment. Dysuria in pregnant women can also be a result of vaginitis or urethritis and can be distinguished by the presence of bacteriuria[17,18].Treatment of acute cystitis in pregnant women includes empiric antibiotic therapy. Initiated at the time of complaints of dysuria, subsequently tailored to culture results to the susceptibility pattern of the isolated organism and follow-up cultures must be done to confirm sterilization of the urine.

Empirical treatment agents should also take into account any prior microbiological data and drug safety, including the particular stage of pregnancy[14]

✧ Pyelonephritis

Infection of the upper urinary tract and kidneys is called pyelonephritis, and typical symptoms in pregnant and non-pregnant women are the same. Typical symptoms include fever (>38°C or 100.4°F), flank pain, nausea, vomiting, pyuria, costovertebral angle tenderness, and is confirmed by the finding of bacteriuria in the setting of these symptoms. Flank pain is a common symptom due to pregnancy-induced hydronephrosis and most commonly unilateral over the involved kidney, although bilateral discomfort may be present.

Calycinal and ureteral dilatation are more common on the right side in 86% of cases and this dilatation appears to begin by the 10th week and worsens throughout pregnancy[7].

Most cases of pyelonephritis occur during the second and third trimesters (2% during the first, 52% during the second, and 46% in the third trimester) and complications include septic shock syndrome, anemia, bacteremia, respiratory insufficiency, and renal dysfunction. Mechanism of anemia is not well understood, but hemolysis, perhaps mediated by endotoxin, may be important. Acute renal failure associated with micro abscesses and suppurative pyelonephritis has been described in isolated cases, independent of sepsis.

Urinalysis and urine culture are important for diagnosis of pyelonephritis in pregnant women who present with typical symptoms. Pyuria is present in the majority of women with pyelonephritis, and its absence suggests an alternative diagnosis or complete obstruction. Pregnant women who have back or flank pain should be evaluated for bacteriuria and a diagnosis of pyelonephritis, given the risk of complications[13,15]· Pyelonephritis should be treated with hospitalization and intravenous antibiotics until the woman is a febrile for 24 to 48 hours and symptomatically improved. Initial empiric therapy of pyelonephritis should be done with parenteral, broad spectrum beta-lactams.[19-23]

Escherichia coli is the most common pathogen associated with both symptomatic and asymptomatic bacteriuria, representing 70–80% of isolates.[24-28]Specific virulence determinants in uropathogenic strains of *E. coli* are associated with invasive infection and pyelonephritis in pregnancy. These include toxins and adhesions, pili or fimbriae that allow adherence to uroepithelial cells and prevent bacteria from urinary lavage, allowing for multiplication and tissue invasion[29]. Klebsiella spp and other enterobacteriaceae species are frequently associated .[30]

LITERATURE REVIEW

Most researchers conclude that urinary tract infections are the second most common pathology in pregnant women, after anemia. Approximately 5-10% of women develop a UTI during pregnancy and it is estimated that 5% of all hospitalizations for pregnant women are due to a UTI. Urinary tract infection, if not treated properly, can significantly increase the risk of pyelonephritis as a result of pregnancy-related adaptive changes in the urinary tract and lead to serious maternal and fetal complications such as preterm birth, low birth weight, or maternal systemic infections.[41]

Risk factors include a history of urinary incontinence, pre-existing diabetes, increased birth rate, low socioeconomic status, immunosuppression, smoking, extreme maternal age, and delayed access to prenatal care [38,39]. Urinary tract infections are common During pregnancy due to numerous women's physiological changes, there is an increased risk of serious infectious complications from symptomatic and asymptomatic urinary infections. Most infections in pregnancy are asymptomatic; however, even covert bacteriuria places the mother at risk for low birth weight and preterm birth.[33, 34]. Additionally, the normal physiologic changes that occur during pregnancy place the woman at risk for pyelonephritis once she has asymptomatic bacterial colonization of the urinary tract. Pyelonephritis can result in significant maternal and fetal morbidity and mortality. [35,36,37]

during pregnancy, since gram-positive and gram-negative bacteria are involved as pathogens. The most common bacteria are gram negative, with Escherichia coli having the highest percentage, while the others are caused by various pathogens such as Klebsiella pneumoniae, Proteus mirabilis, Enterobacter spp. , Pseudomonas, saprophytic staphylococcus, and group B beta-hemolytic streptococci [40]

The results make it evident that this study showcases E. coli's role as the most prevalent cause in community incidents, constituting 58%.The microorganism responsible for causing urinary tract infections (UTIs) was found to have a substantial sensitivity to Meropenem and Nitrofurantoin in the isolates from the majority of species. According to a recent research endeavor, Imipenem, gentamicin, levofloxacin, co-trimoxazole, and ciprofloxacin exhibited sensitivity, whereas ceftriaxone, ampicillin, and Ceftazidime demonstrated comparatively lower levels of sensitivity.The frequent misuse of antibiotics leads to the development of resistance against them.

MATERIALS AND METHODS

Study Type and Population

Prospective cross-sectional study was conducted over a 2 month period from November (2022) to January 2023. Urine samples from a total of 120 pregnant women were collected at a laboratory attached to the gynecology department of Plumbing Provincial Hospital in Butwal, Nepal. Pregnant women included in this study were randomly selected from a sample who met the inclusion criteria, aged 18 to 38 years and without symptoms of urinary tract infection such as abdominal pain, fever, heartburn, stomach pain , or dysuria. Exclusion criteria included patients with symptomatic urinary tract infection and a history of urinary tract infection.

Demographic information

Demographic data (age, height, body weight, population age, pregnancy date, pregnancy and antibiotic use in the last week) were extracted from the records of the LPH Department of Obstetrics and Gynecology.

Specimen collection

A collection of urine specimens in a clean, sterile, screw-top, dry, leak - proof, wide-mouthed, container appropriately labeled with the laboratory number. Before urinating, each person was advised to spot-less the external genitals.

Sample Transportation

samples were transported to the laboratory within half an hour to be tested according to standard laboratory protocol (WHO guidelines) at the laboratory of Plumbing Provincial Hospital, Butwal, Nepal. If samples were not shipped on time, they were refrigerated at 4 °C.

Microscopic Examination

Before processing, the bio-physical character of the urine sample such as urine color, consistency, presence of blood, mucus, debris and any other abnormalities were observed with an unaided eye.

Processing the Specimen

First of all, immerse the strip completely in a well-mixed sample of urine and leave it to stand for the time necessary for reaction to occur. Finally the colors that appear are compared against a

specific chromatic scale provided. Then the microscopic examination was carried out for the detection of pus, epithelial cells, bacteria, casts, oxalate and other cells.

Microscopic examination for pus cells

Urine is examined under microscope by using per high power field and noted the pus cells. The count of 10 or more pus cells per high power field is considered as an indication of urinary tract infection.

Quantitative bacteriology - calibrated loop direct streak method

The collected mid-stream urine samples were cultured on MacConkey and Cysteine Lactose Electrolyte Deficient Agar (CLED). The loop full of well mixed uncentrifuged urine specimens was delivered onto the dried plate of a medium to make primary inoculums. The size of the platinum loop was 4mm and it was sterilized using flame and cooled before making primary inoculums. The inoculum was spreaded very thinly in parallel with the loop.

The loop was again sterilized between different streaks. The inoculated agar plates were incubated at 37°c for overnight and read after 24 hours.

Colonial characteristics were read and colony count was done on every plate. Total counts were estimated from all the cultured agar plates. In each culture plate, the number of colonies was multiplied by 100, to estimate the number of organisms per milliliter of urine. The culture plate having mixed growth was regarded as contamination and such sample was again repeated for the culture. If there was the absence of any bacterial growth, those specimens were again kept for a day in an incubator, and if still negative, they were reported as no growth after 48 hours. After determining the plate count, organisms were further processed by a series Disc- Diffusion method was carried out for the antimicrobial susceptibility test.

Bacterial Identification

Gram staining was performed by making a smear from a single colony of the cultured plates. Motility test was examined from the SIM test. Similarly, a series of biochemical investigations (Citrate test SIM, Urease, Oxidative,TSI tests) were performed for the identification of the various gram - negative bacteria/ Gram Positive bacteria.

Antibiotic Susceptibility Test

The antibiotic susceptibility test of the urine isolates from pregnant women were done on Mueller Hinton Agar (MHA) by the standard disk diffusion technique method using various antibiotic discs as recommended by Clinical Laboratory Standard Institute (CLSI 2022). The growth colony was picked from the MacConkey or CLED agar plate and isolated on MHA plate with a sterile cotton swab stick. The antimicrobial disks were slightly pressed down on the media so that the disks were in complete contact with the medium. After inoculating the antimicrobial disks, they were incubated aerobically at 37°C overnight.

After overnight incubation, the diameter of **Zone Of Inhibition (ZOI)** of each antimicrobial disk was measured with a scale from the opposite surface of the plate with their lid closed and recorded in millimeters. The results were reported in terms of **'Sensitive','Resistant' and 'Intermediate'** by comparing with the standard chart developed by Kirby-Bauer.

For susceptibility testing ,Meropenem (10mcg), Gentamicin (30mcg), Nitrofurantoin (300mcg), Ceftriaxone (30mcg), Cefotaxime (30mcg), Cotrimoxazole (1.25mcg), Levofloxacin (5mcg), Ampicillin (10/10 mcg), Imepenem (10mcg) were tested against the gram negative organism. Interpretation was done by comparing the diameter of the zone of inhibition of the test organism by the above antibiotics.

RESULTS

A total of 120 pregnant women participated in this study. 26 (21.67%) samples in the culture plate are negative (no bacterial growth) and 94 (78.33%) samples in the culture plate are positive (bacterial growth). The association of UTIs with different age groups of pregnant women was calculated and the results suggest that UTIs were observed more frequently in the 25-30 year old (55 years old) age group. 3%, followed by the 18-25 age group (27.6%) and the 30-38 age group (17.0%). Among the bacteria isolated from a case of severe bacteriuria, Escherichia coli was the most commonly cultured organism (61.7%), followed by Klebsiella sp.(19,1%) Proteus sp. (7,4 %), Pseudomonas sp.(7.4%) and Enterobacter sp. (4.2%). , while the above bacteria were susceptible to imipenem, ceftriaxone, gentamicin, meropenem, levofloxacin, ampicillin, ceftazidime, cotrimoxazole, ciprofloxacin and nitrofurantoin. Here, the table and graph each show the variability of the data.

Case Distribution:-

Table 1

Positive Case	**94**	**78.33%**
Negative Case	**26**	**21.67%**
Total case	**120**	**100%**

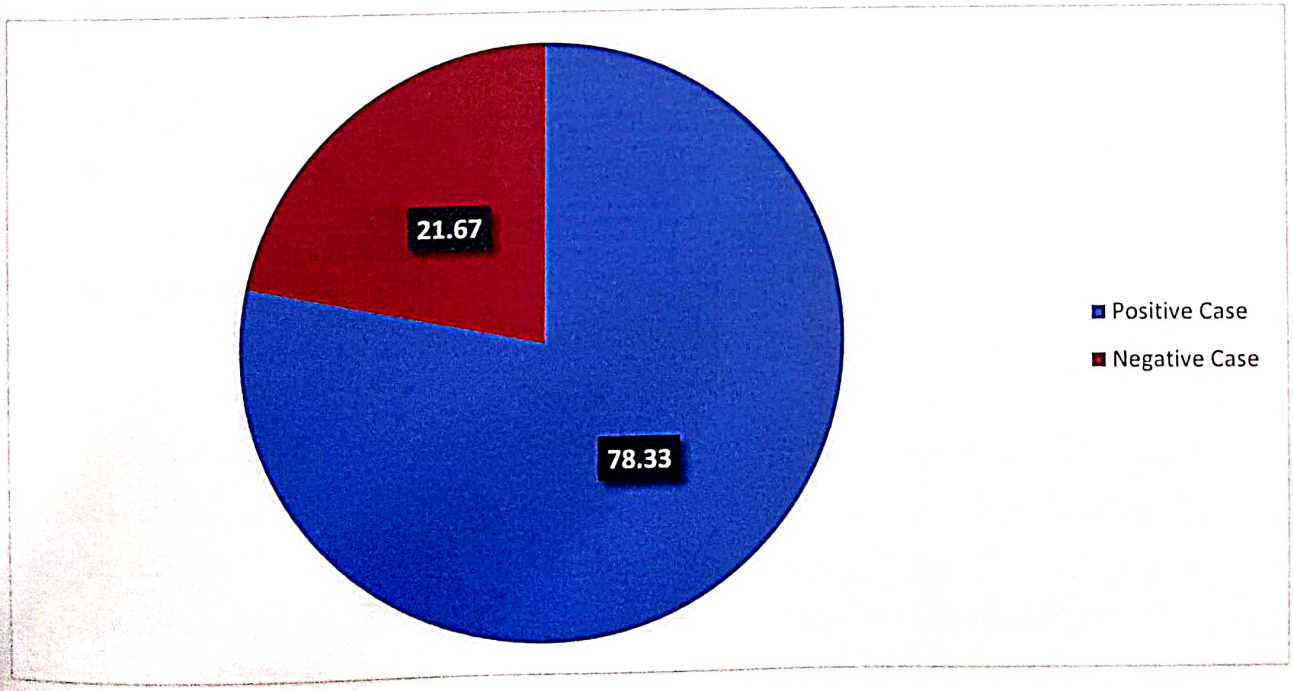


Figure1:- Case Distribution in percentage

Table-2

Age

Group	Pregnant women	Percentage
18-25	26	27.6%
25-30	52	55.3%
30-38	16	17.0%

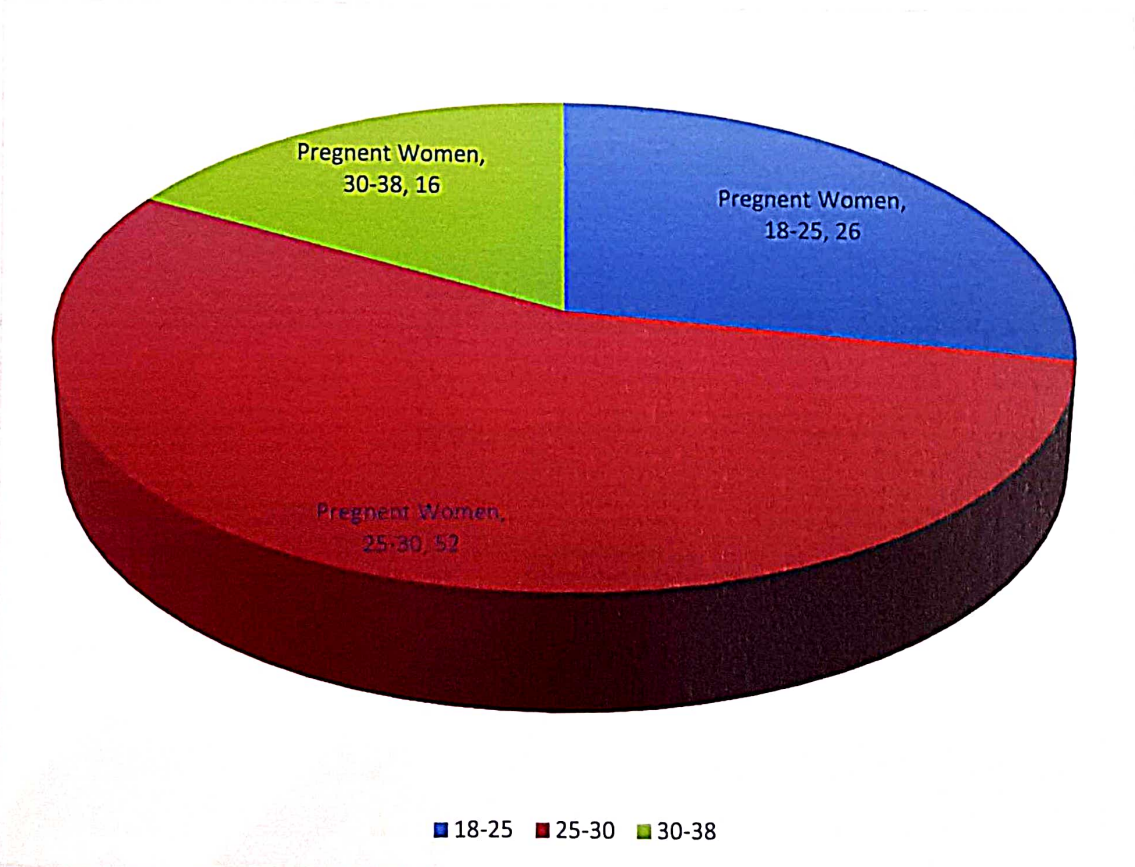
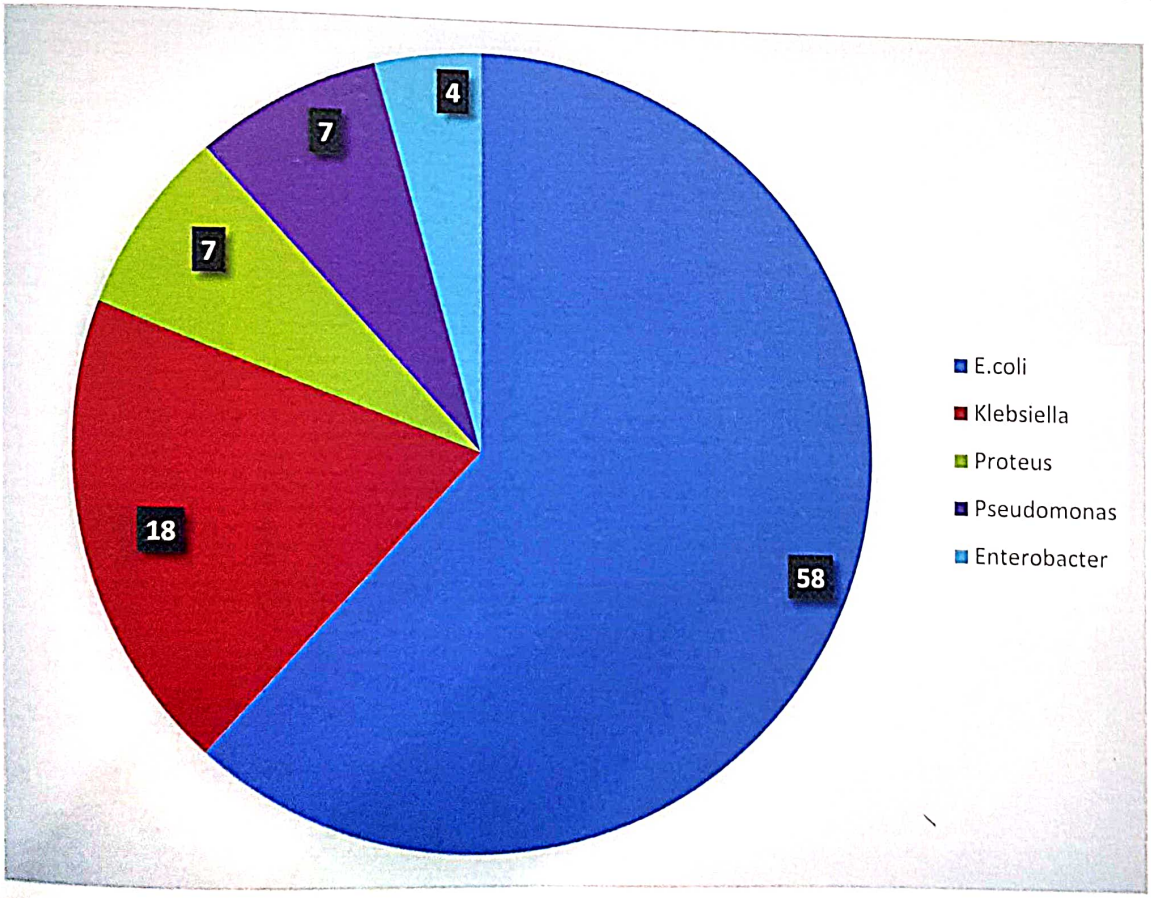


Figure 2. Reaction of UTI with a different age group of pregnant women.

Table 3

Positive Bacterial Pathogen

Organism	Frequency	In percentage(100% -94)
E.coli	58	61.70
Klebsiella	18	19.15
Proteus	7	7.45
Pseudomonas	7	7.45
Enterobacter	4	4.25



E. coli-58, Klebsiella-18%, Proteus- 7, Pseudomonas- 7, Enterobacter- 4

Figure 3. Positive Bacterial Pathogens.

Table 4: Sensitive, Intermediate and Resistance pattern in AST:-

microorganism	E.coli			Klebsiella			Proteus			Pseudomonas			Enterobacter		
Drug	S	I	R	S	I	R	S	I	R	S	I	R	S	I	R
Meropenem	49	7	2	16	2	-	7	-	-	2	1	4	4	-	-
Nitrofurantoin	53	3	2	3	5	10	6	1	-	-	-	7	3	-	1
Imipenem	48	6	4	15	2	1	7	-	-	7	-	-	4	-	-
Levofloxacin	32	22	4	3	4	11	3	3	1	-	1	6	3	-	1
Gentamicin	52	3	3	14	3	1	5	2	-	6	-	1	3	1	-
Co-trimoxazole	21	7	30	1	3	14	6	1	-	-	2	5	2	1	1
Ceftriaxone	12	21	33	13	5	-	7	-	-	6	-	1	4	-	-
Ampicillin	2	3	53	-	3	15	6	1	2	-	-	7			
Ceftazidime	43	5	10	-	2	16	6	1	-	7	-	-	-	-	4
Ciprofloxacin	46	7	5	2	-	16	4	-	3	-	1	6	3	-	1

S= Sensitive

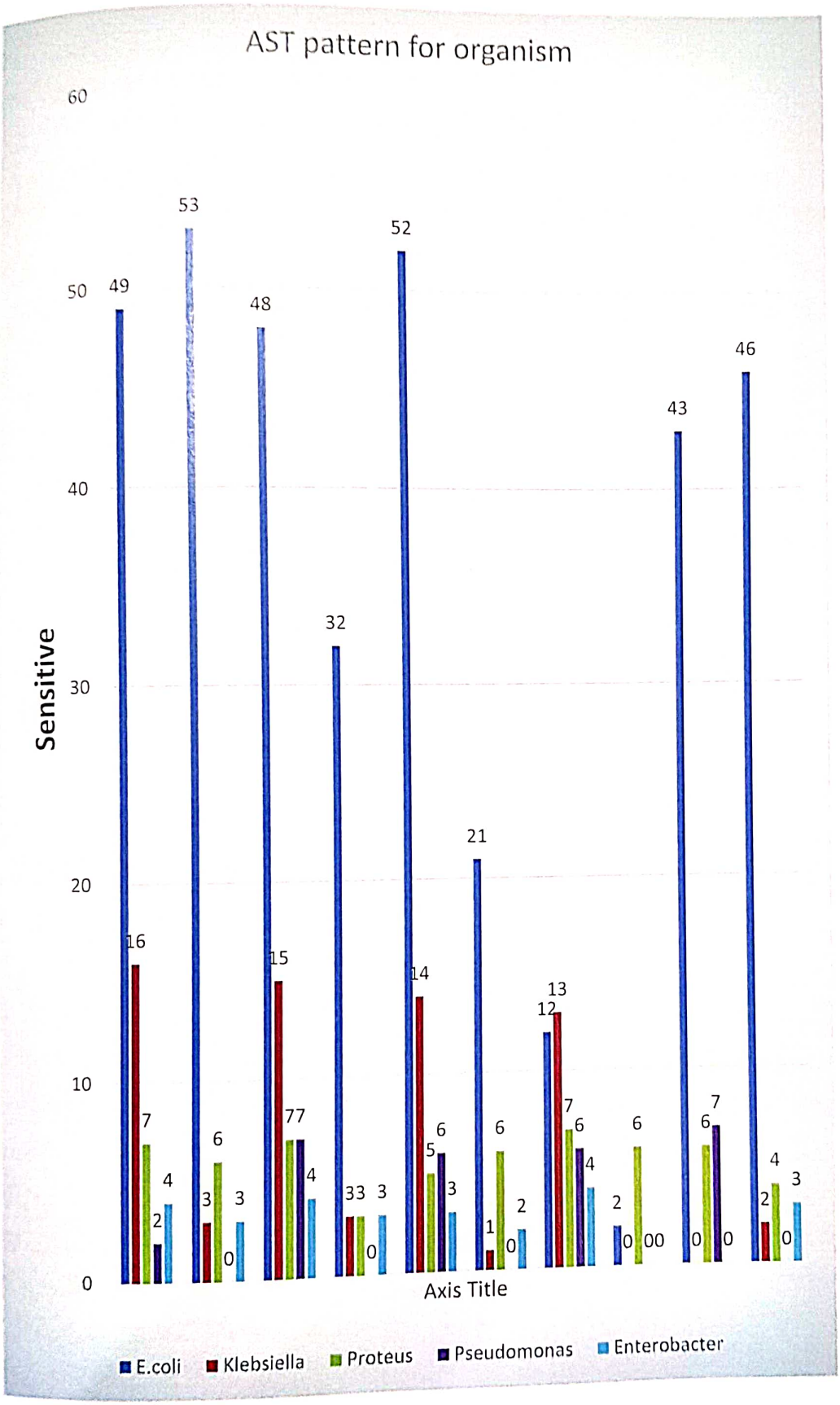
I= Intermediated

R= Resistance

Table 5

AST pattern for organism (Sensitive)

Antibiotic	E.coli	Klebsiella	Proteus	Pseudomonas	Enterobacter
Meropenem	49	16	7	2	4
Nitrofurantoin	53	3	6	-	3
Imipenem	48	15	7	7	4
levofloxacin	32	3	3	-	3
Gentamicin	52	14	5	6	3
Co-trimoxazole	21	1	6	-	2
Ceftriaxone	12	13	7	6	4
Ampicillin	2	-	6	-	-
Ceftazidime	43	-	6	7	-
Ciprofloxacin	46	2	4	-	3



(Above) Figure 4. AST pattern for organism (Sensitive)

Table 6

AST pattern for organism (Intermediate)

Antibiotic	E.coli	Klebsiella	Proteus	Pseudomonas	Enterobacter
Meropenem	7	2	-	1	-
Nitrofurantoin	3	5	1	-	-
Imipenem	6	2	-	-	-
levofloxacin	22	4	3	1	-
Gentamicin	3	3	2	-	1
Co-trimoxazole	7	3	1	2	1
Ceftriaxone	21	5	-	-	-
Ampicillin	3	3	1	-	1
Ceftazidime	5	2	1	-	-
Ciprofloxacin	7	-	-	1	-

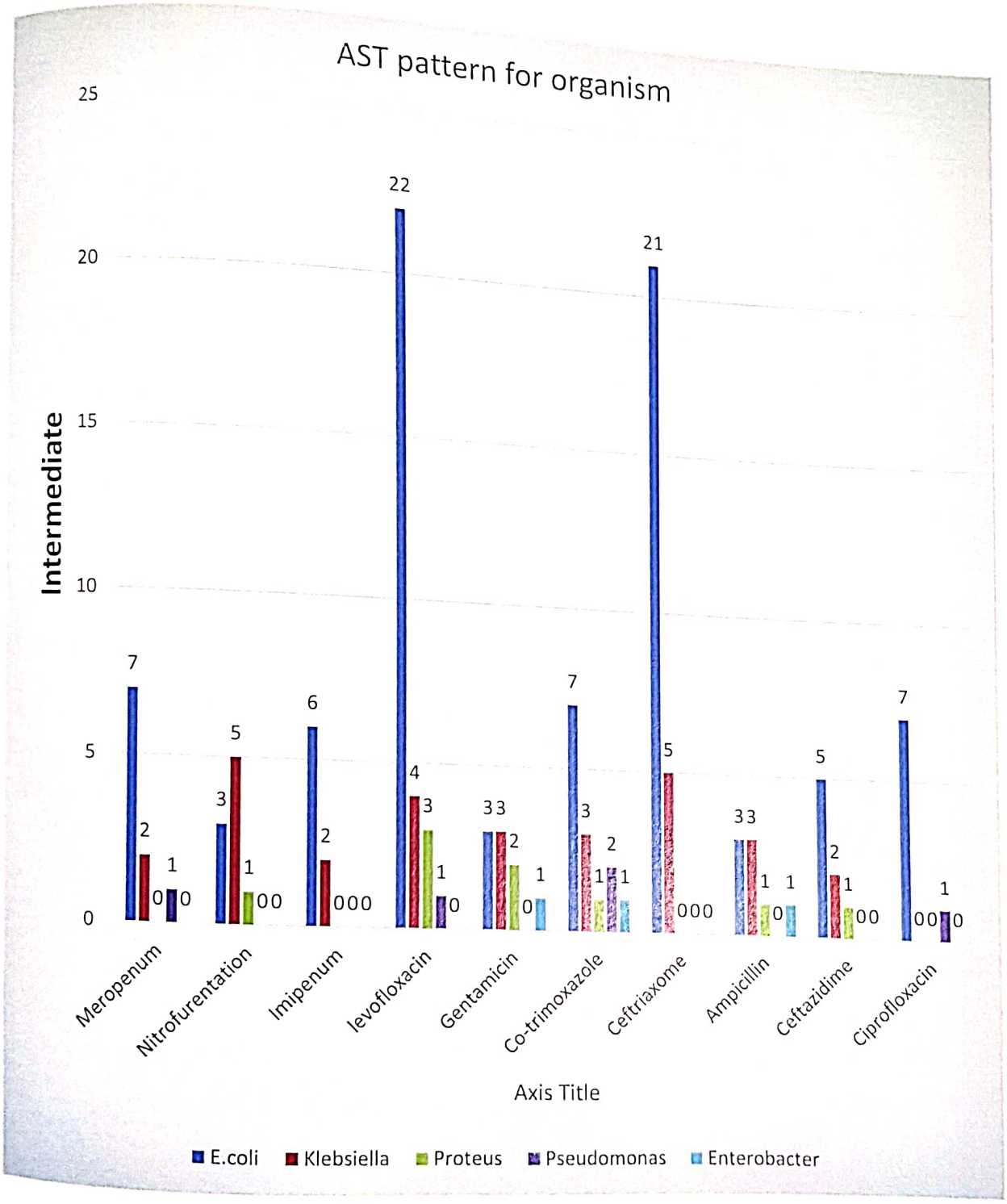


Figure 5. AST pattern for organism (Intermediate)

Table 7

AST pattern for organism (Resistance)

Antibiotic	E.coli	Klebsiella	Proteus	Pseudomonas	Enterobacter
Meropenem	2	-	-	4	-
Nitrofurantoin	2	10	-	7	1
Imipenem	4	1	-	-	-
levofloxacin	4	11	1	6	1
Gentamicin	3	1	-	1	-
Co-trimoxazole	30	14	-	5	1
Ceftriaxone	33	-	-	1	-
Ampicillin	53	15	2	7	3
Ceftazidime	10	16	-	-	4
Ciprofloxacin	5	16	3	6	1

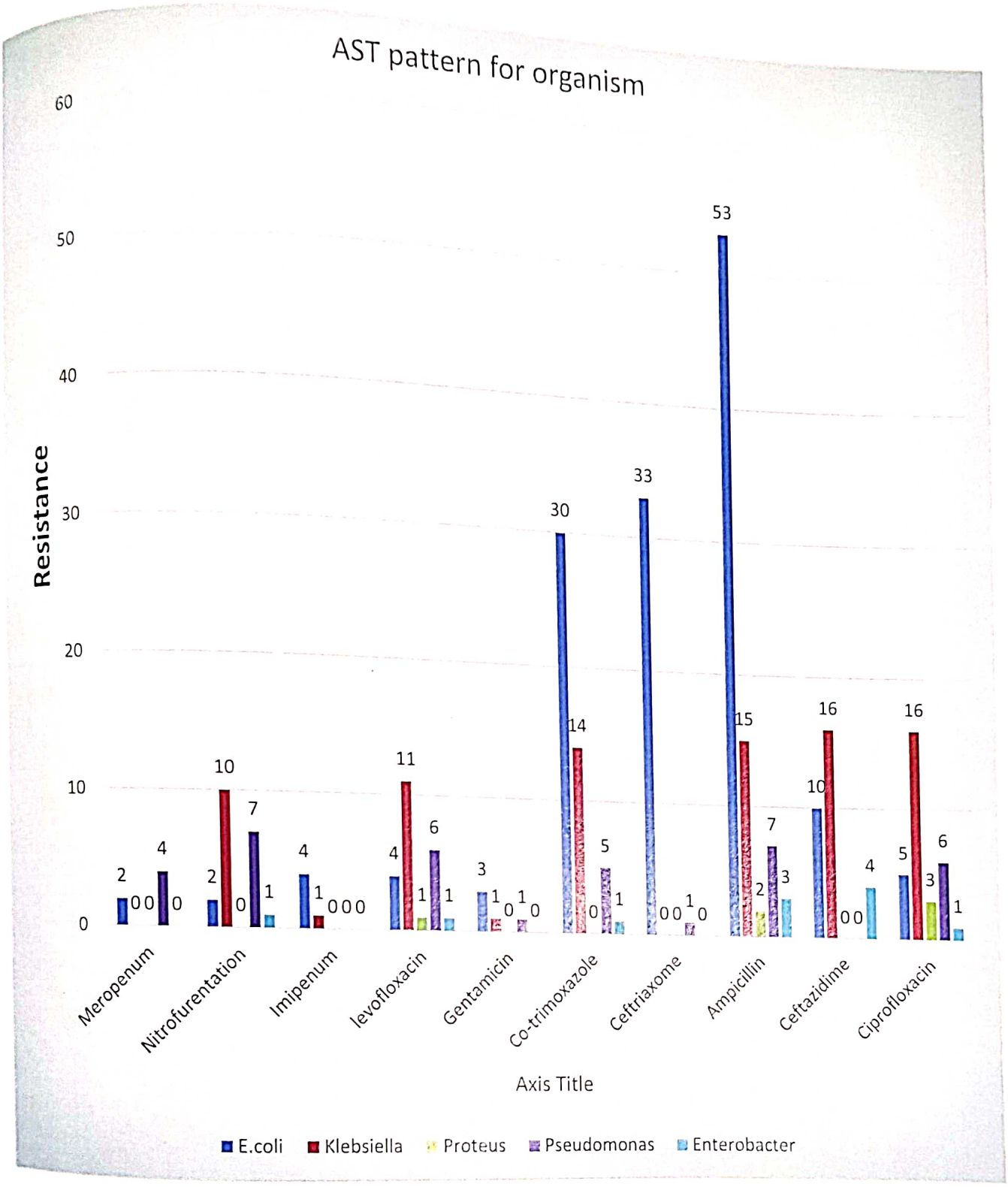


Figure 6. AST pattern for organism (Resistance)

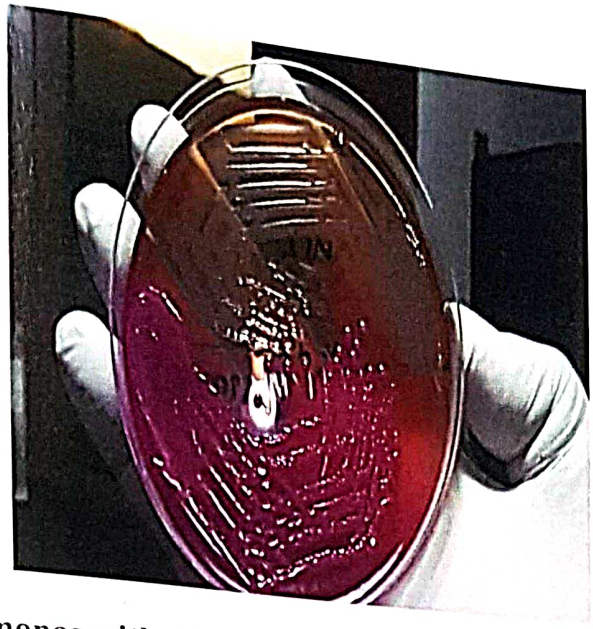
Figure 7.

Images of bacterial growth on agar plate.

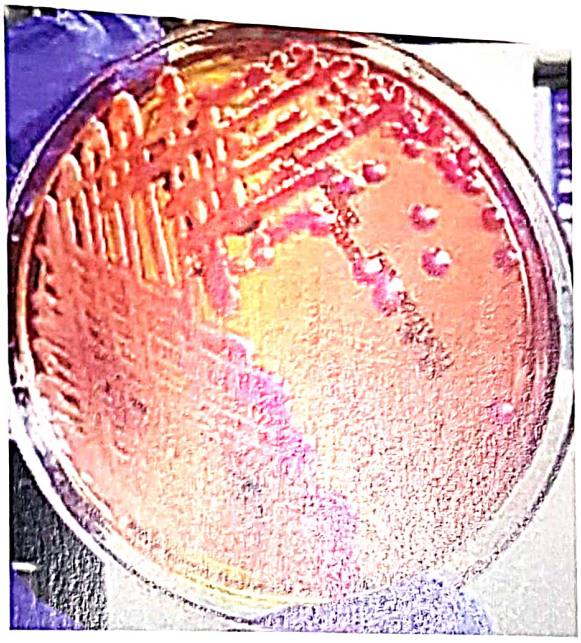
E.coli on Mac-Conkey agar plate

Klebsiella on Mac-Conkey agar plate.

Proteus sp. on Mac-Conkey agar plate



Pseudomonas with Klebsiella growth on Mac-Conkey.

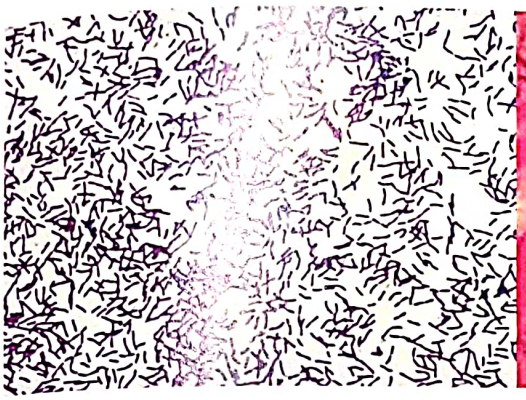


Enterobacter spp., are often late lactose fermenters,

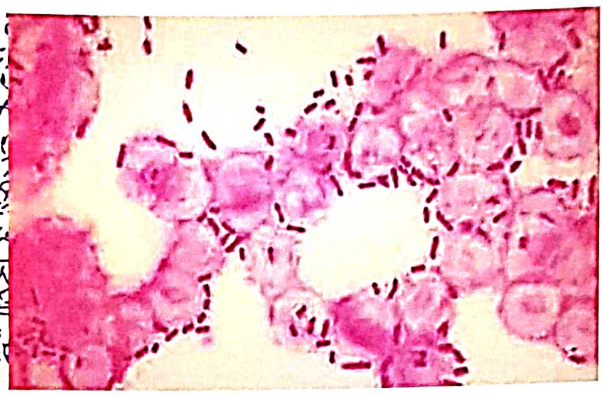
(so colonies may appear colorless to light pink).

Figure 8.

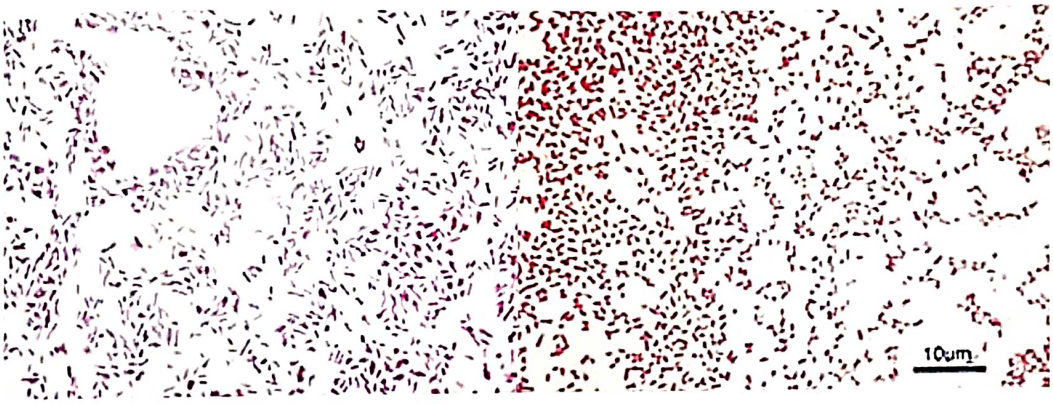
Microscopic view of positive organism



E.Coli

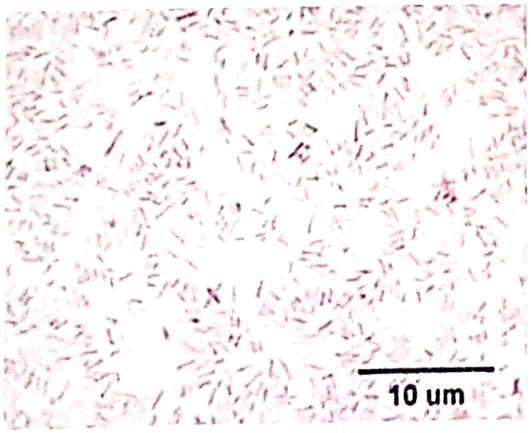


Klebsiella sp.



Proteus sp.

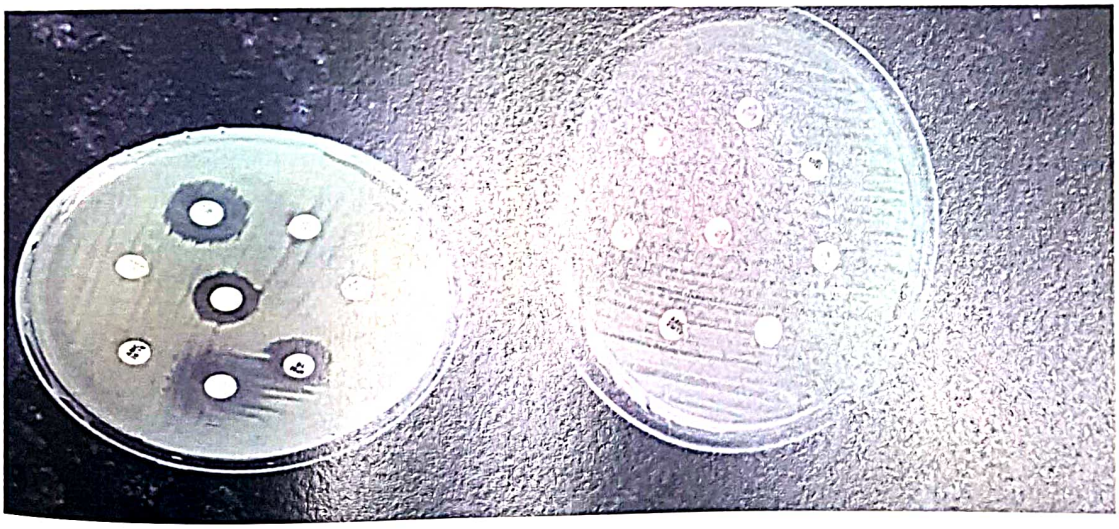
Pseudomonas sp.



Enterobacter sp.

Figure 9.

Antibiotic sensitivity test of above bacteria.



(By using Kirby- Disc Diffusion Method AST in each growth)

DISCUSSION

Due to the anatomical and physiological changes in the body during pregnancy, women become more susceptible to urinary tract infections. Therefore, it is the most common complication in the course-pregnancy. This increased compliance can lead to bacteriuria and pyelonephritis. Such conditions during pregnancy can lead to disease in pregnant women and fetal complications[31]

The Aim of the study was to assess the frequency of urinary tract infections during pregnancy and associated microorganisms .Within the scope of this study, our goal was to identify the total quantity of pregnant women undergoing urinary tract infections over a designated period. Total **120 women were included in this study (Table 1), (Figure 1) .** This data shows **78.3%** women positive for urinary tract infection and **21.6%**are negative for urinary tract infection. In this study, according to the age, women between **25 to 30** years old showed the highest incidence (Table 2) (Figure 2) of urinary tract infection as compared to women of younger or older age.

According to the results of this study, only gram negative bacteria are causing UTI . E. coli was the most common causative agent; it caused **61.7%** cases of UTI, followed by Klebsiella which caused **19.1%** cases. Proteus caused **17.4 %**cases, Pseudomonas **7.4 %**cases and Enterobacter **4.2%** cases (Table 3) (Figure 3). These pathogens being the cause of urinary tract infection indicates that the infection was a result of poor hygienic conditions. This is because these microbes originate from human waste. During the gestation period, amino acids and lactose levels in the body increase. This encourages the growth of Escherichia coli bacteria, which is a gram-negative bacteria, leading to the high prevalence of urinary tract infections.[32]

The major factor responsible for higher frequency of E. coli in pregnant women is urine stasis in pregnancy, which promotes the growth and colonization of bacteria. Majority of the isolated uropathogens were found to be highly sensitive for,Nitrofurantoin, Meropenem, Imipenem, Levofloxacin, Gentamicin, Co-trimoxazole, white less sensitive for Ciprofloxacin, Ceftriaxone and Ampicillin.(Table 4) (Figure4,5 and 6). So preventing UTIs during pregnancy is a vital aspect of maintaining maternal and fetal health.

Limitation of study

The research was carried out within a government hospital, employing a prospective study design. The methodology involved the utilization of a non-probability random sampling approach.

- The hospital's records lack any historical documentation of UTI cases involving pregnant women.
- The follow-up period varied across studies and thus the outcomes, such as eradication and complications, may not be comparable among studies.
- Owing to limited antibiotic resources, the task of pinpointing the sensitive antibiotic and the optimal agar plate medium for a particular organism becomes intricate.

CONCLUSION

Bacteriuria is associated with pregnancy complications, so it is necessary to regularly screen pregnant women for bacteriuria every trimester. Routine urine cultures should be performed in all pregnant women to women to detect bacteriuria, and all positive cases should be treated with appropriate antibiotic therapy to prevent pregnancy related obstetric complications .

The most important risk factors associated with urinary tract infection during pregnancy were poor personal hygiene, history of urinary tract infection, diabetes and anemia.

Therefore, the study recommends health education on personal sanitary hygiene and a comprehensive urinalysis to prevent complications from urinary tract infection during pregnancy.

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APPENDIX I

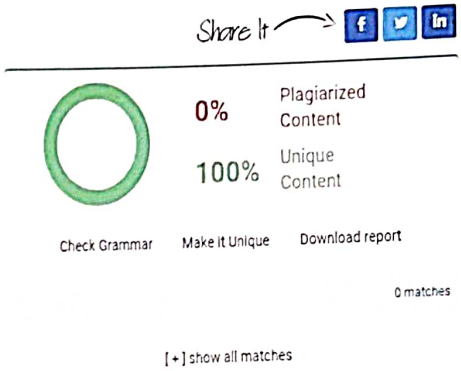
Plagiarism check

Plagiarism check done was done with prepost seo Plagiarism checker.

https://www.prepostseo.com/plagiarism-checker

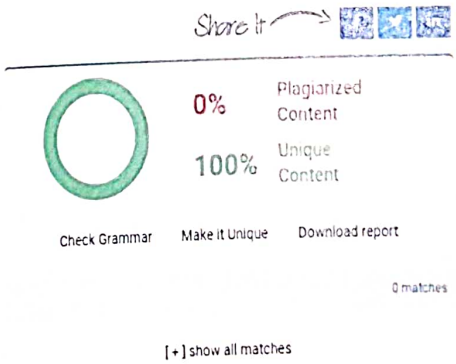
Plagiarism Result

Urinary tract infection (UTI) is a disease in which microbes grow in the urinary tract and cause inflammation. The urinary tract consists of kidneys, ureters, bladder, and urethra. UTI can cause inflammation of the urethra that is called urethritis, inflammation of kidneys called pyelonephritis, and inflammation of the bladder called cystitis. It is the most common type of infection to occur in the human body at any age. It is especially common during the gestation period. Urinary tract infection is the one of the most common infection seen in Nepal with a high rate of morbidity financial cost [1] Most of the important thing elements predisposing to UTI had been attributed to negative non-public hygiene and urinary tract abnormalities..[2]UTI is one of the widely studied health problem during pregnancy, it has been reported among 20% of the pregnant girls and it is the most not unusual place cause of admission in obstetrical wards [3]



Plagiarism Result

The risk of UTI during pregnancy increases as the pregnancy progresses, beginning in the 6th week of the first trimester and peaking around the 22nd-24th week of pregnancy. The week of the second trimester[4] various factors tend to increase the risk of Urinary tract infection during pregnancy. Because the uterus sits directly above the bladder, the uterus enlarged during pregnancy and its weight gain can block the flow of urine from the bladder, causing infections. Higher levels of progesterone decrease the muscle tone of the uterus, causing it to dilate, which in turn decrease urine flow. As the uterus grows, it can compress the ureters. The end result of these changes is that urine flows longer through the Urinary tract, giving bacteria more time to multiply. This make it easier for the bacteria to get into the kidneys.



DTSCUSSION

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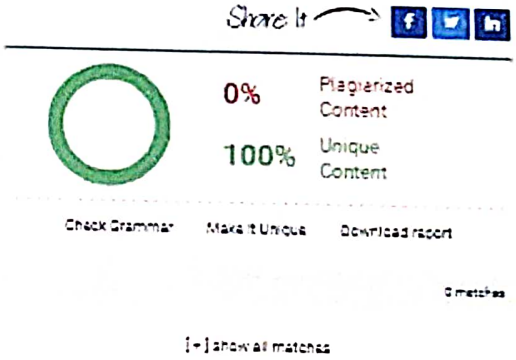
Therefore, the study recommends health education on personal sanitary hygiene and a comprehensive urinalysis to prevent complications from urinary tract infection during pregnancy.



PREPOSTSEO

PLAGIARISM SCAN REPORT

Date	August 14, 2023
Exclude URL:	NO

Unique Content	100%	Word Count	91
Plagiarized Content	0%	Records Found	0
Paraphrased Plagiarism	0		

CONTENT CHECKED FOR PLAGIARISM:

LITERATURE PAPER Most researchers conclude that urinary tract infections are the second most common pathology in pregnant women, after anemia. Approximately 5-10% of women develop a UTI during pregnancy and it is estimated that 5% of all hospitalizations for pregnant women are due to a UTI. Urinary tract infection, if not treated properly, can significantly increase the risk of pyelonephritis as a result of pregnancy-related adaptive changes in the urinary tract and lead to serious maternal and fetal complications such as preterm birth, low birth weight, or maternal systemic infections. [41]

PLAGIARISM SCAN REPORT

Date	August 14, 2023
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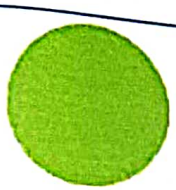


Unique Content	100%	Word Count	222
Plagiarized Content	0%	Records Found	0
Paraphrased Plagiarism	0		

CONTENT CHECKED FOR PLAGIARISM:

MATERIALS AND METHODS Study Type and Population prospective cross-sectional study was conducted over a two-month period from November (2022) to January 2023. Urine samples from a total of 120 pregnant women were collected at a laboratory attached to the gynecology department of Plumbing Provincial Hospital in Burial, Nepal. Pregnant women included in this study were randomly selected from a sample who met the inclusion criteria, aged 18 to 38 years and without symptoms of urinary tract infection such as abdominal pain, fever, heartburn, stomach pain, , or dysuria. Exclusion criteria included patients with symptomatic urinary tract infection and a history of urinary tract infection. Demographic Information Demographic data (age, height, body weight, population age, pregnancy date, pregnancy and antibiotic use in the last week) were extracted from the records of the LPH Department of Obstetrics and Gynecology. A collection of (collection day) urine specimen in a clean, sterile, screw-top, dry, leak - proof, wide-mouthed,

Appendix II

Collections of pictures during reporting.

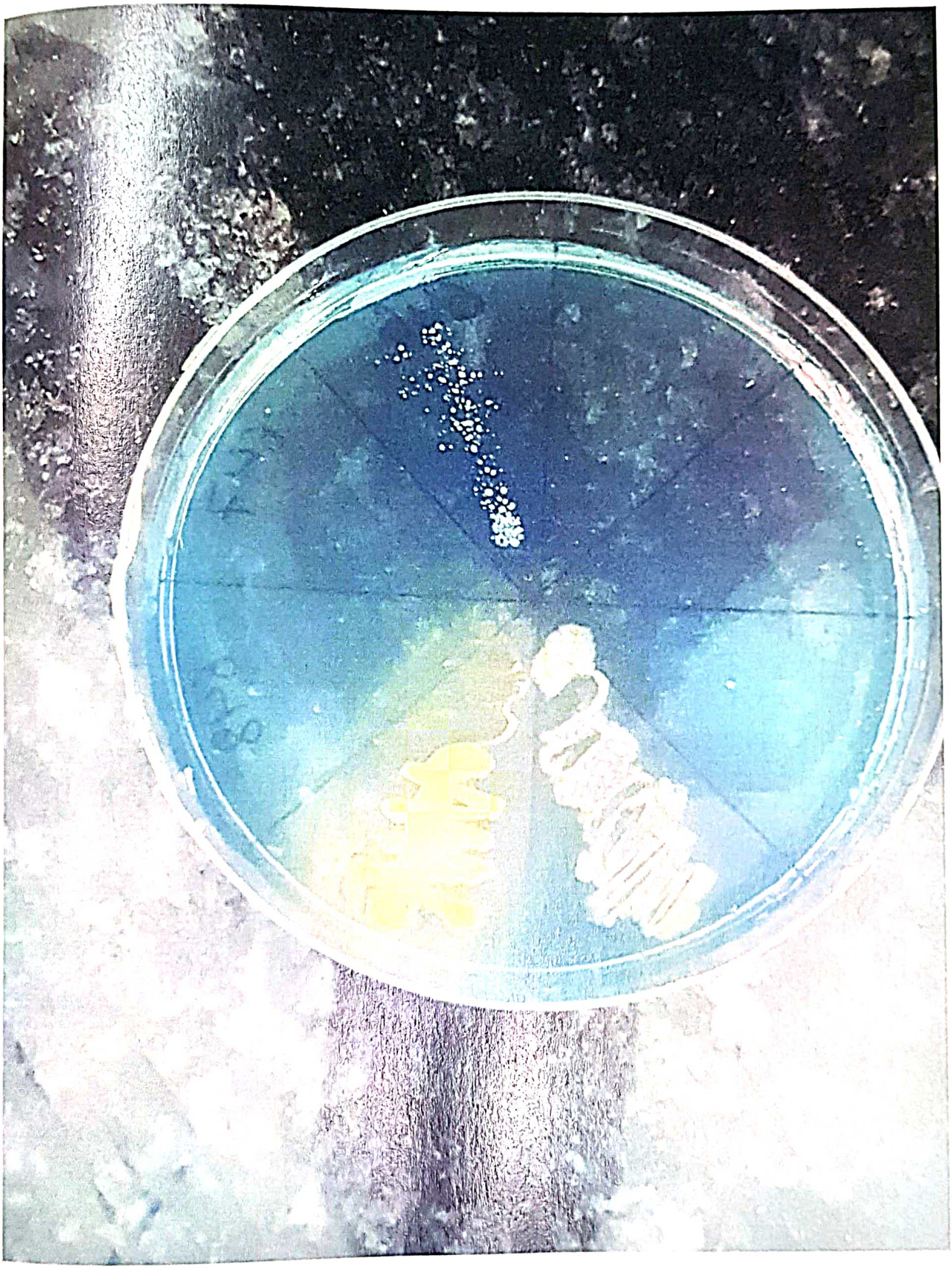
Sensitive and Resistance activity in Mueller Hinton Agar Plate.

Biochemical test in NLF species.

Manju Gaire

Klebsiella Species on Mac-Conkey Agar Plate.

Non Lactose fermenter growth in Mac-Conkey agar plate.



Growth seen in CLED Media.