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Original Research Article

Assessment of knowledge and prevention practices of urinary tract infection (UTI) among female students residence in university of Jos

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Urinary tract infection and its associated complications are the cause of nearly 150 million deaths per year worldwide. The disease can be developed in 40% - 50% of women and 5% of men. To assess the knowledge and prevention practices of urinary tract infection among female students resident in University of Jos. A descriptive survey design was adopted. A sample size was 185 respondents and structured questionnaire was used as an instrument for data collection. The findings of the study revealed that majority (82.2%) of the respondents have a knowledge about urinary tract infection. They are also aware that cleaning the perineum from front to back, keeping the genital area clean and dry, avoiding fluids that irritate the bladder such as alcohol and emptying the bladder frequently when full helps in the prevention of urinary tract infection. However, most of the respondents have never experienced urinary tract infection. It was concluded that health care professionals and facilities have the mandate of disseminating information about urinary tract infection to individuals especially females so that they will be aware of the causes, risk factors, symptoms and prevention practices of the infection. Based on the findings of this study, it was recommended that, there should be an awareness campaign to help adults, females and other communities to be knowledgeable about urinary tract infection, designing and implementation of educational programs to increase the awareness and susceptibility about chances of getting urinary tract infection among the females, and educating individuals on the causes of urinary tract infection by the healthcare professionals.

Key words: UTI infection, knowledge, prevention practice.

INTRODUCTION

Urinary tract infection is a unique infection that can happen anywhere along the urinary tract. The urinary tract includes the: Bladder, Kidneys, Ureters, and Urethra, (Smelters et al., 2008). UTIs are caused by the presence of bacteria in urine, although fungi and viruses could be involved. Majority of women have recurrent infection within one year (Demile et al., 2012; Siiri et al., 2009). *Escherichia coli* causes 75 - 90% of uncomplicated UTIs, (Karen et al., 2006), whereas *Staphylococcus saprophyticus* causes an estimated 5 - 15% of UTIs frequently in younger women (Micheal et al., 2007). Also enterococcus and other gram negative rods other than E. coli have also been implicated in some cases (Benjamin et al., 2009). Urinary tract infection (UTI) is the most common disorder caused by bacterial agents in pregnancy, which can lead to important complications in newborn of such mothers in case of inappropriate diagnosis and treatment (Marziyeh et al., 2015). Urinary tract infection and its associated

complications are the cause of nearly 150 million deaths per year worldwide. The disease can be developed in 40% - 50% of women and 5% of men. After anemia, UTIs are the second common complications in pregnant women, which if not controlled well, can adversely affect the health of infant or the pregnant mother. Pregnancy UTI is classified into two categories of symptomatic and asymptomatic (El-Lawindi et al., 2014). The involvement of the lower urinary tract, leading to asymptomatic bacteriuria is the most common cause of UTI during pregnancy. The involvement of the upper urinary tract can lead to symptomatic bacteriuria and is characterized by acute Pyelonephritis (Al-Badar and Al-Shaikh 2013; Ahmed and Avasarala 2008; Baba et al., 2006).

Based on performed researches, the prevalence of symptomatic urinary tract infection in pregnant women has been 17.9% and asymptomatic form in 13%. If asymptomatic infection is not treated, it leads to some clinical manifestations in mother and newborn symptoms are usually precipitated by sexual intercourse (Micheal et al., 2007). UTIs occur in both acute and chronic forms, in the former patients complain of severe and low back pain that may associate with fever due to the associated bacteraemia, while in the latter, a sensation of perineal fullness is felt. The common causative agent is *E. coli* but micrococcal infections may account for up to 10 - 20% of cases in sexually active women, (Vorland et al., 2001). This infection reaches the bladder by the ascending route, with the main symptoms as urinary frequency and dysuria. Other infections that are due to less common pathogens usually occur in the presence of gross structural abnormality of the urinary tract or neurological effects (Kolawole et al., 2012). The common source of E. coli infections in women is the faecal flora. Introital colonization precedes the development of urinary tract infections in women and girls. In males, the organisms frequently originate from the sub prepucial sac, (Ojo and Anibijuwon, 2010). The higher prevalence in females as compared with males is attributable to the shortness of the female urethra and so is more liable to contamination during sexual intercourse, urethra massage and even urination with chronic flora that resides in the perineal skin. It also includes the effect of turbulence of the urinary stream, (Starr and Taggart, 2012). Urinary tract infections (UTIs) occur more often in women than in men, at a ratio of 8:1. Approximately 50–60% of women report at least one UTI in their lifetime, and one in three will have at least one symptomatic UTI necessitating antibiotic treatment by age 24, Ojo and Anibijuwon, (2010).

About 25-50% of women and 15-40% of men living in long-term-care facilities have ASB. The prevalence rates in elderly women and men outside of the nursing home are 10.8-16% and 3.6-19%, respectively, (Nicolle et al., 2005). From a study conducted by (Chandra et al., 2017) it was observed that there was high prevalence (63.47%) of urinary tract infection among participants at Mwananyamala Hospital at Kinondoni district, Tanzania. The study found that most of participants (68.11%) have little knowledge and awareness about urinary tract infection. According to this study, the knowledge about urinary tract infection is still a problem despite several studies that come with this factor and recommendations. Evidenced revealed high prevalence of urinary tract infection in children in the age group of 6-12 years also showed that there were a poor knowledge and unhygienic use of toilets among school children, (Raya, 2011).

Ocher et al. (2018), shows that UTI exists among pregnant women attending antenatal clinic with a prevalence rate of 31.0%. However, it was found to be lower than the 32.7% and 55% reported by (Onuorah et al., 2016 ; Onuoha and Fatokun. 2014) respectively; while on the other hand, it was found to be higher than the 21.7% reported by (Akinloye et al., 2006) in a study to determine the prevalence of asymptomatic bacteriuria in pregnancy in Ibadan, Oyo State.

In a similar vein, UTI is the most common serious bacterial infection in young febrile children. It is important to note that in children under the age of 2 years, the presence of another possible source of fever such as gastroenteritis and bronchitis does not exclude UTI. Overall, UTIs are estimated to affect 2.4%-2.8% of all children every year in the United States. The international incidence of UTI is difficult to accurately assess especially in developing countries, but, it is assumed to be similar to that in the United States, (Moftah et al., 2015). UTIs are second only to infections of the upper respiratory tract as infectious disorders for which medical intervention is sought (Hasan et al., 2006). However, there is paucity of research on the female students knowledge in the prevention practice of urinary tract infection among female students resident in university of Jos.

In the same vein, there is a link between the prevalence of UTI among female students and the level of personal hygiene (Isah et al., 2013) or the state of toilet facilities in the hostels, sexual activity; another factor that predisposes females to UTI (Staphylococcus aureus for example, which is a member of skin flora might stay on the skin and get transmitted during sexual intercourse) and enhances better transmission of UTI especially in females, who usually have higher prevalence than males as seen in a study conducted by Ojo and Anibijuwon (2010), hence the need for this study among female students in University of Jos in order to assess their knowledge and prevention practices.

The objectives of this study:

1. To assess the respondents on knowledge of urinary tract infection among female students resident in University of Jos.
2. To assess the respondents prevention practices of urinary tract infection among female students resident in University of Jos.

Significance

Urinary tract infection (UTI) is a common bacterial infection known to affect the different parts of the urinary tract and the occurrence is found in both male and female

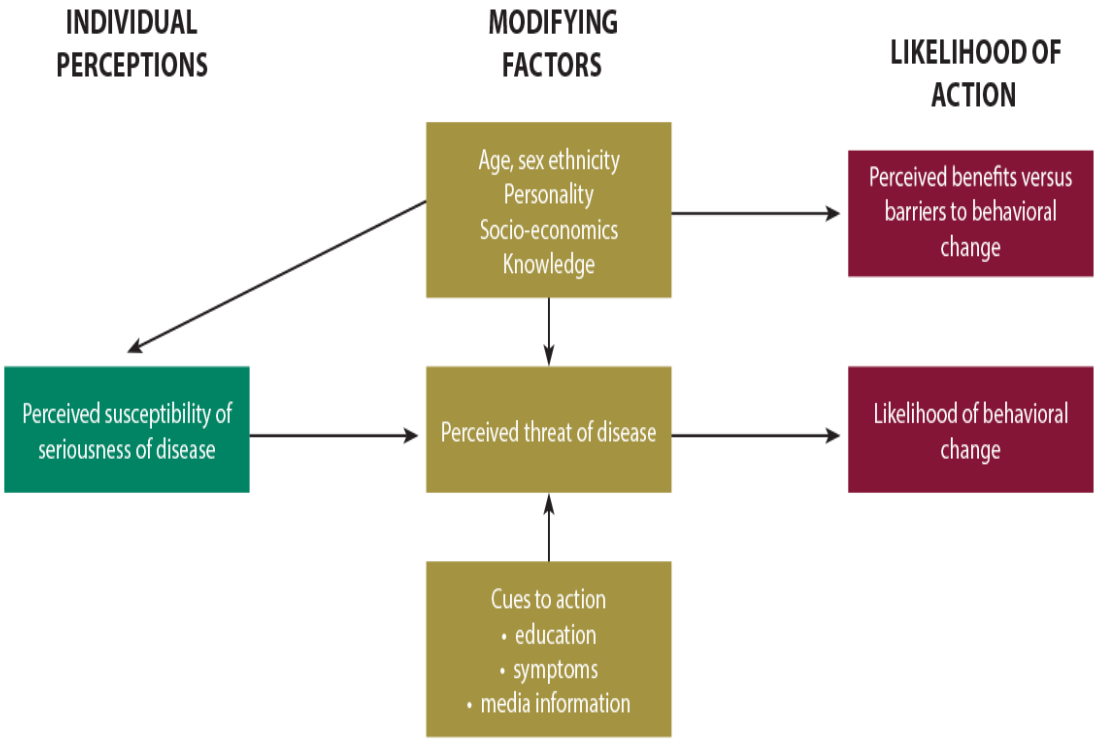

Figure 1: Health believe Model was adopted

(Ochei et al., 2018). Both genders are susceptible to the infection however, women are mostly vulnerable due to their anatomy and reproductive physiology (Arunachallam et al., 2017). Despite the wordiness, UTI is a very serious infection that if left untreated or not diagnosed early becomes an issue to the individual: male or female. The knowledge of UTI is very crucial in preventing its occurrence and recurrence(Changizi et al., 2014). This issue cannot be overemphasized because of the tremendous effect it has on the health of individuals claiming lives under severe circumstances however, proper treatment results in quick recovery from the contagion. As earlier stated, women are at a high risk of this infection due to the short nature of their urethra and because of this treatment should be commenced as soon as it is diagnosed so that the prognosis will be positive. The information in this study will go a long way in creating awareness about UTI as well as the prevention measures thereby reducing the menace caused by this infection(Figure 1).

METHODOLOGY

A descriptive survey was adopted to assess the knowledge and prevention measures of urinary tract infection among female students resident in University of Jos hostels in which questionnaire was used to gather relevant data. of Jos female residence; Village and Zion hostels are accommodation facilities meant to shelter students during their period of stay in the institution. They are hostel accommodations located in Naraguta Campus situated in Jos North Local Government Area of Plateau State (North-Central Nigeria) which comprises several compounds and blocks for both male and female but for the purpose of this research, only the female hostels shall be visited. Zion hostel comprises two blocks whereas Village hostel comprises 8 compounds. Zion hostel is found along the road to Bauchi state while Village hostel is along Farin gada area of Jos metropolis.

The population of study is made up of all female students resident in university of Jos hostels precisely Village and Zion hostels which are located in the permanent site of the institution. The target population is all female students 928 residence.

Sample size

The sample size was calculated using percentage method. According to Benjamin (2018), it is a random sampling technique formula to estimate sample size, it allows the

Table 1: Socio-demographic characteristics of respondent

Characteristics		Frequency	Percentage
Age (years)	18-22	95	62.5
	23-27	48	31.6
	28-32	-	-
	33 and above	5	3.3
	Missing String	4	2.6
TOTAL		**152**	**97.4**
Level	100L	42	27.6
	200L	33	21.7
	300L	34	22.4
	400L	36	23.7
	500L	6	3.9
	Diploma	-	-
TOTAL		**152**	**100.0**
Status	Married	25	16.4
	Single	127	83.4
TOTAL		**152**	**100.0**
Hostel	Village	112	73.7
	Zion	39	25.7
TOTAL		**152**	**100.0**
Ethnicity	Yoruba	27	17.8
	Igbo	28	18.4
	Hausa	15	9.9
	Others	79	52.0
TOTAL		149	98.0
Religion	Christianity	146	98.1
	Islam	6	3.9
TOTAL		152	100.0

researcher determine the sample considering the available resources. Percentage between 10-20% was chosen depending on the population, i.e. the lesser the total population, the higher the percentage and the higher the total population, the lesser the percentage. For the purpose of this research, 20% was used.

Therefore, the sample size is calculated as follows:

20% of 928 students

20/100 * 928

0.2 * 928 = 185

Ethical clearance and approval were obtained from the university health centre Research ethics committee and the data obtained was used only for the research purpose with strict compliance of anonymity and confidentiality of information.

Table 1 shows that 62.5% of the respondents were 18-22 years, 31.6% were 23-27 years, 0% were 28-32 years while only 3.3%, 2.6% had no response from the respondents. Most of the respondents were 100L students (27.6%), 21.7% were 200L, 22.4% were 300L, 23.7% were 400L, 3.9% were 500L and none of the respondents were in diploma. A large number of the respondents were single (83.4%) while the others are married (16.4%). Respondents from village hostel were 73.7% while those from Zion were 25.7%. Again, the table shows that most (52.0%) of the respondents were from other ethnic groups, 17.8% were Yoruba, 18.4% were Igbo and 9.9% were Hausa. Lastly, the table shows that only 3.9% of the respondents were from the Islamic religion while 98.1% were from Christianity.

NA: Not always; NR: No response

Table 2 reveals that 82.2% had heard about UTI while 17.8% have not. 80.3% had a knowledge about UTI, 19.7% had not of what UTI is, 71.1% know the causes of UTI, while 27.6% do not know the causes while 1.3% did not respond. Most (62.5%) of the respondents have never experienced UTI, 34.9% experienced it at some point while 1.3% had no response. Out of the whole respondents, 69.7% are aware that cleaning the perineum from front to back helps in prevention of UTI, 82.2% know that keeping the genital area clean and dry helps in prevention of UTI, 53.9% know that avoiding fluids that irritate the bladder

Table 2: Respondent's knowledge of UTI

	YES		NO		NR	
	F	%	F	%	F	%
Have you ever heard of UTI?	125	82.2	27	17.8	-	-
Do you have any knowledge about what UTI is?	122	80.3	30	19.7	-	-
Do you now the causes of UTI?	108	71.1	42	27.6	2	1.3
Have you ever experienced UTI?	53	34.9	95	62.5	2	1.3
Are you aware that cleaning the perineum from front to back helps in prevention of UTI?	106	69.7	45	29.6	1	0.7
Are you aware that keeping the genital area clean and dry helps in prevention of UTI?	125	82.2	24	15.8	2	1.3
Do you know that avoiding fluids that irritate the bladder such as alcohol aids in UTI prevention?	82	53.9	70	46.1	-	-
Do you know that emptying the bladder frequently when full helps in prevention of UTI?	108	71.1	43	28.3	-	-

Table 3. Respondent's Prevention Practices of UTI

	YES	NO	NA	NR				
	F	%	F	%	F	%	F	%
Do you clean the perineum from front to back after elimination (urination/defecation)?	86	56.6	10	6.6	54	35.5	2	1.3
Do you keep the genital area clean and dry?	115	75.7	4	2.6	33	21.7	-	-
Do you wear cotton underwear and loose fitting clothing?	74	48.7	11	7.2	65	42.8	2	1.3
Do you drink plenty of water daily?	80	52.6	16	10.5	54	35.5	2	1.3
Do you empty your bladder frequently when full?	81	53.3	16	10.5	53	34.9	1	0.7
Do you avoid fluids that irritate the bladder?	131	86.2	9	5.9	12	7.9	-	-

such as alcohol aids in UTI prevention while 71.1% know that emptying the bladder frequently when full helps in prevention of UTI. 29.6% of the respondents were not aware that cleaning the perineum from front to back helps in UTI prevention while 0.7% gave no response. Also, 15.8% were also not aware that keeping the genital area clean and dry helps in the prevention of UTI and 1.3% had no response and that, 46.1% do not know that avoiding fluids that irritate the bladder aids in UTI prevention while 28.3% have no idea that emptying the bladder frequently when full helps in prevention UTI.

NA: Not always; NR: No response

Table 3 shows that 56.6% clean their perineum from font to back, 6.6% do not while 35.5% clean the perineum but not always, 1.3% gave no response, 75.7% keep the genital area clean, 21.7% clean but not always while 2.6% do not clean at all. 48.7% wear cotton underwear and loose fitting clothing, 7.2% do not wear cotton underwear and loose fitting clothing, 21.7% wear them but not always while 1.3% gave no response. Most (52.7%) of the respondents drink plenty of water daily, 35.5% do not drink water always while 10.5% do not drink plenty of water daily, 1.3% of the respondents gave no response.

Lastly, respondents who empty their bladder frequently when full and avoid fluids that irritate the bladder were 53.3% and 86.2% respectively, 10.5% and 5.9% do not while 34.9% and 7.9% do not practice it always. 0.7% of the respondents gave no response.

HYPOTHESIS

There is no significant relationship between the knowledge of urinary tract infection and the prevention practices

Cleaning the perineum from front to back * Do you clean the perineum from front to back after elimination Cross tabulation

Table 4: shows that the calculated Chi square (X^2) value of 11.667 with the df of 2 and the significant level of 0.05 is greater than the critical/table of 5.991. Hence, the null hypothesis was rejected. Therefore, there is a significant relationship between the knowledge of urinary tract infection and the prevention practices.

DISCUSSION OF FINDINGS

In this study, knowledge and prevention practices of UTI were assessed. The study therefore revealed that majority of the respondents were between 18-22 years (62.5%), most the respondents were first year students (27.6%), and half of the residents who responded were single (83.4%). 73.7% were from village hostel, 52.0% were from other ethnic groups and 98.1% were Christians by religion.

Table 4. calculated Chi square (X^2)

		Do you clean the perineum from front to back after elimination			TOTAL
		YES	NO	NOT ALWAYS	
Are you aware that cleaning the perineum from front to back helps in prevention of UTI?	YES	70	5	30	105
	NO	16	4	24	44
Total		86	9	54	149
	Value	**Df**	**Asymptotic Significance (2-sided)**		
Pearson Chi-Square	11.667[a]	2	.003		
Likelihood Ratio	11.643	2	.003		
Linear-by-Linear Association	10.917	1	.001		
N of Valid Cases	149				

The respondents who had heard about UTI were 82.2%. 80.3% had a knowledge about UTI, 71.1% know the causes of UTI. Most (62.5%) of the respondents have never experienced UTI. Out of the whole respondents, 69.7% are aware that cleaning the perineum from front to back helps in prevention of UTI, 82.2% know that keeping the genital area clean and dry helps in prevention of UTI, 53.9% know that avoiding fluids that irritate the bladder such as alcohol aids in UTI prevention while 71.1% know that emptying the bladder frequently when full helps in prevention of UTI. Table 2 answers research question a "Do female students of University of Jos have the knowledge of urinary tract infection?". This shows that most of the respondents have a knowledge of urinary tract infection and are also aware of the various prevention practices which helps in prevention of UTI. However, this is in contrast with (Adhkari and Dhakal, 2015). In their descriptive research design, titled; Knowledge on urinary tract infection among primigravida women. Their findings revealed that, 64.63% of women had no information about UTI, 24.39% had poor knowledge. But much recent study revealed by (Bhat et al., 2017), that, 77.3 % women had average knowledge and 22.7% of sample had poor knowledge. In this same study, the researchers found that 69.7% had positive attitude and 30.3% showed neutral attitude towards Urinary tract infection during pregnancy.

The study also shows as presented in Table 3 that the respondents clean their perineum from front to back (56.6%), keep the genital area clean (75.7%) and wear cotton underwear and loose fitting clothing (48.7%). Most (52.7%) of the respondents drink plenty of water daily, respondents who empty their bladder frequently when full and avoid fluids that irritate the bladder were 53.3% and 86.2% respectively. This Table answers research question b and c "what are the prevention practices of UTI among University of Jos female students?" and "what are the prevention practices best used by female students resident in University of Jos?" . Most of them know the various prevention practices that help in prevention of UTI and at the same time practice them. This implies that the results disagree with the null hypothesis which states that "there is no statistically significant difference between the knowledge and prevention practices of UTI".

In a recent study conducted by (Bhat et al., 2017), 77.3 % women had average knowledge and 22.7% of sample had poor knowledge. In this same study, the researchers found that 69.7% had positive attitude and 30.3% showed neutral attitude towards Urinary tract infection during pregnancy. This study concluded that knowledge enhancement program related to UTI during pregnancy may change their attitude, hence, helping in prevention of urinary tract infection which in turn reducing the occurrence.

Another study conducted by (Marziyeh et al., 2014) showed that urinary tract infection is a common infection among women and is followed by several complications. The aim of this study was to determine the prevalence and factors influencing prevention of urinary tract infection based on health belief model. Almost 22.3% of the participant had history of experience with urinary tract infection at last once in their lifetime. Based on the result, it seems that designing and implementation of educational programs to increase susceptibility about chance of getting urinary tract infection among the female students may be useful in order to prevent urinary tract infection.

In addition, Heba et al. (2016) in a study explained that genitourinary tract infections (GUTI) are serious health problems affecting millions of people each year, especially among female adolescents and women. This study aimed to evaluate prevention program on knowledge and habitual practices regarding prevention of urinary tract infection among female adolescents. Results of this study showed that, there was an improved knowledge related to prevention of genitourinary infection and improve habitual practices among female adolescents regarding personal hygiene related to prevention of genitourinary infection.

In conclusion, It is very glaring that UTI is a common contagion among men and women but the incidence is quite high among women due to their physiology. In simple terms, it can be referred as a condition which women will certainly encounter during the span of their lifetime and the prevalence is higher among women during pregnancy. The

infection can occur in either an uncomplicated host setting, where there is no underlying structural or functional abnormality of the patient's genitourinary tract, or complicated, where there is. For the latter, common predisposing factors are the presence of a foreign body, including urinary catheter, or disruption of normal urinary flow by obstruction or retention. Health care professionals and facilities have the obligation to disseminate proper information about urinary tract infection so that females will be aware of the causes, risk factors, symptoms and prevention practices of this infection.

The following recommendations were made based on the findings of the study.

These recommendations include inputs from both healthcare professionals and individuals.

1. Education of individuals on the causes of urinary tract infection by the healthcare professionals.
2. Encouragement of individuals to practice the necessary prevention practices thereby reducing the occurrence of the infection.
3. Awareness campaign program should be conducted to help females to be knowledgeable about urinary tract infection.
4. There should be knowledge enhancement program related to UTI during pregnancy which may aid in changing their attitude.
5. Individuals have an obligation to judiciously adhere to the medical counseling and regimen for urinary tract infection.
6. Designing and implementation of educational programs to increase susceptibility about chance of getting urinary tract infection among the females.
7. Patients who are on catheter must be given close attention and catheter should be changed every two weeks.
8. Females who had experienced UTI at an early stage of their lives should be encouraged to treat it at its early stage to avoid becoming severe.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this manuscript.

REFERENCES

Adhkari S, Dhakal R (2015). Knowledge on urinary tract infection among primigravida women. Int. J. Hlth Sci. Res., 5(10): 200-205.

Ahmed SM, Avasarala AK (2008). Urinary Tract Infections (UTI) among adolescent girls in rural Karimnagar district, Indian J. Prev Social Med. 39: 13-16.

Al-Badar A, Al-Shaikh G (2013). Recurrent Urinary Tract Infections Management in Women: A review. Sultan Taboos University medical J, 13(3):359-367.

Arunachallam U, Ponmudi C, Prashat V, Deepam D, Vignesh N, Preeti P, (2017). A study about urinary tract infection among patients attending tertiary care hospital Aug; 4(8):2620-2622. Accessed on 6th July, 2019.

Baba J, Banda J, Abdullahi M, Atahiru Z (2006). Prevalence of Escherichia coli in urinary tract infection among patients attending Umar Sanda Ndayako General Hospital Bida , Niger state Nigeria. Jewel J. Sci. Res. 3(1): 54-61.

Benjamin C, Ramirez D, Rauch D, Mendez R (2018). Changes in Urinary Tract Infection Hospitalizations Post 2011 Revised American Academy Pediatrics Guidelines. Clinical Pediatrics, 57(12):1409-1413.

Bhat A, Pradna G, Prakash W, Geeta R, (2017). Knowledge and Attitude Regarding Urinary Tract Infection (UTI) and its prevention during pregnancy. IOSR J. Nurs and Health Sci. 6(6): 2320-1959.

Chandra B, Koner R, Evod E, Devarajan D (2017). Evaluation of the Prevalence of Urinary Tract Infection in Females Aged 16-50 years at Kinondoni District, Tanzania. Sci. Int. J., 5(2): 42-46.

Changizi M, Zadeh S, Zinat-Motlagh F, Mahboubi M, (2014). Beliefs of Female Teenagers on Prevention of Urinary Tract Infection: Application of Health Belief Model. J. Bio Today's World, 3(10): 223-226.

Demile T, Beyene G, Melaku S, Tsegaye W, (2012). Urinary bacterial profile and antibiotic susceptibility pattern among pregnant women in North West Ethiopia. Ethiopia J. Health Sci.; 22(2): 121-128.

El-Lawindi M, Sayed H, El Shafei A, Hayek N, Noor H (2014). Assessment of Urinary Tract Infection Risk Factors and Knowledge among Attendees of Theodor Bilharz Research Institute, Giza, Egypt. International Public Health Forum. Vol.1 March 2014 http://www.researchpub.org/journal/iphf/iphf.html.

Hasan T, Makimoto K, Yoshida S, Ohsako S (2005). Relationship between catheter care and catheter-associated urinary tract infection at Japanese acute care hospitals. American J. Infection Control, 33(5), e177-e178.

Heba A, Hanan T, Elbahnasawy M, Samia A, El-nagar N, Nadin S, Ghabyen S (2016). Prevention of Genitourinary Tract Infection among Female Adolescent students. IOSR J. Nurs and Hlth Sci, 5(4): 12-18.

Isah A, Ismail I, Allamin A, Shetima B, Mustapha A (2013). Prevealence of Urinary tract infection among primary school children in Maiduguri, Borno state, Nigeria. Int. J. Environ. 2(1): 2091-2854.

Karen J, Moses J, Lisa I, McDonald S, Michelle M, Anna C (2008). When is a Urinary Tract Infection Really a Urinary Tract Infection?. Emergency Medicine News, 30(11), 6.

Koffour A, Boye A, Siakwa M, Boampong N, Ephraim D (2012). Asymtomatic urnary tract infections in pregnant women attending antenatal clinic in Cape Coast, Ghana. E3 J. Med. Res. 1(6): 74-83.

Kolawole A, Kolawole O, Kandaki Y, Babatunde S, Durowade K (2012). Prevailence of urinary tract infections (UTI) among patients attendingg Dalhatu Araf Specialist Hospital, Lafia, Nasarawa state, Nigeria, Int J. Med. Medical Sci, 1(6): 163-167.

Marziyeh A, Zoreh L, Reza N, Masoomeh M, Amin R, Mohammed R, Hadi Z (2015). Prevalence of Urinary Tract Infection among Pregnant Women and its Complications in the new borns during the birth in the Hospital (2012-2013). Iran J. Microbiol. Res. 1(6): 18-24.

Micheal W, Johan W, Suen F, Carina K, Tor M (2007). Molecular epidemiology of Staphylococcus saprophyticus isolated from women with uncomplicated community-acquired urinary tract infection. J. Clin. Microbiol.,. 45: 1561-1564.

Moftah S, El-Naggari M, Al-Nabhani D, Al Sawai A, Al Muharrmi Z, Elnour I (2015). Incidence of antibiotics resistance among uropathogens in Omani children presenting with a single episode of urinary tract infection. J. Infection and Public Health, 8(5):458-465.

Nicolle L, Jack W (2005). Catheter-Related Urinary Tract Infection. Drugs & Aging, 22(8):627-639.

Ochei J, Enitan S, Adejumo N, Folaye T, Oniyide F (2018). Prevalence of Urinary Tract Infection among Students in Nigerian University. Microbiol Res J. Int, 24(6): 1-14.

Ojo O, Anibijuwon I (2010). Urinary tract infection among female students residing in the campus of the Ado Ekiti, Nigeria. Afri. J. Microbiol Res. 4(12): 1195-1198.

Onuoha K, Fatokun S (2014). From toilet insecurity to toilet security: creating safe sanitation for women and girls. Wiley Interdisciplinary Reviews: Water, 3(1):19-24.

Onuorah E, Dozie C, Adeleke M, Julius A, Chidi H (2016). The Prevalence of Urinary Tract Infection among Pregnant Women Attending Antenatal Clinic at Atertiary Care Centrein AlRass, Al Qassim. Int. J. Sci. Res. 5(5):23-27.

Raya A (2011). Imaging the urinary tract in children with urinary tract infection. Acta Paediatrica, 100(12), e253-e259.

Samuel O, Victoria O, Ifeanyi O (2016). Prevalence of asymptomatic bacteriuria among the pregnant women receiving antenatal care at federall medical centre Owerri, Nigeria. Universal J. Clinical Med. 4(1): 1-5.

Smelters SC, Bare BG, Hinkle JL, Cheever KH, (2008): Textbook of medical-surgical nursing. Chapter 45, Infection of the urinary tract, (11th Edition), Lippincott company, pp. 1570-1580. http://www.ijsurgery.com.

Starr M, Taggart N (2012). Awareness among Educated Mothers about Sexually Transmitted Disease Aids. Int. J. Sci. Res., 5(1):259-260.

Vorland A, Carlson A, Aaeelen M (1993). Urinary Tract Infection. The Biology of Infection. The Quarterly Review Biol., 68(3):423-424.