HARMONY AND HEALTH: APPROACH TO IDENTIFYING RISK FACTORS AND COMPLICATIONS OF DIABETES MELLITUS

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ABSTRACT
Diabetes mellitus, commonly referred to as diabetes, is a chronic condition characterized by lifelong affliction. This study employs the literature review methodology, wherein researchers undertake a systematic examination of a range of current publications encompassing diverse genres. The objective of this study is to explore diverse concepts and theories that can subsequently be formed to align with the research objectives. Diabetes mellitus (DM) is a chronic metabolic condition with several causes, characterized by elevated blood glucose levels and associated metabolic dysregulation of carbohydrates, lipids, and proteins due to insufficient insulin activity. Diabetic foot is recognized as a notable consequence of diabetes mellitus. The management of diabetic foot can be improved with the implementation of foot workouts. Typically, individuals diagnosed with diabetes mellitus have access to several treatment options, including insulin therapy, administration of diabetic medications, exploration of alternative treatments, consideration of surgical interventions, and adoption of a healthier lifestyle.

Keywords: risk factors, diabetes mellitus, complications

ABSTRAK

Kata kunci: faktor risiko, diabetes mellitus, komplikasi
INTRODUCTION

Diabetes mellitus or diabetes is a chronic disease that can be suffered for life. Diabetes Mellitus (DM) is caused by system disorders that occur in the organ system characterized by an increase in blood sugar or often referred to as hyperglycemia conditions caused by a decrease in the amount of insulin from the system [1]. DM can cause various complications both macrovascular and microvascular. DM disease can cause cardiovascular disorders which is a fairly serious disease if not immediately given treatment so that it can increase hypertension and heart infarction [2].

Indonesia is the fourth country with the highest number of people with diabetes after the United States, China and India [3]. In addition, people with DM in Indonesia are expected to increase rapidly by 2-3 times in 2030 compared to 2000. WHO (World Health Organization) also stated that, the world is now inhabited by 171 million people with DM and will increase twice become 366 million in 2030 [4]. The Data and Information Center of the Indonesian Ministry of Health also states that the latest estimate of IDF (International Diabetes Federation) in 2035 there will be 592 million people living with diabetes in the world [5].

Diabetes has 2 types, namely type 1 diabetes mellitus which is the result of an autoimmune reaction to pancreatic islet cell proteins, then type 2 diabetes which is caused by a combination of genetic factors associated with impaired insulin secretion, insulin resistance and environmental factors such as obesity, overeating, undereating, exercise and stress, and aging [6]. Exercise or physical activity is useful for controlling blood sugar levels and weight loss in patients with diabetes mellitus. The great benefits of exercise in diabetes mellitus include lowering blood glucose levels, preventing obesity, playing a role in overcoming complications, blood lipid disorders and increased blood pressure [7].

Diabetes is often caused by genetic factors and a person's behavior or lifestyle. In addition, social environmental factors and health service utilization also lead to diabetes and its complications. Diabetes can affect various organ systems of the human body over a period of time, called complications. Diabetes complications can be divided into microvascular and macrovascular. Microvascular complications include nervous system damage (neuropathy), renal system damage (nephropathy) and eye damage (retinopathy) [8].

Risk factors for type 2 diabetes mellitus include age, physical activity, exposure to smoke, Body Mass Index (BMI), blood pressure, stress, lifestyle, family history, HDL cholesterol, triglycerides, gestational DM, history of glucose abnormalities and other abnormalities and people who have a body weight with an obese level have a 7.14 times risk of developing type two DM disease when compared to people who are at an ideal or normal weight [3,9,10].
According to the Islamic view, diabetes mellitus is a disease of the pancreas and a disorder of its function that can cause various disabilities and other dangerous complications so that sufferers will generally experience a decrease in the quality of life. Diabetes mellitus can cause obstacles to the maintenance of the objectives of Islamic law (Maqashid asSyariah), which include the maintenance of life, mind, property, religion and offspring. Meanwhile, according to the health view, fasting can reduce excess sugar levels in the body. Therefore, diabetes mellitus requires treatment [11].

In various narrations, the Prophet Muhammad SAW had treated himself and had ordered his family and friends to seek treatment when sick. Diabetes is a disease that can be caused by an unhealthy lifestyle, such as eating and drinking irregularly. So it is natural that the Prophet Muhammad SAW suggested fasting so that the body becomes healthy [12].

For people with diabetes, it is recommended to maintain their diet or commonly referred to as a diet. Diet is one of the main forms of treatment. Diabetes can be cured by fasting. By fasting, a person can reduce the portion of food every day. The purpose of fasting is to maintain the stability of blood sugar levels, and it is recommended to check with a doctor to measure blood sugar levels. This method is done in order to control blood sugar levels. Blood conditions are not balanced if diabetics constantly consume foods that contain a lot of sugar. If the patient has self-discipline not to consume sweet foods and is diligent in fasting, then he does not need to worry about the disease he is suffering from. But please note that not all diabetics are allowed to fast. There are certain patient conditions that are allowed to fast, for example diabetics who can control blood glucose levels with food planning and exercise [13].

**METHOD**

This research used the literature review method, where researchers conduct a series of studies involving various types of existing journals with the aim of finding various types of ideas and theories which can then be formulated in accordance with the research objectives. The search for the necessary sources used electronic site search programs such as Google Scholar, PubMed, Springerlink, and Science Direct with the keywords Diabetes from an Islamic and health perspective. Some articles that have been obtained are selected based on the publication time with a span of the last 10 years (2014–2021) published in Indonesian and English. The literature review in this study was conducted to explore diverse concepts and theories that can subsequently be formed to align with the research objectives.
### Table 1. List of Literature

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<th>No.</th>
<th>Researchers Name</th>
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<th>Journal and Year of Publication</th>
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<td>1.</td>
<td>Dita Wahyu Hestiana</td>
<td>Factors Associated with Adherence to Dietary Management in Outpatients with Type 2 Diabetes Mellitus in Semarang City <em>(Faktor-Faktor yang Berhubungan Dengan Kepatuhan Dalam Pengelolaan Diet Pada Pasien Rawat Jalan Diabetes Mellitus Tipe 2 Di Kota Semarang)</em></td>
<td>Journal of Health 2 (2) (2017)</td>
<td>The management of type 2 DM includes meal planning or diet, physical activity, blood sugar control, and medication. The prevalence of type 2 DM cases reaches 85-90%. In Tlogosari Wetan Health Center, type 2 DM cases are the top 5 highest cases in Semarang City. The type of research used was a cross-sectional study with a population of all patients with type 2 DM in 2016 (July 1 - December 31) and the sample size was 57 respondents. Measurement of dietary management was done using a questionnaire. The results showed there was a relationship between age (p role of health workers (p: 0.7). Factors associated with adherence in dietary management of type 2 DM were age, gender, and family role [14].</td>
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<td>2.</td>
<td>Lestari, Zulkarnain, Aisyah Sijid</td>
<td>Diabetes Mellitus: Review of Etiology, Pathophysiology, Symptoms, Causes, How to Test, How to Treat and How to Prevent <em>(Diabetes Mellitus: Review Etologi, Patofisiologi, Gejala, Penyebab, Cara Pemeriksaan, Cara Pengobatan dan Cara Pencegahan)</em></td>
<td>Prosiding Biologi Achieving the Sustainable Development Goals with Biodiversity in Confronting Climate Change Gowa, 08 November 2021</td>
<td>Diabetes mellitus or commonly called diabetes is a chronic disease that can be suffered for life. There are 2 types of diabetes, namely type 1 diabetes mellitus which is the result of an autoimmune reaction to pancreatic islet cell proteins, then type 2 diabetes which is caused by a combination of genetic factors associated with impaired insulin secretion, insulin resistance and environmental factors such as obesity, overeating, under-eating, exercise and stress, and aging. This review discusses the etiology, pathophysiology, symptoms, causes, examination, treatment and prevention of diabetes mellitus [15].</td>
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<td>3.</td>
<td>Zaenab M. Syahid</td>
<td>Factors Associated with Diabetes Mellitus Treatment Adherence <em>(Faktor yang Berhubungan dengan Kepatuhan Pengobatan Diabetes Mellitus)</em></td>
<td>Jurnal Nursing Update Vol. 12 No.4 (2021)</td>
<td>This literature study was conducted by analyzing Indonesian-language scientific articles published from 2015. Then after journal selection, 6 qualitative articles were obtained that met the inclusion criteria. Found that many factors are associated with adherence to diabetes mellitus treatment, namely</td>
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age, knowledge, motivation, social (family support and health workers), education, economy, access and psychological factors. Health workers and health workers must know the factors associated with adherence to diabetes mellitus treatment so that complications can be prevented and treated appropriately. Become the basis for health workers and policy makers in planning tips for the prevention and control of diabetes mellitus [16].

The results showed that predisposition factors in the form of knowledge, beliefs, beliefs, and attitudes simultaneously influenced the health behavior of patients with diabetes mellitus with an $R$ value of 0.809 and separately the attitude factor was the dominant predisposition factor determining the health behavior of patients with diabetes mellitus with a p value of 0.000. In conclusion, the respondent's attitude towards his condition suffering from diabetes mellitus affects the respondent's actions to seek health help to manage symptoms or carry out treatment for complications experienced [16].

Biological and psychosocial factors contribute to sex differences in diabetes risk. Overall, psychosocial stress has a greater impact on women than men. In addition, women have a greater increased risk of cardiovascular, myocardial infarction, and stroke mortality than men, compared to nondiabetic subjects. However, when dialysis therapy was initiated, mortality rates were comparable in men and women. Diabetes appears to attenuate the protective effect of

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<td>4.</td>
<td>Sasmiyanto, S.</td>
<td>Predisposing Factors of Health Behavior of Patients with Type 2 Diabetes Mellitus (<em>Faktor Predisposisi Perilaku Kesehatan Penderita Diabetes Mellitus Tipe 2</em>)</td>
<td>Jurnal Keperawatan Silampari 3, 466 – 476 (2020).</td>
<td>The results showed that predisposition factors in the form of knowledge, beliefs, beliefs, and attitudes simultaneously influenced the health behavior of patients with diabetes mellitus with an $R$ value of 0.809 and separately the attitude factor was the dominant predisposition factor determining the health behavior of patients with diabetes mellitus with a p value of 0.000. In conclusion, the respondent's attitude towards his condition suffering from diabetes mellitus affects the respondent's actions to seek health help to manage symptoms or carry out treatment for complications experienced [16].</td>
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<td>5.</td>
<td>Rev, E.</td>
<td>Sex and Gender Differences in Risk, Pathophysiology And Complications of Type 2 Diabetes Mellitus.</td>
<td>Published online 2016 May 9. doi: 10.1210/er.2015-1137</td>
<td>Biological and psychosocial factors contribute to sex differences in diabetes risk. Overall, psychosocial stress has a greater impact on women than men. In addition, women have a greater increased risk of cardiovascular, myocardial infarction, and stroke mortality than men, compared to nondiabetic subjects. However, when dialysis therapy was initiated, mortality rates were comparable in men and women. Diabetes appears to attenuate the protective effect of</td>
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female sex in the development of heart disease and nephropathy. Endocrine and behavioral factors are involved in gender inequality and influence the outcome. Further research into the sex-differentiated pathophysiological mechanisms of T2DM and its complications may contribute to more personalized diabetes care in the future and will thus increase awareness of sex-differentiated risk factors [17].

RESULTS AND DISCUSSION

Diabetes mellitus (DM) is defined as a disease or chronic metabolic disorder with multiple etiologies characterized by high blood sugar levels accompanied by metabolic disorders of carbohydrates, lipids, and proteins as a result of insulin function insufficiency. Insufficiency of insulin function can be caused by impaired or deficient insulin production by beta Langerhans cells of the pancreas gland, or caused by lack of responsiveness of body cells to insulin [4].

According to Perkeni, Diabetes Mellitus is a chronic metabolic disorder characterized by hyperglycemia. Various complications can arise due to uncontrolled blood sugar levels, such as neuropathy, hypertension, coronary heart disease, retinopathy, nephropathy, and gangrene. Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose (hyperglycemia), caused by an imbalance between supply and demand to facilitate the entry of glucose into cells so that it can be used for metabolism and cell growth. Reduced or absent insulin makes glucose retained in the blood and causes an increase in blood sugar, while cells become deficient in glucose which is needed in cell survival and function [18].

Several studies have mentioned that risk factors for type 2 diabetes mellitus include age, physical activity, exposure to smoke, body mass index (BMI), blood pressure, stress, lifestyle, family history, HDL cholesterol, triglycerides, pregnancy DM, history of glucose abnormalities and other abnormalities. Research conducted by Isnaini dan Ratnasari states that family history, physical activity, age, stress, blood pressure and cholesterol values are associated with the occurrence of type 2 DM, and people who have a body weight with an obese level are at risk of 7.14 times developing type two DM disease when compared to people who are at an ideal or normal [10].
According to the Ministry of Health (2010), by understanding the risk factors, diabetes mellitus can be prevented. DM risk factors are divided into several risk factors, but there are some that can be changed by humans, in this case it can be diet, activity patterns, and stress management. The second factor is a risk factor, but its nature cannot be changed, such as age, gender, and factors of diabetics with a family background [19]. Management of type 2 DM includes meal planning or diet, physical activity, blood sugar control, and taking medication [14]. Factors associated with adherence to diabetes mellitus treatment are age, knowledge, motivation, social (family support and health workers), education, economy, access to health services, and psychological factors [19].

The results of research by Yurida and Huzaifah (2019) state that fasting during Ramadan can be used as an alternative dietary method that has positive benefits if carried out by people with type II diabetes mellitus, which can reduce blood sugar to be more stable [20]. Patients with DM can also experience complications at all cellular levels and all anatomic levels. The manifestation of chronic complications can occur at the microvascular level (diabetic retinopathy, diabetic nephropathy, diabetic neuropathy, and cardiomyopathy) or macrovascular (stroke, coronary heart disease, peripheral vascular disease). Another complication of DM can be excessive susceptibility to infection due to easy urinary tract infections, pulmonary tuberculosis, and foot infections, which can then develop into diabetic ulcers/gangrene [21].

One of the most common complications of diabetes mellitus is diabetic foot, which can manifest as ulcers, infections and gangrene and Charcot arthropathy. Foot gymnastics is an exercise performed for DM sufferers or non-sufferers to prevent wounds and help improve blood circulation in the foot. Diabetic foot problems, such as ulceration, infection and gangrene, are common causes of hospitalization for people with diabetes. Routine diabetic foot care is any form of foot disorder caused by diabetes mellitus. The main factors influencing the formation of diabetic foot are a combination of autonomic neuropathy and somatic neuropathy, vascular insufficiency, and infection. Diabetic foot patients who are hospitalized are generally caused by minor trauma that is not felt by the patient. This causes the transmission of infection to continue [22]. There are two actions in the basic principles of diabetic foot management, namely preventive measures and rehabilitation measures. Rehabilitation measures include an integrated program, namely ulcer evaluation, control of metabolic conditions, wound debridement, germ culture, appropriate antibiotics, rehabilitative surgery and medical rehabilitation. Preventive measures include foot care education, diabetic shoes and foot exercises [23].

Diabetic foot exercise is an activity or exercise performed by patients with diabetes mellitus to prevent wounds and help improve blood circulation in the feet. Foot exercises can help improve blood circulation and also strengthen the small muscles of the feet and prevent foot deformities. In addition, foot
exercises can also increase strength in the thigh muscles, calves, and also overcome limitations in joint movement. The purpose of doing leg exercises is to improve blood circulation, strengthen small muscles, prevent leg deformities, increase calf and thigh muscle strength, and overcome limitations in movement. These foot exercise movements can improve blood circulation in the feet, improve blood circulation, strengthen leg muscles and facilitate foot joint movements. Thus it is hoped that the feet of diabetics can be well maintained and can improve the quality of life of diabetics [24].

**CONCLUSION AND SUGGESTIONS**

Based on the results of the literature review, it was concluded that the risk factors for diabetes mellitus include education, occupation, physical activity, smoking habits, consumption patterns, and nutritional status. The treatment that can be done for people with diabetes mellitus is insulin therapy, taking diabetes drugs, trying alternative treatments, undergoing surgery and improving life style (healthy lifestyle) by eating nutritious or healthy foods and exercising. One of the complications of diabetes is diabetic foot. Foot exercises are one way to prevent wounds and improve blood circulation in the feet. Interventional research is needed to measure the effectiveness of foot exercises on the prevention of complications of diabetes mellitus and is associated with an Islamic approach.

**REFERENCES**


