

KIBOGORA POLYTECHNIC

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCES

PREVALENCE AND RISK FACTOR OF URINARY TRACT INFECTION AMONG PREGNANT WOMEN

A Retrospective study, CHUB from January to December 2018.

Undergraduate there is presented in partial fulfillment of the requirements for the Bachelor's degree with honor in biomedical laboratory sciences of high education at Kibogora Polytechnic.

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DECLARATION

Declaration by the Candidate

We, UWIMANA Julienne and MUKAMUVUNYI Clesence at this moment declare that this is our original work and not a duplication of any similar academic work. It has therefore not been previously or concurrently submitted for any other degree, diploma or other qualification to Kibogora Polytechnic or any other institution. All materials cited in this paper which are not our own have been duly acknowledged.

Name:

Name:

Signature.....

Signature.....

Date.....

Date.....

Declaration by the Supervisor

I declare that this work has been submitted for examination with My approval as KP Supervisor

Supervisor's name:

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Date.....

ABSTRACT

Urinary tract infection (UTI) is one of the most frequently encountered problems facing the family physician. Pregnant women are vulnerable to UTI which may lead to complications such as, hypertensive condition, anemia, chronic renal failure, premature delivery and fetal mortality. The understanding of the epidemiology and antimicrobials susceptibility pattern of UTI during pregnancy is fundamental care for pregnant women and health care providers in guiding intervention strategies. The main objective was to determine the prevalence of bacterial urinary tract infections and associated risk factors among pregnant women attending CHUB from January to December 2018.

This cross-section study approach was conducted among pregnant women attending obstetrical and gynecology department of Butare University Teaching Hospital. During the sample collection was performed in the laboratory department and we collected all information on the pregnant women who requested urine culture test and after we visited the obstetrical and gynecology department, for more information to the pregnant women are identified in laboratory. The variables were associated at the 95% of confidence interval with **P. value \leq 0.05**.

This study show us the analytical study where the associated variables are education level of participants with the P. value = 0.0500, gestation age of the participants with P. value = 0.0428, Number of Parity with the P. value = 0.0395 and the history of the UTIs with the P. value = 0.0443. Based on this study we found that different bacteria responsible of UTIs among pregnant women at CHUB are the *Escherichia Coli*, *Klebsiella Pneumonia*, *Proteus Mirabilis* and *Streptococcus Saprophyticus*. The highest prevalent bacteria causing UTIs at CHUB was *Escherichia Coli* with 81.01%, followed by *Klebsiella Pneumonia* with 10.08%, *Proteus Mirabilis* with 6.20% and *Streptococcus Saprophyticus* with 2.71%. The associated factors with UTIs was observed to be linked with poor education level of participants with the P. value = 0.0500, gestation age of the participants with P. value = 0.0428, Number of Parity with the P. value = 0.0395 and the history of the UTIs with the P. value = 0.0443.

This work would not have been worthwhile if it is limited itself exclusively to the level of suggesting remedial ways. These recommendations were addressed to the Government of Rwanda and to the CHUB.

DEDICATION

DEDICATION 1

To almighty God

To my parents

To my sisters and Brothers

UWIMANA Julienne

DEDICATION 2

To almighty God

To my husband

To my sisters and Brothers

MUKAMUVUNYI Clesence

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LIST OF ABBREVIATIONS

UTI: Urinary tract infection

RUTI: Recurrent urinary tract infection

CHUB : Centre Hospitalier Universitaire de Butare

ASB: Asymptomatic bacteriuria

ICD; International Classification of Diseases

CHAPTER ONE: GENERAL INTRODUCTION

1.0 INTRODUCTION

This chapter described the detailed discussion of background of the study, statement of the problem, purpose of the study, research question, and significance of the study, limitation of the study and scope of the study.

1.1 BACKGROUND OF THE STUDY

According to the International Classification of Diseases (ICD-10), urinary tract infections are infections affecting structures participating in the secretion and elimination of urine: the kidneys, ureters, urinary bladder and urethra (E, 2012). In pregnancy, these infections can lead to serious adverse maternal and neonatal outcomes (E, 2012). More than 50% of women suffer at least one incidence of UTI during their lifetime.

The prevalence of urinary tract infection during pregnancy in Egypt was 30.29, asymptomatic bacteriuria doubles prevalence in pregnancy to 2% - 15%, and if left untreated, approximately 40% of those infected will develop an acute symptomatic UTI.

Symptomatic lower UTI occurs in 1.3 % to 3.4% of pregnant women. Pyelonephritis, kidney tissues and pelvis inflammation, occurs in 1% to 2% of pregnant women (Marziyel Amiri, 2012-2013)

In worldwide More than 50% of women suffer at least one incidence of UTI during their lifetime. UTIs during pregnancy are among the most common health problems worldwide, especially in developing countries. In Egypt, the prevalence of UTIs during pregnancy ranges between 22 and 35% (al, 2016) . third Colombian study, UTI prevalence was 31%, and the major causative agents were *E. coli* (69%), *Enterococcus spp.* (11%), and *Klebsiella spp.* (8%) (13).

In sub-Saharan, Study population and prevalence of bacteriuria A total of 247 pregnant women were recruited in this study. Of these 89.4% were 15-34 years old. The mean gestation age was 34.05±7.44 and 85% of the women were in the third trimester. Among 247 pregnant women, 36 (14.6%) were found to have significant bacteriuria. Prevalence of symptomatic and asymptomatic bacteriuria was 17.9% and 13%, respectively. High rate of bacteriuria was observed in the third trimester with 85.8% and 90.9% of symptomatic and asymptomatic

bacteriuria, respectively. There was no association between maternal age, parity, gestational age, occupation, marital status and education with bacteriuria (Orrego-marin C)

In Rwanda, the study conducted from GITWE Hospital show that The percentage of pregnant women who knows something about urinary tract infection is high with 75.8% and those who did not have any idea is low with only 24.2% (BIKORIMAN J, 2018).

1.2 STATEMENT OF THE PROBLEM

Urinary tract infections (UTI) are mainly caused by the presence and growth of microorganisms in the urinary tract, which are the single commonest bacterial infections of all age groups and especially in pregnancy. It may involve the lower urinary tract or the bladder. After anemia, UTIs are the second common complications in pregnant women, which if untreated can adversely affect the health of infant or the pregnant mother (Ranjan A, 2018) (Adam I, 2015)

Pregnant women are vulnerable to UTI which may lead to complications such as, hypertensive diseases, anemia, chronic renal failure, premature delivery and fetal mortality (Matalingana RA, 2015).The understanding of the epidemiology and antimicrobials susceptibility pattern of UTI during pregnancy is fundamental care for pregnant women and health care providers in guiding intervention strategies (A., 2011).

In Rwanda, UTIs is one of the most common health problem, as it has been reported among 20%of the pregnancy women and it is the most common cause of admission in obstetrical wards. Symptomatic and asymptomatic bacteriuria has been reported among 17.9% and 13.0 % pregnancy women, respectively (BIKORIMAN J, 2018)

1.3 PURPOSE OF THE STUDY

The aim of this study was to determine the prevalence of UTI and its associated risk factors in pregnant women diagnosed with UTI in CHUB. The study results are expected to help health administrators in formulating guidelines on how to control and treat UTI leading to safeguarding the health of pregnant women and the newborns.

1.1.1 objectives

1.1.2 general objective

The main objective was to determine the prevalence of bacterial urinary tract infections and associated risk factors among pregnancy women attending CHUB from January to December 2018.

1.1.3 Specific objective

- ✓ Identify prevalence urinary tract infections among pregnancy women attending University Teaching Hospital of Butare
- ✓ Identify the most bacterial isolates from UTI in pregnant women in CHUB.
- ✓ Identify the associated risk factors to the urinary tract infection among pregnant women in CHUB.

1.4 RESEARCH QUESTIONS

- ✓ What are the prevalence urinary tract infections among pregnancy women attending University Teaching Hospital of But are?
- ✓ What are the most prevalent bacterial isolates from UTI in pregnant women in CHUB?
- ✓ What are the associated risk factors to the urinary tract infection among pregnant women in CHUB?

1.5 SIGNIFICANCE OF THE STUDY

This study is important for the researchers, Kibogora Polytechnic, CHUB and to the Government of Rwanda.

1.5.1. To the researchers

The researchers will have enough knowledge about urinary tract infection among the pregnant women and will have an opportunity to practice their knowledge acquired during under graduate studies.

1.5.2. To Kibogora Polytechnic

Kibogora Polytechnic' community and other researchers who will be interested in this area of the study will use it for the purpose of acquiring information and practical knowledge. It will also provide them a basis for additional literature for their future research in this area.

1.5.3. To the CHUB

The population of CHUB will also benefit from this study since they will know the prevalence and risk factors of UTIs that will help the upper management of CHUB to take measures and strategies to reduce and preventing the UTIs among the pregnant women attending CHUB.

1.5.4. To the Government of Rwanda

Through the provision of possible recommendations, the Government will be able to know and improve the current ways of supporting the prevention of UTIs.

1.7 SCOPE OF THE STUDY

This study was conducted in CHUB, Ngoma sector, Huye District, Southern province in Rwanda. It was done in Laboratory department and Maternity unit of CHUB. It was a retrospective study, limited within a period of one year from January up to December 2018.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This section deals with the analysis of existing literature on the urinary tract infection among the pregnant women related to the prevalence and risk factors associated to the urinary tract infection.

2.1 Definitions of key concepts/terms

Prevalence: The proportion of individuals in a population having a disease or characteristic. Prevalence is a statistical concept referring to the number of cases of a disease that are present in a particular population at a given time, whereas incidence refers to the number of new cases that develop in a given period of time (D.(2019), 2019).

Risk factor: A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (D.(2019), 2019), (ME.).

Urinary tract infection: Is defined as significant bacteriuria in the presence of a constellation of symptoms such as dysuria (painful urination), increased urinary frequency and urgency, suprapubic discomfort and costovertebral angle tenderness. It is a common cause of infections, particularly among young, sexually active women; an estimated 1 in 3 women will develop a urinary tract infection before the age of 24 years (D.(2019), 2019), (ME.).

Pregnancy: The state of carrying a developing embryo or fetus within the female body (Mohamed NR, 2017).

Mid-stream urine specimen: a specimen obtained from the middle part of urine flow: Clean catch urine specimen. Symptomatic UTI refers to patients whose urine is yielding positive cultures ($\geq 10^5$ CFU/ml) and who have symptoms referable to the urinary tract ((2013), 2013).

2.1.6 Asymptomatic bacteriuria (ASB) refers to the presence of two consecutive clear voided urine specimens both yielding positive cultures ($\geq 10^5$ CFU/ml) of the same Uropathogen, in a patient without urinary symptoms ((2013), 2013).

2.1.7 Maternal Anemia defined as hemoglobin concentration less than 11 g/dl. Parity is the number of pregnancy reaching viability or beyond stage of abortion (before 20 weeks/less than 500 g BW) ((2013), 2013).

2.1.8 Gestational Age is the age of the fetus estimated by computing from the first day of the last menstrual period (time that precedes conception) until the day of consultation ((2013), 2013).

2.2 Prevalence of UTIs in pregnant women

The variation in UTI mode of screening, and confounding risk factors such could be attributed to differences in UTI perception, prevalence from one geographical location to another as age, parity, and pregnancy. Regarding the residence of the pregnant women, H. Shaheen *et al.* their

study shows that a significantly higher percentage of this may be attributed to the nature of urban from UTI (43.6% in rural versus 56.4% in urban). Pregnant women who lived in urban areas suffered sanitation as well as lower concern with personal hygiene (shaheen HM, Farahat TM, ET NA, Hammad H(2018), 2016, 2018) Regarding the educational level of pregnant women with UTI were in the middle with UTI, Shaheen H *et al.* their study shows that the highest percentage education on the incidence of UTI educational level (diploma or equivalent). However, found no significant effect of education on the incidence of UTI in their study (Ranjan A, 2018)

Also found that the highest percentage of in their study conducted in Turkey ($P < 0.05$) and women who had less than secondary level education UTI among pregnant women was among those who were illiterate or of low education level (61.5% (Shaheen, Farahat, El, & Hammad, 2018) (shaheen HM, Farahat TM, ET NA, Hammad H(2018), 2016, 2018), (John AS, 2016). in the study of N. Mohamed *et al.* reveals that, the most frequent organism in positive infected cases was *E. coli* (47.4%) followed by *staphylococcus aureus* (22.1%), then *klebsiella* (9.5%) (Mohamed NR, 2017).

N. Al-mamoryi *et al.* their study revealed that the overall prevalence of UTI among pregnant was 64.6% which include symptomatic bacteriuria 8.0%, asymptomatic bacteriuria 6.3%, and UTI 50.3%). The higher rate of UTI was found in lower age, multiparous women, and during the second trimester (Al-mamoryi NA, Salaman A.(2019), 2019).

2.3 Risk factors of UTIs in pregnant women

Factors proposed to affect the frequency of bacteriuria during pregnancy include multiparity, gestational age, previous medical history of UTI, diabetes mellitus and anatomic urinary tract abnormalities ((2013), 2013), . In addition anemia, socio-economic status, educational status, sexual activity and catheterization are also associated with increased risk of UTI ((2013), 2013), (Oladeinde BH, Omoregie R, Olandende OB.).

N. Mohamed *et al.* their study shows that the highly significant factors predisposing for the development of urinary tract infection during pregnancy were increased frequency of sexual intercourse and decreased frequency of urination per day, followed by no post coital urination, forward direction of wiping the perineum, increased duration of voluntary delay of voiding and use of synthetic undergarment. The highest odd ratio was shown with the use of synthetic undergarment, those who used synthetic undergarment had 2.7 increased risk of UTI compared to those who used cotton undergarment. Another logistic regression model was performed to find out the best predictor of UTI among different covariate (Mohamed NR, 2017), (urinary tract infections).

Also shows that, presence of previous history of UTI, hemoglobin level < 11 mg/dl, husband that didn't wash genitals before coitus, child spacing less than 2 years, inadequate type of water

supply, pregnant women that didn't wash hands before urination, and no urination before sleeping were significant predictors of UTI when all variables were included in the model. The highest odd ratio was previous history of UTI where, those who have previous history of UTI have 3.2 increased risk of UTI compared to those who don't have previous history of UTI (Mohamed NR, 2017), (John AS, 2016).

D. City et al. their study demonstrates that the *E. Coli* as main cause of UTIs in pregnant women (57.25%) and *Klebsiella* as the second cause of UTI (25.85%). In a study conducted by Amiri et al. in babol city, *E. coli* was indicated to be the cause of 83% of UTIs in pregnant women and *Staphylococcus saprophyticus* 10%, *Enterococcus* 4% and *Proteus* 3% were other causes of UTIs (City D. Amiri M, 2015).

N. Mohamed *et al* 's point of view, their findings support the association between hygiene practices, especially genital hygiene and UTI. Post coital urination was associated with UTI as reported by many studies in Egypt this may be attributed to wrong cultural beliefs that discourage post coital urination as stated by some women in their study. In their study, there was significant association between past history of UTI and UTI during pregnancy (OR=3.2) (City D. Amiri M, 2015) (. (2014), 2014).

2.4 Uropathogen by Type of UTIs

2.4.1 Uncomplicated UTI

- ✓ *E. coli*
- ✓ *S. saprophyticus*
- ✓ *Enterococcus* spp.
- ✓ *K. pneumonia*
- ✓ *P. mirabilis*

2.4.2 Complicated UTI

- ✓ Similar to uncomplicated UTI
- ✓ Antibiotic-resistant
- ✓ *E. coli*
- ✓ *P. aeruginosa*
- ✓ *Acinetobacter baumannii*
- ✓ *Enterococcus* spp.
- ✓ *Staphylococcus* spp.

2.4.3 CA-UTI

- ✓ *P. mirabilis*
- ✓ *Morganella morganii*
- ✓ *Providencia stuartii*
- ✓ *C. urealyticum*

- ✓ *Candida* spp.

2.4.4 Recurrent UTI

- ✓ *P. mirabilis*
- ✓ *K. pneumonia*
- ✓ *Enterobacter* spp.
- ✓ Antibiotic-resistant *E. coli*
- ✓ *Enterococcus* spp.
- ✓ *Staphylococcus* spp.

2.5 Diagnosis of UTI

2.5.1 Medical history

The clinical diagnosis of an infection of the urinary tract is essentially based on the medical history. Specific data may either increase the probability of an infection of the urinary tract (↑) or decrease it (↓). The following factors have been established from clinical studies (Schmiemann G, Kniehl E, Gebhardt K, Matejacyk MM, Hummeras-pradier E. (2010), 2010):

- Dysuria, pollakisuria, nycturia (↑)
- Present or increased incontinence (↑)
- Macro hematuria (↑)
- Suprapubic pain (↑)
- “Offensive” smell, turbid urine (↑)
- Prior infections of the urinary tract (↑)
- Changed or new discharge, vaginal irritation (↓).

2.5.2 Laboratory diagnosis of UTI

Screening for asymptomatic bacteriuria should be performed ideally at 12 to 16 weeks’ gestation on all women.

The diagnosis of asymptomatic bacteriuria is made following isolation of a significant growth of one bacterial species in a “clean catch” specimen of urine. A clean catch specimen involves collection of a mid-stream specimen of urine after cleaning of the perineum in order to minimize contamination by skin flora (Le J, 2015).

Urine microscopy and culture remain the gold standard in detection of asymptomatic bacteriuria. However, it can take 48 hours to obtain a result. Rapid screening tests have been developed. Urine reagent dipstick testing provides a cheap, rapid and easy test for asymptomatic bacteriuria, however, studies have reported sensitivity rates between 50 and 90% with a specificity of 83 to 94%. Another study comparing centrifugation and Gram-staining of urine, urinalysis and reagent strip testing in isolation and in combination showed high false negative rates with urinalysis (19.4%) and reagent strip testing (52.8%) and low specificity of the centrifuged Gram-stained smear (7.7%) when compared with the reported 80% sensitivity

with urine culture. The additional value of urine culture is in the identification of an appropriate antibiotic for treatment using antibiotic sensitivity testing (Le J, 2015).

2.6 Management of UTI

2.6.1 Clinical management

Asymptomatic Bacteriuria

- Antibiotic treatment of asymptomatic bacteriuria in pregnancy reduces the risk of urinary tract infection, preterm delivery and low-birth weight infants.
- All women should be screened for asymptomatic bacteriuria at the first antenatal visit.
- Treat women with a positive urine culture for bacteriuria detected during pregnancy with an appropriate antibiotic for the bacteria isolated and the trimester of pregnancy
- Refer to local and national guidelines for the choice of antibiotic in pregnancy
- A seven-day course of treatment is normally sufficient
- Do not prescribe trimethoprim for pregnant women with established folate deficiency or women taking folate antagonists((Guideline CP,Infection UT.(2018), 2018)).

Symptomatic Bacteriuria

- Urine culture is the investigation of choice in symptomatic bacteriuria.
- Treat symptomatic bacteriuria with an antibiotic in accordance with local guidance.
- Take a single sample for urine culture before empiric treatment is started.
- Women with symptomatic bacteriuria with systemic signs of infection should be admitted for intravenous antibiotics pending the result of blood cultures and the urine culture
- In cases where a clinical improvement fails to occur with 24 hours of instigating treatment or where there are additional co-morbidities additional senior medical and microbiology advice should be sought
- Renal imaging should be considered if renal pathology is suspected or in cases that recur.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 INTRODUCTION

This chapter shows the methods and techniques which was used in collecting and analysis of data and present the area of the study.

3.1 RESEARCH APPROACHES AND DESIGN

This retrospective study approach was conducted among pregnant women attending obstetrical and gynecology department of but are University Teaching Hospital.

3.2 TARGET POPULATION, SAMPLING PROCEDURES AND SAMPLE SIZE

Source of population: The source population for this study were all pregnant women attending obstetrical and gynecology department and requested the urine culture test at Butare University teaching hospital (CHUB).

Study population: All pregnant women attending obstetrical and gynecology service and requested the urine culture test at Butare university teaching hospital that fulfill the inclusion criteria during the data collection period will be considered as study participants.

Sample size: Total number of all pregnant women and requested urine culture test in specified sample collection period at CHUB will be the study sample size.

3.3 DATA COLLECTION TOOLS AND PROCEDURES

The data were collected by using data collection sheet and questionnaire from consultation books in obstetrical and gynecology department and missed information During the data collection was found in Laboratory especially in the Bacteriology service.

3.4. EXCLUSION AND INCLUSION CRITERIA

Inclusion criteria: This study focused on all pregnant women attending CHUB and did tested urine or vaginal swab culture from January to December 2018.

Exclusion criteria: All pregnant women attending CHUB and didn't tested urine or vaginal swab culture from January to December 2018.

3.5. DATA ANALYSIS

Data were entered, cleaned and checked using Epi Info version 7.2 and analyzed using SPSS version 21 statistical software. Categorical variables were summarized as numbers and percentages, whereas normally distributed continuous will be presented as means and standard deviations by descriptive statistics. To identify factors associated with the outcome variable (UTIs), a bivariate logistic regression analysis was performed for each independent variable and crude odds ratio (COR) with 95% confidence intervals was obtained. The strength of

statistical association was measured by adjusted odds ratios (AOR) and 95% confidence intervals. Value <0.05 was considered statistically significant. Finally, the result was presented using tables and graph.

3.6 RELIABILITY AND VALIDITY MEASURES

Validity is the degree to which an instrument measures what you are intended to measure; while Reliability refers to the consistence, accuracy, stability with which an instrument measures an attribute.

In this study the pilot study was conducted thereafter the findings was tested to test sample collection sheet's validity and reliability. The sample collection sheet was constructed using concepts from literature following the study variables and this will give it content validity. Each item was analyzed with the researcher supervisor and mentor to adjust any ambiguous terms and to check if questions are relevant to the topic and objectives of the study. Thereafter the instrument was translated from English to Kinyarwanda paying attention to consistency in meaning.

3.6. ETHICAL CONSIDERATION

Before the conducting of this study, the study protocol reviewed and approved by **Institutional Review Board** from the Kibogora Polytechnic.

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 INTRODUCTION

This chapter concern the data analysis and interpretation. After analyzing of data in this study were presented in tables and interpretation becomes before of each table as the following.

4.1. PRESENTATION OF FINDINGS AND INTERPRETATIONS

4.1.1 Description of variables

Descriptive analysis concerned to the frequency and percentages of the different variables without cross with the outcome.

4.1.2 Socio-economic characteristics due to UTIs

The following table show the description of socio-economic characteristics due to the UTIs. According to the age group of participants 41.86% are between 15 – 30 years followed by the 39.92% who are between 31 – 45 years while these who have 46 years and above represent 18.22%. The women who are still young are the most who affected by the UTIs. Due to the marital status of participants 98.06% are those who married, 1.16% are those who still single while 0.78% are widower. Based on the genital urinary abnormality, all participants hadn't any genital abnormality. According to the education level the most of them have secondary level of education with 58.14% followed by these who have primary level of education with 21.71% while these who have university level of education represent 20.16%. Due to the religion of participants the most participants are catholic with 60.85% followed by the EAR with 17.83% while the latest are EER, EIBR and METHO with 0.30%. According to Ubudehe category the most participants are in the third category of Ubudehe with 82.17% followed by these who are in the second category of Ubudehe with 14.34% while the last are those who are in the fourth category of Ubudehe with 3.49%.

Socio-economic characteristics due to UTIs

Table 1: UTIs based on age

Age group of participants in 12 months		
Variables	Frequency	Percent
15 – 30 Years	108	41.86%
31 – 45 Years	103	39.92%
46 Years and above	47	18.22%

The above table shows the age group of participants in 12 months, the highest percentage was 41.86% whose age group of 15 – 30 Years followed by 39.92% whose age group of 31 – 45 Years while the lowest percentage was 18.22% whose age group of 46 Years and above.

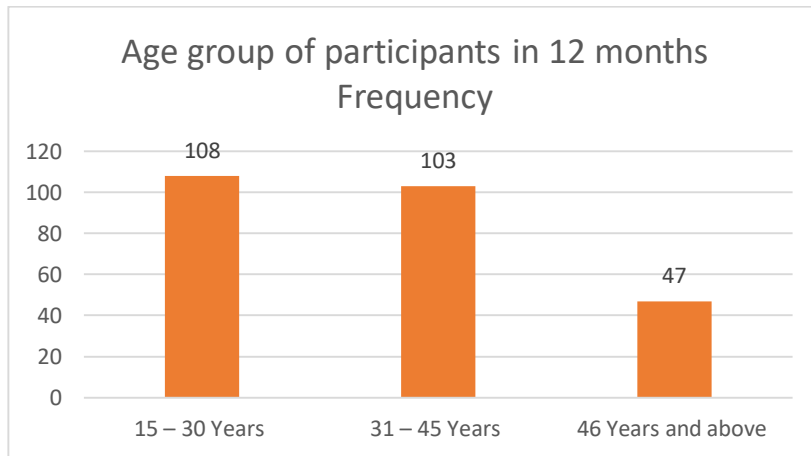


FIGURE:1

Table2: UTIs based on Marital status

Marital status		
Variables	Frequency	Percent
Single	3	1.16%
Married	253	98.06%
Widower	2	0.78%

The above table shows the UTIs based Marital status where the highest percentage was married 98.06% followed by single with 1.16% and the last was widower 0.78%

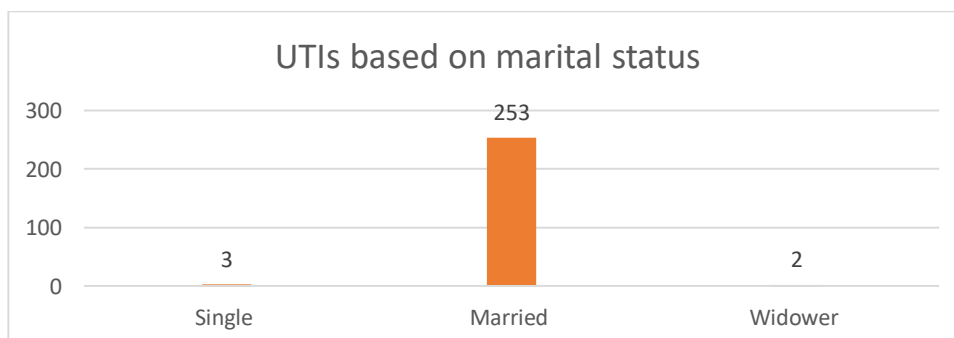


Figure:2

Table3: UTIs based On Genital urinary abnormality

Genital urinary abnormality		
Variable	Frequency	Percentage
No	258	100.00%

The above table shows the UTIs based on Genital urinary abnormality where all participants hadn't any genital abnormality

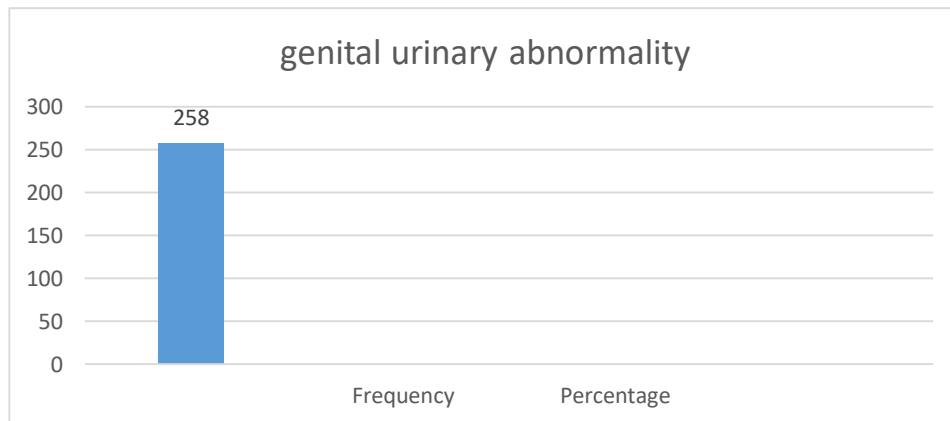


Figure:3

Table4:UTIs based On Education level of parent

Education level of parent		
Variable	Frequency	Percentage
Primary	56	21.71%
Secondary	150	58.14%
University	52	20.16%

The above table shows the UTIs based on Education level of parent, the highest percentage had a secondary level of education with 58.14% followed by who had primary level of education with 21.71% while the lowest percentage was those who had university level of education with 20.16%.

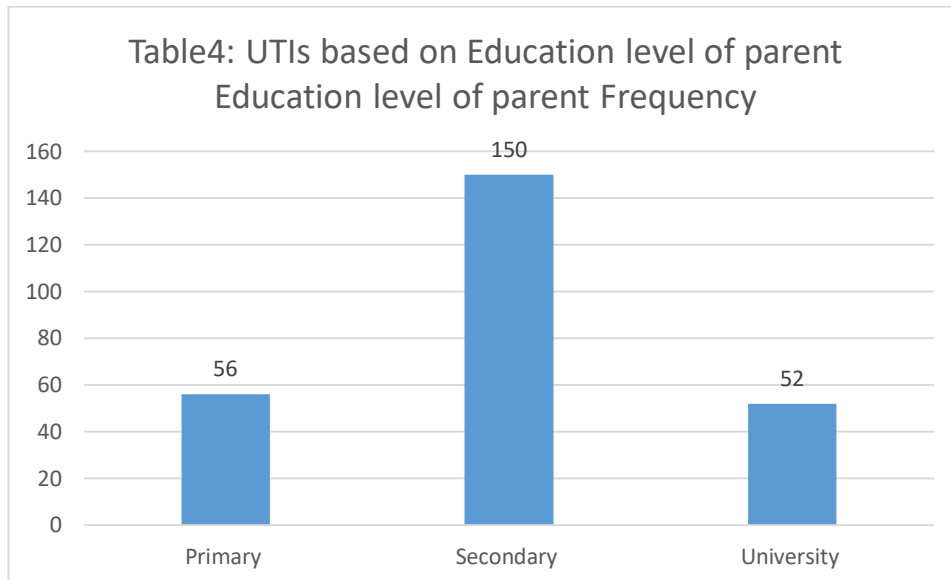


Figure4

Table 5: UTIs based On Ubudehe category

Ubudehe category		
Variable	Frequency	Percentage
2	37	14.34%
3	212	82.17%
4	9	3.49%

The above table shows the UTIs based on Ubudehe category, where the highest percentage was 82.17% were in the second category of ubudehe while the lowest percentage was 3.49% were in the third category of ubudehe

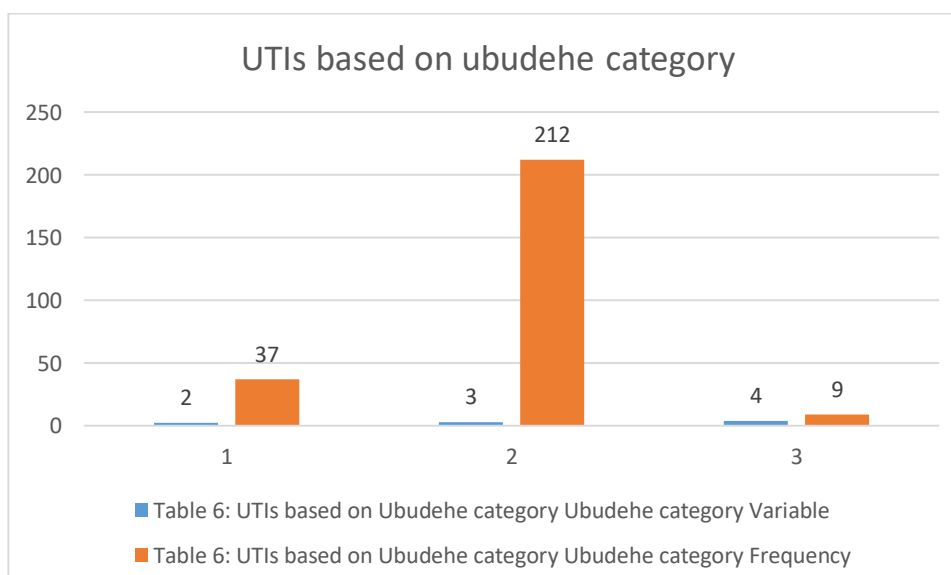


Figure:5

4.1.3 Risk factors of UTIs

The following table show us the description of the risk factors due to the UTIs where due to the gestation age the most participants are in their third trimester with 88.76% while these who are in their second trimester represent 11.24%. According to the parity of the participants 75.58% had 2 parities and 24.42% had one parity. Based on the gravidity of participants 74.03% had 2 gravidities and 25.97% had 1 gravidity. Due to the history of catheterization 64.73% hadn't have the history of catheterization and 35.27% had the history of catheterization. According to the history of UTIs 62.40% hadn't history of UTIs and 37.60% had history of UTIs. Due to the times of changing their underwire 81.78% had change their underwire one time per day, 16.28% had change their underwire two times per day while the 1.94% hadn't change their underwire per day.

Descriptive of risk factors due to UTIs

Table 6: UTIs based On Gestation age

Variables	Frequency	Percent
Gestation age		
In second trimester	29	11.24%
In third trimester	229	88.76%

The above table shows the UTIs based on Gestation age, where the highest percentage was 88.76% in the third trimester while the lowest was 11.24% in the second trimester

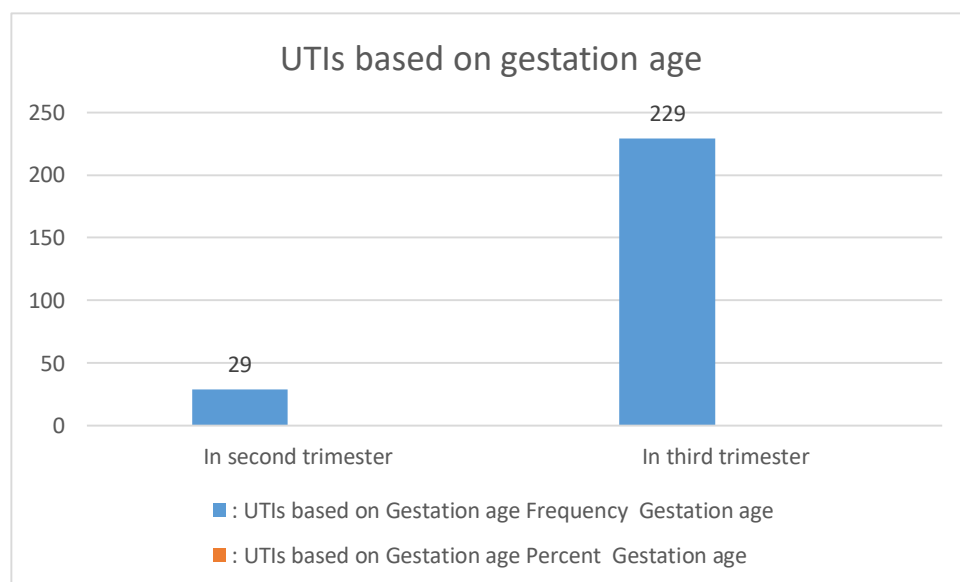


figure:6

Table 7: UTIs based On Parity

Parity		
Variables	Frequency	Percent
1	63	24.42%
2	195	75.58%

The above table shows the UTIs based on Parity, where the highest percentage was 75.58% had 2 parity while the lowest was 24.42% had the 1parity.

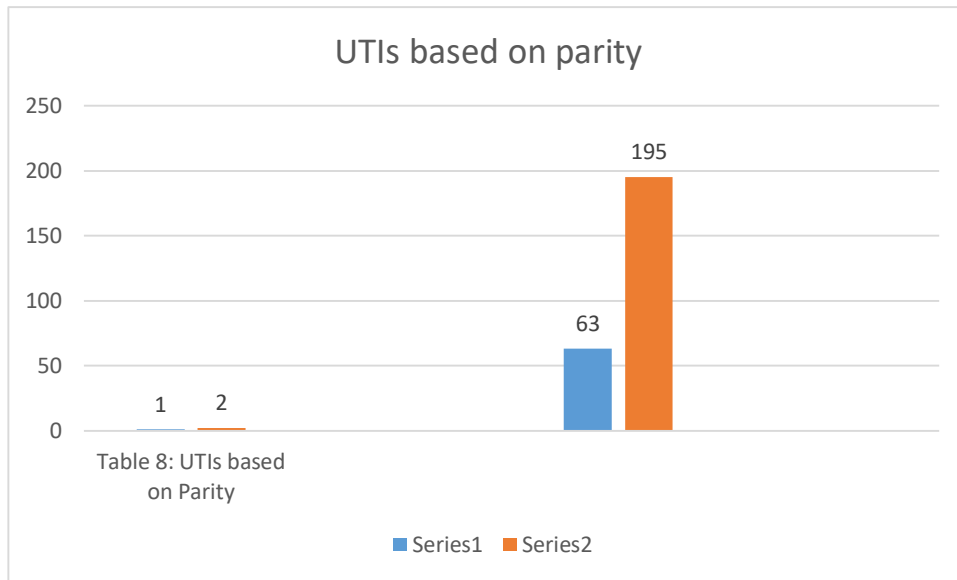


Figure:7

Table 8:UTIs based On Gravidity

Gravidity		
Variables	Frequency	Percent
1	67	25.97%
2	191	74.03%

The above table shows the UTIs based on Gravidity, where the highest percentage was 74.03% had 2 gravidity while the lowest percentage was 25.97% had 1 gravidity

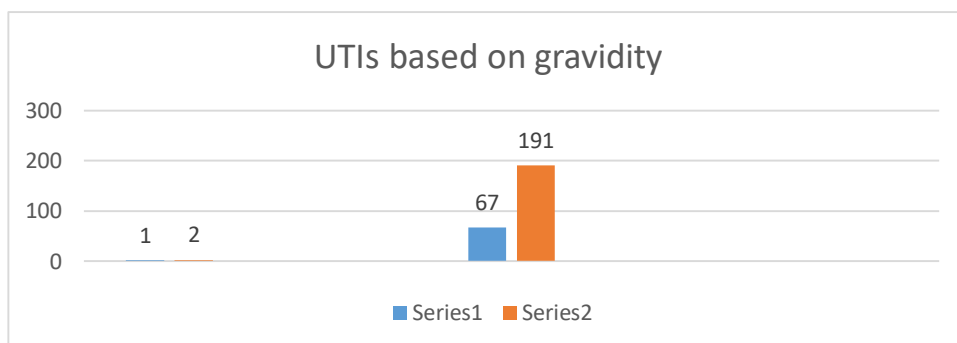


Figure:8

Table 9: History of catheterization

History of catheterization		
Variables	Frequency	Percent
No	167	64.73%
Yes	91	35.27%

The above table shows the History of catheterization, where the highest percentage was 64.73% who not had history of catheterization while the lowest percentage was 35.27% who had history of catheterization.

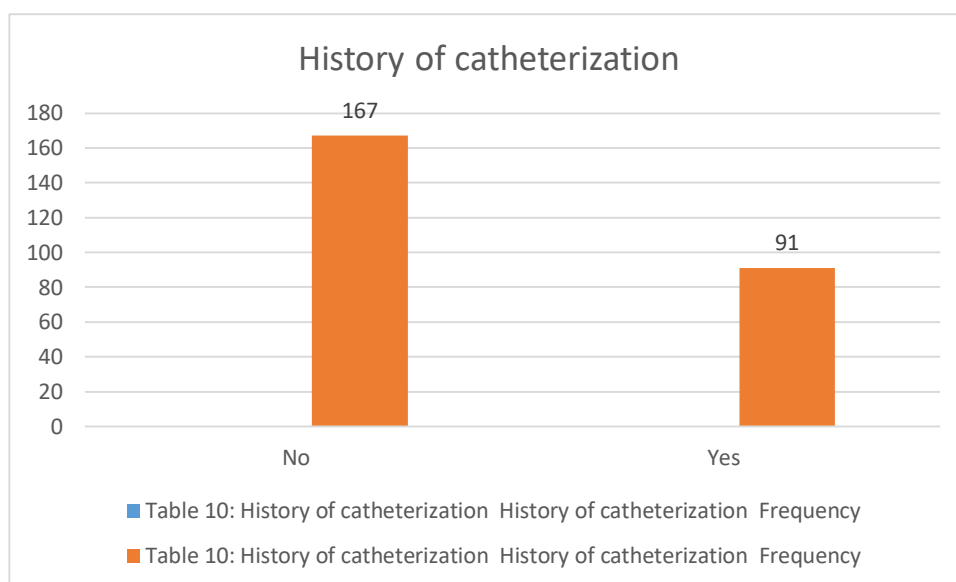


Figure:9

Table 10: UTIs based on History

History of UTIs		
Variables	Frequency	Percent
No	161	62.40%
Yes	97	37.60%

The above table shows the History of UTIs, where the highest percentage was 62.40% who hadn't a history of UTIs while the lowest percentage was 37.60% who had a history of UTIs.

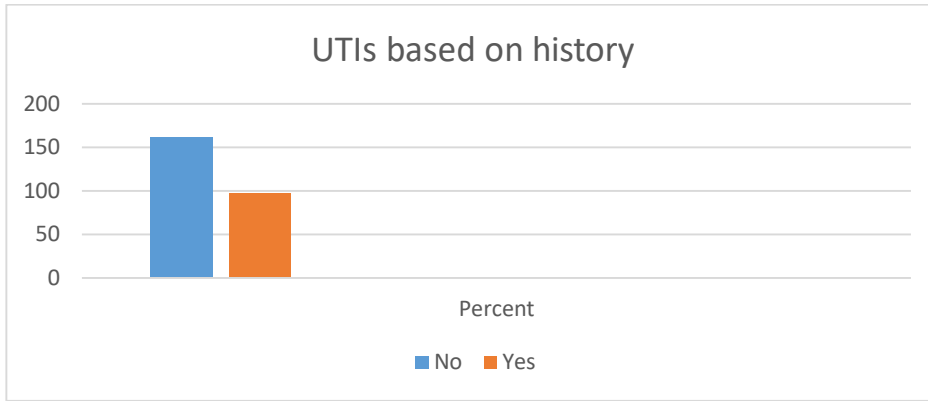


Figure:10

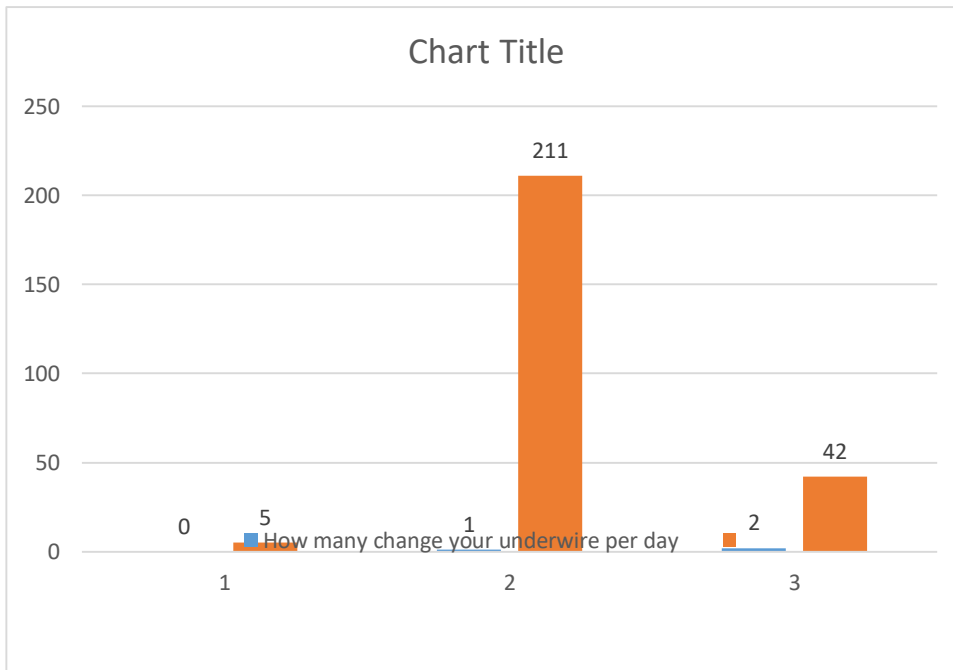


Table 11: UTIs based on Synthetic undergarment

Synthetic undergarment		
Variables	Frequency	Percent
No	224	86.82%
Yes	34	13.18%

The above table shows the UTIs based on Synthetic undergarment, where the highest percentage was 86.82% who didn't use Synthetic undergarment while the lowest percentage was 13.18% who did use Synthetic undergarment.

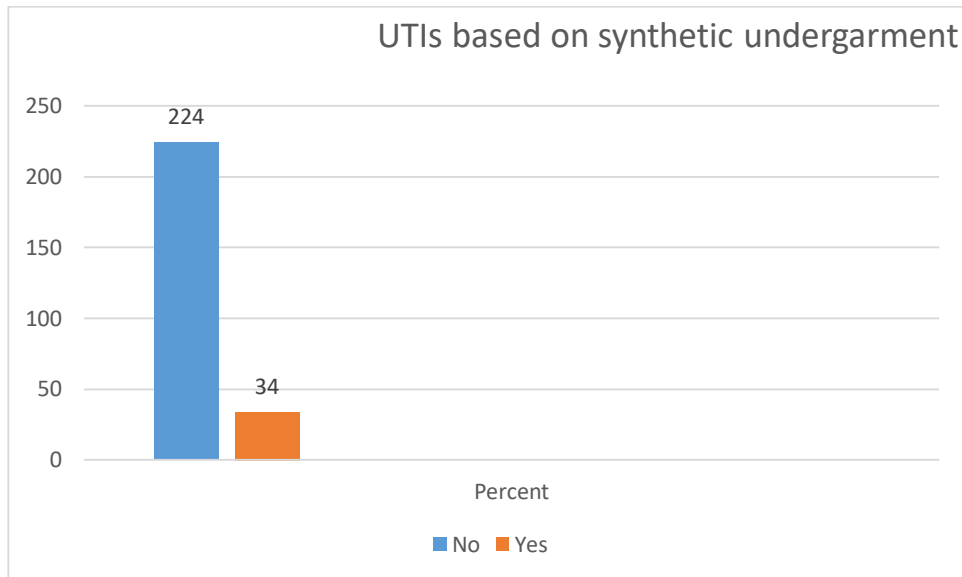


Figure:11

4.1.3 Summary of UTIs results from culture

The following table show us the summary of the germ identified from the results of culture where the most frequent germ is the *Escherichia Coli* with 81.01%, *Klebsiella Pneumonia* with 10.08%, *Proteus Mirabilis* with 6.20% and *Streptococcus Saprophyticus* with 2.71%.

Table 2: Summary of UTIs results from culture

RESULTTS	Frequency	Percent
<i>Escherichia Coli</i>	209	81.01%
<i>Klebsiella Pneumonia</i>	26	10.08%
<i>Proteus Mirabilis</i>	16	6.20%
<i>Streptococcus Saprophyticus</i>	7	2.71%

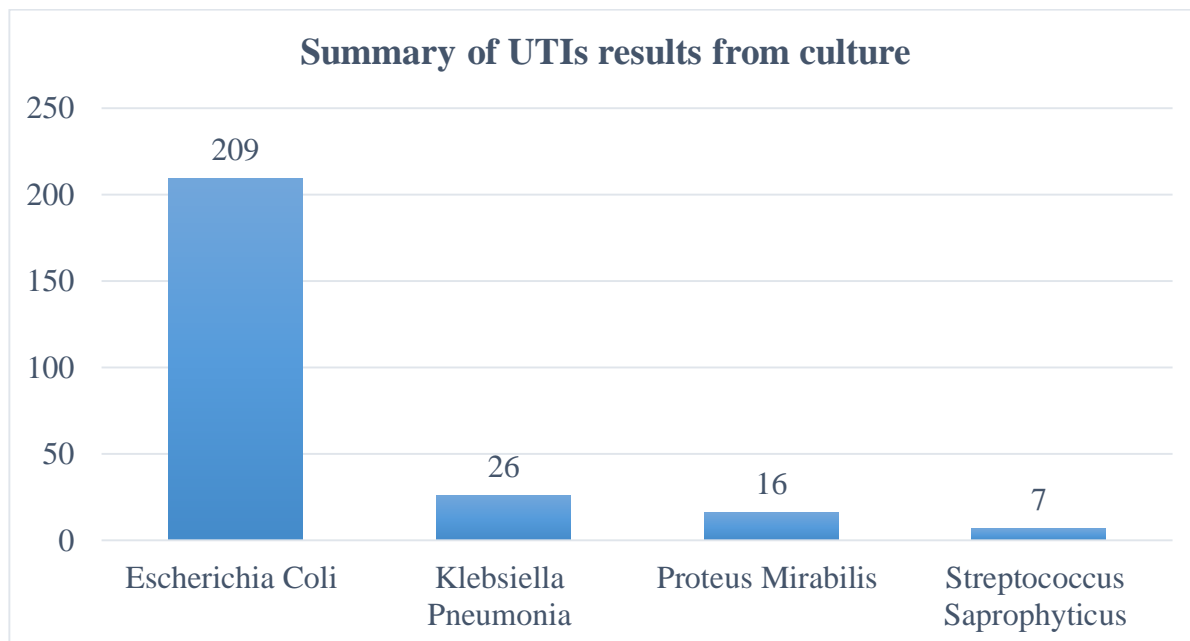


Figure 1: Summary of UTIs results from culture

4.1.4 Analytical study for the risk factors

The analytical study shows and help us to determine the associated variables to the UTIs within the participants where we consider the 95% of confidence interval which means all variables with a P. Value which lesser than 0.05 after cross tabulation with the outcome of this study are considered as an associated risk factors to the outcome.

4.1.5 Risk factors due to UTIs

The following table show us the analytical study where the associated variables are education level of participants with the P. value = 0.0500, gestation age of the participants with P. value = 0.0428, Number of Parity with the P. value = 0.0395 and the history of the UTIs with the P. value = 0.0443.

4.2 DISCUSSIONS OF FINDINGS

The total number of bacterial isolates from cultured urine samples is 258 and the most prevalent bacterial isolate is Escherichia coli with 81.01% (209/258), as shown on table 13. The Uropathogen Escherichia coli (81.01%) predominated over Klebsiella spp. (10.08%) in this study as in some other studies (Ifeanyi abraham O, 2015) where they found that the Uropathogen Escherichia coli (40%) predominated over Klebsiella spp. (31%) and (Access, 2017) where they fund that The commonest bacteria isolated was Escherichia coli 38.8%, this was followed by Staphylococcus aureus at 29.7%. based on the prevalence UTIs in this study was not applicable because this study was limited to calculate the prevalence because of all participants were cultured positive that should indicate a biased prevalence. Due to the risk factors associated with UTIs, the current study found that education level of participants was associated with the UTIs at the P. value = 0.0500. This may suggest that the knowledge was

the key of hygiene and as we know the most cause of UTIs is a hygiene, the poor hygiene should read to the UTIs. This was the same from the study (Ifeanyi abraham O, 2015) gestation age of the participants was a risk factor associated with UTIs at the P. value = 0.0428 especially those who are in the third trimester. This may suggest that the woman who are in their third trimester should have lower immunization that cause more likely to be affected by more infections include UTIs. This was the same in the study done by (Ifeanyi abraham O, 2015) was found that the gestation age was associated with UTIs in pregnant women. Number of Parity was associated with UTIs in this study at the P. value = 0.0395, this should be caused by once the parity increase you are highly risk of being infected by UTIs and the history of the UTIs was also associated with UTIs at the P. value = 0.0443, this means that it is very easy to re-infected of UTIs.

4.3 Summary of findings

Socio-economic characteristics due to UTIs

The following table show us the description of socio-economic characteristics due to the UTIs. According to the age group of participants 41.86% are between 15 – 30 years followed by the 39.92% who are between 31 – 45 years while these who have 46 years and above represent 18.22%. The women who are still young are the most who affected by the UTIs. Due to the marital status of participants 98.06% are those who married, 1.16% are those who still single while 0.78% are widower. Based on the genital urinary abnormality, all participants hadn't any genital abnormality. According to the education level the most of them have secondary level of education with 58.14% followed by these who have primary level of education with 21.71% while these who have university level of education represent 20.16%. Due to the religion of participants the most participants are catholic with 60.85% followed by the EAR with 17.83% while the latest are EER, EIBR and METHO with 0.30%. According to Ubudehe category the most participants are in the third category of Ubudehe with 82.17% followed by these who are in the second category of Ubudehe with 14.34% while the last are those who are in the fourth category of Ubudehe with 3.49%.

Risk factors due to UTIs

The following table show us the description of the risk factors due to the UTIs where due to the gestation age the most participants are in their third trimester with 88.76% while these who are in their second trimester represent 11.24%. According to the parity of the participants 75.58% had 2 parities and 24.42% had one parity. Based on the gravidity of participants 74.03% had 2 gravidities and 25.97% had 1 gravidity. Due to the history of catheterization 64.73% hadn't have the history of catheterization and 35.27% had the history of catheterization.

According to the history of UTIs 62.40% hadn't history of UTIs and 37.60% had history of UTIs?

Summary of UTIs results from culture

The following table show us the summary of the germ identified from the results of culture where the most frequent germ is the *Escherichia Coli* with 81.01%, *Klebsiella Pneumonia* with 10.08%, *Proteus Mirabilis* with 6.20% and *Streptococcus Saprophyticus* with 2.71%.

Risk factors due to UTIs

The following table show us the analytical study where the associated variables are education level of participants with the P. value = 0.0500, gestation age of the participants with P. value = 0.0428, Number of Parity with the P. value = 0.0395 and the history of the UTIs with the P. value = 0.0443.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.0 INTRODUCTION

The chapter consist the conclusion of this study, recommendations and the suggestions for the further study to the future researchers.

5.1 CONCLUSION

Based on this study we found the different UTIs among pregnant women at CHUB are the *Escherichia Coli*, *Klebsiella Pneumonia*, *Proteus Mirabilis* and *Streptococcus Saprophyticus*. The prevalence of different UTIs among pregnant women at CHUB are the following *Escherichia Coli* with 81.01%, *Klebsiella Pneumonia* with 10.08%, and *Proteus Mirabilis* with 6.20% and *Streptococcus Saprophyticus* with 2.71%. The associated factors with UTIs are the following table show us the analytical study where the associated variables are education level of participants with the P. value = 0.0500, gestation age of the participants with P. value = 0.0428, Number of Parity with the P. value = 0.0395 and the history of the UTIs with the P. value = 0.0443.

5.2 RECOMMENDATIONS

This work would not have been worthwhile if it is limited itself exclusively to the level of suggesting remedial ways. These recommendations were addressed to the Government of Rwanda and to the CHUB.

To the CHUB

Based on the results obtained from this study, we recommend to CHUB:

- To increase the clinical education to the pregnant women due to the UTIs.
- To improve education on hygiene to the women attending at CHUB.

To the Government of Rwanda

As we have seen, we recommend to the Government of Rwanda:

- To support CHUB in daily clinical education to the women attending CHUB.

5.3 Suggestions for further study

We suggest Kibogora Polytechnic to make sure that such dissertation should be in Kibogora Polytechnic library which will be available to all students for literature and we suggest all students of Kibogora Polytechnic to be familiar with the literature and be more knowledgeable through the reading more books and researches.

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APPENDIX 1: Consent form

Questionnaire on Prevalence and risk factor of urinary tract infection among pregnancy women at CHUB from January to December 2018.

Introduction

Dear Respondent, Good morning

We, UWIMANA Julienne and MUKAMUVUNYI Clesence pursuing Bachelor's degree in Biomedical Laboratory Sciences at Kibogora Polytechnic.

As part of fulfillment of the requirements for the award of our degree we required to conduct and report on a research topic that its results will be of use to the larger society.

We conducting a study titled Prevalence and risk factor of urinary tract infection among pregnancy women at CHUB from January to December 2018.

The main objective was to determine the prevalence of bacterial urinary tract infections and associated risk factors among pregnancy women attending CHUB from January to December 2018. You are kindly invited to participate in this study by completing the attached questionnaire. We will be highly gratefully to you if accept to respond to these questions. We promise that all information or opinions that you will provide will be held on a strict confidential and will be used for research purpose only. Should you have any questions or clarifications regarding this research, please feel free to contact us on telephone 0788587016

Thank you in advance

APPENDIX 1: Questionnaire

1. Social demographic information

1. Age:

2. Marital status:

- a) Single
- b) Married
- c) Widower
- d) Other (specify)_____

3. Religion:

- a) Catholic
- b) Protestant(all)
- c) Methodist
- d) Muslim
- e) Adventist
- f) Others
- g) No religion

4. Education Level:

- a) None
- b) Primary
- c) secondary
- d) University
- e) Others

5. Occupation:

- a) Business
- b) Farmer
- c) Employed

- d) Student
- e) Other (specify)

6. Ubudehe categories

- a) Category 1
- b) Category 2
- c) Category 3
- d) Category 4

2. Factors associated with UTI

1. Gestation age
 - a) First trimester
 - b) Second trimester
 - c) Third trimester
2. Number of sexual intercourses per week
 - a) Less than three
 - b) Three or more
3. Genitourinary abnormality
 - a) Yes
 - b) No
4. History of catheterization
 - a) Yes
 - b) No
5. History of UTI
 - a) Yes
 - b) No
6. Parity
 - a) Nulipara
 - b) Primipara
 - c) Multipara
7. Gravidity
 - a) Priigravida
 - b) Multigravida

8. Hemoglobin level

- a) <11g/dl
- b) >11g/dl

9. Fluid intake per day

- a) One time
- b) Two time
- c) Three or more

10. Synthetic undergarment

- a) Yes
- b) No

11. Urination after sexual intercourse

- a) Yes
- b) No

12. How many change your underwear per day

- a) One time
- b) Two time
- c) Three or more

Thank you for your participation!



**CENTRE HOSPITALIER UNIVERSITAIRE
UNIVERSITY TEACHING HOSPITAL**

**CENTRE HOSPITALIER UNIVERSITAIRE
DE BUTARE (CHUB)
OFFICE OF DIRECTOR GENERAL**

Huye, *16/07/2019*

N° Ref: CHUB/DG/SA/07/...../2019

1134

**Julienne Uwimana
Clesence Mukamuvunyi
Kibogora Polytechnic
Phone: +250787144669**

Dear All

Re: Your request for data collection

Reference made to your letter requesting for permission to collect the data within University Teaching Hospital of Butare for your research proposal entitled "*Prevalence and risk factors of urinary tract infection among pregnant women attending CHUB*", based to the approval No: **RC/UTHB/058/2019** from our Research-Ethics committee, we are pleased to inform you that you are accepted to collect data within University Teaching Hospital of Butare. Please note that your final document will be submitted in our Research Office.

Sincerely,

[Signature]
**Dr. Augustin SENDEGEYA
Director General of CHUB**



Cc:

- Ag. Head of Clinical Education and Research Division
- Ag. Director of Research
- Chairperson of Research-Ethics Committee
- Ag. Research officer

CHUB

E-mail : info@chub.rw
Website: www.chub.rw

**B.P : 254 BUTARE
Hotline: 2030**

UWIMANA Julienne and MUKAMUVUNYI Clesance
KIBOGORA POLYTECHNIC
BIOMEDICAL LABORATORY SCIENCE

Tel: 0787144669/0781418210

Date: 10/07/2019

CHUB - CENTRAL SECRETARIAT
Reception Date: <i>10/07/2019</i>
Filing No:
Followed by
Received by

To: Director of CHUB Hospital

Dear Sir,

Re: applying for data collection in CHUB Hospital

We are final year student in biomedical laboratory science at Kibogora Polytechnic.


In order to gain data for our project and to explore our topic, I wish to collect data in your hospital

Our topic is prevalence and risk factor of urinary track infection among pregnancy women attending CHUB hospital.

Thank you for your time and consideration, I look forward to hearing from you in your convenient time

Sincerely yours,

UWIMANA Julienne and MUKAMUVUNYI Clesance





STUDENT PROJECTS LETTER

DATE: 10th July, 2019

To whom it may concern:

We write this letter to humbly request you to allow Mrs UWIMANA Julienne and MUKAMUVUNYI Clesece to conduct project work at University Teaching Hospital of Butare (CHUB)

The above mentioned are bonafide students of Kibogora Polytechnic pursuing Bachelor's degree in Biomedical Laboratory Sciences.

This candidate is currently conducting a project entitled "Prevalence and risk factors of urinary tract infection among pregnant women attending CHUB"

We are convinced that your institution will constitute a valuable source of information pertaining to their work. The purpose of this letter is to humbly request you to avail them with the pertinent information they may need. We pledge to ensure that all provided information will be used in the strict academic purpose.

Any assistance rendered to the candidate will be highly appreciated.

Approved by:

MUNYANDAMUTSA Fulgence

Head of department/Biomedical Laboratory

Kibogora Polytechnic

