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*Research Report*

# A study to evaluate the prevalence of chronic secondary illnesses in diabetic patients

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## Abstract

Diabetic patients are more susceptible to secondary diseases like neuropathy, nephropathy, retinopathy, cardiovascular disease and various other non-cardiovascular disorders. Long term diabetes promotes the risk for secondary diseases. In present study we evaluated the prevalence of cardiovascular disease (CVD), urinary tract infection (UTI), and neuropathy and liver diseases in diabetic patients. In the following research, a cross-sectional study of randomly selected diabetic patients was performed using a standardized questionnaire. We evaluated all patients of type II and type I diabetes mellitus with severe secondary disease that were followed in the outpatient clinic. The total of 970 patients was randomly selected divided into two broad groups. Group A had 552 male participants and group B had 480 female participants. Each subject was evaluated on the basis of their clinical data for the presence of neuropathy, nephropathy, CVD and liver diseases. Among 970 subjects, 67 male (12%) and 74 female participants (15.41%) were diagnosed with neuropathy, 98 male (17.7%) and 232 female (48.33%) with UTI, cardiovascular diseases found in 293 male (53.07%) and 82 female (17.08%) diabetic patients while 71 male subjects (12.86%) and 53 female patients (11.04%) with liver disease. In the conclusion, study was proving that CVD is most prevalent in diabetic male patients and UTI was found significantly more frequent secondary disease in female participants.

**Keywords:** Diabetes Mellitus, CVD, UTI, Peripheral Neuropathy
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## Introduction

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels (American diabetic association, 2012). Today diabetes is consider as an alarm for human health as its epidemic is increasing with aging, urbanization, smoking, inactive lifestyles and obesity (Elizabeth et al., 2013). Despite the methodological variations it has estimated that by 2025 the prevalence projection will be approximately 334 million people affected by DM worldwide (Wild *et al.,* 2004). Several studies have evidence that nearly 9 million individuals have been affected by diabetes in Pakistan and it can reaches to 11 million by 2025 while according to WHO Pakistan has ranked as 7$^{th}$ affected country with diabetes (Zafar *et al.,* 2016).

Diabetes mellitus type I and II is a chronic disorder characterized by metabolic disturbances predominantly presents with hyperglycemia and altered fat and protein metabolism mainly due to defective insulin pathways that involves sometime its secretion, and sometimes its actions or both (Kitabchi *et al.,* 2009). Diabetes is a long life chronic disorder that is not only described as high blood sugar levels but it can also cause lethal long-term complications (Verrotti *et al.,* 2012) like heart diseases, kidney failures, ulcerative disorders, retinopathies and stroke (Shera *et al.,* 2007). The most common complication of diabetes is cardiovascular disorders which affects nearly 65% of patients and causes death from angina, stroke and myocardial infarction (Nathan *et al.,* 2005). The other most common complication associated with both types of diabetes is highly frequent urinary tract infection (Muller *et al.,* 2005). Women are more prone to be affected by urinary tract infections as compare to their counterparts due to short length urethra, lack of prostate gland and infestation of microbiota (Awaness *et al.,* 2000). Due to weaken immune system kidneys are also affected by urinary tract infections in DM patients (Sarnak *et al.,* 2003). Other chronic illness conjugated with diabetes is peripheral neuropathy (Davies *et al.,* 2006). Based on this approach, this study was undertaken to investigate the prevalence of CVD, UTI, liver disorders, neuropathy and other infectious diseases in diabetic patients in urban areas of Karachi.

## Materials and methods

The cross sectional study was performed on diabetic mellitus patients presented with various secondary disorders. Total number of participants was 970 with average age of 67 years out of which 529 were male and 441 were female patients. The study comprised on questionnaire, data was

collected from different hospitals. Population chosen for the data collection mainly belonged to the urban areas of Sindh (Karachi). The diabetic patients were surveyed for the incidence of neuropathy, UTI, CVD and liver disease by evaluating the provided clinical data and physician diagnosis. The data was evaluated and calculated for prevalence.

## Results

Present research reveals that diabetic patients have shown gender based consequences of occurrence of secondary diseases. It has been observed that male patients were more prone towards cardiovascular disorders while the female subjects have greater tendency to develop urinary tract infections. In the current paper we proven that 12% males had neuropathy, 17% males had UTI and 53% males had CVD while 15% females had neuropathy, 48% females had UTI and 17% females had CVD. Liver diseases found in 12% male and 11% female diabetic participants (Table 1).

## Discussions

Diabetes nowadays consider as most lethal cause of various morbid illnesses such as heart diseases and stroke, although evident demographic, social factors and economic facts can be a positive harmful factors in the development of disease but that can be self-limitating by adopting health care activities and role of clinicians (Ramachandran *et al.,* 2012). Type II diabetes increases the risk factors for cardiovascular disease along with the development of related risk factors includes hypertension, altered lipid metabolism, obesity, sedentary life style and smoking (Lal *et al.,* 2012). Following research study showed that 53.07% of total selected male population has cardiovascular disease as most prevalent disorder as compare to other diseases. The main consequences of cardiovascular disease and other lethal disorders in men is increased with the metabolic syndrome which is major contributing factor for the development of diabetes due to insulin resistance, overweight and hyperlipidemia (Lakka *et al.,* 2002). It is evident through past researches that the most common cause of neuropathy is Diabetes Mellitus (DM) (Young *et al.,* 1993). Neuropathies are cause by a continuous nerve fiber dysfunction (Boulton *et al.,* 1998). Recent reports proves that about 26 % of type II DM presented with nerve damage at the time of diagnosis and annual increment rate is approximately by 2% (Davies *et al.,* 2004). In present study it is find that on average there is 67% of male patients and 74 % of female had diabetic neuropathy. Similarly UTI in the patient with diabetes is common finding, however maintaining the glucose levels at optimal levels can be helpful to prevent the complication of urinary tract. Bacterial urinary tract infections can be treated through proved clinical antimicrobial trials that predict about 80% and even 90% recovery component in UTI and diabetic individuals (Ronalda *et al.,* 2001). Women are more susceptible to having UTIs than male because women have short urethra which reduces the distance that bacteria must travel to reach a female's bladder. UTI in diabetes females due to infection by variety of organism etiologies causes 48.33% prevalence in this project that leads to high occurrence of morbidity in diabetic patients. There is a higher prevalence found in previous studies of renal infections and injuries in females (Geerlingsa *et al.,* 2013) as compared to diabetic males, despite no marked alterations in vascular processes, lipid metabolism, myoglobinurea and HbA1.

It has proven that diabetic patient have 10 to 3 fold at higher risk of UTIs (Goswamia *et al.,* 2001). These results of UTI can be manageable through public awareness and antibiotic therapy. The incidence of liver dysfunction and other infectious diseases were also reported with variable percentages in this article, which is about 71% in men and 53% in women and 23% and 39% respectively. However the relationship between liver disease and diabetes is unknown but its incidence is higher (Gaggini *et al.,* 2013). Both diseases share the same pathogenesis as lipid metabolism abnormalities and higher insulin resistance (Smith *et al.,* 2011). . The use of antioxidants can reduce the hepatic fibrosis and steatosis thus improves the toxicity.

**Conclusion**

It has been concluded that diabetes mellitus has an increasingly alarmingly public health concern that has present with multiple etiologies and can cause other chronic lethal disorders such as heart disease, neuromuscular disorder and kidney diseases etc. These disorders are lethal and cause mortality in both sexes. It has been observed that cardiovascular risks found to be more in male individuals as compared to their counterparts while female participants are more prone to developed urinary tract infections. However, the severity of diabetes and co existences of other medical complications can be reduced by knowledge of disease, by opting preventive measures and management of patient with possible primary and secondary treatment strategies.

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**Table 1: Prevalence various illnesses secondary to diabetes**

| Secondary diseases | Male | Female |
|---|---|---|
| | (n=529) | (n=441) |
| Neuropathy | 67(12) | 74(15.41) |
| UTI | 98(17.7) | 232(48.33) |
| CVD | 293(53.07) | 82(17.08) |
| Liver disease | 71(12.86) | 53(11.04) |

Values given in parenthesis are percentages.