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Treatment Of Grade II Diabetic Ulcer with Mindi Leaf Hydrogel (Melia Zadarach L) Against Wound Healing Process

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ABSTRACT

Diabetic ulcer is a chronic complication of Diabetes Mellitus. Ulcers can be treated with pharmacological or non-pharmacological. Modern society prefers non-pharmacology as a nursing action because it is far from chemical and more traditional with natural ingredients and affordable prices and the researchers found that it is mindi leaves with ingredients that can be used as anti-inflammatory, antidiabetic and antibacterial used to treat diabetic ulcers which are packaged into hydrogel for the basic ingredients of modern care (modern dressing) with a dose of 270 mg and has been released clinically (toxic and authenticity tests in experimental animals).

True experimental design with pre-test post-test with control group design. Data were collected by taking 40 respondents through stratified random sampling. The data normality test used Saphiro Wilk and the hypothesis was tested by using the General Linear Model effectiveness test.

Mindi leaf hydrogel significantly accelerated the healing process of grade II ulcers with a value of p = 0.000.

Treatment of diabetic ulcers with mindi leaf hydrogel is effective in accelerating the wound healing process with a value of p = 0.000.

Keywords: Ulcers, Hydogel, Mindi leaves

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BACKGROUND

International Diabetes Federation (IDF) predicts an increase in the number of people with diabetes in Indonesia from 9.1 million in 2014 to 14.1 million in 2035. With this figure, Indonesia is ranked 5th in the world.1. According to the 2013 Basic Health Research, the proportion of DM was 6.9%2 and as much as 10.9% in 2018.

The increasing DM population has resulted in various complications including retinopathy and neuropathy3. One of the complications of neuropathic DM is a change in the structure and function of the peripheral nerves both motor, sensory and autonomic which causes diabetic neuropathy due to degeneration of peripheral or autonomic nerves. Neuropathy will create motor, sensory and autonomic nerve disorders. Motor disturbances cause muscle atrophy, leg deformity, changes in foot biomechanics and disturbed leg pressure distribution, causing ulcers. When microtrauma occurs, the condition of the leg that is prone to cracks increases the risk of developing diabetic ulcers4. The annual incidence rate of diabetic ulcers is 1% to 6.84% in individuals with diabetes mellitus with a lifetime risk of between 15% and 25%. 15% -25% of DM sufferers will experience diabetic ulcers and bad ulcer conditions if the ulcer condition occurs.1. About 15% of diabetic ulcers result in amputation of the lower limb5. In one study found that patients with diabetes with a history of diabetic ulcers had a 47% increased risk of death5.

If the ulcer is not handled properly, it will further aggravate tissue death which will make the ulcer gangrene. In addition to controlling blood sugar, controlling diet, and others, the most important thing for DM wounds is to take diabetic ulcer treatment to prevent the DM wound from becoming gangrene which in turn will result in amputation which will affect self-image and body function. will start to decline.

The concept of wound care consists of the cleansing, debridement and dressing stages6. One of the stages of wound care that can affect the ulcer healing process is modern dressing using a hydrogel. The findings indicate that a warm, humid environment with appropriate wound healing agents can achieve faster wound healing and therefore the hydrogel is chosen for use in modern dressings. Hydrogels can be considered as good barriers against microbes. In carrying out renewal and benefit for the local community, the researchers carried out modern dressing treatments with mindi leaf hydrogel as a traditional ingredient that was packaged and made in a modern, cheap, efficient and useful manner. So it is necessary to renew the hydrogel which can further accelerate the wound healing process such as from traditional ingredients which contain various kinds of good substances for diabetic ulcers.

Mindi leaf hydrogel (a plant found growing in tropical Indonesia)7 which has pharmacological activity as an antioxidant, antibacterial, analgesic8, antidiabetic, antihypertensive, antireumatic, insecticide, rodenticide and fungicide9.Then Hidayat, et al. In 1991 also argued that in mindi leaves, the main ingredients were saponins, flavonoids and polyphenols. Other studies have revealed that the effectiveness of these flavonoids has been shown to be antimicrobial, antiviral, anti-diabetic, anti-inflammatory and antioxidant.10.

Research conducted by Vedya (research on experimental animals) revealed that 2 grams of dry extract mixed with 99 grams of base melia azedarach l ointment resulted in the results of melia zadarach l leaf extract increasing wound contractions faster than diabetes controls p = 0.0001.

Based on the description above, the researcher will conduct research on "Treatment of Grade II Diabetic Ulcer with Mindi Leaf Hydrogel on the Wound Healing Process".

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METHODS

This study, entitled Grade II Diabetic Ulcer Treatment with Mindi Leaf Hydrogel to the Wound Healing Process, used a true experimental research method with a pre-test post-test approach with control group design. This type of design is used to determine the effectiveness of mindi leaf hydrogel (Melia azedarach L) in the healing process of grade II diabetic ulcers.

In this study, the research group was divided into the intervention group by giving mindi leaf hydrogel and the control group using the hydrogel manufacturer. Data collection and measurement using the BWAT instrument for ulcer healing where the wound will get better if the BWAT score decreases with a score range of 1-65, by observing the diabetic ulcer healing process is carried out before and after wound care procedures every 3 days for 21 days. Where the number of samples for each group is 20 with sample

selection using stratified random sampling. Where the inclusion criteria of this study were ulcer patients who were given antibiotics, taking anti-diabetes drugs, Grade II diabetic ulcers using modern dressings who are treated at the Arza Wound Care Clinic in Blitar Regency and are willing to be respondents, while the exclusion criteria are diabetic ulcer patients who are in a state of emergency or shock and are not willing to be respondents. This research was conducted in February 2020. In this study the team conducted an ethical feasibility test at the Health Polytechnic of the Ministry of Health Semarang with the number 030 / EA / KEPK / 2020. Written informed consent in this study was actually obtained from the study participants for the research process. In this study, the team conducted an ethical feasibility test at the Health Polytechnic of the Ministry of Health Semarang with number 030 / EA / KEPK / 2020. Written informed consent in this study was actually obtained from the study participants for the research process. In this study, the team conducted an ethical feasibility test at the Health Polytechnic of the Ministry of Health Semarang with number 030 / EA / KEPK / 2020. Written informed consent in this study was actually obtained from the study participants for the research process.

RESULTS

Analysis of Test of Within-Subjects Effects Anova Test Results BWAT Score in the Control and Intervention Groups

	Type III Sum of Squares	df	Mean Square	F	*Sig.*
Intervention Greenhouse-Geisser	1382.143	4.004	345.181	66.291	.000
Control Greenhouse-Geisser	756.343	2.786	271.440	39.026	.000

** Repeated Measure ANOVA test*

It shows that in the control group and the intervention group after the repeated anova test, the results of each group were sig 0.000, which means that there is a significant difference in the decrease in BWAT scores in each group. These results indicate that both the mindi leaf hydrogel and the manufacturer hydrogel effectively accelerated the healing process of grade II diabetic ulcers

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Analysis of Mixed Between-Within Subject ANOVA Test Results in the Intervention Group and the Control Group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.100	1	8.100	.520	.475

**The NOVA Between Group Test*

It shows that giving mindi leaf hydrogel can accelerate the wound healing process by reducing the BWAT score and after being tested with the Mixed Between-Within Subject ANOVA with a value of p = 0.475, there is no significant difference between the intervention group and the control group

BWAT Score Distribution Based on Normal Value (Cut Point)

Cut Point BWAT Score	Group			
	Mindi Leaf Hydrogel		Hydrogel Manufacturing	
	BWAT score Normal	BWAT score Abnormal	BWAT score Normal	BWAT score Abnormal
n	14	6	13	7
%	70%	30%	65%	35%
Total	n=40 (100%)			

Shows that the Cut Point in the group given mindi leaf hydrogel shows that on average on the 21st day measurement, 14 respondents (70%) reached a normal BWAT score while in the group given the manufacturer's hydrogel and foot exercises were 13 respondents (65%)

Calculation Results of Relative Risk Reduction (RRR), Absolute Risk Reduction (ARR) and Number of Needed (NNT) on the Wound Healing Process (BWAT) in the Control Group and the Intervention Group

	BWAT Score						
	Normal		Abnormal				
Group	n	%	n	%	RRR	ARR	NNT
Intervention	14	70%	6	30%	14.3	5	20
Control	13	65%	7	35%			

Shows the RRR calculation results for the wound healing process (BWAT score), which means that mindi leaf hydrogel reduces therapy failure by 14.3%. With the results of such calculations, it is concluded that by providing wound care to 20 people using mindi leaf hydrogel will reduce the failure of 1 person in patients with wounds who have a high BWAT score.

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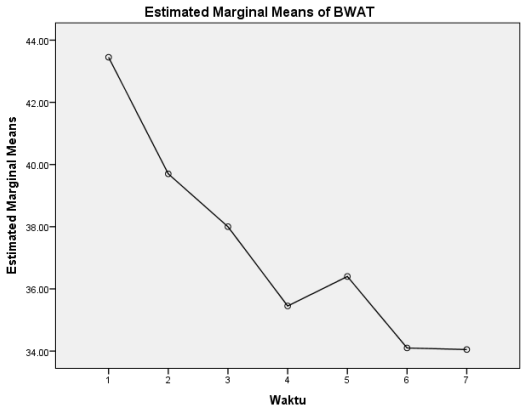
Analysis of Average BWAT Score Decrease in the Intervention Group (Pairwise Comparisons



DISCUSSION

The Effectiveness of Mindi Leaf Hydrogel on Wound Healing Process

Based on the research results, it was found that the homogeneity of the data to see the distribution of the number of respondents was obtained> 0.05, which means that there was no significant difference in BWAT scores in the two groups, both in the control group and the intervention group.

From the results of the study in the intervention group, it shows that the 1st to 6th posts are equal to p = 0.000, which means that from post 1 to the last post the BWAT score has a significant difference. The BWAT score is used to assess the wound healing process, where the lower or the lower the BWAT score, the better the wound healing.

From the results of the analysis in the intervention group based on the average BWAT score, it decreased from a score of 42.15 on day 1 to 26.05 on day 21. In this score, the wound was in wound degeneration. So that the average reduction can decrease by 14 points in the BWAT score. When the calculation with the cross multiplication formula was carried out, it was found that the average healing rate improved in this research was on day 17.

Where the results of this study were not much different in the control group with the results of the BWAT score with a value of p = 0.000 which means that there is a significant difference. This means that both mindi leaf hydrogel and manufactured hydrogel can lower BWAT scores or can accelerate the healing process of grade II diabetic ulcers.

This unstable wound healing process is caused by several factors, including uncontrolled blood sugar in each patient, which affects the ulcer healing process. However, in general, mindi leaf hydrogel which is also given exercise intervention can significantly accelerate the wound healing process. This is because modern wound care with traditional ingredients can reduce the side effects of excess chemicals.

Research conducted by Eko (2014) which compared wound care using hycoloid and 0.9% NaCl revealed the results that the decrease in BWAT score using hydrocoloid was 10-13 while NaCl was 2-3.11. This proves that NaCl (conventional) only has a decrease in BWAT score or the wound healing process is not as good as modern treatments.

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Clinical Significance

Clinical Significance In the healing process, which is marked by a decrease in the BWAT score, which means that the wound is getting better with the results of the calculation of the Relative Risk Reduction (RRR) value of 14.3%, which means that mindi leaf hydrogel reduces therapy failure by 14.3% and with a Number of Needed value (NNT) of 20, which means that by providing wound care to 20 people using mindi leaf hydrogel, it will reduce the failure of 1 person in patients with infected wounds or bad wounds.

Nursing Implications

Wound care includes promotion of accelerated wound healing, preventing infection, preventing skin damage, preventing prolonged hospitalization, minimizing patient discomfort, minimizing the financial burden on patients and the workplace and minimizing the burden on nursing apes.12.

Health efforts made by medical personnel and nurses in particular are carrying out wound care which is in line with the Levine Conservation theory nursing theory in the part of the conservation of structural integrity where this section is closely related to the healing process to improve the integrity and continuity after someone experiences injury, trauma or illness. The role of the nurse is to limit the amount of tissue involved with disease through changing functions and nursing interventions13. Where in this theory mindi leaf hydrogel is used as a modern dressing for patients with grade II diabetic ulcers to accelerate the healing process of diabetic ulcers.

This mindi leaf hydrogel after going through the process of testing the content, allergy and toxicity test so that it can be applied to the treatment process of grade II diabetic ulcers. From the results of this study, mindi leaf hydrogel used in modern dressings can accelerate the healing process of grade II diabetic ulcers.

CONCLUSION

From the results of research conducted at the Arza Wound Care Clinic, Blitar Regency, East Java Province, it can be concluded that: Diabetic ulcer treatment with mindi leaf hydrogel is effective in accelerating the wound healing process with p value = 0.000

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