



THE USE OF HONEY FOR THE WOUND-HEALING PROCESS OF DIABETES MELLITUS

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KEYWORDS

honey for wound-healing,
diabetes mellitus, blood sugar
level

ABSTRACT

Diabetes Mellitus is an increase in blood sugar levels in the blood or hyperglycemia. In this condition, there are abnormalities in carbohydrate, fat and protein metabolism caused by decreased insulin secretion or decreased insulin sensitivity or both. It causes chronic complications of microvascular, macrovascular, and neuropathy. This literature review aims to find out more about the use of honey for the wound-healing process in Diabetes Mellitus. The literature search method used the Google Scholar database, and Hurzing Publish or Perish (2017-2023) using the keywords "Honey for Wound-Healing" AND "Diabetes Mellitus." There were 3 journals that met the specified inclusion criteria. The results of the literature analysis were published in 2017, 2019, and 2022, and the research design used was quasi-experimental. The sampling techniques used were purposive sampling, accidental sampling, and consecutive sampling. The research instrument used was an observation sheet. The data analysis used by the majority (66%) was the Independent T Test analysis test. The results of a review of all journals state that there is a significant effect of using honey in wound care on the wound healing process, growth of granulation tissue, reduction of exudate, wound depth, necrotic tissue, wound size, and signs of infection in the wound. Health workers can apply/apply the use of honey in wound care in Diabetes Mellitus patients.

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INTRODUCTION

Changes in lifestyle and lifestyle by consuming unhealthy foods such as fast food, fizzy drinks, and other types of food are one of the factors that trigger an increase in the occurrence of degenerative diseases such as diabetes mellitus (Curioni et al., 2022; Saravanan et al., 2023). Diabetes Mellitus is an increase in blood sugar levels in the blood or hyperglycemia. In this condition, there are abnormalities in carbohydrate, fat and protein metabolism caused by decreased insulin secretion or decreased insulin sensitivity or both. It causes chronic complications of microvascular, macrovascular, and neuropathy (Nurarif & Kusuma, 2015).

In 2030, the number of people with Diabetes in Indonesia will more than double to around 21.3 million people (Rahayu et al., 2023). In Indonesia, the death rate due to wounds in diabetes mellitus sufferers ranges from 17-32%. In comparison, the amputation rate ranges from 15 to 30%. Diabetic wounds easily develop into infections due to the entry of germs or bacteria and the presence of high blood sugar becomes a strategic place for growth. germs (Nurarif & Kusuma, 2015 ; Lissa et al., 2018 ; Hia, 2019). If diabetic wounds are not treated properly, they will cause disability and even lead to amputation (Minarningtyas et al., 2022).

Diabetic foot ulcer (DFU) is an open wound that occurs on the surface of the skin, and there is dead tissue in the wound area (necrotic). Patients with DFU often experience symptoms such as pain, limited patient mobility, pruritus, sleep disturbances, an unpleasant odor resulting from the release of exudate from wounds, and the occurrence of psychological impacts on patients such as emotions, shame, frustration, and low self-esteem (Tasalim & Putri, 2021).

If diabetic wounds are not treated properly, they will be difficult to heal. They will even become ulcers, so they must be treated with pharmacological and non-pharmacological therapy by giving oral hypoglycemic drugs (OHO) and insulin injections, which are pharmacological therapies.

Tasalim and Putri (2021) said honey is a non-pharmacological alternative for treating DM wounds. Giving honey therapy includes first cleaning the wound and the surrounding area with 0.9% NACL fluid, cleaning the existing necrotic tissue, cleaning the wound area once again with 0.9% NACL fluid, drying it with dry gauze, then applying honey evenly to the wound. Wounds: 2-3 drops of the injured area before covering with dry gauze.

Honey has the effectiveness of helping the wound healing process quickly because honey contains various enzymes and antivirals and honey can reduce the risk of infection (Oryan et al., 2016). Honey contains antibiotics, which function as an antiseptic and antibacterial to protect wounds and can help treat infections that occur in wounds. Honey also functions as an anti-inflammatory, which relieves pain and maintains circulation, which can help the wound healing process and accelerate new tissue so that it can fade scar tissue or scars on the skin (Tasalim & Putri, 2021).

"Based on the background description above, the author is interested in conducting a literature review regarding the use of honey in treating diabetic wounds." This literature review aims to find out more about the use of honey for the wound-healing process in Diabetes Mellitus.

METHOD

This research uses a literature search strategy, namely through keywords and databases or search engines. For primary data, the author conducted a journal search using keywords (AND, OR NOT, or AND NOT), which are used for more detail in journal searches and can make it easier to find the desired journal. The keywords used are "Honey for Wound Treatment" AND "Diabetes Mellitus." Then, the secondary data in this research is data from several research journals that have been carried out previously. The data sources used are the *Google Scholar* and *Hurzing Publish or Perish databases* in the form of articles or journals. From the results of a literature review search through the Google Scholar database and Hurzing Publish or Perish, which used the keywords "Honey for Wound Care" AND Diabetes Mellitus was treated with a maximum result of 100 journals so that 90 journals were obtained, and then the journals were selected, 87 journals were excluded because they did not comply with The inclusion criteria were determined so that 3 journals were reviewed.

RESULTS AND DISCUSSION

General Characteristics

Table 2. General Characteristics of Literature

No.	Category	F	%
A.	Year of Publication		
1	2017	1	33.3
2	2018	0	0
3	2019	0	0
4	2020	1	33.3
5	2021	1	33.3
6	2022	0	0
	Amount	3	100

B. Research design			
1	<i>Pre-Experimental with One Group Pre-test Post-test approach</i>	1	34
2	<i>Quasi-experiment with One Group Pre-test Post-test approach</i>	2	66
	Amount	3	100
C. Research Sampling			
1	<i>Purposive sampling</i>	1	33.3
2	<i>Accidental sampling</i>	1	33.3
3	<i>Consecutivie</i>	1	33.3
	Amount	3	100
D. Research Instrument			
1	<i>Observation</i>	3	100
	Amount	3	100
E. Research Statistical Analysis			
1	<i>Independent T test</i>	2	66
2	<i>Paried sample T-test</i>	1	34
	Amount	3	100

Based on Table 2, it can be seen that the research journals that will be reviewed were published in 2017, 2020, and 2021. The majority (66%) used a quasi-experimental research design. The sampling technique used in the journals that will be reviewed uses purposive sampling, accidental sampling, and consecutive sampling. All research instruments used (100%) used observation. The analysis used by most (66%) is the Independent T Test analysis test.

Characteristics of Research Results

Table 3. Characteristics of Research Results

No.	Category	F	%
A. Diabetes Mellitus wound care			
1.	Use of honey in wound care	3	100
B. Wound healing process			
1.	Granulation Tissue	3	100
2.	Wound depth	1	33.3
3.	Exudate	1	33.3
4.	Wound size	1	33.3
5.	Infection	1	33.3
6.	Necrotic tissue	1	33.3

Based on Table 3, it can be seen that all journals that will be reviewed look at the Diabetes Mellitus wound care category from the use of honey in wound care, which is connected to the wound healing process category as seen from granulation tissue. However, there is 1 article that links wound care with honey; apart from being linked to granulation tissue, it is also linked to wound depth, exudate, wound size, infection, and necrotic tissue.

Research Analysis

Table 4. Analysis of Research Results

No	Variables studied	Literature Analysis	Empirical Sources
1	Independent Variable: Use of honey in wound care. Dependent Variable: Wound healing process (Granulation Tissue)	The results of the study showed that granulation tissue growth was 25 – 90% after treating wounds with honey.	- (Sari & Sari, 2020) - (Lasito & Koto, 2021) - (Nabhani & Widiyastuti, 2017)
2	Independent Variable: Use of honey in wound care. Dependent Variable: Wound healing process (Wound Depth)	The research results show a reduction in the depth of the wound from the depth of damage to the subcutaneous layer, reduced only to damage to the epidermis layer.	(Nabhani & Widiyastuti, 2017)
3	Independent Variable: Use of honey in wound care. Dependent Variable: Wound healing process (Exudate)	The results showed that there were no exudate and dry wounds after treating the wounds with honey.	(Nabhani & Widiyastuti, 2017)
4	Independent Variable: Use of honey in wound care. Dependent Variable: Wound healing process (Wound Size)	The results showed that the size of the wound decreased by 20cm ² (from 36cm ² to 16cm ²).	(Nabhani & Widiyastuti, 2017)
5	Independent Variable: Use of honey in wound care. Dependent Variable: Wound healing process (Infection)	The results showed that there was a reduction in signs of infection.	(Nabhani & Widiyastuti, 2017)
6	Independent Variable: Use of honey in wound care. Dependent Variable: Wound healing process (Necrotic Tissue)	The results showed a reduction in the amount of necrotic tissue to less than 25%, and it was easy to remove.	(Nabhani & Widiyastuti, 2017)

Based on Table 4, it can be seen that all journals that will be reviewed state that Ha is accepted; this can be interpreted as meaning that there is an influence of using honey in wound care on the process of healing Diabetes Mellitus wounds.

Diabetes mellitus is a chronic disease caused by abnormalities in insulin secretion, insulin absorption or both (Balaji et al., 2019). The characteristic of people suffering from Diabetes mellitus is increased blood sugar levels (hyperglycemia). Treatment requires ongoing medical care with multi-factor risk reduction strategies beyond glycemic control (Marasabessy & Nasela, 2020). There are several factors that play a role in the diabetic wound healing process, including wound care, infection, abnormal blood vessels (vascularization), age of the sufferer, nutritional needs, smoking habits, psychology, and disease complications (Umar et al., 2017).

Table 5. Description of the wound healing process before and after wound treatment using honey

	Granulation tissue		Depth of wound		Exudate		Size of wound		Infection		Necrotic Tissue		Note
	Before	Sth	Before	Sth	Before	Sth	Before	Sth	Before	Sth	Before	Sth	
Nengke	Pink, pale, red, blackish, and/or the wound is <25% filled with granulation	Intact skin or injury to part of the skin	-	-	-	-	-	-	-	-	-	-	Visible improvement in wounds or skin integrity.
Budi	There is tissue damage (degeneration) as much as 20%	There is healthy tissue repair (90%)	-	-	-	-	-	-	-	-	-	-	There is an increase in the amount of healthy tissue.
Nabani	No granulation	Bright, red like flesh 75% to 100% of the wound is granulated or growing tissue	Entire layers of skin were lost, with extensive destruction. Damage to bone muscle tissue	Laceration of the epidermis and/or dermis layers	The wound appeared moist, but no exudate was observed	No exudate, dry wound	16 to <36cm ²	4 to <16cm ²	There are signs of infection (dolor, calor, rubor, tumor)	Signs of infection diminish	25% of the wound surface is covered with necrotic tissue	<25% of the wound surface is covered with necrotic tissue	There is growth of new granulation tissue, disappearance of exudate, reduction in wound size, reduced infection and reduced amount of necrotic tissue.

The antibacterial content in honey will protect wounds from infection and can also regenerate new tissue (Fuadi & Yanto, 2022). Using honey as a dressing for diabetic ulcers is more economical, has better results, and is an alternative (Sukarno et al., 2019).

Sari & Sari (2020) said that honey is anti-inflammatory because of its high sugar content which can inhibit bacterial growth and produce an energy source for macrophages.

It is believed that antibacterial honey can be used in the wound-healing process. Various mechanisms have been explained for the antibacterial effects of honey. The high sugar content in honey can inhibit microbial growth. This is believed to be a result of the osmotic effect, which prevents the growth of bacteria, thereby accelerating wound healing, nutritional and anti-oxidant content, immune stimulation, and other unknown compounds. It is also worth noting that using honey to dress an infected wound will make it cleaner, which is the basis for tissue growth. As for patients suffering from malignant wounds, improvement is related to the size and cleanliness of the wound and its care. In this regard, applying honey accelerates wound healing.

Honey has also been used to reduce the foul odor emanating from wounds. Research results (Tarigan & Ariani, 2014; Minarningtyas et al., 2022) report that honey can significantly lower pH and reduce the size of chronic wounds (venous/arterial ulcers and decubitus wounds) within 2 weeks. This will facilitate the process of granulation and epithelialization of the wound.

There are several factors that influence the wound-healing process. One factor is age. This is supported by the opinion of Ridwan et al. (2017) that age factors influence wound healing. The theory from Efendi et al. (2020) also states that skin cells can reduce their elasticity due to aging. Therefore, the ability of cell regeneration decreases. The second factor is nutrition. According to Ridwan et al (2017) nutrition can influence the wound healing process. This is because protein plays an important

role as a basis for forming collagen tissue; if a person experiences malnutrition, then wound healing will be hampered.

Moreover, the third factor is the GDS value of each respondent. According to Lede et al. (2018), DM patients experience slower wound healing because their blood sugar levels are higher than normal. Meanwhile, according to Ridwan et al. (2017), even a slight increase in blood sugar levels will result in damage to the body's blood vessels, nerve cells, and other intellectual functions. This causes complex substances, including glucose, to thicken the walls of blood vessels, which will cause limited blood flow to the skin and nerves and delay wound healing.

CONCLUSION

Based on the results of a literature review from 3 research journals, it can be concluded that the use of honey in treating DM wounds has a good effect on the growth of granulation tissue, reduction of exudate, wound depth, necrotic tissue, wound size, and signs of infection in the wound. Then, all the journals that were reviewed stated that Ha was accepted; this could mean that there is an influence of using honey on the process of healing Diabetes Mellitus wounds. In this research, the author advises health workers to apply/apply the use of honey in wound care in Diabetes Mellitus patients. The author hopes that the results of this research can be used as a reference for conducting further research on the benefits of honey in the wound healing process.

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