https://stikes-nhm.e-journal.id/NU/index

P-ISSN : 2085-5931
e- ISSN : 2085-5931
Sekolah Tinggi Ilmu Kesehatan Ngudia Husada Madura
Bekerja sama dengan Persatuan Perawat Nasional Indonesia (PPNI) Kabupaten Bangkalan
NURSING UPDATE
Jurnal Ilmiah Ilmu Keperawatan

Article

The Correlation Between Sugar Level Values in Patients with DM and the Incidence of Skin Fungus in the Skin Clinic of Bhayangkara Hospital Lumajang

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SUBMISSION TRACK

Recieved: November 15, 2024
Final Revision: November 25, 2024
Available Online: December 07, 2024

KEYWORDS

Blood Sugar Value, DM, Skin Fungus

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A B S T R A C T

DM is a group of metabolic diseases with characteristics of hyperglycaemia that occurs due to abnormalities in insulin secretion, insulin action or both. Skin sugar levels constitute 55% of blood sugar levels in ordinary people. In patients with diabetes, the ratio increases to 69-71% of blood glucose that has been elevated. The purpose of this research is to determine the correlation between sugar level values in patients with dm and the incidence of skin fungus in the skin clinic of Bhayangkara Lumajang hospital.This study was a quantitative study with a r etrospective design, and is a type of correlational research. The sample size was 41 patients with total sampling technique. Data were collected by observing patient medical record data from January 2022 - December 2023 and using an instrument in the form of a checklist, then the data were analysed using the Spearman rank test. According to the results, the majority of patients (63,4%) had high blood sugar levels when they checked into the Skin Clinic, and the majority of patients (58,5%) had skin events meeting severe criteria. The results of the analysis test showed a Sig.(2-tailed) = 0.000 < 0,05 and r (correlation coefficient) = +0,701, meaning that there is a relationship between blood sugar values in patients with DM and the incidence of skin fungus in the Dermatology Clinic of Bhayangkara Lumajang Hospital. As an effort to improve the quality of services at the skin clinic, this research requires support from management in the form of a standard operating procedure so that every patient diagnosed with skin fungus is also checked for blood sugar considering that there is a strong relationship between sugar levels and the incidence of skin fungus.

I. INTRODUCTION

(independent variable) (Nursalam, 2020) Diabetes mellitus is a non-communicable disease (NCD) that occurs throughout the world, both in developed and developing countries such as Indonesia itself. Diabetes Mellitus (DM) occurs due to chronic metabolic disorders with multiple etiologies characterized by high blood sugar levels accompanied by impaired carbohydrate, lipid and protein metabolism as a result of insulin function insufficiency (WHO, 2021).

DM is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin function or both. DM is a chronic disease characterized by blood glucose

levels that exceed normal values (hyperglycemia) for years. Hyperglycemia is a condition in which fasting blood glucose levels are ≥ 126 mg/dl and random blood glucose levels are ≥ 200 mg/dl (Petersmann, 2018).

Hyperglycemia is a medical condition in the form of increased blood glucose levels above normal which is characteristic of several diseases, especially DM. DM is currently one of the global health threats. Based on the cause, DM can be classified into 4 groups, namely type 1 DM, type 2 DM, gestational DM and other types of DM. In this guideline, the hyperglycemia discussed is related to type 2 DM. Various epidemiological studies have shown a tendency for an increase in the incidence and prevalence of type 2 DM in various parts of the world. The WHO organization predicts a significant increase in the number of type 2 DM patients in the coming years. The World Health Organization (WHO) predicts an increase in the number of type 2 DM patients in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030. The International Diabetes Federation (IDF) prediction also shows that in 2019-2030 there will be an increase in the number of DM patients from 10.7 million to 13.7 million in 2030 (Soelistijo, 2021). The IDF in 2022 reported that 537 million adults (20-79 years) were living with diabetes worldwide. This number is expected to increase to 643 million (1 in 9 adults) in 2030 and 784 million (1 in 8 adults) in 2045. Diabetes mellitus caused 6.7 million deaths in 2021. An estimated 44% of adults living with diabetes (240 million people) are undiagnosed. 541 million adults worldwide, or 1 in 10, have impaired glucose tolerance, putting them at high risk for developing type 2 diabetes (IDF, 2021). The Ministry of Health of the Republic of Indonesia reported that the number of people with diabetes mellitus in 2021 was 19.47 million (Kemenkes RI, 2022). The East Java Provincial Health Office reported that the number of DM sufferers in East Java Province in 2021 reached 929,535 cases. Of this number, it is estimated that 867,257 sufferers (93.3%) have been diagnosed and received health services (East Java Health Office, 2022).

The prevalence of dermatophytosis disease in Asia reaches 35.6%, while in Indonesia dermatophytosis disease has increased by 65% this is due to poor personal hygiene. The incidence of dermatophytosis disease states that 20% of people worldwide experience cutaneous infections with tinea corporis infection which is the most dominant type and followed by tinea cruris, tinea pedis, and onychomycosis. From medical record data at the Bhayangkara Lumajang Hospital, the number of DM sufferers from 2022, which numbered 1866, increased to 3076 patients in 2023. Meanwhile, in the Skin Polyclinic itself, there was also an increase in patients with a diagnosis of skin fungus from 2022, which numbered 55 to 118 patients in 2023. The number of uncontrolled blood sugar in patients causes complications of skin fungus that often recur and the healing process is also long. In addition, patients also often complain of being very uncomfortable and embarrassed by the appearance of skin fungus. From the results of a preliminary study conducted on January 2, 2024, in the fourth trimester of 2023 at the Bhayangkara Lumajang Hospital skin clinic, 35 patients were found with a diagnosis of skin fungus. Of the 35 patients with a diagnosis of skin fungus, 6 patients were found to have a history of DM and blood sugar above normal, namely above 200mg/dl. From the data above, it can be concluded that 17.14% of patients with a diagnosis of skin fungus who visited the Bhayangkara Lumajang Hospital skin clinic in the fourth trimester of 2023 were also accompanied by a history of DM and blood sugar above normal, namely above 200mg/dl. This increase is in line with the increase in obesity which is one of the risk factors for diabetes, which is 14.8% in the 2013 RISKESDAS data to 21.8% in 2018. Along with the increase in the prevalence of overweight from 11.5% to 13.6%, and for central obesity (waist circumference ≥ 90 cm in men and ≥ 80 cm in women) increased from 26.6% to 31%. The data above show that the number of DM patients in Indonesia is very large and is a heavy burden to be handled alone, especially by specialist/subspecialist doctors or even by several other health workers (Soelistijo, 2021). According to the International Diabetes Federation (IDF), in 2019, diabetes caused 4.2 million deaths; and 463 million adults aged between 20 and

79 years have diabetes. Diabetes is a major cause of health expenditure amounting to at least 720 billion USD in 2019. In addition, the actual burden of TYPE 2 DM disease may be underrepresented because 1 in 3 people with diabetes are undiagnosed, equivalent to 232 million people. The largest number of people with diabetes is aged 40 to 59 years. The incidence and prevalence of type 2 DM vary by geographic region, with more than 80% of patients living in low- to middle-income countries, posing additional challenges in effective treatment. Patients with type 2 DM have a 15% increased risk of all-cause mortality compared to people without diabetes with cardiovascular disease (CVD) as the largest cause of morbidity and mortality associated with type 2 DM (Ministry of Health, 2022).

The increasing prevalence of DM in several developing countries is due to the increasing prosperity rate in the country concerned. The increase in per capita income and changes in lifestyle, especially in big cities, have led to an increase in the incidence of degenerative diseases, one of which is DM. This disease is one of the health problems that has an impact on productivity and can reduce human resources (Decroli, 2019). Women are more at risk than men of developing diabetes because physically women have a greater chance of increasing their body mass index. The symptoms complained of by people with diabetes mellitus are divided into acute and chronic, acute symptoms of DM such as Polyphagia (eating a lot), Polydipsia (drinking a lot), Polyuria (urinating a lot / urinating often at night) increased appetite but weight loss rapidly, while chronic symptoms are tingling, skin feels hot or like; pricked by needles, numbness in the skin, cramps, fatigue, drowsiness, blurred vision, loose teeth, and easy to fall out, decreased sexual ability, even in men impotence can occur, miscarriage / fetal death in pregnant women (Ministry of Health, 2022). In patients with type 2 DM, hyperglycemia occurs which is associated with various complications and can increase susceptibility to infection, for example skin infections. Skin manifestations can occur during the course of DM disease associated with complications or due to side effects of therapy. These infections are more common in patients with type 2 DM compared to viral and bacterial infections (Prahana, 2022). Chronic hyperglycemia in DM is associated with long-term damage, dysfunction or failure of several organs of the body, especially the eyes, kidneys, nerves, heart and blood vessels. The skin is one of the organs that is often affected by diabetes mellitus. Skin manifestations in the form of infection are one of the chronic complications that are often seen in DM patients. Skin sugar levels are 55% of blood sugar levels in ordinary people. In patients with diabetes, the ratio increases to 69-71% of blood glucose that is already high. In patients who have been treated, the ratio exceeds 55%. Skin sugar is highly concentrated in the intertriginous and interdigital areas. This facilitates the development of dermatitis, bacterial infections (especially furuncles), and fungal infections (especially candidiasis). These conditions are called skin diabetes. Hyperglycemia also causes disruption of the immunoregulatory system mechanism. This causes a decrease in chemotaxis, phagocytosis and bactericidal ability of leukocyte cells so that the skin is more susceptible to infection. Under normal conditions, fungi are found in the human body, but in certain conditions, for example in people with diabetes, their growth becomes excessive, causing infection. Infection usually attacks the skin in the folds such as the armpits, under the breasts, groin or often in women causes itching in the genital area and vaginal discharge. Several studies have shown a relationship between fungal infections and the incidence of diabetes mellitus (DM) (Saskia, 2015).

Dermatophytosis is a disease that affects tissues containing horny substances, such as the stratum corneum of the epidermis, hair and nails caused by the dermatophyte fungus group. Theoretically, it is stated that one of the predisposing factors for dermatophytosis is DM. High blood glucose levels in diabetics cause increased skin glucose which can interfere with the immune process and supply energy for fungi to grow, so that skin abnormalities easily appear, one of which is dermatophytosis (Ningsih, 2022).

Manifestations of skin disorders are very common in patients with type 2 Diabetes mellitus. Skin disorders in DM can be caused by uncontrolled blood sugar levels

and can be an indication of diabetes mellitus in patients who have not been diagnosed. The pathogenesis of skin manifestations in diabetes mellitus can be caused by high glycemic levels, the role of AGE's, and damage to both microangiopathy and angiopathy. Dermatological disorders in patients with type 2 DM can be categorized into: disorders related to diabetes mellitus, skin infections, skin disorders due to complications of diabetes mellitus and skin reactions due to diabetes mellitus treatment.
Along with the increasing incidence of DM, early diagnosis and therapy need to be carried out. Recognition of skin symptoms in diabetes is necessary to be able to recognize diabetes early. In addition, routine evaluation of the patient's skin also needs to be done to prevent complications that can arise either due to the course of the disease or the therapy carried out. (Reza, 2023).
From the explanation above, the author is interested in conducting research on the Relationship Between Sugar Levels in DM Patients and the Incidence of Skin Fungus in the Skin Polyclinic of Bhayangkara Lumajang Hospital in 2022 - 2023.

II. METHOD

Research design is a framework of research methods and techniques chosen by a researcher (LPPM, 2021). This research refers to a quantitative research approach. Quantitative research is for cases where statistical conclusions to gather actionable insights are essential. Numbers provide a better perspective for making important business decisions. Quantitative research methods are needed for the growth of any organization. Insights drawn from numerical data and analysis have proven to be very effective when making decisions regarding the future of the business. Meanwhile, the type of research used in this study is research with a retrospective design. Retrospective research is research where data collection of dependent variables is carried out first, then the causal variables that have occurred in the past are measured, for example a year ago (Notoatmodjo, 2012). Retrospective research is research in the form of observations of events that have occurred and aims to find factors related to the cause (Sugiyono, 2017). This research was conducted by observing and observing patient data at the Bhayangkara Lumajang Hospital skin clinic in 2022 - 2023.

III. RESULT

1. Research Result

1) Research Location Overview

This study was conducted at the Skin Polyclinic of Bhayangkara Lumajang Hospital in February 2024 by looking at patient medical record data and instruments in the form of patient data checklists. The Skin Polyclinic is one of the Polyclinics at Bhayangkara Lumajang Hospital which has been operational since January 2022. The Skin Polyclinic of Bhayangkara Hospital is equipped with toilets and sinks and furniture including: 1 doctor's table, 1 nurse's table, 1 doctor's chair, 2 patient chairs, 1 nurse's chair, 1 regular patient bed, 1 gynecological bed, 1 tool table, and screen. The tools available at the Skin Polyclinic are wound care sets, heating sets, electrocauter sets, wood lamps, magnifying glasses, body scales, skin cutters, spoon extractors, loop extractors, lancet extractors, microscopes, lacer dermabrasion machines, dermatoscopes. The Skin Polyclinic service at Bhayangkara Hospital is open 4 times a week, namely Monday, Wednesday, and Friday mornings at 08.00-10.00, while on Thursday it opens in the afternoon at 15.00-17.00. Patients who will be examined at the Skin Polyclinic can register online via mobile JKN for BPJS patients, via WA, or register offline at the outpatient TPP by doing a fingerprint for the registration process and insurance claims. Then the patient waits for a call from the nurse in the Polyclinic waiting room to be anamnesis and examination by a dermatologist. The results of the anamnesis and examination are documented in the patient's medical record from January 2022 to June 2023, since July 2023 until now all data is inputted via E-Medical Records using the Khanza application.

2) General Patient Data

a.Age

Table 1. Patient Characteristics Based on Age

Age	Amount	Percentage
21 — 30 y.o	1	2,4%
31 — 40 y.o	2	4,9%
41 — 50 y.o	6	14,6%
51 — 60 y.o	14	34,2%
>60 y.o	18	43,9%
Total	41	100%

Table 1 shows that most patients were aged > 60 years with a total of 18 patients (43.9%).

b. Gender

Table 2. Patient Characteristics Based on Gender

Gender	Amount	Percentage
Male	12	29,3 %
Female	29	70,7 %
Total	41	100 %

Table 2 shows that the majority of patients were female with a total of 29 patients (70.7%).

c. Education

Table 3. Patient Characteristics Based on Education

Education	Amount	Percentage
Elementary School	9	21,9%
JHJ	18	43,9%
SHS	12	29,2%
Bachelor	2	5,0%
Total	41	100%

Table 3 shows that most patients had a junior high school education with a total of 18 patients (43.9%).

d. Working/Not Working

Table 4. Patient Characteristics Based on Occupation

Occupation	Amount	Percentage
Working	25	60,9%
Not Working	16	39,1%
Total	41	100%

Table 4 shows that most patients are still working, with a total of 25 patients (60.9%).

B. Special Data

a. Patient Characteristics Based on Blood Sugar

Table 5. Patient Characteristics Based on Blood Sugar Values

Blood Sugar Values	Amount	Percentage
Low (< 90)	0	0,0%
Normal (90-199)	15	36,6%
High (> 200)	26	63,4%
Total	41	100%

Table 5 shows that the majority of patients had high blood sugar levels when they were examined at the Skin Polyclinic, namely 26 patients (63.4%).

b. Patient Characteristics Based on Skin Fungal Incidence

Table 6 Patient Characteristics Based on Skin Fungal Incidence

Skin Fungal Incidence	Amount	Percentage
Light (1-2)	1	2,4%
Moderate (3-4)	16	39,1%
Heavy (5-6)	24	58,5%
Total	41	100%

2) Data Analysis

Table 7 Cross Table of Relationship between Sugar Levels in DM Patients and the Incidence of Skin Fungus

Sugar Level	Light	Moderate Skin Fungus Occurrence	Heavy	Total
Normal (90-199)	1	12	2	15
High (≥ 200)	-	4	22	26
Total	1	16	24	41

Table 7 above is a cross table between blood sugar levels and skin fungus cases. At normal blood sugar levels (90-199 mg/dl), the incidence of skin fungus with mild, moderate, and severe symptoms is quite high, namely 15 patients. While at high blood sugar level (≥ 200 mg/dl)), the incidence of skin fungus with mild, moderate, and severe symptoms is much higher, namely 26 patients. After analyzing the data using the Spearman rank test in the SPSS 26 for Windows program, the following values were obtained:

r (correlation coefficient): +0.701

Sig. (2-tailed): 0.000

Based on the results of the research data analysis, it can be concluded that the significance value or Sig (2-tailed) is 0.000, because the Sig (2-tailed) value is 0.000 < or less than 0.05, which means there is a significant relationship between the blood sugar value variable and the incidence of skin fungus. Looking at the level of strength (closeness) of the relationship between the blood sugar value variable and the incidence of skin fungus from the SPSS output, a correlation coefficient figure of 0.701 was obtained, meaning that the level of strength of the relationship (correlation) between the blood sugar value variable and the incidence of skin fungus is 0.701 or a strong correlation. Looking at the direction (type) of the relationship between the blood sugar value variable and the incidence of skin fungus, the correlation coefficient figure in the results above is positive, namely +0.701 so that the relationship between the two variables is unidirectional (unidirectional relationship type), thus it can be interpreted that the higher the blood sugar value, the incidence of skin fungus will also increase.

IV. DISCUSSION

1. Data and Results Interpretation

This section will present a discussion of the research results consisting of blood sugar levels of DM patients who were treated at the Skin Polyclinic of Bhayangkara Lumajang Hospital and the incidence of skin fungus in DM patients who were treated at the Polyclinic, as well as the relationship between blood sugar levels in DM patients and the incidence of skin fungus in the Skin Polyclinic of Bhayangkara Lumajang Hospital.

1) Blood Sugar Levels of Diabetes Mellitus (DM) Patients Who Were Treated at the Skin Polyclinic of Bhayangkara Lumajang Hospital with a Diagnosis of Skin Fungus

Based on Table 5 regarding patient characteristics based on blood sugar levels, it shows that most patients have blood sugar levels in the high category, namely ≥200 mg / dl with a total of 26 patients (63.4%). Then 15 patients had normal blood sugar levels, namely between 90-199 mg / dl (36.6%), while there were no patients with low blood sugar levels, namely <90 mg / dl. This is supported by the results of previous studies which stated that high blood glucose levels in diabetics cause increased skin glucose which can interfere with the immune process and supply energy for fungi to grow, so that skin abnormalities such as dermatophytosis easily appear (Ningsih, 2022).

According to the researcher's assumption, most patients' blood sugar levels are high (200 mg / dl) when checking with the Skin Polyclinic, this is related to diet, negligence in controlling blood sugar, and lack of exercise or physical activity. A well-maintained diet will play a very important role in maintaining blood sugar levels. Blood sugar control is no less important in determining blood sugar levels, because when blood sugar levels are controlled, the right therapy can be determined, patients must use insulin or simply use OHO. Physical activity also plays an important role in a person's blood sugar levels, because physical activity can convert glucose into energy.

Diabetes Mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin function / both (Soelistijo, 2021). According to the Indonesian Endocrinology Association (PERKENI), random blood sugar levels in whole blood specimens (capillary blood) must be considered for differences in interpretation results, namely <90 mg/dl (low), 90-199 mg/dl (normal), ≥ 200 mg/dl (high) (Soelistidjo, 2015). Table 5.5 shows that most patients have high blood sugar values, namely ≥ 200 mg/dl.

Various factors can affect blood sugar levels in DM patients, including gender. This is in accordance with table 5.2, DM patients diagnosed with skin fungus where the number of female patients is greater than male patients with the number of female patients as many as 29 patients (70.7%), while male patients are 12 patients (29.3%). The basal calorie requirement per day for women is 25 cal / kg BW, while for men it is 30 cal / kg BW. So with the same body weight between women and men, it is certain that women have a higher risk of DM than men. Women have a greater risk of suffering from DM than men, because physically women have a greater chance of increasing body mass index monthly cycle syndrome (premenstrual syndrome) (Soelistidjo, 2015).

2) The occurrence of skin fungus in patients with Diabetes Mellitus (DM) who are treated at the Skin Polyclinic of the Hospital. Bhayangkara Lumajang

Based on table 6, it shows that most patients experienced skin fungus incidents with severe criteria, namely 24 patients (58.5%). Then as many as 16 patients experienced skin fungus incidents with moderate criteria (39.1%). While only 1 patient experienced skin fungus incidents with mild criteria (2.4%). This can be influenced by several factors, one of which is the lack of patient awareness of the importance of early detection of DM complications in the form of skin fungus and the tendency to underestimate the appearance of skin fungus symptoms that occur, so that most patients come to the hospital if the skin fungus symptoms are already severe. Based on previous research (Absor, 2020) which states that education is a planned effort so that individuals or communities can do what is taught by educational behavior. A person who is highly educated, if they get sick, will increasingly need health care facilities as a place to seek treatment for themselves and their families. The more individuals have a higher level of education, the more they will realize that health is an important thing for life so that they are motivated to visit health care facilities. In addition, these individuals will find it easier to receive information and increase their knowledge. This is in accordance with table 3, most patients have a final education of junior high school as many as 18 patients (43.9%), high school education is in second place, as many as 12 patients (29.2%), in third place elementary school education as many as 9 patients (21.9%), and the last is a bachelor's degree as many as 2 patients (5%). Symptoms of fungal infections of the skin are very typical, namely patches that are clearly defined, there is damage to skin tissue and inflammatory reactions on the host's skin. Accompanied by an itchy feeling that can interfere with sleep, if scratched the papules or vesicles will burst so that when dry there will be crusting and scaling. The way to confirm fungal disease is by examining the clinical appearance and examination with the help of skin scrapings, mucosa, nails for microscopic examination, and culture examination to determine the type of fungus (Kurniawati, 2008).

In addition, work factors can also affect the occurrence of skin fungus. This is in accordance with table 4, namely the table of patient characteristics based on work. Most patients work with a total of 25 patients (60.9%), while patients who do not work are 16 patients (39.1%).

According to the researcher's assumption, patients who work are more at risk of fungal infections because in the work there is trauma and direct radiation to the skin, so that it can damage the skin's resistance and fungal infections can enter easily. Meanwhile, women who suffer from DM are more at risk of skin fungus than male DM sufferers, because in terms of posture, women tend to have body parts in the form of folds so that they are at risk of increasing the growth of skin fungus. Women also pay more attention to aesthetics so that more

women check themselves at the Skin Polyclinic than men.

3) Relationship between Blood Sugar Levels in Diabetes Mellitus (DM) Patients with Skin Fungus

Based on the results of the study in table 7 in the normal blood sugar level column (90-199 mg/dl), the incidence of skin fungus with mild, moderate, and severe symptoms was quite high, namely 15 patients, this happened because blood sugar checks were carried out immediately after the patient was examined at the skin polyclinic by ignoring the history of food eaten, taking hyperglycemic drugs or previous insulin injections. However, researchers have asked about the history of DM and previous blood sugar levels which were on average high (200 mg/dl) when examined at the internal medicine polyclinic or checked personally at home. While at high blood sugar levels (200 mg/dl), the incidence of skin fungus with mild, moderate, and severe symptoms was much higher, namely 26 patients according to the results of the study. The results of the study in table 7 show that there is a relationship between blood sugar levels in DM patients with the incidence of skin fungus at the skin polyclinic of Bhayangkara Lumajang Hospital. Based on the results of the data analysis, it can be concluded that the significance value or Sig (2-tailed) is 0.000, because the Sig (2-tailed) value of 0.000 < or less than 0.05, it means that there is a significant relationship (meaning) between the blood sugar value variable and the incidence of skin fungus. Looking at the level of strength (closeness) of the relationship between the blood sugar value variable and the incidence of skin fungus from the SPSS output, a correlation coefficient figure of 0.701 is obtained, meaning that the level of strength of the relationship (correlation) between the blood sugar value variable and the incidence of skin fungus is 0.701 or a strong correlation. Looking at the direction (type) of the relationship between the blood sugar value variable and the incidence of skin fungus, the correlation coefficient figure in the results above is positive, namely +0.701 so that the relationship between the two variables is unidirectional (unidirectional relationship type), thus it can be interpreted that the higher the blood sugar value, the incidence of skin fungus will also increase. In patients with type 2 DM, hyperglycemia occurs which is interrelated with various complications and can increase susceptibility to infection, for example skin infections. Skin manifestations can occur in the course of DM disease associated with complications or due to side effects of therapy. These infections are more common in patients with type 2 DM compared to viral and bacterial infections (Prahana, 2022). Chronic hyperglycemia in DM is associated with long-term damage, dysfunction or failure of several organs of the body, especially the eyes, kidneys, nerves, heart and blood vessels. The skin is one of the organs that is often affected by diabetes mellitus. Skin manifestations in the form of infection are one of the chronic complications that are often seen in DM patients. Skin sugar levels are 55% of blood sugar levels in ordinary people. In people with diabetes, the ratio increases to 69-71% of blood glucose that is already high. In patients who have been treated, the ratio exceeds 55%. Skin sugar is highly concentrated in the intertriginous and interdigital areas (Saskia, 2015).

2. Research Limitations

The limitations in this study are:

1) The instrument in this study only uses a checklist that is seen from the patient's medical record data which is secondary data, so the researcher does not take data directly from the patient (primary data).

2) The blood sugar value in patients is carried out when the patient checks into the Bhayangkara Lumajang Hospital skin clinic directly (random blood sugar), by setting aside whether the patient has eaten or not, the patient has finished taking anti-hyperglycemic drugs or not, the patient has been given insulin injections or not, so that there are 1 patient with mild skin fungus symptoms, 12 moderate, and 2 severe even though their blood sugar is within normal limits (90-199 mg / dl).

3) The incidence of skin fungus experienced by patients when visiting the skin clinic is on average after the symptoms of skin fungus are severe and very disturbing, so that most cases of skin fungus are included in the severe criteria with symptoms that appear 5-6 symptoms. This may also be influenced by the low level of patient education.

4) This study was conducted in a minimal population because the number of patients diagnosed with skin fungus and a history of DM was also limited because the skin polyclinic at Bhayangkara Lumajang Hospital can be said to be still newly operational, namely starting in January 2022.

3. Implications for Services, Education and Health

The results of this study have several implications, the implications are as follows:

1) Implications for Services

This study provides information that there is a relationship between blood sugar levels in DM patients and the incidence of skin fungus. With the results of this study, as a health service institution, Bhayangkara Lumajang Hospital can provide advice to DM patients to be diligent in controlling their blood sugar levels so that complications in the form of skin fungus do not appear which can certainly interfere with patient comfort.

2) Implications for Education

The implications for educational institutions, in this case Hafshawaty Zainul Hasan University Probolinggo, must always strive to improve student knowledge regarding Diabetes Mellitus in relation to complications that may occur, namely Skin Fungus. For this reason, it is recommended that S-1 Nursing educational institutions provide facilities or communication media services such as the availability of nursing journals, magazines, the internet, libraries, and other sources, so that students do not find it difficult to find communication channels as an effort to improve their academic abilities. In addition, students also actively form study groups, discussions, and other groups, making it easier for students to exchange information related to nursing academics so that they can improve their knowledge, both in academic and non-academic fields. 3) Implications for Health The results of this study identified the relationship between blood sugar levels in DM patients and the incidence of skin fungus, which can provide input for policy makers in order to improve the quality of life of patients with a diagnosis of DM which is a matter of disease where many complications will arise if blood sugar levels are not controlled properly. Complication prevention policies must be a priority as an effort to reduce mortality. According to the results of the study, innovative breakthroughs are needed on a large scale from health policy makers, especially those related to the quality of life of DM patients regarding the prevention of complications due to uncontrolled blood sugar.

V. CONCLUSION

Based on the results of the research conducted by the researcher regarding the relationship between blood sugar levels in DM patients with the incidence of skin fungus at the Skin Polyclinic of Bhayangkara Lumajang Hospital which was conducted in June 2024, the following conclusions were obtained:

1. Most patients had high blood sugar levels when checked at the Skin Polyclinic, namely 26 patients (63.4%).

2. Most patients experienced skin events with severe criteria when checked at the Skin Polyclinic, namely 24 patients (58.5%).

3. There is a Relationship between Sugar Levels in DM Patients with the Incidence of Skin Fungus at the Skin Polyclinic of Bhayangkara Lumajang Hospital, proven by the Spearmann Rank Test in the SPSS 26 for Windows program. After the statistical test was carried out, the results of the Sig. (2-tailed) significant level results were 0.000 <0.05 so that H1 was accepted.

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