**AN ASSESSMENT OF THE PREVALENCE OF URINARY TRACT INFECTION IN TYPE 2 DIABETES MELLITUS PATIENT (CASE STUDY OF FEDERAL TEACHING HOSPITAL LOKOJA)**

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***Abstract***

*This study focused on the prevalence of-urinary tract infection in type 2 diabetes mellitus-patient. Specifically the study determine the prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM), investigate the factors contributing to the increased prevalence of UTIs in T2DM patients and evaluate the effectiveness of various preventive strategies for reducing the prevalence of UTIs in T2DM patients. The survey design was adopted for the study, while the population size comprise of healthcare professionals. The simple random sampling techniques were employed in this study, while the questionnaire was the instrument employed for data collection. A total of 147 copies of the questionnaire were administered, while 141 responses were validated from the survey. The collected and validated questionnaires were analysed using frequency tables and mean scores. While the hypotheses were tested using T-test statistical tool. From the responses obtained and analysed, the findings revealed that there is no significant difference in the prevalence of urinary tract infections between type 2 diabetes mellitus patients and the general population. Therefore, it was recommend that healthcare providers should focus on improving patient education regarding diabetes management and UTI prevention. This can be achieved through regular educational sessions that involve both patients and their families. Also, improving the collaboration between different healthcare providers, such as primary care physicians, endocrinologists, and urologists, can enhance the overall management of T2DM and prevent complications like UTIs.*

**CHAPTER ONE**

**INTRODUCTION**

**1.1 Background of the Study**

Diabetes is the prevailing endocrine illness of the past century. The disease incidence in emerging countries has been amplified by multiple causes, such as lifestyle modifications (Hu, 2018). Additionally, diabetes can be classified into two primary categories, with type 2 diabetes being more prevalent. Type 2 diabetes is a long-lasting and advancing metabolic condition that includes a diverse range of problems linked to different levels of insulin resistance, insulin secretion dysfunction, insulin generation and persistence, and increased glucose production (Boyko et al.,2018).

Furthermore. the incidence of diabetes mellitus has risen significantly in recent decades and is now reaching epidemic levels. Globally, there are 371 million individuals who have diabetes, and it is projected that by 2030, this figure will increase to 552 million. The extreme situation can be attributed to changes in lifestyle, the ageing population, and the rising prevalence of obesity (Hu, 2018).

Diabetes ranks among the top 10 leading causes of mortality worldwide , and this is a verifiable reality. The incidence rose from 4.3% to 9% in men and from 5% to 7.9% in women (NCD-RisC, 2016). According to Muller, Gorter, Hak, Goudzwaard, Schellevis, Hoepelman, et al (2018),Type 2 diabetes elevates the likelihood of specific ailments, such as cardiovascular illness, ocular complications leading to blindness, lower limb amputation, renal disease, and infectious diseases. Beyond that Type 2 urinary tract infection (UTI) is the most prevalent infectious illness in diabetic people. Approximately 150 million individuals globally experience urinary tract infections annually (Gupta, 2016). On the other hand, a urinary tract infection (UTI) is a microbial infection that affects the urine system. This infection can affect several parts of the urinary system, including the urethra (urethritis), kidneys (pyelonephritis), or bladder (cystitis) (Fu et al., 2016). However, females have a higher susceptibility to having a urinary tract infection (UTI) compared to males. Localized infection within the bladder can cause significant discomfort and irritation. Nevertheless, if a urinary tract infection (UTI) extends to the kidneys, it might lead to significant repercussions. While urinary tract infections in type 2 diabetic patients can be caused by factors such as immune system problems, weakened white blood cells, inadequate blood supply, bladder dysfunction owing to nephropathy, and glucosuria (Fünfstück, 2017). Dysuria, a symptom characterized by painful urination, is a complication that arises in diabetes individuals who have urinary tract infections. This consequence occurs as a result of organ damage and can even lead to death, particularly in cases of pyelonephritis, a severe infection of the kidneys. Additionally, these patients suffer from nocturnal urine retention, urgency, and incontinence as a result of increased urination to eliminate excessive glucose (Bennett et al., 2018). Urinary tract infections are more common in women compared to men, possibly because of the unique anatomy of the shorter urinary tract, the shorter length of the urethra, and its close proximity to the anus in women (Nitzan, 2015).

Urinary tract infections in diabetic patients hinder the ability to regulate blood sugar levels, leading to an increased requirement for blood sugar monitoring. This not only diminishes the quality of life but also imposes substantial treatment expenses on the patient (Gorter, 2019).  Moreover, statistics from multiple studies reveal variation in the reported prevalence of urinary tract infections (UTIs) among individuals with type 2 diabetes. This suggests inconsistency and uncertainty regarding the frequency of UTIs in this patient population. Thus, in order to effectively decrease the occurrence of urinary tract infections (UTIs) in individuals with type 2 diabetes, intervention studies necessitate precise and consistent information to mitigate the potential problems associated with UTIs.Therefore, a survey will be conducted in order to assess the prevalence of urinary tract infection in type 2 diabetes mellitus patient.

**1.2 Statement of the Problem**

As the number of individuals with diabetes continues to rise, so too will the occurrence of urinary tract infections. However, other variables, such as recurrent bouts of acute kidney injury caused by infections, medications, or nephrotoxins, can also contribute to its advancement. It is widely acknowledged that infections are common causes of illness and death in individuals with diabetes (Muller et al., 2018). Immunological deficiencies, such as poor neutrophil function, low levels of prostaglandin E, thromboxane B2, and leukotriene B4, as well as a diminished T cell-mediated immunological response, lead to an elevated risk of infection (Shah, 2018). Shah (2018)further assert that urinary colonization by microorganisms can occur due to diseases such as autonomic neuropathy causing incomplete bladder emptying and excessive glucose concentration in the urine  Research indicates that individuals with diabetes are more prone to developing silent bacteriuria and urinary tract infections (UTIs). UTIs are particularly prevalent among diabetic patients, constituting the most frequent bacterial illnesses (Ellenberg , 2018). Furthermore, it is crucial to acknowledge and address urinary tract infections (UTIs) in diabetes patients due to the potential for serious consequences, such as bacteremia, renal abscess, and renal papillary necrosis.  According to Ellenberg & Weber (2019) managing urinary tract infections (UTIs) in individuals with diabetes poses challenges due to their high likelihood of recurring, resulting in increased financial burdens for both the healthcare system and the patient. Hence, it is in the light of these that the study seeks to assess the prevalence of urinary tract infection in type 2 diabetes mellitus patient.

**1.3  Objectives of the Study**

The main purpose of this study is to assess the prevalence of urinary tract infection in type 2 diabetes mellitus patient. Specifically, the study will;

1. Determine the prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM).
2. Investigate the factors contributing to the increased prevalence of UTIs in T2DM patients.
3. Evaluate the effectiveness of various preventive strategies for reducing the prevalence of UTIs in T2DM patients.

**1.4  Research Questions**

The following questions have been prepared for the study:

1. What is the prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM)?
2. What factors contribute to the increased prevalence of UTIs in patients with T2DM?
3. How effective are various preventive strategies in reducing the prevalence of UTIs in patients with T2DM?

**1.5 Research Hypotheses**

H0: There is no significant difference in the prevalence of urinary tract infections between type 2 diabetes mellitus patients and the general population.

Ha: There is a significant difference in the prevalence of urinary tract infections between type 2 diabetes mellitus patients and the general population.

**1.6 Significance of the Study**

Specialists who manage diabetes will benefit from insights into the increased risk of UTIs among their patients, allowing them to incorporate preventive measures into diabetes management plans.Furthermore, the study findings will help patients become more aware of their susceptibility to UTIs and manage their condition more effectively, potentially reducing the incidence of UTIs and improving overall health. Likewise, the findings will inform public health campaigns aimed at educating diabetic patients about the risks of UTIs and promoting preventive measures.Moreover, subsequent researchers will use it as a literature review. This means that other students who may decide to conduct studies in this area will have the opportunity to use this study as available literature that can be subjected to critical review. Invariably, the result of the study contributes immensely to the body of academic knowledge with regard to the prevalence of urinary tract infection in type 2 diabetes mellitus patient.

**1.7 Scope of the study**

The scope of this study is boarded on the prevalence of urinary tract infection in type 2 diabetes mellitus patient. Empirically, this study will determine the prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM), investigate the factors contributing to the increased prevalence of UTIs in T2DM patients and evaluate the effectiveness of various preventive strategies for reducing the prevalence of UTIs in T2DM patients. Geographically, the study will be delimited to healthcare professionals in Federal Teaching Hospital, Lokoja.

**1.8 Limitation of the study**

In the course of carrying out this study, the researcher experienced some constraints, which included time constraints, financial constraints, language barriers, and the attitude of the respondents. In addition, there was the element of researcher bias. Here, the researcher possessed some biases that may have been reflected in the way the data was collected, the type of people interviewed or sampled, and how the data gathered was interpreted thereafter. The potential for all this to influence the findings and conclusions could not be downplayed. More so, the findings of this study are limited to the sample population in the study area, hence they may not be suitable for use in comparison to other schools, local governments, states, and other countries in the world.

**1.9 Definition of Terms**

**Urinary Tract Infection (UTI):**an infection in any part of the urinary system, including the kidneys, ureters, bladder, and urethra.

**Type 2 Diabetes Mellitus (T2DM):** a chronic metabolic disorder characterized by insulin resistance and relative insulin deficiency, leading to hyperglycemia.

**CHAPTER TWO**

**REVIEW OF LITERATURE**

**INTRODUCTION**

Our focus in this chapter is to critically examine relevant literature that would assist in explaining the research problem and furthermore recognize the efforts of scholars who had previously contributed immensely to similar research. The chapter intends to deepen the understanding of the study and close the perceived gaps.

Precisely, the chapter will be considered in three sub-headings:

* Conceptual Framework
* Theoretical Framework
* Empirical framework

**2.1 CONCEPTUAL FRAMEWORK**

**Concept of Urinary Tract Infection**

Urinary Tract Infections (UTIs) are infection of any part of the urinary tract. The normal urinary tract is sterile above the urethra. UTIs are caused by pathogenic microorganisms in the urinary tract (Waugh & Grant, 2010). The most common organism that causes urinary tract infection (UTI) is E coli accounting for approximately 80-90% of cases (Waugh & Grant, 2010). It originates from faecal flora colonizing the periurethral area, causing an ascending infection. Other pathogens include the following: Klebsiella pneumoniae (5%), Proteus mirabilis (5%), Enterobacter species (3%), Staphylococcus saprophyticus (2%), Group B beta- hemolytic Streptococcus (GBS; 1%) and Proteus species (2%) Gram-positive organisms, particularly Enterococcus faecalis and GBS, are clinically important pathogens. Infection with S saprophyticus, an aggressive community-acquired organism, can cause upper urinary tract disease, and this infection is more likely to be persistent or recurrent (Wamalma, Onolo, & Makokha, 2013). GBS colonization has important implications during pregnancy. Intrapartum transmission that leads to neonatal GBS infection can cause pneumonia, meningitis, sepsis, and death. Current guidelines recommend universal vaginal and rectal screening in all pregnant women at 35-37 weeks’ gestation rather than treatment based on risk factors (Wamalma, Onolo, & Makokha, 2013).

**Concept Of Diabetes**

Diabetes is the most common endocrine disorder in the last century. In developing countries, various factors, including lifestyle changes, have increased the incidence of the disease [Hu, 2018]. There are two main types of diabetes, and type 2 diabetes is more common. Type 2 diabetes is a chronic and progressive metabolic disease involving a heterogeneous group of disorders associated with varying degrees of insulin resistance, insulin secretion disorder, insulin development and persistence, and increased glucose production [Fronzo, 1999]. The prevalence of type 2 diabetes has increased in recent years [Shah & Hux, 2003]. In 2015, about 415 million adults with type 2 diabetes were reported, which is projected to increase to 642 million by 2040 [Zheng, Ley, & Hu, 2018]. The prevalence increased from 4.3% to 9% in men and 5% to 7.9% in women. Type 2 diabetes increases the risk of certain diseases, including cardiovascular disease, eye and blindness problems, amputation of the lower limbs, kidney disease and infectious diseases [Zheng, Ley, & Hu, 2018]. The most common infectious disease in diabetic patients is type 2 urinary tract infection (UTI). It is estimated that 150 million people worldwide suffer from urinary tract infections each year [Ellenberg, 2018].

**Classification of UTI**

The infection is classified based on the site of infection. The infection of urethra and ureter are referred to as urethritis and ureteritis respectively where as cystitis and pyelonephritis corresponds to bladder and kidney infections. The infection of bladder and urethra are referred to as the infection of the lower urinary tract whereas the kidney and ureter infection is upper urinary tract infection (Schnarr and Smaill, 2008). Also UTIs are classified based on the factors that trigger the infection and the nature of occurrence. Taking these aspects in to consideration, UTIs can be classified as follows uncomplicated and complicated (based on the factor that triggers the infection).

Uncomplicated urinary tract infection d is a consequence of bacterial infection and the prevalence is higher in women than men. This includes the common form of the infection like the cystitis and pyelonephritis which affects the lower and the upper tracts leading to bladder and kidney infections (Schnarr and Smaill, 2008). In contrast, complicated urinary tract infection occurs in men and women at any point of their life and has the tendency to produce severe outcomes resulting in death under serious circumstances. These infections are highly intricate and are difficult to treat and they are persistent. Complicated urinary tract infections can lead to outcomes like structural anomalies that reduces the capability of the urinary tract to flush out the urine and this in turn provides better scope for the growth of bacteria as urine is considered to be a suitable growth medium and leads to dire consequences (Waugh & Grant, 2010)

According to Smeltzer et al. (2008), the symptoms of UTI include pelvic or suprapubic pain, dysuria (painful urination), polyuria (frequent urination), urinary urgency nocturia (urination during night), haematuria (urine with traces of blood) and incontinence. Contributing factors for UTI include diabetes mellitus, pregnancy, neurologic disorders, and gout.

**Diagnosis of Urinary Tract Infection**

Quantitative mid stream specimen of urine (MSSU) culture is the only gold standard for diagnosis of all suspected urinary tract infections. Royal College of Obstetric and Gynecology concluded that an ideal screening test should have high sensitivity, high specificity and should be simple, inexpensive and produce rapid results. Urine microscopy and reagent strip analysis have been postulated as alternatives to culture but concerns remain over the efficacy of these techniques. Studies by McCormick, Ashe and Kearney (2008) have shown a high false negative rate for Gram staining and microscopy up to 20% and reagent strip testing up to 52%, precluding their use as screening tests for asymptomatic bacteriuria. Other urine-based screening tests include the interleukin-8 test; rapid enzymatic test; chromogenic limulus amoebocyte lysate assay; semi-automated urine screen and the dip-slide quantitative kit. The Royal College of Obstetric and Gynecology guidelines review in 2009 stated that none of these approximate the sensitivity and specificity of urine culture and, therefore, cannot be advocated as screening tools for asymptomatic bacteriuria of pregnancy (National Collaborating Centre for Women’s and Children’s Health 2010)..In addition to providing a quantified assessment of the concentration of bacteriuria, culture also allows reliable identification of the organism involved and antibiotic sensitivity testing to guide effective therapy. With its high sensitivity and specificity, a single urine culture is sufficient for the reliable diagnosis of significant bacteriuria, provided there is rigorous attention to sample collection, storage and laboratory evaluation. Asymptomatic bacteriuria is the presence of bacteria in urine greater or equal to 100, 000 bacteria / mL without symptoms.

* **Acute cystitis**

In addition to midstream MSSU, clinical diagnosis is based on symptoms such as: dysuria, urinary frequency, strangury, lower abdominal pain or supra pubic pain without fever, pyuria may also be present.

* **Pyelonephritis**

Pyelonephritis usually presents as an acute episode. In addition to midstream MSSU, clinical diagnosis include: maternal clinical history and examination, assessment of fetal wellbeing, low and high vaginal swabs, complete blood count, renal function test including creatinine, urea and electrolytes, urinalysis for proteinuria, women with pyelonephritis often have pyuria or leukocyte casts (Fronzo, 1999). Symptoms include: pyrexia, chills, rigor, flank or renal angle pain, nausea and vomiting, less commonly dysuria, frequency, fetal tachycardia may also be present. Antibiotics treatment guided by urine culture and sensitivity reports is normally sufficient, however, shortest possible treatment is associated with better fetal outcomes.

**Pathophysiology of UTI**

Bacteria adherence to mucosal cells is a prerequisite to colonization and infection of mucosal surfaces including UTI .The interaction of the mucosal cell and the bacterium is probably dependent on receptors on the mucosal cell and some type of attachment mechanism employed by the bacteria. Infections result from ascending colonization of the urinary tract, primarily by existing vaginal, perineal, and faecal flora (Mittal & Wing, 2005). Various maternal physiologic and anatomic factors predispose to ascending infection. Such factors include urinary retention caused by the weight of the enlarging uterus and urinary stasis due to progesterone-induced ureteral smooth muscle relaxation. Blood- volume expansion is accompanied by increases in the glomerular filtration rate and urinary output (Mittal & Wing, 2005). Loss of ureteral tone combined with increased urinary tract volume results in urinary stasis, which can lead to dilatation of the ureters, renal pelvis, and calyces. Urinary stasis and the presence of vesicoureteral reflux predispose some women to upper urinary tract infections (UTIs) and acute pyelonephritis. Calyceal and ureteral dilatation are more common on the right side; in 86% of cases, the dilatation is localized to the right (Smeltzer et al.,2008). Differences in urine pH and osmolality and pregnancy induced glycosuria and aminoaciduria may facilitate bacterial growth sexual activity can traumatise the urothelium of the distal urethra, resulting in increased bacterial invasion(Mittal & Wing, 2005).

**Demographic differences in UTI occurrence**

Demographics, according to Cambridge International dictionary (2002), is the quantity and characteristics of the people in relation to their age, sex, and socioeconomic status. Demographic differentials in UTI among pregnant women are the differences in characteristics of the pregnant women in relation to their age, parity, gestational age, education and socioeconomic status. The current review makes an attempt to put forth the various factors that are considered to contribute to the occurrence of urinary tract infection. Host factors like age, parity, gestational age, education and economic status are being considered to know their effect in conferring UTI among pregnant women (Aiyegoro et al, 2017).

Age is the period of time someone has been alive or something has existed (Cambridge international dictionary, 2002). The elderly (women and men) are more prone to develop UTI because of incomplete emptying of the bladder and urine stasis which arises due to structural or functional abnormalities that occur with aging (Smeltzer et al., 2008).

Parity is number of healthy deliveries (concise medical dictionary, 2007). Multiparity is being considered as one of the demographic factors because the more children the woman has the more she is exposed to getting UTI, by acquiring it in the hospital (Lawani, Alade & Oyelaran, 2015).

Gestational Age is the age of pregnancy which is measured in weeks. This demographic factor is also being attributed as one of the factors which may lead to UTI because the physiologic changes in pregnancy which encourage bacteria multiplication become more profound with advancing gestation( Adekunle and Adetokunbo 2014).

Economic status is the differences between groups of people due to their financial situation (Cambridge International Dictionary 2002). In this study economic status is the level of financial status of the women attending antenatal care in UNTH. Educational level is the extent which people attain in their educational achievement (Cambridge International Dictionary 2002). The levels of education can be divided into primary, secondary and tertiary educational levels. The women with high level of education are not prone to UTI because they are more likely to practice good personal hygiene when compared with women with low educational level, Faidah et al ( 2012).

**The Prevalence Of-Urinary Tract Infection In Type 2 Diabetes Mellitus-Patient**

Urinary tract infections (UTIs) are a common complication in individuals with Type 2 Diabetes Mellitus (T2DM). The prevalence of UTIs in T2DM patients is significantly higher compared to the general population due to a combination of metabolic, immune, and structural factors inherent in the disease. Understanding the mechanisms and factors contributing to this increased susceptibility is crucial for improving patient outcomes and managing the risk of UTIs in this vulnerable population. One of the primary factors contributing to the high prevalence of UTIs in T2DM patients is hyperglycemia. Chronic hyperglycemia leads to glycosuria, a condition where excess glucose is excreted in the urine. This glucose-rich environment in the urinary tract serves as an ideal medium for bacterial growth, thereby increasing the risk of infection (Geerlings, 2015). Bacteria, particularly Escherichia coli, which is responsible for the majority of UTIs, thrive in the presence of glucose, leading to an increased frequency of infections in diabetic patients. T2DM is associated with multiple defects in the immune system, which significantly increase the susceptibility to infections, including UTIs. Hyperglycemia impairs the chemotactic and phagocytic activity of neutrophils, which are essential for the body’s defense against bacterial infections (Casqueiro et al., 2012). Additionally, there is an impairment in the production of cytokines, which are crucial for the coordination of the immune response. This immune dysfunction means that diabetic patients are less capable of fighting off infections once they occur, leading to more frequent and severe UTIs. Diabetic autonomic neuropathy, a common complication of T2DM, can lead to bladder dysfunction, also known as diabetic cystopathy. This condition is characterized by decreased bladder sensation, increased bladder capacity, and impaired bladder emptying (Brown et al., 2005). Incomplete bladder emptying results in urinary stasis, which provides a favorable environment for bacterial growth and increases the risk of developing UTIs. The inability to completely void the bladder allows bacteria to multiply, leading to infections that are often recurrent and difficult to treat. The level of glycemic control in T2DM patients is directly correlated with the risk of infections, including UTIs. Poorly controlled diabetes, marked by consistently high blood sugar levels, exacerbates all the aforementioned risk factors, making patients more susceptible to UTIs (Alemzadeh & Wyatt, 2021). Studies have shown that patients with higher HbA1c levels, an indicator of poor glycemic control, have a higher incidence of UTIs compared to those with better-controlled blood sugar levels (Patterson et al., 2017). Obesity, which is prevalent among T2DM patients, is another significant risk factor for UTIs. Obesity contributes to increased abdominal pressure and urinary incontinence, both of which can facilitate the entry of bacteria into the urinary tract (Nitzan et al., 2015). Furthermore, the physical changes associated with obesity, such as excess skin folds and increased sweating, can lead to poor hygiene, further increasing the risk of bacterial infections, including UTIs. The urinary pH of diabetic patients is often less acidic compared to non-diabetics. This alteration in pH reduces the natural defense mechanism against bacterial colonization in the urinary tract. The normal acidity of urine inhibits bacterial growth; however, in diabetic patients, this protective barrier is weakened, making them more prone to infections (Geerlings & Hoepelman, 2017). Additionally, T2DM patients often have an altered vaginal and urinary microbiome, which can predispose them to infections (Miller et al., 2016). T2DM is associated with microvascular and macrovascular complications, which can impair blood flow to various organs, including the kidneys and urinary tract. Reduced blood flow can compromise the local immune response and impair the healing process, making it easier for infections to take hold and more difficult to eradicate them (Forbes & Cooper, 2013). These vascular changes can lead to chronic infections that are resistant to standard treatments. Diabetic patients, particularly those with complications such as neuropathy and bladder dysfunction, may require catheterization more frequently than non-diabetic individuals. The use of catheters introduces a direct route for bacteria to enter the urinary tract, significantly increasing the risk of UTIs (Tambyah & Maki, 2000). This is especially concerning in T2DM patients, who are already at a higher risk of infections due to other factors.

Hormonal changes associated with T2DM, especially in postmenopausal women, can further increase the risk of UTIs. Reduced estrogen levels lead to changes in the vaginal flora, decreasing the number of lactobacilli that normally protect against infections (Geerlings et al., 2000). This makes postmenopausal women with diabetes more susceptible to UTIs compared to their non-diabetic counterparts. Additionally, women in general are more prone to UTIs due to anatomical differences, and this risk is exacerbated in those with diabetes. Many T2DM patients have multiple comorbid conditions such as hypertension, cardiovascular disease, and chronic kidney disease, which can further increase the risk of UTIs (Sampson et al., 2020). These conditions often require the use of multiple medications, which can affect bladder function and alter the normal flora of the urinary tract, thereby increasing the risk of infections.

**2.2 THEORETICAL FRAMEWORK**

**Web Of Causation Theory**

The theory used in this study is Web of causation theory (theory of multiple causation of disease) by Pettenkofer of Munich (1901). This theory is based on the assumption that agent, host and environmental factors will act and interact synergistically and act as joint partners in causing the disease. The theory originated from the field of medical epidemiology and emphasizes that host factors (like demographic factors - age, sex, ethnicity; biological - genetic factors, biochemical levels of cholesterol, immunological factors), Socio-economic factors- like education, occupation, stress, marital status. Lifestyle factors -personality traits, nutrition, physical exercise, use of alcohol), Environmental factors, physical, biological, social and spiritual components) and Agents which are the pathogens work together to cause disease. The theory also assumes that several factors form into groups or constellations to cause the disease and that a necessary or principal cause will be helped and complemented by other causes (predisposing, enabling, precipitating, reinforcing causes) making it sufficient to initiate the disease. Unless a necessary cause has enough support by other causes by means of their complementing and synergistic action, that cause can never become sufficient enough for disease initiation. Disease occurs only when the agent finds a susceptible host and favourable environment for interaction. These causal partners will not lose their identity and individuality while complementing necessary cause but just help the necessary cause. While doing so, these causal partners form a web of cumulative and synergistic action with the necessary cause to initiate the disease. That means when a necessary cause is fully complemented with its causal partners, it becomes sufficient enough to cause the disease.

**Health Belief Model**

The Health Belief Model (HBM) was developed in the 1950s by three notable scholars with social psychology backgrounds – Godfrey Hochbaum, Stephen Kegels and Irwin rosenstock. The model was furthered by Becker and colleagues in 1990s and 1980. Subsequent amendments to the model were made as late as 1988, to accommodate evolving evidence generated within the health community about the role that knowledge and perceptions play in personal responsibility (Glanz, Lewis and Rimer, 2002). It is one of the first, and remains one of the best known social cognition models. Originally, the model was designed to predict behavioural response to treatment received by acutely or chronically ill patients, but in more recent years the model has been used to predict attitude and communication a patient has towards a given medication. The health belief model includes the following constructs: Perceived Susceptibility, Perceived Severity, Perceived Barrier, Perceived Benefits, Perceived Control, and Perceived Threat. Hence, the prediction of the model is likelihood of the individual concerned to undertake recommended health action such as preventive and curative health actions. This HBM theory is so adopted because it suggests that individual belief in a personal threat together with one’s belief in the effectiveness of the proposed behaviour will predict the likelihood of that behaviour.

**Biopsychosocial Model**

The Biopsychosocial Model is a comprehensive approach to understanding health and illness, incorporating biological, psychological, and social factors. Biologically, T2DM is known to impair the immune system, making patients more susceptible to infections, including UTIs. High blood sugar levels can lead to glycosuria, which provides a favorable environment for bacterial growth in the urinary tract. Moreover, autonomic neuropathy, a common complication of T2DM, can result in bladder dysfunction, which further increases the risk of UTIs due to incomplete bladder emptying (Geerlings, 2016). Psychological factors, including stress and anxiety, can also play a role in the prevalence of UTIs among T2DM patients. Chronic stress is known to weaken the immune system, potentially increasing susceptibility to infections. Additionally, the psychological burden of managing a chronic condition like T2DM can lead to poor self-care practices, including inadequate hydration or poor glycemic control, which are risk factors for UTIs (Diener, Kuehner, & Flor, 2016). Social determinants of health, such as access to healthcare, socioeconomic status, and education, can significantly influence the prevalence of UTIs in T2DM patients. For instance, individuals with limited access to healthcare may not receive timely treatment for UTIs, leading to higher prevalence and complications. Additionally, lower socioeconomic status is often associated with poorer health outcomes, including a higher incidence of infections, due to factors like inadequate nutrition, limited access to clean water, and suboptimal living conditions (Adler & Newman, 2022). The Biopsychosocial Model emphasizes the need to consider the interplay of biological, psychological, and social factors in understanding the prevalence of UTIs in T2DM patients.

**Immunological Theory**

The Immunological Theory provides a framework for understanding how the immune system's function, or dysfunction, influences the susceptibility and progression of diseases, including infections like urinary tract infections (UTIs) in patients with Type 2 Diabetes Mellitus (T2DM). T2DM is characterized by chronic hyperglycemia, which leads to various complications, including an impaired immune response. The immune system's ability to respond to pathogens is compromised in individuals with T2DM, making them more susceptible to infections such as UTIs (Casqueiro, Casqueiro, & Alves, 2012). This immunological dysfunction is multifactorial and includes defects in both the innate and adaptive immune systems.

In the context of T2DM, the innate immune response is often compromised. Hyperglycemia can impair the function of neutrophils, which are crucial for the initial response to infections. Neutrophils from diabetic patients have been shown to exhibit reduced chemotaxis, phagocytosis, and microbial killing abilities. Additionally, the production of reactive oxygen species (ROS) is often impaired, reducing the ability of neutrophils to destroy pathogens effectively (Goldberg, 2009). This weakened first line of defense increases the risk of UTIs in T2DM patients. The adaptive immune response is also altered in T2DM. Chronic hyperglycemia can lead to glycation of proteins, including immunoglobulins, which impairs their ability to recognize and bind to antigens effectively. This glycation process reduces the efficacy of antibody-mediated immunity, leaving patients more vulnerable to infections like UTIs (Jafar et al., 2016). Moreover, T2DM is associated with a state of chronic low-grade inflammation, which can cause immune exhaustion, further reducing the ability of the immune system to mount an effective response to infections. T2DM is also linked to a dysregulated inflammatory response, characterized by increased levels of pro-inflammatory cytokines such as IL-6 and TNF-α. This chronic inflammatory state can exacerbate tissue damage in the urinary tract, making it more susceptible to colonization by uropathogenic bacteria. Furthermore, the altered inflammatory response can lead to a delayed or inadequate immune response, allowing infections to progress more easily (Pickup, 2004). The Immunological Theory highlights how the immune dysfunction associated with T2DM contributes to the increased prevalence and severity of UTIs in these patients.

**Ecological Systems Theory**

Ecological Systems Theory, developed by Urie Bronfenbrenner, emphasizes the complex interactions between individuals and their various environmental systems. This theory is particularly useful for understanding how different layers of a patient’s environment influence health outcomes, such as the prevalence of urinary tract infections (UTIs) in individuals with Type 2 Diabetes Mellitus (T2DM). The microsystem includes the immediate environment in which an individual lives, such as family, healthcare providers, and close social networks. For patients with T2DM, the quality of relationships within this microsystem significantly affects their health behaviors and outcomes. Supportive family members and effective healthcare providers can help ensure that patients adhere to diabetes management protocols, including maintaining good hygiene, following a healthy diet, and adhering to medication regimens, all of which can reduce the risk of UTIs (Bronfenbrenner, 1979). Conversely, a lack of support or dysfunctional relationships can lead to poor self-management, increasing UTI susceptibility. The mesosystem represents the interactions between different microsystems. For instance, the relationship between a patient’s family and healthcare providers can impact the management of T2DM. Effective communication between these entities can lead to better-coordinated care, improving the patient's ability to manage their condition and, by extension, reducing the risk of complications such as UTIs. On the other hand, poor communication or conflicts between these systems can result in inconsistent care, leading to suboptimal diabetes management and an increased risk of infections (Tudge et al., 2009). The exosystem includes broader social structures that do not directly involve the individual but still affect them. This can include a patient's workplace policies, community health services, and local healthcare infrastructure. For example, access to high-quality healthcare facilities and affordable medications plays a crucial role in managing T2DM and preventing UTIs. A patient living in a community with limited healthcare resources may experience delays in receiving care, increasing the likelihood of complications such as UTIs. Additionally, workplace stress or inadequate support systems can indirectly affect a patient's ability to manage their diabetes effectively (Bronfenbrenner, 2005). The macrosystem encompasses the broader cultural, socioeconomic, and policy environments that influence health outcomes. Cultural beliefs about healthcare, societal attitudes toward chronic illness, and national health policies all play a role in shaping how T2DM is managed and how vulnerable individuals are to infections like UTIs. For instance, in societies where there is stigma associated with diabetes, patients may be less likely to seek timely care, leading to higher rates of complications. Additionally, socioeconomic factors, such as poverty and lack of health insurance, can limit access to necessary healthcare services, increasing the prevalence of UTIs in T2DM patients (Neal & Neal, 2013). The chronosystem involves the dimension of time, including life transitions and historical events that can influence an individual's health. For T2DM patients, changes over time, such as the progression of diabetes or changes in healthcare policies, can affect their risk of developing UTIs. For example, as diabetes progresses, the risk of complications, including UTIs, typically increases. Additionally, historical events such as economic downturns can lead to reduced healthcare funding, which may affect access to necessary treatments (Bronfenbrenner & Morris, 2006). The Ecological Systems Theory provides a comprehensive framework for understanding how different environmental factors interact to influence the prevalence of UTIs in T2DM patients.

**2.3 EMPIRICAL REVIEW**

Lawani, Alade and Oyelaran (2015) conducted a study on urinary tract infection amongst pregnant women in Amassoma, Southern Nigeria. It was a prospective study among 138 pregnant women. Information on maternal age and gestational age was obtained using oral interview. Urine samples were collected and cultured within 24hours using standard loop technique on blood agar, CLED agar and macconkey agar. Data was analysed using Graphpad prism version 6.1 software. Differences within group were determined using Chi square. In relation to maternal age, it was observed that the incidence of bacteria was highest in the age group 34 and above (46.7%). Though it was not statistically significant, the reason could be due to the fact that many women within this age group are likely to have many children and this study reported that multiparity is a risk factor for acquiring bacteriuria in pregnancy. In this study, the frequency of urinary tract infection was higher in the third trimester compared to the first and second trimester. This is in agreement with Leigh and Sharma (2009) who reported an increased frequency of urinary tract infection in the third trimester compared to the first and second trimester of pregnancy.

Okonko et al. (2009) conducted a quasi-experimental study on incidence of urinary tract infection (UTI) among 80 pregnant women in Ibadan, South-Western Nigeria. Cross -sectional descriptive design was used and the demographic and clinical information of the subjects were obtained using a structured questionnaire. Urine samples were collected and cultured within 30 min to 1 hour of collection. A loopful of each urine sample was also streaked on MacConkey agar and Blood agar plate for the isolation of the bacteria present in the urine. The results of this study showed that 58.3% of the women who had UTIs have had more than 3 children; 43.7% were in their 2nd pregnancy and 42.5% were in their 1st pregnancy. This showed that parity is one of the possible factors affecting the incidence and prevalence rate of UTIs among women. UTI was high in pregnancy, (50%) Also a higher percentage of pregnant women (77.8%) with UTIs were found within the age brackets of 36-40 years while age groups 26-30 years had the least percentage (37.1%).In relation to occupation UTIs appear to be more prevalent among civil servants who constituted 77.8% of the pregnant women with UTIs, followed by teachers (70%), businesswomen (53.8%), traders (40.0%), professionals/artisans/full housewives (36.4%), and students appeared to be the least constituting 30.4% This study also showed that women in their 6th month (50.0%) and 7th month (71.4%) of their pregnancy had the higher incidence of UTI while women in their early month of the pregnancy had no specific bacteria growth and shows no sign of UTIs. Women in their 2nd and 3rd trimester were found to have a higher incidence of UTI; 41.4 and 55.1% respectively. However, this report did not agree with Onuh et al. (2006), who reported a higher prevalence of urinary tract infection in the second trimester compared to the third trimester. This difference may be as a result of either change in urinary stasis and vesico ureteral reflux or decrease in urinary progesterones and oestrogens in the various trimester of pregnancy.

Haider et al. (2010) studied risk factors of urinary tract infection in pregnancy in Liaquat University Hospital Pakistan. This was a comparative study and a total of 232 women were involved. Descriptive design was used, dipstick test was performed on midstream urine and urine was cultured. This study revealed that there was UTI among the participants. Parity was found to be a significant variable as 6(60%) patients were multiparous while 4(40%) were primigravida. Significant impact of economic class was seen with UTI as 8(80%) patients belonged to the lower economic group while 2 (20%) were from the upper economic group. Sexual activity was found to be a significant risk factor for UTI as 1(10%) patient with UTI was sexually active (who had intercourse in last 8 months, at least once per fifteen days) while 9 (90%) patients were not sexually inactive (no intercourse in last 8 months). Maternal age was not found to be a significant risk factor in this study.

Ashshi et al. (2012) studied Urinary Tract Infections in Pregnant Women, Assessment of Associated Risk Factors in Makkah, South Africa. The aim of the study was to assess different risk factors that may influence the infection among pregnant women in Makkah, South Africa. It was a cross-sectional comparative study. A total of 200 pregnant women who visited maternity and children hospital in Makkah were investigated. Personal data as well as medical history and some risk factors data were collected using a structured questionnaire. Midstream clean catch urine samples for urinalysis, and urine culture were collected from all investigated cases for diagnosis of UTI. The study revealed the presence of significant association between the advanced age (30 - Ã 40) (OR=1.2, 95% CI: 0.610-2.468) and the UTI. Meanwhile educational level (primary and secondary) represent a risk factor that significantly influence UTI among pregnant women (OR= 1.3; 95% CI: 0.590-3.008 and OR= 2.1; 95% CI: 1.020-4.499, respectively). Also, significant association (OR= 2.00; 95% CI: 0.362- 11.625) was found between high socio-economic level and UTI followed by low socio-economic level (OR= 1.3; 95% CI: 0.586-3.192). A significant association was found between the 3rd trimester stage of pregnancy and the occurrence of UTI among pregnant women (OR= 1.5; 95% CI: 0.765-3.075). In addition, significant association were reported between the increased number of previous deliveries (4-6 and 10-13 groups) and the occurrence of UTI among pregnant women (OR= 1.2; 95% CI: 0.556-2.666 and OR= 2.00; 95% CI: 0.362-11.625, respectively). No significant associated was found between the presence or the absence of complicated pregnancy history and the frequency of UTI among pregnant women.

Adekunle and Adetokunbo (2014) conducted a study on Prevalence and Predictors of Asymptomatic Bacteriuria in HIV Positive Pregnant Women in a clinic at Sagamu, Ogun State. This was a qausi experiment on 211 HIV-positive pregnant women. A cross-sectional descriptive design was used. Information on the socio- demographic characteristics, genotype and CD4 count of the participants were collected using questionnaire. Out of the total of 211 HIV- positive pregnant women recruited for the study, 66 urine samples had significant bacteriuria giving a prevalence of 31.3% for asymptomatic bacteriuria. There was a significant rise in prevalence of asymptomatic bacteriuria among respondents in the 36-45 age group when compared to the lower age groups. This pattern was noted to be statistically significant ( χ2 = 14.36; p = 0.001). There was however no statistically significant association of the educational level and type of marriage of respondents on the prevalence of asymptomatic bacteriuria. Respondents classified as being of high socio-economic status had a higher prevalence of asymptomatic bacteriuria when compared to those classified as being of low or medium socio-economic class. This pattern was noted to be statistically significant (χ2 = 10.267; p = 0.006). The parity and genotype of respondents had no statistically significant association with the prevalence of asymptomatic bacteriuria. The gestational age and packed cell volume

of respondents had no statistically significant association with the prevalence of asymptomatic bacteriuria.

Onuoha and Fatokun (2014) studied prevalence and antimicrobial susceptibility pattern of urinary tract infection (UTI) among pregnant women in Afikpo, Ebonyi State. It was a cross-sectional comparative study among 200 pregnant women with UTI attending the outpatient clinics between April-August 2013.Clean midstream urine samples were collected and Urinalysis with culture and sensitivity test was the major diagnostic measure were carried out, information on their age, gestational age, gravidity, parity, level of education and residence were also collected using questionnaire. The study revealed that age group within the range of 27-32 years recorded the highest incidence of UTI, whereas those of them above 39 years showed the least incidence.Housewives constituted 77.3% of the studied population with 63.6% living in rural areas. Also, patients’ with primary level of education made up 45.5% and only 29.1% attend antenatal care regularly, with about 61.8% showing no concern for antenatal services. Going by their obstetric history, 72.7% of the infected women were multigravida, those who had 1-4 children constituted 47.3%, while the grandmultiparous (≥ 5children) women made up about 22.7%. Short child spacing (less than 2 years birth space) was recorded among 36.4% of the antenatal patients evaluated. This showed that maternal age, parity, morbid obesity and socio- economic status are risk factors for UTI among pregnant women.

Shahira, Hanan, Nagla , Moustafa and Mohamed (2007) investigated on Urinary Tract Infection and Adverse Outcome of Pregnancy in Egypt, among 249 pregnant women attending the ante natal care in a rural clinic annex of Zagazig university hospital. The aim of this study was to determine the incidence of UTIs during pregnancy, identify the main risk factors associated with such infections and evaluate the impact of these infections on some pregnancy outcomes. The women demographic characteristics were collected using a structured questionnaire. Midstream clean catch urine samples for urinalysis, and urine culture were collected from all participants. Descriptive statistics was used for data analysis. The study revealed that some socio-demographic characteristics had been significantly associated with developing the UTI with pregnancy, namely; age being 30 years and more, illiterates and those with low level of education, low economic level, unsatisfactory personal hygiene and those who wear underpants other than cotton.

**CHAPTER THREE**

**RESEARCH METHODOLOGY**

**3.1 INTRODUCTION**

In this chapter, we described the research procedure for this study. A research methodology is a research process adopted or employed to systematically and scientifically present the results of a study to the research audience viz. a vis, the study beneficiaries.

**3.2 RESEARCH DESIGN**

Research designs are perceived to be an overall strategy adopted by the researcher whereby different components of the study are integrated in a logical manner to effectively address a research problem. In this study, the researcher employed the survey research design. This is due to the nature of the study whereby the opinion and views of people are sampled. According to Singleton & Straits, (2009), Survey research can use quantitative research strategies (e.g., using questionnaires with numerically rated items), qualitative research strategies (e.g., using open-ended questions), or both strategies (i.e., mixed methods). As it is often used to describe and explore human behaviour, surveys are therefore frequently used in social and psychological research.

**3.3 POPULATION OF THE STUDY**

According to Udoyen (2019), a study population is a group of elements or individuals as the case may be, who share similar characteristics. These similar features can include location, gender, age, sex or specific interest. The emphasis on study population is that it constitute of individuals or elements that are homogeneous in description.

This study was carried out to assess the prevalence of-urinary tract infection in type 2 diabetes mellitus-patient using Federal Teaching Hospital Lokoja. Healthcare professionals in general hospital, Federal Teaching Hospital Lokoja. form the population of the study.

**3.4 SAMPLE SIZE DETERMINATION**

A study sample is simply a systematic selected part of a population that infers its result on the population. In essence, it is that part of a whole that represents the whole and its members share characteristics in like similitude (Udoyen, 2019). In this study, the researcher adopted the convenient sampling method to determine the sample size.

**3.5 SAMPLE SIZE SELECTION TECHNIQUE AND PROCEDURE**

According to Nwana (2005), sampling techniques are procedures adopted to systematically select the chosen sample in a specified away under controls. This research work adopted the convenience sampling technique in selecting the respondents from the total population.

In this study, the researcher adopted the convenient sampling method to determine the sample size. Out of the population of healthcare professionals in Federal Teaching Hospital Lokoja, the researcher conveniently selected one hundred and forty-seven (147) participants as the sample size for this study. According to Torty (2021), a sample of convenience is the terminology used to describe a sample in which elements have been selected from the target population on the basis of their accessibility or convenience to the researcher.

**3.6 RESEARCH INSTRUMENT AND ADMINISTRATION**

The research instrument used in this study is the questionnaire. A survey containing series of questions were administered to the enrolled participants. The questionnaire was divided into two sections, the first section enquired about the responses demographic or personal data while the second sections were in line with the study objectives, aimed at providing answers to the research questions. Participants were required to respond by placing a tick at the appropriate column. The questionnaire was personally administered by the researcher.

**3.7 METHOD OF DATA COLLECTION**

Two methods of data collection which are primary source and secondary source were used to collect data. The primary sources was the use of questionnaires, while the secondary sources include textbooks, internet, journals, published and unpublished articles and government publications. The reason for using both primary and secondary source of data is, so that the researcher will have concrete and more valid answers to the research questions

**3.8 METHOD OF DATA ANALYSIS**

The responses were analysed using the frequency percentage tables, which provided answers to the research questions. In analysing data collected, mean score was used to achieve this. The four points rating scale will be given values as follows:

SA = Strongly Agree 4

A = Agree 3

D = Disagree 2

SD = Strongly Disagree 1

**Decision Rule:**

To ascertain the decision rule; this formulae was used

|  |
| --- |
| 4+3+2+1 =10  **= 2.5**  4 4 |

Any score that was 2.5 and above was accepted, while any score that was below 2.5 was rejected. Therefore, 2.5 was the cut-off mean score for decision taken. The hypotheses will be tested using the t-test statistical tool.

**3.9 VALIDITY OF THE STUDY**

Validity referred here is the degree or extent to which an instrument actually measures what is intended to measure. An instrument is valid to the extent that is tailored to achieve the research objectives. The researcher constructed the questionnaire for the study and submitted to the project supervisor who used his intellectual knowledge to critically, analytically and logically examine the instruments relevance of the contents and statements and then made the instrument valid for the study.

**3.10 RELIABILITY OF THE STUDY**

The reliability of the research instrument was determined. The Pearson Correlation Coefficient was used to determine the reliability of the instrument. A co-efficient value of 0.68 indicated that the research instrument was relatively reliable. According to (Taber, 2017) the range of a reasonable reliability is between 0.67 and 0.87.

**3.11 ETHICAL CONSIDERATION**

The study was approved by the Project Committee of the Department. Informed consent was obtained from all study participants before they were enrolled in the study. Permission was sought from the relevant authorities to carry out the study. Date to visit the place of study for questionnaire distribution was put in place in advance.

**CHAPTER FOUR**

**DATA PRESENTATION AND ANALYSIS**

**INTRODUCTION**

This chapter presents the analysis of data derived through the questionnaire and key informant interview administered on the respondents in the study area. The analysis and interpretation were derived from the findings of the study. The data analysis depicts the simple frequency and percentage of the respondents as well as interpretation of the information gathered. A total of one hundred and forty-seven (147) questionnaires were administered to respondents of which only one hundred and forty-one (141) were returned and validated. This was due to irregular, incomplete and inappropriate responses to some questionnaire. For this study a total of 141 was validated for the analysis.

**4.1 DATA PRESENTATION**

**Table 4.1: Demographic profile of the respondents**

|  |  |  |
| --- | --- | --- |
| **Demographic information** | **Frequency** | **percent** |
| **Gender**  Male |  |  |
| 66 | 46.80% |
| Female | 75 | 53.19% |
| **Age** |  |  |
| 25-30 | 44 | 31.20% |
| 31-35 | 56 | 39.7% |
| 36-40 | 25 | 17.73% |
| 41+ | 16 | 11.34% |
| **Marital Status** |  |  |
| Single | 52 | 36.87% |
| Married | 74 | 52.48% |
| Separated | 15 | 10.63% |
| Widowed | 0 | 0% |
| **Education Level** |  |  |
| Bsc | 100 | 7.09% |
| MS.c | 30 | 14.18% |
| ph.D | 11 | 7.80% |

**Source: Field Survey, 2024**

**4.2 ANALYSIS OF RESEARCH QUESTION**

**Question 1: What is the prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM)?**

**Table 4.2:** Respondent onquestion 1

|  |  |  |
| --- | --- | --- |
| **Options** | **Frequency** | **Percentage** |
| Very prevalent | 75 | 53.19 |
| Not prevalent | 30 | 21.27 |
| Undecided | 36 | 25.53 |
| **Total** | **141** | **100** |

**Field Survey, 2024**

From the responses obtained as expressed in the table above, 53.19% of the respondents said very prevalent, 21.27% said not prevalent, while 25.53% were undecided.

**Question 2:** What factors contribute to the increased prevalence of UTIs in patients with T2DM?

**Table 4.3:** Respondents on question 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **SA**  **4** | **A 3** | **D 2** | **SD 1** | **X** | **S.D** | **DECISION** |
| 1 | Elevated serum and urine glucose levels | 40 | 45 | 33 | 23 | 3.2 | 5.78 | Accepted |
| 2 | Defective host immune factors | 60 | 51 | 26 | 04 | 3.4 | 5.91 | Accepted |
| 3 | Poor glycemic control | 50 | 45 | 23 | 23 | 3.2 | 5.8 | Accepted |
| 4 | Obesity | 78 | 50 | 08 | 05 | 3.5 | 5.7 | Accepted |

**Source: Field Survey, 2024**

In table 4.3 above, on factors contribute to the increased prevalence of UTIs in patients with T2DM, the table shows that all the items (item1-item4) are accepted. This is proven as the respective items (item1-item4) have mean scores above 2.50.

**Question 3: How effective are various preventive strategies in reducing the prevalence of UTIs in patients with T2DM?**

**Table 4.4:** Respondent onquestion 3

|  |  |  |
| --- | --- | --- |
| **Options** | **Frequency** | **Percentage** |
| High relevance | 68 | 48.22 |
| Low relevance | 33 | 23.40 |
| Undecided | 40 | 28.36 |
| **Total** | **141** | **100** |

**Field Survey, 2024**

From the responses obtained as expressed in the table above, 48.22% of the respondents said high relevance, 23.40% said low relevance, while 28.36% were undecided.

**4.3 TEST OF HYPOTHESIS**

**Decision Rule:**

Accept the alternate hypothesis if p-value is less or equal to .05. sig. Level.

Reject the null hypothesis if the p-value is greater than .05. sig. Level.

**Test of hypothesis One:**

**Ho:** There is no significant difference in the prevalence of urinary tract infections between type 2 diabetes mellitus patients and the general population.

**Table 4.10.** Two Sample t-test on the prevalence of urinary tract infections between type 2 diabetes mellitus patients and the general population

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Group | N | Mean | Std. Deviation | Std. Error | t-value | DF | P-value |
| type 2 diabetes mellitus patients | 51 | 7.48 | 4.95 | 50 | 9.034 | 308 | 0.001 |
| the general population | 90 | 15.32 | 7.08 | 0.71 |  |  |  |

*(critical value of t at DF(139) = 2.0)*

The table 4.10 above analyzed the difference in the prevalence of urinary tract infections between type 2 diabetes mellitus patients and the general population. The mean scores of the two groups are (M= 7.48, SD= 4.95) and (M= 15.32, SD= 7.08) respectively. The observed t-value for the test (9.034) is greater than the critical value of 2.0 at the probability level of 0.05. The observed P-value is 0.001 (P < 0.05). This means that there is a sufficient evidence to reject the null hypothesis. Therefore, the alternate hypothesis which states that there is a significant difference in the prevalence of urinary tract infections between type 2 diabetes mellitus patients and the general population is retained.

**CHAPTER FIVE**

**SUMMARY, CONCLUSION AND RECOMMENDATION**

**5.1 SUMMARY**

In this study, our focus was to assess the prevalence of-urinary tract infection in type 2 diabetes mellitus-patient. The study specifically was aimed at highlighting determine the prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM), investigate the factors contributing to the increased prevalence of UTIs in T2DM patients and evaluate the effectiveness of various preventive strategies for reducing the prevalence of UTIs in T2DM patients. A total of 141 responses were validated from the enrolled participants where all respondent are drawn from healthcare professionals in Federal Teaching Hospital Lokoja.

**5.2 CONCLUSION**

Conclusively, based on the evidence obtained in this study, there is a high prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM). In addition the study found that factors that contribute to the increased prevalence of UTIs in patients with T2DM includes, elevated serum and urine glucose levels, defective host immune factors, poor glycemic control and obesity. Lastly, the study revealed that the various preventive strategies have been effective in reducing the prevalence of UTIs in patients with T2DM .

**5.3 RECOMMENDATION**

Based on the responses obtained, the researcher proffers the following recommendations:

1. Healthcare providers should focus on improving patient education regarding diabetes management and UTI prevention. This can be achieved through regular educational sessions that involve both patients and their families.
2. Improving the collaboration between different healthcare providers, such as primary care physicians, endocrinologists, and urologists, can enhance the overall management of T2DM and prevent complications like UTIs.
3. Policy-makers should focus on improving access to healthcare services for T2DM patients, particularly in underserved communities. This can include increasing funding for diabetes care programs, expanding insurance coverage for preventive services, and implementing public health campaigns to reduce stigma associated with chronic illnesses.

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**APPENDIXE**

**QUESTIONNAIRE**

**PLEASE TICK [√] YOUR MOST PREFERRED CHOICE(S) ON A QUESTION.**

**SECTION A**

**PERSONAL INFORMATION**

**Gender**

Male ( )

Female ( )

**Age**

25-30( )

31-35( )

36-40( )

41+ ( )

**Marital Status**

Single ( )

Married ( )

Separated ( )

Widowed ( )

**Education Level**

BS.c ( )

MS.c ( )

MBA ( )

**SECTION B**

**What is the prevalence rate of urinary tract infections (UTIs) among patients diagnosed with Type 2 Diabetes Mellitus (T2DM)?**

|  |  |
| --- | --- |
| **Options** | **Please tick** |
| Very prevalent |  |
| Not prevalent |  |
| Undecided |  |

**SECTION C**

**What factors contribute to the increased prevalence of UTIs in patients with T2DM?**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **SA** | **A** | **D** | **SD** |
| 1 | Elevated serum and urine glucose levels |  |  |  |  |
| 2 | Defective host immune factors |  |  |  |  |
| 3 | Poor glycemic control |  |  |  |  |
| 4 | Obesity |  |  |  |  |

**SECTION D**

**How effective are various preventive strategies in reducing the prevalence of UTIs in patients with T2DM?**

|  |  |
| --- | --- |
| **Options** | **Please tick** |
| High relevance |  |
| Low relevance |  |
| Undecided |  |