Difference on the Incidence of Urinary Tract Infection (UTI) between Diabetic and Non-diabetic Women Admitted in Metro Cebu, Philippines

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Abstract

This paper evaluates the relationship of women who were admitted with urinary tract infection (UTI) and its relationship with diabetes in Metro Cebu. Accessing the medical log books of the different hospitals, it has been found out that 61% of those admitted of the infection have beyond the normal sugar level, possibly due to diabetes. Statistics also showed that there is a significant difference between those with and without diabetes among all hospitals. It has also been noted that cases of UTI are becoming more frequent in older women. This shows that in the said locality, there is a strong chance that UTI could be secondary disease due to high blood sugar level. However, other pertinent cause should not be ruled out. Hence, other diagnostic test results should be considered as inclusion to the probable cause of UTI.

***Keywords**:* diabetes, urinary tract infection, women, Cebu

1. Introduction

Urinary tract infection (UTI) is said to be a serious health problem affecting millions of people each year. This is a common bacterial infection in women of all ages. The risk of UTI increases with harmful changes in the immune system which also leads to the easier invasion and colonization in the lining of the bladder by uropathogens (U.S. Department of Health and Human Services, 2005).

Diabetes is one of the well-known associated factors and risk factors for UTI leading to overactive neurogenic bladder aside from sexual activity, urinary

retention, oestrogen deficiency and a prior history of UTI have been described in previous research (Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults, 2009).

The prosperity of the infection varies in different individuals, especially when there is underreporting from the patients having a risk of acquiring infections. Commonly recovered UTI isolates were *Enterococcus faecalis, Pseudomonas aeruginosa*, and *Staphylococcus aureus* and mostly *Escherichia coli* (E. coli) (Gupta, *et al.,* 2002). Eventually, varieties of factors are responsible for UTI in diabetic patients that include genetic susceptibility, damaged immune response, and inadequate glycemic control, duration of diabetes mellitus, diabetic microangiopathy, impaired leukocyte function, recurrent vaginitis, and anatomical and functional abnormalities of the urinary tract (Saleem and Daniel, 2011). This infection is most common in diabetic women due to the short urethra readily accessible to microorganisms from the vagina and rectum and the bladder has been confirmed also to possess an inherent resistance factor which is necessary for maintenance of uninfected state (Mahadeva, 2002).

Diabetes mellitus alters the genitourinary system where urinary tract infection can be a cause of severe complications ranging from dysuria (pain or burning sensation during urination), organ damage and sometimes even death due to complicated urinary tract infections (Casqueiro, *et al.,* 2012). It has a number of long term effects on the genitourinary system also. This effect predisposes to bacterial urinary tract infection (UTI) in the patient with diabetes (Nicolle, 2003). The prevalence of diabetes mellitus has increased over the past decades, and it is now approaching epidemic proportions. Worldwide, 371 million people have diabetes and it is estimated that by 2030 this number will reach up to 552 million (World Health Organization, 2003).

Diabetes can cause more serious health problems and more complications including heart disease, blindness, lower extremity amputations and most commonly kidney failure. There are a lot of symptoms that would totally trigger our body such as frequent urination, excessive thirst, unexplained weight loss, extreme hunger, sudden vision changes, tingling or numbness in hands or feet, feeling very tired much of the time, very dry skin, sores that are slow to heal and more infections than usual (National Diabetes Fact Sheet, 2011).

This study is concentrated to the correlation of diabetes with UTI in women admitted in different hospitals in Metro Cebu.

2. Methodology

2.1 Research Design

In this study, quantitative and descriptive methods of research were used in gathering, presenting and interpreting the data. This study used the non-probability sampling specifically the purposive sampling technique.

2.2 Research Environment

The chosen area for this study consists of the government hospitals of the four major cities in Metro Cebu area which are highly industrialized and urbanized cities, namely, the City of Cebu, Mandaue, Lapu-lapu, and Talisay.

2.3 Research Respondents

This study focuses on the women UTI patients of the four hospitals in Metro Cebu. Fifty UTI patients were chosen from each hospital to comprise a total of 200 respondents. From these 200 patients, the researchers identified those who have diabetes based on the laboratory test results as recorded in the hospitals' log book. The identity of the respondents were not disclosed.

2.4 Research Instruments

The Urinalysis and Chemistry Logbooks of each hospital were used to gather the data which are needed for the study.

2.5 Research Procedures

2.5.1 Gathering of Data

A letter was sent to the head of the hospital asking permission to conduct the said study. When approved, the researchers asked the assistance of the person in charge in the laboratory department to look into the records of the patients who were having the urinalysis test for the year 2009 to 2013. The

researchers took note of the patients who were having urinary tract infection (UTI).

From the list gathered, the researchers checked if the patient had undergone an FBS (Fasting Blood Sugar) test. Then the patients with UTI who were having FBS test were considered as the respondents of the study. Ten patients were chosen for each year. After the 50 patients were noted, the researchers looked into the result of the FBS test that determines whether the patient has diabetes or none.

2.6 Treatment of Data

Simple percentage, Chi square and One-Way ANOVA were used to treat the data in obtaining the percentage and significant differences between UTI patient with and without diabetes.

3. Results and Discussion

Figure 1 shows the comparison between the number of UTI with diabetes and without diabetes from 2009 – 2013. It is noted that patients with diabetes and UTI outnumbered those without diabetes. This result is supported by the findings of the previous study that the risk of infection is higher and urinary tract infections are serious clinical problem in patients with diabetes (Nicolle, 2006). It also implies that over the past years, there have been no significant decline of the cases of diabetes (with reference to UTI patience). Hence, it is important to have further measure to control the possible rise of diabetes within Metro Cebu.

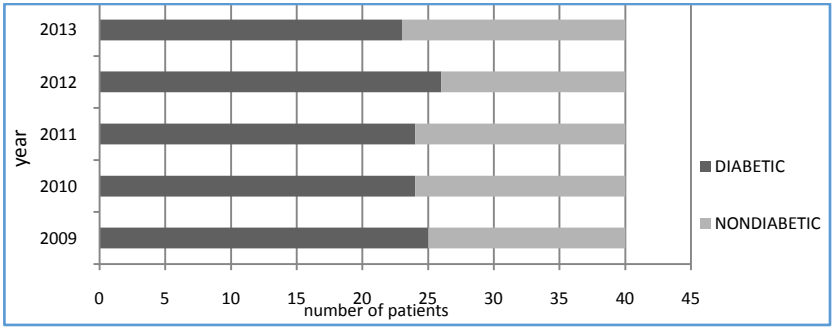

Figure1. UTI Patients with and without Diabetes from year 2009 – 2013

Table 1 shows the number of UTI patients with and without diabetes in the four hospitals. It shows that Lapu-lapu City District Hospital has the most number of patients with diabetes, which comprise 26% of the total number of diabetic patients while Cebu City Medical Center has the least number of diabetic patients which has only 24% of the total number of diabetic patients.

In the four hospitals, it is found out that majority of the UTI patients has diabetes. It is therefore tested whether there is a significant difference between the number of patients with diabetes and without diabetes using Chi-square test. The Chi-square test will determine the significance of the difference of the two given samples.

Chi square test in Table 2 showed that the number of those UTI patient with and without diabetes differs significantly.

Table 1. UTI patients with and without diabetes in four hospitals.

Hospitals	Diabetic		Non diabetic	
	Frequency	Percentage	Frequency	Percentage
Talisay City District Hospital	31	25.4%	19	24.4%
Cebu City Medical Center	29	23.8%	21	26.9%
Mandaue City District Hospital	30	24.6%	20	25.6%
Lapu-lapu City District Hospital	32	26.2%	18	23.1%
Total	122	100%	78	100%

Table 2. Computation on Chi-square Test.

Patient	Observed Frequency (fo)	Expected Frequency (fe)	Deviation (fo-fe)	Deviation squared (d^2)	d^2/fe	Computed value $\chi 2=\sum d^2/fe$	Tabled Value
Diabetic	122	100	22	484	4.84	9.68	3.841
Nondiabetic	78	100	-22	484	4.84		

Findings : The computed χ^2 (9.68) is greater than the tabled value (3.841).

Figure 2 shows the age range of the UTI patients with diabetes. It shows a directly proportional relation with age, wherein those with advance age tend to be more susceptible of acquiring UTI in diabetic women. The result affirms to the findings of Zamanzad and Moezzi in 2006, which showed that the age of patients was an important risk factor for developing UTI in diabetic women.

The findings in this study which show that UTI is common among old women with diabetes and seems to be a serious health problem for many of them. If this association is valid one should assess old women with UTI for underlying diabetes or other causes and medical intervention is important. This means that UTI in old women cannot be regarded as a trivial condition. When old women turn to the healthcare system with repeated UTI, the standard care should always include an examination of underlying causes; it should be mandatory and the focus should be on secondary prevention (Geerlings, *et al.*, 2002).

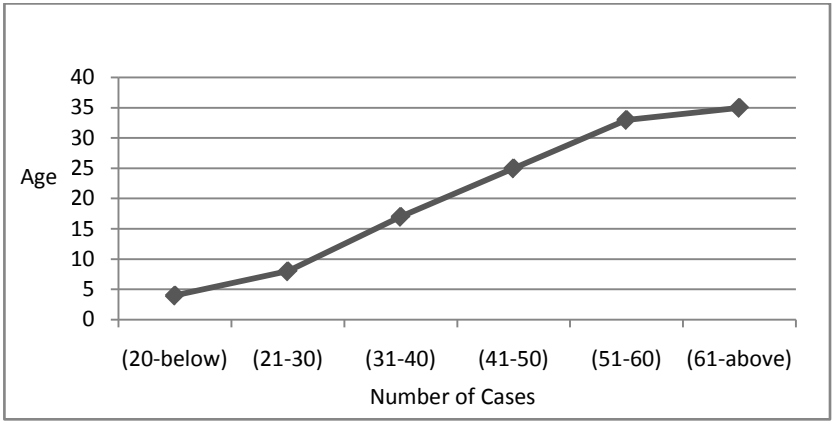

Figure 2. Age of UTI patients with diabetes.

Table 3 shows the number of percentage of UTI patients of the four different hospitals with diabetes from year 2009 to 2013. It shows that 2012 has the highest percentage of UTI patients with diabetes (21%) and year 2013 has the lowest percentage (19%). The number of UTI patients with diabetes of the four hospitals significantly differed within the five year data based on the findings using the One-Way ANOVA (F Ratio) test.

Table 3. UTI patients with diabetes in the four hospitals from 2009 to 2013.

Year	Talisay City District Hospital	Cebu City Medical Center	Mandue City District Hospital	Lapu-lapu City District Hospital	Total	Percentage
2009	6	7	6	6	25	20%
2010	5	6	6	7	24	20%
2011	5	6	6	7	24	20%
2012	8	4	7	7	26	21%
2013	7	6	5	5	23	19%
Total	31	29	30	32	122	100%

Table 4 shows the significant difference in the number of UTI patients with diabetes among the four hospitals. The difference between the numbers of UTI patients with diabetes among the four hospitals may be due to the geographical location of the four cities and the lifestyle of the people which contributes to their health conditions.

Table 4. Computation on One-Way ANOVA (F Ratio) Test.

Source of Variation	Sum of Square	Df	Mean Square	Computed Value (F ratio)	Tabled Value (F ratio)
Between Groups	558.9	(m) 3	186.3	177.43	3.2389
Within Groups	16.8	(n) 16	1.05		

Findings: The computed value (177.43) is greater than tabled value (3.2389)

4. Conclusions

Based on the data gathered, there is a significant difference between the number of UTI patients with diabetes and the number of UTI patients without diabetes. This means that most of the UTI patients have diabetes. Furthermore, the number of UTI patients with diabetes in the four hospitals significantly differs. The profile of the age of the patients with diabetes showed that the most of the older patients with UTI has diabetes. This implies that women of older age with diabetes are at high risk of having urinary tract infection.

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