

**PREVALANCE AND RISK FACTORS OF URINARY TRACT  
INFECTIONS AMONG PREGNANT MOTHERS ATTENDING  
ANTENATAL CARE AT KAMPALA INTERNATIONAL UNIVERSITY  
TEACHING HOSIPITAL**

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**BMS/0008/91/DU**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE AWARD OF THE DEGREE IN BACHELOR  
OF MEDICINE AND BACHELOR OF SURGERY IN THE FACULTY OF  
CLINICAL MEDICINE AND DENTISTRY OF KAMPALA  
INTERNATIONAL UNIVERSITY-WESTERN CAMPUS.**

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**MMed (Obs & Gyn) (MUST), MBChB (Mak).**

**NOVEMBER 2014**

## **DECLARATION**

I, **NASSANGA SARAH (BMS/0008/91/DU)**, declare that the dissertation entitled “**Prevalance and risk factors of urinary tract infections among pregnant mothers attending antenatal care at Kampala International University-Teaching Hospital**” is a result the original record of project work I carried out under the supervision of DR. Nyongozi Baltazar and has never been submitted to any other University or Institution of higher learning for the purpose of an academic award.

.....

**SIGNATURE**

.....

**DATE**

## **SUPERVISOR’S APPROVAL**

I certify that this dissertation entitled: “**Prevalance and risk factors of urinary tract infections among pregnant mothers attending antenatal care at Kampala International University-Teaching Hospital**” is a result of the original record of project work carried out by Nassanga Sarah (BMS/0008/91/DU) and has been done under my supervision.

**SUPERVISOR: DR. NYONGOZI BALTAZAR,**

**MMed (Obs& Gyn) (MUST), MBChB (Mak)**

Signature.....

Date.....

## **DEDICATION**

I dedicate this project to the family of MR. BATTE G. WILLIAM.

## **ACKNOWLEDGEMENT**

I praise the **ALMIGHTY GOD** for His unending love and grace which have always led my paths and have been there throughout my entire life and course.

Special thanks go to my father, MR. BATTE G. WILLIAM who has always loved, supported and sponsored me throughout my entire education.

I thank the administration of Kampala International University-Western Campus and all my lecturers, from whom I have learnt a lot during my training and have helped me achieve my dream of becoming a doctor.

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Finally, I thank the management of KIUTH and the entire antenatal department for the support they availed to me during the time of data collection.

**MAY GOD BLESS YOU ALL**

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## **LIST OF ABBREVIATIONS USED**

ANC: Antenatal Care.

ASB: Asymptomatic Bacteriuria.

g/dl: grams per deciliter.

IUFGR: Intrauterine Fetal Growth Restriction.

KIUTH: Kampala International University Teaching Hospital.

LBW: Low Birth Weight.

Mak: Makerere University.

ml: milliliter.

MOH: Ministry Of Health.

MSU: Mid Stream Urine.

MUST: Mbarara University of Science and Technology.

Obs & Gyn: Obstetrics and Gynaecology.

UTI: Urinary Tract Infection.

## OPERATIONAL DEFINITIONS

***Acute cystitis*** is defined as presence of significant amount of microorganisms in urine (atleast 100 per milliliter) in urine with associated bladder mucosal invasion (Tazebew Emiru et al, 2013).

***Antenatal care*** is the care provided by health care professionals to a pregnant mother and her unborn baby from the time conception to the time of delivery (G. Chamberlain and M. Margery, 2002).

***Antenatal visits*** are visits made by a mother during pregnancy at certain agreed stages of gestation to the hospital antenatal clinic for crucial checks (G. Chamberlain and M. Margery, 2002).

***Asymptomatic bacteriuria*** is defined as presence of atleast 100,000 organisms per mL of urine with absence of specific symptoms of acute urinary tract infection (Emilie K. Johnson et al, 2011).

***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 (Tazebew Emiru et al, 2013).

***Maternal Anemia*** is defined as hemoglobin concentration of less than 11 g/dl in a pregnant mother (Tazebew Emiru et al, 2013).

***Parity*** is the number of pregnancy reaching viability or beyond stage of abortion (before 20 weeks or less than 500 g birth weight) (Tazebew Emiru et al, 2013).

***Pyelonephritis*** is defined as the identification of at least 100,000 bacteria / mL of a single uropathogen in a midstream urine culture with associated inflammation of the renal parenchyma, calices and pelvis in the presence of systemic illness (Tazebew Emiru et al, 2013).

***Urinary tract infections*** is the presence of at least 100,000 organisms per milliliter of urine in an asymptomatic patient, or as more than 100 organisms/mL of urine with accompanying pyuria (>5 WBCs/mL) in a symptomatic patient (Dr. Kawser Parveen et al, 2011).

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## **ABSTRACT**

**Background:** Urinary tract infections represent the most common bacterial infection in pregnancy. Screening for and treatment of UTI in pregnancy has become a standard of obstetric care and most antenatal guidelines include routine screening for asymptomatic bacteriuria.

The objectives of the study were to determine the prevalence and risk factors of Urinary Tract Infections among pregnant mothers attending antenatal care at Kampala International University -Teaching Hospital.

**Materials and methods:** A retrospective study was carried out from July to September 2014. A systematic random sampling technique was used until a sample size of 177 respondents was reached from a population of 868 mothers and a data collection checklist was used to collect data.

**Results:** The study found out that out of the 177 mothers sampled, 25(14.1%) were diagnosed with UTI. Out of the 25 mothers diagnosed with UTI, most of the mothers were between 20-30years of age (52%), multiparous (60%), in second trimester (48%), and having hemoglobin concentration of more than 11.5g/dl (68%). There was a low prevalence of UTI among mothers whose hemoglobin concentration was below 11.5g/dl (32%).

**Conclusion and recommendation:** There's a high prevalence of UTI among pregnant mothers attending ANC at KIUTH. Therefore, there's need for KIUTH to maintain regular health education to the mothers attending ANC about the prevalence and present burden of UTI and extend the education services to communities in Bushenyi district in order to help reduce cases of UTI especially during pregnancy.

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background**

Urinary Tract Infection is defined as the presence of at least 100,000 organisms per milliliter of urine in an asymptomatic patient, or as more than 100 organisms/mL of urine with accompanying pyuria (>5 White blood cells/mL) in a symptomatic patient (Dr. Kawser Parveen et al, 2011). Urinary Tract Infections in pregnancy are among the commonest health problems worldwide especially in developing countries. Screening for and treatment of UTI in pregnancy has become a standard of obstetric care and most antenatal guidelines include routine screening for asymptomatic bacteriuria. As with many infectious diseases, it appears that the burden of ASB/UTI in pregnancy is greatest in some of the poorest nations (John E et al, 2000).

Worldwide, the prevalence of UTIs in pregnancy ranges from 13%-33% (Samad, 2007; Agersew et al., 2012) with Panama-Latin America having 29.8% (August S and De Rosa MJ, 2012), Bangladesh has 2% (Versi et al, 1997) and Saudi Arabia has 12.7% prevalence (Mona Abdullah et al, 2013). 23.5% in Cameroon (Mokube et al, 2013), 18.8% in South Ethiopia (Endale T et al, 2013), 55% in Nigeria (Chukwudozie S and Kayode F, 2013) and 14% in Sudan (Hamdan et al, 2011). In East Africa, studies have shown prevalences of 15.5% in Tanzania (Masinde et al., 2009), 14.8% in Kenya (Ukachukwu V.E et al, 2007) and 13.3% in Mulago hospital-Uganda (Andabati and Byomugisha, 2010).

Risk factors associated with the development of UTI in pregnancy include increasing gestational age (Agersew et al, 2012; John E et al, 2000); ages between 21-35years (G. Haider et al, 2010, Dr Kawser Parveen, 2011), mechanical compression from the enlarging uterus onto the urinary bladder (Masinde et al, 2009; Jeyabalan and Lain, 2007, hormonal changes during pregnancy and

post-menopausal period (Harvey, 2009), alteration of the vaginal PH during pregnancy favoring multiplication of organisms, poor perineal hygiene due to abdominal distension and short urethra (Wamalwa et al, 2013), previous history of UTI and sexual activity (Dr Kawser P et al, 2011), increasing parity (Okonko *et al*, 2009), low socio-economic status, not washing genitals before and after coitus, not voiding urine postcoitus and washing genitals from back to front (Amiri FN, 2009); sickle cell traits, diabetes mellitus and maternal anemia (Enayat K et al 2008), urethral catheterization (Aboderin OA; 2009), among others.

Anatomically, UTI can be classified into lower urinary tract infection involving the bladder and urethra and upper urinary tract infection involving the kidney, pelvis, and ureter (John E et al, 2009).

*Escherichia coli* (E-Coli) with its multidrug resistant strains have been found to be the most common cause of UTI among pregnant women. It is accountable for 75% to 90% of uncomplicated UTI isolates. *Staphylococcus saprophyticus* is the second most frequently cultured uropathogen while other Gram-positive cocci, such as group B streptococci, are less common. Other organisms include Gram negative bacteria such as *klebsiella*, *proteus* or *enterobacteriaceae* (McCormick et al, 2008; John E at al, 2000).

Three common clinical manifestations of UTIs in pregnancy are asymptomatic bacteriuria, acute cystitis and acute pyelonephritis (Loh KY, 2007).

Particularly in asymptomatic patients, a diagnosis of UTI should be supported by a positive culture for the uropathogen (Emilie K. Johnson et al, 2011). In a study by A. Masinde et al in Mwanza, Tanzania; 68.4% of mothers had ASB. Untreated asymptomatic bacteriuria is a risk



factor for acute cystitis (40%) and pyelonephritis (25-30%) in pregnancy and accounts for 70% of all cases (Emilie K. Johnson et al, 2011).

Acute cystitis is distinguished from asymptomatic bacteriuria by the presence of symptoms such as urgency of micturation, frequency of micturation, nocturia, haematuria and suprapubic discomfort in afebrile women with no evidence of systemic illness (South Australia perinatal guidelines, 2013).

Pyelonephritis presents with flank or renal angle pain, pyrexia, rigors, chills, nausea and vomiting, dysuria and frequency of urination (South Australia perinatal guidelines, 2013). Acute cystitis and acute pyelonephritis are both symptomatic bacteriurias. Symptomatic and asymptomatic bacteriurias have been reported among 17.9% and 13.0% pregnant women, respectively (Masinde A, 2009).

UTIs are usually diagnosed on the basis of history, physical examination, urinalysis and urine culture. Collection of urine specimens for quantitative culture before initiation of antimicrobial therapy is considered the gold standard for the diagnosis of bacterial UTIs (B. Haylen et al, 2009).

This study was mainly focused on determining the prevalence and risk factors of Urinary Tract Infections among pregnant mothers attending ANC at KIUTH.

## **1.2 Problem statement**

Urinary tract infections represent the most common bacterial infection in pregnancy (Harvey, 2009) and have been reported among 20% of pregnant women (B.Walt et al, 2010).

Although the prevalence of ASB is known to vary between populations; generally, pregnant women are at risk most (C. Obiogbolu et al, 2009).

Symptomatic and asymptomatic bacteriuria has been reported among 17.9% and 13.8% of pregnant women respectively (A. Masinde 2009).

Untreated asymptomatic and symptomatic bacteriuria in pregnancy is associated with a 50% increase in the risk of LBW and a significant increase in the risk of premature deliveries, preeclampsia, hypertension, anemia, and postpartum endometritis (J. Leticia, 2011). It can also lead to serious obstetric complications, poor maternal and perinatal outcomes like IUFG, and Caesarean deliveries (E. Mazor, 2009). In their analysis of strategies to achieve MDG4 Millennium development goals, Adam et al cited screening for ASB as one of the most practical and cost-efficient means by which to improve maternal and neonatal health in developing countries.

The ANC register at KIUTH showed that 98 out of 976 mothers who attended ANC from March to June 2014 were diagnosed with UTI (KIUTH antenatal care register, 2014). It's therefore of utmost importance to assess the prevalence of UTIs among pregnant mothers in KIUTH.

## **1.3 Study justification.**

This study is one of the requirements for the researcher to attain an award of a degree in Bachelor of Medicine and Bachelor of surgery at Kampala International University- Western campus.

Since no study had been found about the prevalence and risk factors of UTIs among pregnant mothers in KIUTH and Bushenyi district at large, the study helped give an idea about the prevalence and risk factors of UTI in pregnancy and was therefore used to influence the formulation of policies in Bushenyi district and the management of KIUTH to develop appropriate courses of action and promote appropriate strategies to reduce the prevalence of UTIs especially among pregnant mothers.

Despite having documented literature about UTIs in pregnancy in various areas of the world, a number of mothers still get UTIs when pregnant, implying that there's still less knowledge given to mothers about the infections. The results of the study will be used to educate mothers about the possible measures of preventing UTIs during pregnancy.

#### **1.4 Study objectives**

##### **1.4.1 General objective**

- To determine the prevalence and risk factors of Urinary tract infections among pregnant mothers attending antenatal care at Kampala International University Teaching Hospital.

##### **1.4.2 Specific objectives.**

- To determine the prevalence of UTIs among pregnant mothers attending ANC at KIUTH.
- To determine the risk factors associated with the development of urinary tract infections among pregnant mothers attending ANC at KIUTH.

#### **1.4.3 Research questions.**

- What is the prevalence of UTIs among pregnant mothers attending ANC at KIUTH?
- What are the risk factors associated with development of UTIs among pregnant mothers attending ANC at KIUTH?

#### **1.4.4 Purpose of the study.**

The purpose of the study was to determine the prevalence of UTIs among pregnant mothers attending ANC at KIUTH and the associated risk factors.

## **CHAPTER TWO: LITERATURE REVIEW.**

### **2.1 Prevalence of UTIs in pregnancy**

Globally, the prevalence of UTIs in pregnancy ranges from 13%-33% with asymptomatic bacteriuria occurring in 2–10% during pregnancies while symptomatic has been found to account for 1-18% during pregnancies (Samad, 2007; Agersew et al, 2012). If untreated, up to 30 % of mothers with ASB may develop acute cystitis and up to 50 % acute pyelonephritis (Delzell, 2000; MC Comick 2008)

In Panama-Latin America, prevalence was found to be 29.8% as per August S and De Rosa MJ, 2012 and Saudi Arabia has 12.7% prevalence (Mona Abdullah et al,2013).

Studies done in some parts of Africa have revealed prevalences of 23.5% in Cameroon (Mokube et al, 2013), 18.8% in South Ethiopia (Endale T et al, 2013), 55% in Nigeria (Chukwudozie S and Kayode F, 2013) and 14% in Sudan (Hamdan et al, 2011).

In studies that have been done in East Africa, the prevalence of UTIs among pregnant women was found to be 15.5% in Tanzania (Masinde et al., 2009), 14.8% in Kenya (Ukachukwu V.E et al, 2007) and 13.3% in Mulago hospital-Uganda (Andabati and Byomugisha, 2010).

However, there were no studies found about UTI in pregnancy in western Uganda, Bushenyi district or KIUTH.

## **2.2 Risk factors associated with the development of UTI during pregnancy**

Women are disproportionately affected by UTI compared to men, and risk of UTI increases further during pregnancy (B. Foxman; 2002). According to the National Kidney and Urologic Disease Information Clearinghouse; Pregnancy doesn't cause UTIs but the physical changes that take place during pregnancy can make one more susceptible to an infection.

Pregnant women are at an increased risk for UTIs, beginning in week 6 and peaking during weeks 22 to 24 due to a number of anatomical and physiological factors, with the incidence of infection of the kidney increasing in the third trimester of pregnancy (Agersew et al, 2012; John E et al, 2000). The renal pelvis and ureters begin to dilate as early as the eighth week of pregnancy opening up the route for bacteria to move up (Jeyabalan and Lain, 2007) and the bladder itself is displaced superiorly and anteriorly by the enlarging uterus. This leads to increased intravesical pressure with frequency but increased stasis (Phidelis Wamalwa et al, 2013).

Mechanical compression from the enlarging uterus affects the bladder volume as well as blockage of the free drainage of urine (Masinde et al, 2009; Jeyabalan and Lain, 2007). This leads to stasis and increased incidence of infection. It is more common on the right due to the tendency of the gravid uterus to incline towards the right and also absence of the protective effect of the ureter by the sigmoid colon as it occurs in the left (Phidelis Wamalwa et al, 2013).

Hormonal changes especially during pregnancy and post-menopausal period increases the risk for UTI due to lack of estrogen. Estrogen loss thins the walls of the urinary tract and reduces its ability to resist bacteria. It also reduces certain immune factors in the vagina that help block *E. coli* from adhering to vaginal cells (Harvey, 2009). Presence of progesterone during pregnancy

causes smooth muscle relaxation leading to decreased peristalsis of the ureters and decreased bladder tone increases urinary stasis that is associated with the infection both in the bladder and the upper urinary tract (Masinde *et al.*, 2009; Jeyabalan and Lain, 2007).

Alteration of the vaginal PH during pregnancy also favors multiplication of organisms. This is due to the absence of estrogen during pregnancy which is essential in the maintenance of the normal acidity of vaginal fluid. This acidity is critical to permit the growth of *Lactobacillus* in the normal vaginal flora, which acts as a natural host defense mechanism against symptomatic UTI. Change of the vaginal PH to alkaline will therefore increase the risk of invasion of microorganisms and hence ascending infections (Phidelis et al, 2013).

Differences in urine pH and osmolality, aminoaciduria and pregnancy-induced glycosuria due to low renal threshold of sugars may facilitate bacterial growth and multiplication thus increased risk of infection (Jeyabalan and Lain, 2007; Schnarr and Smaill, 2008).

During pregnancy, due to the abdominal distension, women find it difficult to clean their genitalia well. The poor perineal hygiene coupled with the short urethra and closer proximity of the urethra to the anus, predispose to ascending infection and thus highly contribute to the occurrence of UTIs in pregnancy (Phidelis Wamalwa et al, 2013).

According to a study done by G. Haider et al, 2009, it showed that past history of UTI is also a risk factor to the development of UTI in pregnancy. Prevalence of bacteriuria was 100% in women who had previous history of UTI.

Sexual activity has also been associated with increased risk of developing UTI during pregnancy with 80% of UTI occurring in sexually active women (G. Haider et al 2009, Dr Kawser Parveen et al, 2011).

Peak age of prevalence of UTI during pregnancy is 21-35 years of age as per studies done by G. Haider et al 2009 and Dr Kawser P et al, 2011.

Increasing parity has also been associated with increasing risk of developing UTI during pregnancy (Okonko *et al*, 2009)

Prevalence of bacteriuria in well status women was found to be 25 % (Dr Kawser P et al, 2011). However, low socio-economic status, not washing genitals before and after coitus, not voiding urine postcoitus and washing genitals from back to front have all been observed as risk factors for UTI during pregnancy (Amiri FN, 2009).

Sickle cell traits, diabetes mellitus and anemia have been reported; each being associated with two-fold increase in the rate of bacteriuria (Enayat K et al, 2008).

There is also increase in the risk of developing UTI due to catheterization, spermicidal contraceptive usage, kidney stones, tumors and urethral strictures (Aboderin OA, 2009).

Finally, increased risk of UTI has been reported in the presence of neurological diseases, congenital/acquired anomalies of bladder, and suppressed immune system (Aboderin OA; 2009).



## **CHAPTER THREE: MATERIALS AND METHODS**

### **3.1 Study design**

A retrospective study design was used. This helped to explore the prevalence and risk factors of UTIs in pregnant mothers that attended ANC at KIUTH.

### **3.2 Study area**

The study was carried out from KIUTH located in Bushenyi- Ishaka municipality, Bushenyi district. KIUTH is a private hospital which was established in 2007 in partnership with the government of Uganda for a programme that runs free treatment policy. It has a total of 250 beds, serves a population of 2million people in Bushenyi and some from Rwanda. It employs 30 doctors; of which 20 are specialized and 10 are general, 10 midwives, 60 nurses, 8 clinical officers, and 29 support staff. It has 5 major disciplines which are; internal medicine, obstetrics/gynecology, surgery, psychiatry and pediatrics.

KIUTH was selected because no research about UTI in pregnancy had been done previously.

### **3.4 Study duration**

The study period was from July to September 2014.

### **3.4 Study population**

The study population included all pregnant mothers who attended ANC at KIUTH from July to September 2014 and these were 868 according to the register at the antenatal clinic.

### 3.5 Sample size determination.

Sample size was determined from the formula;  $n = \frac{z^2 p(1-p)}{d^2}$  (Fischer et al, 1998)

Where;

n was the minimum sample size required

Z was the standard deviation set as 1.96 when the confidence interval is 95%

P was estimated prevalence of UTI in pregnant mothers which is 13.3% in Mulago hospital-Uganda (Andabati and Byomugisha, 2010).

D was the Margin of error at 5% which is 0.05.

$$n = \frac{1.96^2 \times 0.133(1-0.133)}{0.05^2}$$

$$n = \frac{3.8416 \times 0.1153}{0.0025}$$

$$n = 177.16.$$

Therefore, the sample size included 177 mothers.

### 3.6 Sampling procedure

A systematic random sampling technique was used to pick the mothers from the study population using the formula  $k = (\text{population size} / \text{sample size})$ .

Where K represented the mother picked,

$$K = 868 / 177$$

$$K = 4.90$$

$K=5$ ; this means that from the total 868 mothers in the register at the antenatal clinic, the initial mother was picked at random and the subsequent sixth mothers were picked until a sample size saturation of 177 mothers was reached.

Records of the selected mothers were got from the register at the antenatal clinic.

### **3.7 Inclusion criteria**

Records of pregnant mothers who attended ANC at KIUTH from July to September 2014 were included.

All records with sufficient information were included in the study.

### **3.8 Exclusion criteria**

Records of mothers who attended antenatal care before July or after September were excluded.

Records of mothers who got abortions during that time were excluded.

Records of non pregnant women were also excluded.

### **3.9 Data collection techniques**

A data collection checklist was used to enter raw information from the mothers' records. This list contained the mothers' age, tribe, parity, gravidity, antenatal visit, gestational age, and hemoglobin concentration.

### **3.10 Data management**

The quantitative data from the records in the antenatal register was recorded in form of tables, graphs and pie charts using Microsoft excel.

### **3.11 Data analysis**

Data was analyzed manually using a pen, paper, tallies and a calculator.

The proportion of pregnant mothers with UTI was obtained by the number of mothers diagnosed with UTI divided by the total number of mothers with and without UTIs and multiplied by 100%

### **3.12 Ethical consideration**

A letter of introduction from the dean of faculty of clinical medicine and dentistry of Kampala International University -Western campus was got. Authorization to access the hospital records was then got from the director of quality assurance of KIUTH

Confidentiality, anonymity and privacy were core in the research process. These were achieved by not allowing unauthorized persons to access the information and handling results without disclosing the mothers' names.

### **3.13 Study limitation**

Since this was a retrospective study, not enough information about maternal sociodemographic characteristics was got and only four of the risk factors of UTI in pregnancy were able to be captured.

### **3.14 Dissemination of findings**

Copies of the dissertation were presented to the following people: Dean of faculty of clinical medicine and dentistry, supervisor, Kampala International University-Western campus main library, East and Central Africa medical journal and to the Director of quality assurance of KIUTH.

### **3.15 Quality control**

Data collection tools were pre tested for validity and reliability using specialist to carefully examine the checklist whether it was systematically arranged according to the study objectives.

## CHAPTER FOUR: RESEARCH FINDINGS

### 4.1 Selected sociodemographic and obstetric characteristics of respondents

**Table 1: Selected sociodemographic and obstetric characteristics of respondents (sample size=177).**

<b>Variables</b>	<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Maternal age</b>	<20yrs	33	18.6%
	20-30yrs	121	68.4%
	>30yrs	23	13%
<b>Tribe</b>	Banyankole	121	68.4%
	Bakiga	27	15.2%
	Bakonjo	8	4.5%
	Others	21	11.9%
<b>Parity</b>	nulliparous	62	35%
	multiparous	115	65%
<b>Gravidity</b>	Prime gravidae	56	31.6%
	Multi gravidae	121	68.4%
<b>Antenatal visit</b>	First visit	39	22%
	fourth visit	26	14.7%
	others	112	63.3%
<b>Gestational age</b>	First trimester	25	14.1%
	Second trimester	72	40.7%
	Third trimester	80	45.2%

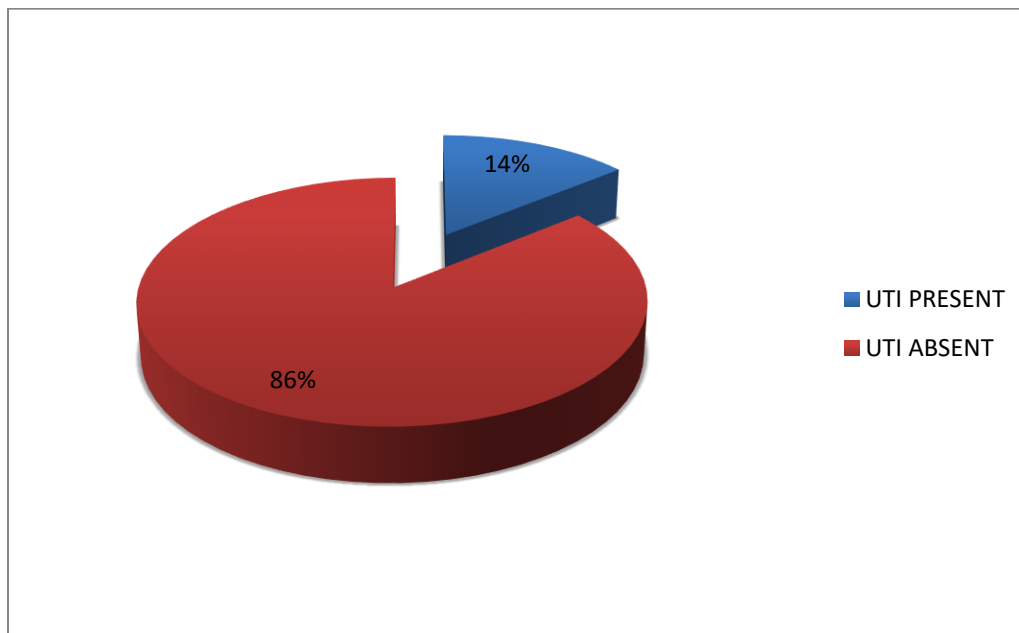
From table 1 above, majority of the respondents were 20-30years old (68.4%), Banyankole (68.4%), multiparous (65%), multigravidae (68.4%), with other antenatal visits (63.3%) and in third trimester (45.2%). These were followed by those below 20 years old (18.6%), Bakiga (15.2%) and other tribes (11.9%); first antenatal visit (22%) and those in second trimester (40.7%). However, minority were above 30years old (13%), Bakonjo (4.5%), nulliparous (35%), prime gravidae (31.6%), with fourth antenatal visit (14.7%) and in first trimester (14.1%).

#### 4.2 Prevalence of UTI among pregnant mothers at KIUTH

**Table 2: Prevalence of UTI among pregnant mothers at KIUTH**

	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
UTI PRESENT	25	14.1%	14.1%
UTI ABSENT	152	85.9%	100.0%
TOTAL	177	100.0%	

**Figure 1: Pie chart showing prevalence of UTI among pregnant mothers at KIUTH (N=25).**



Out of 177 mothers, 25(14.1%) had UTI while 152(85.9%) were not diagnosed with UTI.

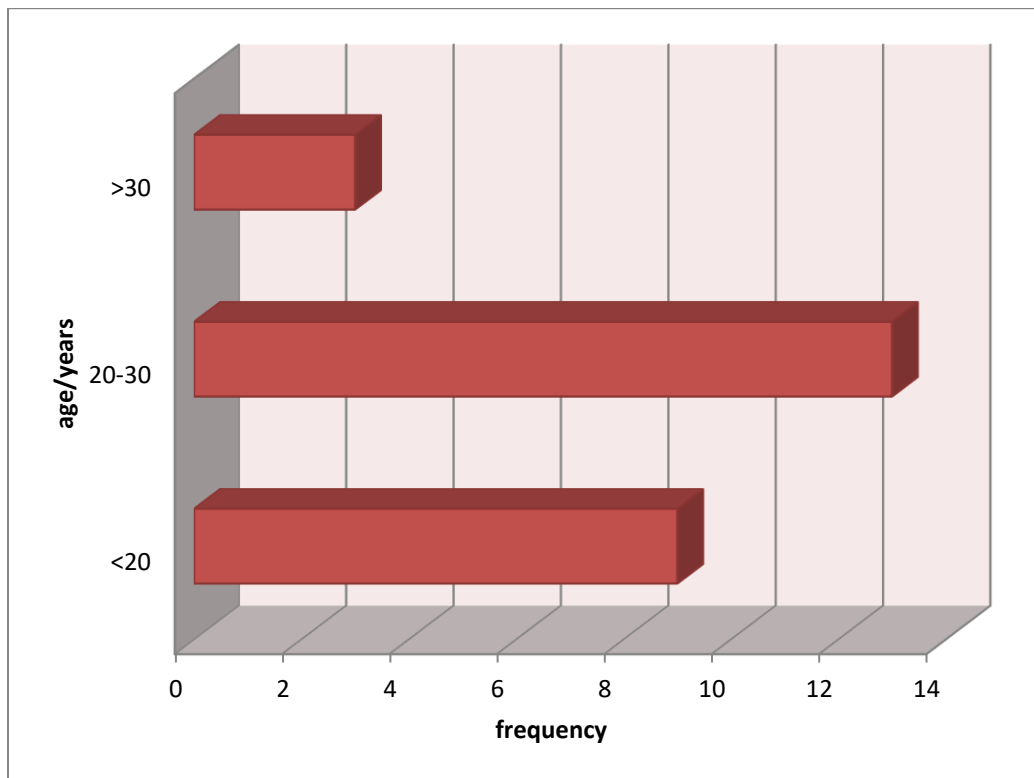


### 4.3 Age distribution of the cases

**Table 3: Age distribution of the cases**

AGE/YEARS	FREQUENCY	PERCENTAGE	VALID PERCENTAGE	CUMULATIVE PERCENTAGE
<20	9	36%	36%	36%
20-30	13	52%	52%	88%
>30	3	12%	12%	100%
TOTAL	25	100%	100%	

**Figure 2: A bar graph showing age distribution of the cases (N=25).**



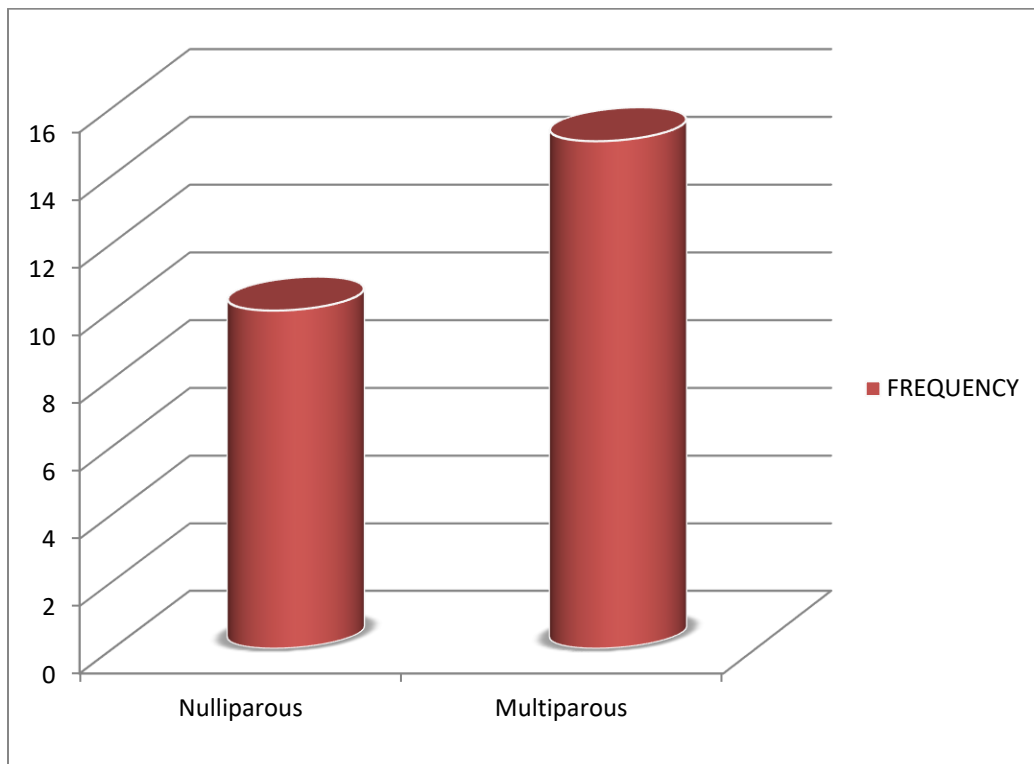
Majority (52%) of the mothers who had UTI were between 20-30 years old, followed by those below 20years with 36% and the least was 12% in those above 30years.

#### 4.4 Parity distribution of cases

**Table 4: Parity distribution of cases.**

PARITY	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
Nulliparous	10	40%	40%
Multiparous	15	60%	100%
Total	25	100%	

**Figure 3: A column graph showing parity distribution of cases (N=25).**



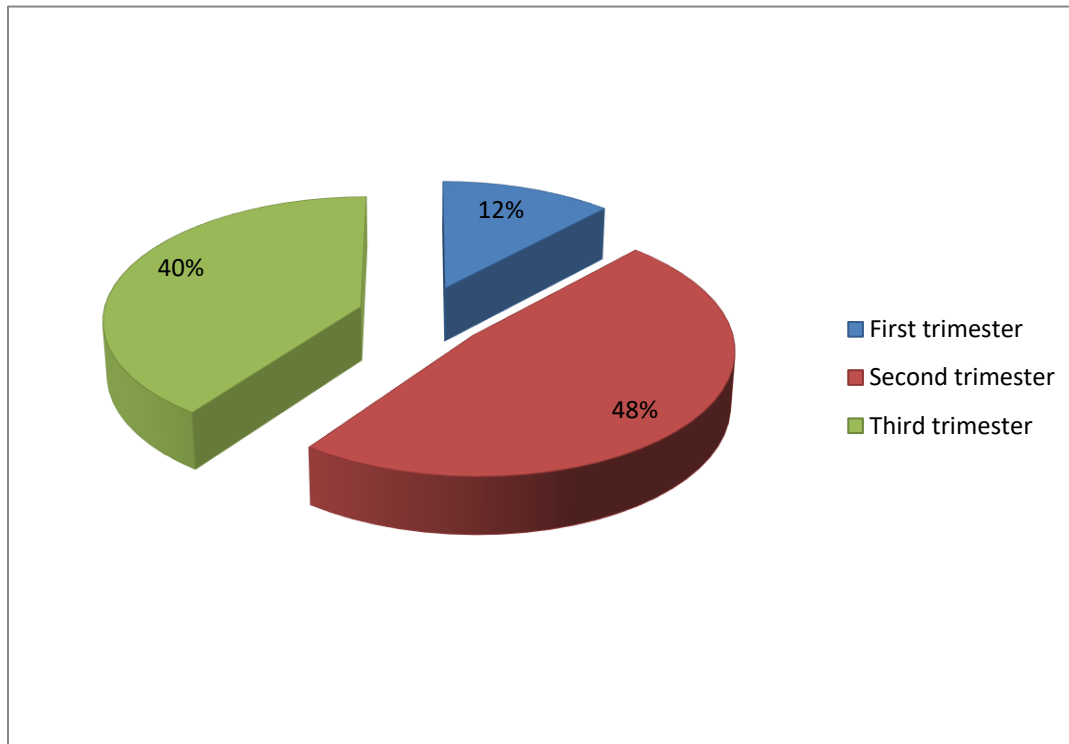
From the above figure, out of the 25 mothers who had UTI, majority (60%) were multiparous while only 40% were nulliparous.

#### 4.5 Distribution of cases in relation to gestational age

**Table 5: Distribution of cases in relation to gestational age.**

GESTATION AGE	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
First trimester	3	12%	12%
Second trimester	12	48%	60%
Third trimester	10	40%	100%
Total	25	100%	

**Figure 4: A Pie chart showing distribution of cases in relation to gestational age (N=25).**



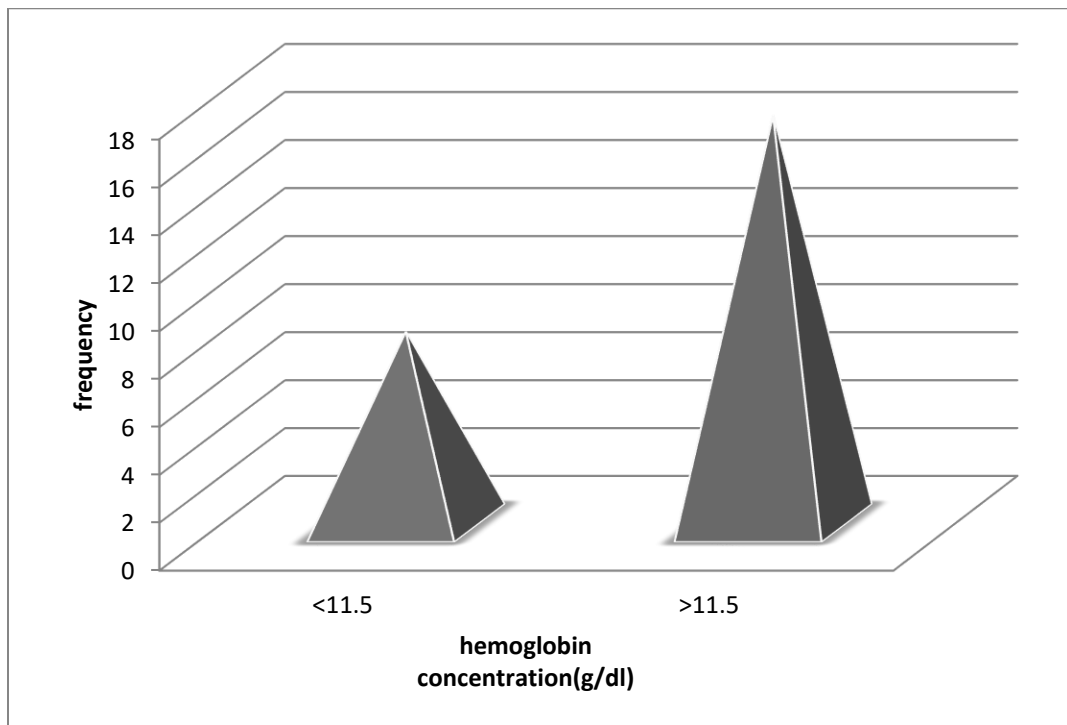
Majority (48%) of the mothers who were diagnosed with UTI were in the second trimester, 40% of the mothers were in the third trimester and those in first trimester were the minority with 12%.

#### 4.6 Distribution of cases according to hemoglobin concentration

**Table 6: Distribution of cases according to hemoglobin concentration**

HEMOGLOBIN CONCENTRATION (g/dl)	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
<11.5	8	32%	32%
>11.5	17	68%	100%
Total	25	100%	

**Figure 5: Column graph showing distribution of cases according to hemoglobin concentration (N=25).**



From the column graph above, it shows that out of 25 mothers who were diagnosed with UTI, 17(68%) had a hemoglobin concentration above 11.5g/dl and 8(32%) had hemoglobin concentration below 11.5g/dl.

## **CHAPTER 5: DISCUSSION**

### **5.1 Prevalance of UTI among pregnant mothers at KIUTH**

25 mothers out of the 177 who were sampled had Urinary Tract Infections, giving a prevalence of 14.1%. This was within the global range of 13%-33% (Samad, 2007; Agersew et al., 2012); slightly lower than that of Tanzania and Kenya with 15.5% (Masinde et al., 2009) and 14.8% (Ukachukwu V.E et al, 2007) respectively and this could be because studies in Kenya and Tanzania were done with larger study areas while this study was only in KIUTH.

The prevalence was found to be higher than that of Mulago hospital- Uganda which is 13.3% (Andabati and Byomugisha, 2010). This could be because Mulago hospital is in Kampala, the capital city of Uganda while Bushenyi district, where KIUTH is located is an Up country district and there could be less patient knowledge about UTI in pregnancy and how to prevent UTI during pregnancy in up-country districts thus leading to a higher prevalence.

The prevalence was however almost equal to that of Sudan which is 14% (Hamdan et al, 2011). This could have be because both Sudan and Bushenyi district have poor socioeconomic statuses and less patient education about UTI in pregnancy leading to an almost equal prevalence.

### **5.2 Risk factors associated with the development of UTI among pregnant mothers at KIUTH.**

Four main risk factors were observed during the study and these were maternal age, parity, gestational age and hemoglobin concentration.

Of the 25 mothers who had UTI,13(52%) were between 20-30 years of age, 9(36%) were less than 20years old and only 3(12%) were above 30years old. This indicates that majority of the

UTIs were diagnosed in mothers between 20-30years of age at the time of study. This finding may agree with the report by G. Haider et al, 2009 which stated that the peak age of prevalence of UTI in pregnancy is 20-35years although the researcher's age bracket was 20-30years.

This could be because this age bracket is made up of sexually active women and sexual activity has been reported to increase the risk of development of UTI during pregnancy by 80% (G. Haider et al, 2009)

It was also discovered from the research findings that Multiparous mothers are at increased risk of developing UTI during pregnancy with 60% prevalence as compared to 40% in nulliparous women and it was the same as the report by Okonko et al, 2009 who quoted that increased parity has been associated with an increased risk of development of UTI during pregnancy.

This could be because multiparous mothers could have suffered from UTI in the previous pregnancies and a history of UTI in pregnancy has been reported to increase risk of development of UTI in pregnancy by 100% (G. Haider et al, 2009).

More so, the majority (48%) of the mothers with UTI during the time of study were in the second trimester, 40% were in the third trimester and the minority (12%) was in the first trimester. This was the same as the report by Agersew et al, 2012 who quoted that pregnant women are at an increased risk for UTIs beginning in week 6 and peaking during weeks 22 to 24 due to a number of anatomical and physiological factors.

This could be due to dilatation of the renal pelvis as early as the eighth week of pregnancy, opening up the route for bacteria to move up (Jeyabalan and Lain, 2007) and displacement of the urinary bladder superiorly and anteriorly by the enlarging uterus leading to increased intravesical pressure with frequency but increased stasis and thus increased risk of UTI (Phidelis Wamalwa et al, 2013).

Finally, the research findings showed that majority (68%) of the mothers who were diagnosed with UTI had a hemoglobin concentration of above 11.5g/dl while minority (32%) had a hemoglobin concentration of less than 11.5g/dl. This however was not the same as the findings of the study by Enayat K et al, 2008 which showed that anemia is associated with increased risk of UTI in pregnancy. This could be because during the study time, most women had been receiving prophylaxis against anemia and other factors above being the main contributors to the development of UTI during pregnancy.

## **CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS**

### **6.1 Conclusions**

- There's a high prevalence (14.1%) of UTI among pregnant mothers attending ANC at KIUTH as compared the 13.3% prevalence in Mulago hospital-Uganda but almost equal to 14% prevalence in Sudan.
- Increased risk of UTI in pregnancy was noted among mothers aged 20-30 years with a 52% prevalence, multiparous (60%), second trimester mothers (48%) and those with a hemoglobin concentration of more than 11.5g/dl (68%).
- A decreased risk was however reported among mothers above 30 years old (12%), nulliparous (40%), those in first trimester (12%) and those with a hemoglobin concentration less than 11.5g/dl (32%).



## 6.2 Recommendations

According to the findings of the study, the research came up with the following recommendations:

- There is need for KIUTH to maintain regular health education to the mothers attending ANC about the prevalence and present burden of UTI and extend the education services to communities in Bushenyi district in order to help reduce cases of UTI especially during pregnancy.
- There is need to encourage mothers to get antenatal care services during pregnancy so as to get regular screening for UTIs and get treatment if the diagnosed with UTI in order to avoid complications that could arise.
- Multiparous, second trimester mothers and those of 20-30years of age are more susceptible to UTI during pregnancy therefore they need special attention in terms of early diagnosis, management and control of the disease.
- Mothers should also be educated about the clinical presentations of UTI in pregnancy so that they may seek medical attention incase such features are present. This will facilitate early management and prevention of complications.
- The MOH, Uganda needs to employ more health workers at the same time organize seminars for health workers in order to provide more knowledge to them on how to deal with UTI in pregnancy.

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## **Appendix A: DATA COLLECTION CHECKLIST**

**A checklist assessing the prevalence of UTI among pregnant mothers attending ANC at KIUTH from July to September 2014**

A) Selected sociodemographic and obstetric characteristics of respondents (sample size=177).

<b>Variables</b>	<b>Response</b>	<b>Tallies</b>
<b>Maternal age</b>	<20yrs	
	20-30yrs	
	>30yrs	
<b>Tribe</b>	Banyankole	
	Bakiga	
	Bakonjo	
	Others	
<b>Parity</b>	Nulliparous	
	Multiparous	
<b>Gravidity</b>	Prime gravidae	
	Multi gravidae	
<b>Occupation</b>	Employed	
	Unemployed	
<b>Marital status</b>	Married	
<b>Antenatal visit</b>	First visit	

	Fourth visit	
	Others	
<b>Gestational age</b>	First trimester	
	Second trimester	
	Third trimester	

B) Prevalance of UTIs among pregnant mothers attending antenatal care at KIUTH.

	<b>TALLIES</b>	<b>TOTAL</b>
<b>UTI PRESENT</b>		
<b>UTI ABSENT</b>		
<b>TOTAL</b>		

C) Risk factors associated with development of UTI during pregnancy at KIUTH.

	<b>TALLIES</b>	<b>TOTAL</b>
<b>AGE/YEARS</b>		
<20		
20-30		
>30		
Total		
<b>PARITY</b>		
Nulliparous		
Multiparous		

Total		
<b>GESTATIONAL AGE</b>		
First trimester		
Second trimester		
Third trimester		
Total		
<b>HEMOGLOBIN CONCENTRATION(g/dl)</b>		
<11.5		
>11.5		
Total		



## Appendix B: MAP OF BUSHENYI DISTRICT



## APPENDIX C: LETTER OF INTRODUCTION



**KAMPALA  
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**OFFICE OF THE DEAN,  
FACULTY OF CLINICAL MEDICINE & DENTISTRY**

22/10/2014

### TO WHOM IT MAY CONCERN

RE: Nassanga Sarah (BMS/0008/91/DU)

The above named is a student of fifth year at Kampala International University pursuing a Bachelor of Medicine, Bachelor of Surgery (MBChB) programme.

She wishes to conduct her research project in your Hospital.

**Topic:** Prevalence and risk factors of Urinary tract infections among pregnant mothers attending antenatal care at Kampala International University – Teaching Hospital

Any assistance given will be appreciated.

Thank you

S-O. Akib

Dr. Akib Surat  
Asso. Dean, FCM & D



To Antenatal Dept.,

Please accommodate  
this student who wants to  
do her research. She is  
our student.



"Exploring the Heights"