

CHAPTER I

INTRODUCTION

1.1. Background

Diabetes mellitus is a group of metabolic disorders characterized and identified by the presence of hyperglycemia in the absence of treatment. The heterogeneous etiopathology includes defects in insulin secretion, insulin action, or both, and disturbances of carbohydrate, fat, and protein metabolism (WHO, 2019). Diabetes foot ulcers are one of the most prevalent and dangerous complications of diabetes mellitus. These ulcers are linked to a high rate of death, morbidity, and the possibility of foot amputation. (Jarl et al., 2019).

According to WHO in 2019, there were 422 million adults with diabetes in the world in 2014, and there will be at least 629 million people living with diabetes by 2045 (WHO, 2019). While the prevalence of diabetes in Indonesia was 1.63% in 1983, 5.7% in 2007, and 6.0% in 2030 (Yusuf et al., 2016), the international diabetes federation IDF estimates that the total adult population of Indonesia will be 172,244,700 in 2020. And the prevalence of diabetes in adults is 6.2%, with total cases of diabetes in adults of 10,681,400 (IDF, 2020). This indicates a rapid increase in the prevalence of diagnosed diabetes per year, which may lead to an increase in the incidence of diabetic foot ulcers (DFU). (Yusuf et al., 2016). Every year, between 9.1 and 26.1 million people worldwide develop diabetic foot ulcers. The majority of individuals who developed foot ulcers were over 45 years old. (Oliver and Mutluoglu, 2020).

DFU is one of the most prevalent diabetic complications. Amputation is 10 to 20 times more common in diabetics than in non-diabetics, and it is estimated that a lower leg is amputated partially or completely every 30 seconds around the world. (IDF, 2019).

The pathophysiology of diabetes mellitus is characterized by neuropathy, vasculopathy, and immunological suppression. Increased blood glucose levels can cause glycosylation proteins in nerve cells in the foot, resulting in ischemia and cellular disruptions that can damage motor, sensory, and autonomic neurons. As the foot's sensory and motor function deteriorates, the risk of infection rises, followed by skin ulcers and gangrene. In diabetic foot ulcers (DFU) , immune alterations will slow the healing process. (Aumiller and Dollahite, 2015). Diabetic individuals can develop also infections, which can increase the incidence of amputations, disability, prolonged hospitalization, and death (Bekele and Chelkeba, 2020).

DFU patients suffers from stigma, loss the job, socail isolation also patients encounter distoration of boday image ,loss of productivity with high cost trating and caring and also the moratlity after amputation will increase from 39% to 80% (Atosona and Larbie, 2019). To avoid these health and social difficulties, we need to find out the risk factors of DFU and the way to prevent the DFU complications.

Age, male gender, lipid abnormalities, hypertension, neuropathy, nephropathy, poor glycaemic control, white blood cell count, and ulcer size are all risk factors for amputation among diabetic patients. (Namgoong et al, 2016).

According to study in 2018, there are 65-75 percent of foot diabetic ulcer patients who visit the clinic the ulcer heals, while 15-20 percent of FDU patients require amputation (Vadiveloo et al, 2018). As a result, it is critical to treat and prevent these problems. There are several strategies to lessen the risk of amputation by taking care of DFU, such as decreasing blood pressure, cleaning the foot, and controlling blood glucose levels with a healthy diet that reduces carbohydrate and fat food consumption (Fu XJ et al, 2021). and also multidisciplinary approach can reduce the high morbidity and serious complications (Yazdanpanah et al, 2015).

Dyslipidemia is one of the most common risk factors for DFU. Cardiovascular disease (CVD) with dyslipidemia and atherogenic abnormalities is frequent in persons with type 2 diabetes (Shankarprasad et al ,2015). Diabetic patients with lipid abnormalities usually termed “diabetic dyslipidemia”, are characterized by high total cholesterol (T Chol), high triglycerides (Tg), low high density lipoprotein cholesterol (HDL-C) and increased levels of small dense LDL particles. Also Low density lipoprotein cholesterol (LDL-C) levels may be can increase or can be normal (Bhowmik et al, 2018). These are not separate components of atherogenic dyslipidaemia, but they are linked to each other (Márk and Dani, 2016). the different results of lipid profile arise from the different pattern of dyslipidemia which can arise from the different factors according to ethnic group, access to health care and economic level for the patients (Bhowmik et al, 2018).

According to Erli Pei et al, a low HDL cholesterol level is linked to diabetic foot, hence efforts to raise HDL cholesterol levels should be made to prevent diabetic foot (Pei et al, 2014). according to Ikura K. et al, Lower HDL cholesterol levels may be an independent predictor of lower extremity amputation (LEA) and wound-related death in patients with DFU (Ikura et al, 2015).

According to another study the most common serum lipid abnormality in diabetic populations, is a high level of TG. the TG level increase in case of hyperinsulinemia not by hyperglycemia which compensated by insulin resistance. (Hirano, 2018). while according to Robbins 2017 Dyslipidaemia, mainly elevated LDL. and HDL considered to have role in the atherogenesis that can lead for downstream ischemia, and eventually necrotic wound in DFU (Robbins, 2017).

Many studies have linked lipid profiles to the risk of diabetes mellitus, however there is a paucity of recent research linking the lipid profile of a diabetic foot ulcer to the risk of amputation. Moreover, not all of the research listed are close in terms of lipid profiles in diabetic individuals. Knowing the correlation between lipid profile for amputated and non amputated diabetic foot ulcer patients have clinical and public health importance and such data can potentially form the basis for prevention programs and prognosis for diabetic foot ulcer patients and patients who have high risk for amputatin in indonesia .

This paper aims to compare the lipid profile for amputated and non amputated diabetic foot ulcer patients among DFU patients in doctor seotomo hospital in surabaya and investigate whether the amputated patients have higher lipid profile than healed patients from DFU.

1.2. Problem Formulation

Is There any difference among total cholesterol, LDL cholesterol, HDL cholesterol and TG between amputated and non amputated DFU patients ?

1.3. Research Objectives

Based on the above problem formulation, the purpose of this research is: -

1.3.1. General Objective

To analyze the difference of total cholesterol, LDL cholesterol, HDL cholesterol and TG between amputated and non amputated DFU patients.

1.3.2. Specific Objective

1.3.2.1. To describe the clinical characteristic amputated and non amputated DFU .

1.3.2.2. To analyze the difference of total cholesterol with amputation in DFU

1.3.2.3. To analyze the difference of LDL cholesterol with amputation in DFU

1.3.2.4. To analyze the difference of HDL cholesterol with amputation in DFU

1.3.2.5. To analyze the difference of TG with amputation in DFU

1.4. Research Benefits

1.4.1. Theoretical Benefit

- To study the pathophysiology and the risk factor of DFU related to high total cholesterol, high LDL cholesterol, low HDL cholesterol and high TG
- To prove the role of Lipid profile as a risk factor for amputation in DFU patients
- To update the knowledge of the prevalence of patients with DFU at Dr. Soetomo General Hospital.
- To update the knowledge of the difference of lipid profile between amputated and non-amputated DFU patients

1.4.2. Practical Benefit

- Medical doctors will be able to use the knowledge of the difference in lipid profile in amputated and non amputated DFU patients.
- Medical doctors will be able to make prognosis about the health status of DFU patients according to lipid profile.