Chapter 5
Comorbidities and Diabetes Type 2: A Gender-Driven Probabilistic Estimate of Patient's Risk Factor

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ABSTRACT

The prevalence of diabetes type 2 among the population and the increasing rate of new diagnoses as well as other co-morbidities make it imperative that we develop a richer understanding of type 2 diabetes. An Australian survey of diabetes type 2 people for different co-morbidities was carried out to obtain information about the possible connections of the co-morbidities with type 2 diabetes. The analysis is done with the logit model and Pearson's chi-square and the results indicate that gender, age of the patients, and the duration of the diabetes type 2 diagnosis play a significant role in the exposure of individuals to different comorbidities. The influence of the duration of diagnosis and age of the patients is limited in comparison to the gender, which has females at a very high risk of developing the studied co-morbidities compared to males. The findings can improve diabetes type 2 management to boost high quality, proactive, and cost-effective caregiving for the patients.

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1.0 INTRODUCTION

Diabetes is a chronic disease condition that results in the body's inability to effectively absorb the glucose it produces or when the pancreas is not able to produce sufficient insulin needed for the proper functioning of the body (WHO 2016). The menace can make it difficult for the body to effectively convert all monosaccharides and disaccharides sugar present in manufactured or cooked food including naturally occurring sugar in honey and fruits (WHO/FAO Expert Consultation 2003). Diabetes can be type 1 that is characterized by insufficient insulin production in the body (ADA 2005, Daneman 2006) or type 2, which results in the body's inability to effectively utilize the insulin produced by the pancreas (WHO 2016,ACCORD 2008). Type 1 diabetes is insulin-dependent and not preventable and exposes patients to excessive urination, taste, constant hunger, fatigue, weight loss, and vision impairments (WHO 2016). Diabetes type 2 has symptoms that are like type 1 but are not always pronounced hence, they may remain undiagnosed for an extensive period causing complications (WHO 2016).

In 2018, Over 500 million people are living globally with diabetes type 2 that has prevalence rate comparable among the poor and rich countries, but that is expected to increase over the next decade (Kaiser et al. 2018). Unfortunately, the ailment is a metabolic disease that is diagnosed on sustained hyperglycaemia and poses an elevated risk for heart problems, blindness, kidney failure, amputation, fractures, depression, arthritis, neuropathy, and cognitive decline (Kaiser et al. 2018, Laakso and Kuusisto 2007, Xie and Cheng 202, Coto-Segura et al. 2013, Solomon et al. 2011). The development of diabetes type 2 is associated with different environmental and genetic factors that increase insulin resistance. These factors could be linked to age, decreased exercise, and overweight especially the accumulation of intra-abdominal adiposity (WHO 2016, Gerich 2003, Kahn 2003, Xie and Cheng 2012).

The evidence of the increased risk factor of diabetes type 2 patients in the literature is numerous from many clinical trials. Goff Jr. *et al.* (2007) established the link between some of the comorbidities with the degree of hyperglycaemia by measuring the glycated haemoglobin level for 2 to 3 months. They concluded that a 1% increase in the glycated haemoglobin level resulted in 18% increase in the risk of cardiovascular diseases. Although the increase of glucose in diabetes type 2 patients can increase the chances of death, retinopathy, heart attack and stroke (WHO 2016, Laakso and Kuusisto 2007, Salvin et al. 2004), the use of intensive glycated haemoglobin reduction can result in the death of patients (ACCORD 2008). Juutilainen *et al.* (2005) investigated the risk of coronary heart disease mortality among diabetes type 2 patients without prior myocardial infarction and concluded that the risk of death among them is similar to non-diabetic type 2 patients with myocardial infarction. The authors also affirmed that the risk level is the same with men and women. However, women patients without coronary heart diseases such as myocardial infarction, angina pectoris, and ischemic ECG changes were at higher risk than non-diabetic patients with the same heart conditions (Juutilainen et al. 2005).

Other researchers have also associated diabetes type 2 with other diseases with Cheng *et al.* (2012) concluding that patients that suffer from psoriasis have a higher risk of developing diabetes type 2 more than those without the disease. Similarly, Coto-Segura *et al.* (2013) used metadata analysis to affirm that both psoriasis and psoriatic arthritis increase the risk of patients' susceptibility to diabetes type 2. Research has also shown that neuropathy is one of the common aftereffects of diabetes type 2 and impacts 1 in 6 patients (Daousi et al. 2004). Diabetic neuropathy affects the patients in the form of sensation loss and has been attributed to neuropathic ulcers and amputation (Poncelet 2003, Vileikyte et al. 2004). This finding concurs with the conclusions of Davies *et al.* (2006) that affirmed that chronic painful diabetic peripheral neuropathy negatively affected the quality of life of diabetes type 2 patients.