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The Effect Of Processed Snakefish (Channa Striata) On The Healing Process Of Diabetes Mellitus Ulcers

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ABSTRACT

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion , insulin action or both . The increase in the number diabetes mellitus sufferers causes an increase in the incidence diabetes mellitus complications , one of which is wounds on the feet of diabetic foot ulcers . In the wound healing process in diabetes, there are many factors that are often forgotten , one of which is adequate nutrition . Fulfilling this nutrition is very important because it can influence the wound healing process . apart from fulfilling nutrition , wound care also needs to be paid attention to . Snakehead fish (Channa striata) is a freshwater fish that is commonly used by Indonesian people as an Ingredients for healing wounds . . The main ingredients in this fish are relatively high protein and albumin. The albumin content in this fish is a globular protein which is often used clinically to improve nutrition and the wound healing process . Albumin also help in the process of forming body tissue . This literature aiming to determine the effect of providing processed snakehead fish (Channa Striata) on the healing process diabetes mellitus ulcers . The method used is a literature review with a Narrative Reviews design to identify and summarize previously published articles regarding the Effect of Providing Processed Snakehead Fish (Channa Striata) on the Healing Process of Diabetes Mellitus Ulcers . From the 10 articles summarized , the results showed that processed snakehead fish (Channa striata) contains protein, albumin, carbohydrates , fat and Zn which help in the healing process of diabetic ulcer and can reduce blood glucose levels .

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INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin function or both (1). Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot use the insulin that is produced naturally. effective. Insulin is a hormone that

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regulates blood glucose. Hyperglycemia, also called high blood glucose or high blood sugar, is a common effect of uncontrolled diabetes and over time causes serious damage to many body systems, especially the nerves and blood vessels. [2]

Diabetes Mellitus is classified into type 1 DM, known as insulin dependent , where the pancreas fails to produce insulin characterized by a lack of insulin production, and type 2 DM known as non-insulin dependent , caused by the body's inability to effectively use insulin produced by the pancreas. [2,3]. Type 2 diabetes is much more common and accounts for about 90% of all diabetes cases worldwide. It is most common in adults, but is also increasingly occurring in adolescents [2,3].

According to World Health Organization (WHO) in 2018, almost 80% of the causes of death in the world are non-communicable diseases. Basic Health Research (2018) explains that the highest cause of death in Indonesian society is caused by non-communicable diseases with a prevalence of around 60.6%. One of the diseases included in non-communicable diseases is diabetes mellitus with a mortality prevalence of 8.5%. (4) (2)

The prevalence of diabetes mellitus continues to soar in various countries. According to World Health Organization (WHO), that around 150 million people suffer from diabetes mellitus worldwide, and this number may double by 2025. Most of this increase will occur in developing countries and will be caused by the growth of aging populations, unhealthy diets, obesity and sedentary lifestyles. By 2025, while most people with diabetes in developed countries will be 65 years or older, in developing countries most will be in the 45-64 age group and will be affected in their productive years (2)

Based on data from the P2PL Division of the South Sulawesi Provincial Health Office's Non-Communicable Disease Surveillance in 2014, there were 27,470 cases of diabetes mellitus with 747 deaths. Meanwhile, based on data from the Makassar City Health Office in 2015, DM was ranked fourth out of the ten main causes of death in Makassar City, namely 191 cases with a total of 25,145 sufferers.(5)

The increase in the number of people with diabetes mellitus causes an increase in the incidence of complications of diabetes mellitus, one of which is wounds on the feet of people with diabetes/ diabetic foot ulcer . Diabetic foot ulcers are one of the most detrimental and serious major complications of diabetes mellitus , 10% to 25% of diabetic patients develop diabetic foot ulcers. (6)

The body parts that often suffer from problems caused by diabetic ulcers are the lower extremities with a percentage of 76.63%, and the upper extremities with 23.37%. In the process of healing wounds in diabetes, many factors are often forgotten, one of which is the fulfillment of nutrition. The fulfillment of this nutrition is very important because it can affect the wound healing process. (7,8)

In addition to fulfilling nutrition, wound care also needs to be considered. Wound care itself means cleaning necrotic tissue regularly that follows the principles of wound care, including cleaning, debridement and dressing. The purpose of treating this ulcer is to improve the quality of life, minimize and eliminate complaints. The way that can be done to speed up the wound healing process and to maintain blood sugar stability is to do regular foot care using snakehead fish extract dressing . Snakehead fish itself has a protein and

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albumin content that can be used for the wound healing process. (7,9)

Snakehead fish (Channa) striata) is a freshwater fish commonly used by Indonesian people as an ingredient for wound healing. This fish has many properties to accelerate the wound healing process and as an anti-inflammatory agent (10). The main content in this fish is relatively high protein and albumin. The albumin content in this fish is a globular protein that is often applied clinically to improve nutrition and the wound healing process. This albumin is used to maintain blood osmotic pressure, maintain the amount of water in blood plasma and to maintain blood capacity. In addition, albumin also helps in the process of forming body tissue such as wounds after surgery and burns. Albumin is the most abundant protein in plasma, which is around 60% of the total plasma (9,11). So, based on the explanation above , the purpose of writing this review article is to find out the benefits of processed snakehead fish (Channa striata) for healing diabetic ulcers by conducting a literature review of various research results

METHOD

This research is a literature research. Review with Narrative design Review .This method is used to identify, study, evaluate, and interpret all available research. By using this method, can be reviewed and systematic journal identification, which in each process follows the steps or established protocols. Type data on research This in the form of data secondary, that is database from various reference,such as research journals, journal reviews , annuals reports , books and related data with Influence Giving Processed Snakehead Fish (Channa Striata) for the Healing Process Diabetes Mellitus Ulcer . At the stage beginning search article journal obtained via electronic database that is *google scholar* found 100 articles , *Clinical Key* 9 articles , *PubMed* 1 2 articles , and national survey results such as RISKESDAS and WHO searching for with using keywords : Snakehead fish (*Channa) Striata*) and diabetic ulcers . After done *screening,* obtained 10 relevant and relevant articles material analysis in study this . Content analysis carried out using a synthesis table by comparing research methods, subjects and objects of research, as well as the variables studied include the influence giving processed snakehead fish (channa striata) for the healing process diabetes mellitus ulcer .

RESULTS

NO	Authors	Publisher	Objective study	Subject	Method	Results
1	Udayati , S. *et.al.*	*Proceedings of the National Pharmacy Workshop and Seminar (202 1)*	The purpose of study This know utilization from use of snakehead fish as healing wound on diabetes	-	Methods used in compilation this review article that is studies library	The results show that the snakehead fish (Channa striata) is able to speed up the healing process wounds on some the experiment that

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NO	Authors	Publisher	Objective study	Subject	Method	Results
			mellitus .			has been done , well use test animals and direct given to post- operative patients .
2	Safitri , Al *et.al* .	*Journal Scientific Nursing Department of Hang Tuah Health College Surabaya* (20 22)	Research purposes This is to know effectiveness snakehead fish (Channa Striata) against healing diabetes mellitus wound with range consumption regular	-	This research uses a literature review Research methods A systematic review searched six electronic databases. (Google Scholar, Scopus , PubMed , Science Direct , CINAHL and ProQuest) for previous studies using cross-sectional designs were published between 2015-2020.	The results show that Snakehead fish with high protein content not only has the potential to develop healing of diabetic wounds, improvement of nutritional status and increase in hypoalbumin
3	OK Yulizal , *et.al*	*Journal Health Science Sandi Husada* (20 21)	Research purposes This For know influence giving snakehead fish extract and metformin against control glycemic diabetes	Population in the study This is a population of male rats with a sample using 30 male rats (*Rattus norvegicus)* Wistar strain , aged 6-8 weeks and weighing 180-	Study This use method experimental with design post test only control group design.	There was an effect of giving EIG on reducing blood glucose levels in mice, and there was a decrease in HbA1c but it was not significant .

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NO	Authors	Publisher	Objective study	Subject	Method	Results
			mellitus model mice .	220 grams.		
4	Princess Bethany	*Journal of Pharmacy Tiara Bunda* (20 21)	Research purposes This For know extract The mucus of the snakehead fish (Channa striata) is able to cure Diabetes wound	-	Research using laboratory experimental methods	From the results research that has been done can concluded that : The mucus of the snakehead fish (Channa striata) has high protein content potential types of albumin For speed up a healing Diabetes Mellitus Wound
5	Ramadhanti , NA , et.al.	*Periodic Dermatology and Venereology – Periodical of Dermatology and Venereology* (202 1 *)*	The aim of this research is to find out and prove influence snakehead fish extract to amount macrophages and vessels blood to reaction inflammation network wound skin on mice	The population of this study was Rattus rats . novergicus strain Wistar male rat gender, rat age between 8-12 weeks, rat weight between 100-200 grams	This study used a posttest-only control group design.	In this study, a decreasing trend was found in the average number of macrophages and blood vessels in treatment group 1 and treatment group 2. The control group and treatment group 2 showed a significant difference, but there was no significant difference between the other groups. significant difference
6	Robert Tungadi	*Universal Journal of Pharmaceutica*	Study This aiming For know The	-	Types of research used is Narrative	Potential of snakehead fish in speed up the

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NO	Authors	Publisher	Objective study	Subject	Method	Results
		/ *Research* (20 19)	Potential of Fish Head (Ophiocephalus Striatus) in Accelerating Wound Healing		Reviews	healing process wound is very helpful increase degrees health society . This is related with content nutrition in snakehead fish such as albumin, glycine and Zn. Among albumin, glycine and Zn are important For healing wound because of this protein capable bind Zn and carry it in blood plasma . Zn deficiency will slow down the healing process wound . Because of the substance nutrition This along with other vitamins found in snakehead fish extract so that can trigger formation of Endothelial Progenitor Cells (EPC) and accelerates healing wounds . The presence of Zn in snakehead fish extract possibility become factor

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NO	Authors	Publisher	Objective study	Subject	Method	Results
						key role in healing wounds and improve lust Eat children . Zn is an important mineral in structure and function cell membrane . Zn supplementation can limit damage membranes caused by radicals free moment happen inflammation . More Far again , Zn is also involved in system immune , start from system defense by skin until gene regulation in lymphocytes .
7	Siti Endang Mustika .	*National Universal Biology Faculty* (2020)	Study This aiming to determine the effect of administering bujuk fish meat extract on collagen synthesis in healing diabetic wounds .	Study done using 54 tails mouse white (Rattus norvegicus) male induced Sprague Dawley strain diabetic with alloxan 150 mg/kg/BW and given need excision on the dorsal part of the mouse body .	Study This is study *in vivo* experimental	Study This proven that giving extract bujuk fish meat can speed up synthesis collagen in tissue wounds . bujuk fish meat extract contains substances needed to accelerate the healing of diabetic wounds , namely total protein (74.28%),

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NO	Authors	Publisher	Objective study	Subject	Method	Results
						albumin (26.20%), carbohydrates (4.30%), fat (5.73%) and Zn (6.69 mg / kg). Administration of bujuk fish extract has been shown to increase the number of collagen fibers and tends to increase hydroxyproline levels in the wound tissue of white mice with diabetic wounds .
8	Nurpudji A,T , *et.al*	*F1000 Research* (202 2)	Research purposes This is For For evaluate efficacy snakehead fish extract towards the healing process wound acute in mice streptozotocin - induced hyperglycemia .	Population from study This is Streptozotocin - induced male wistar rats	Types of research used is trial method experimental in animal models hyperglycemi a .	Our research shows improvement significant amount fibroblasts on the 3rd day in the group snakehead fish extract compared to with group control . There is none difference significant in number vascular and neutrophils . The results of the study also showed that snakehead fish extract can lower mean

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NO	Authors	Publisher	Objective study	Subject	Method	Results
						visual score of erythema on day 3 and lower formation crust on the 5th day
9	Maharani, L,A et al .	*Periodic Medicine (2020)*	The aim of this study was to prove the effect of giving Toman fish extract at a dose of 16 mL / KgBW of rats orally on the length and contraction of wounds on the backs of Wistar rats (Rattus novergiucs) DM patients for 14 days.	The research sample was male Wistar rats.	This research was conducted using an experimental method with a posttest. only with control group design	The conclusion of the study is that snakehead fish extract at a dose of 16 mL /kg of rat body weight has an effect on the length and contraction of diabetic wounds.
10	Pratiwi et al.	*International Journal of Nursing and Health Services* (20 21)	Research purposes This is For know effectiveness hydrogel from snakehead fish to amount colony bacteria and healing wounds in patients with type II diabetes mellitus grade II	patients with an average blood sugar level of 255 mg /dl with an average age of 55 years	This research is a quasi-experimental research, pretest , and posttest with a non-equivalent control group.	Administration of 675.675 mg of snakehead fish extract hydrogel is effective in reducing ... wound healing of grade II ulcer score in type II diabetes mellitus patients.

Ten The articles were analyzed using a synthesis table to see the variables that investigated by each study about the effect of giving snakehead fish on accelerating the healing of diabetic ulcers . Out of 10 article that discusses influence snakehead fish feeding to acceleration healing diabetes mellitus ulcers , 5 articles mentioned snakehead fish (

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channa) striata) can accelerate the healing process of diabetic wounds (journal 1,2,4,6,7), 1 article mention snakehead fish (channa) striata) can reduce blood glucose levels and HbA1C (journal 3). 2 articles mention snakehead fish (channa) striata) significantly increased the number of fibroblasts and decreased the number of macrophages (journals 5 and 8). And 2 other articles mentioned that snakehead fish (channa striata) reduces the score of diabetes mellitus ulcer grade and wound contraction (journal 9 and 10)

Wrong One strength a number of article the is use data Which representative in a way national and also international with edition latest as well as amount sample Which big Which adequate For analyze Influence Giving Processed Snakehead Fish (Channa Striata) for the Healing Process Diabetes Mellitus Ulcer

Wrong One limitations Which need be noticed is that it requires relatively large or numerous research subjects , assuming that there are quite a lot of independent variables that have an influence , it is less able to describe the healing process diabetic ulcers appropriately. Source data Which available in studies literature Possible No complete For answer all question study. Besides That, some articles use coverage population Which not enough. With thus , the author recommend study time front with methodology Which more Good, size until I that more big, And more Lots variable. Required study more carry on For improve the quality of life and healing of patients suffering from diabetic ulcers

Discussion

Treatment performed through administration of snakehead fish (Channa striata) has Lots benefits . Some studies that have been prove benefit from snakehead fish and has to obtain results . Some study This implemented in developed countries and in developing countries . Based on reference journal obtained as material reference literature and has implemented proof about effectiveness of snakehead fish as material For healing diabetic wound

Essential amino acids and fatty acids of snakehead fish are the main composition to restore wound healing in the human body. Wound healing is a very complex process involving a series of reactions and interactions between cells and mediators. The skin has a complex network that is infiltrated by pro-inflammatory cells during wound repair. Snakehead mucus and tissue extracts were found to contain high amounts of amino acids, especially glycine and arachidonic acid . Both are reported to promote wound healing by initiating collagen synthesis and re-epithelialization of damaged tissues. Snakehead fish extract is recommended for postoperative wound healing as well as post-pregnancy rehabilitation and also, is known to produce polyunsaturated fatty acids, which regulate prostaglandin synthesis including wound healing. .That encourages the wound healing properties of snakehead fish extract is supported by the observation that it is able to affect the tensile strength of postoperative wounds better than existing cetrimide creams, including faster wound dough contraction and positively affects the fibroblastic phase of wound healing with marked increase in glycosaminoglycans . Re-epithelialization of healing wounds is also accelerated under the influence of topical application of snakehead fish with the benefit of rapidly cleaning the wound leaving only minimal scars.

Channa striata provides anti-inflammatory effects by adding macrophages to the

healing process of diabetic wounds. Addressing inflammation immediately will support the acceleration of the next phase of wound healing. Research shows that Channa extract striata reduces lymphocyte concentration by 50%-100%, equivalent to the function of ibuprofen . The anti-inflammatory effect of Channa on the angiogenesis process can control NF-B expression and increase VEGF expression, thus being beneficial for the wound healing process.(36)

Albumin and omega-6 in Channa Extract function as antioxidants and anti-inflammatory in diabetic wounds. In addition, they show antihyperglycemic and antidiabetic properties . Channa Extract striata has been shown to reduce the number of lymphocytes in the healing process of diabetic wounds.

Based on the results of research conducted by Nurpudji Astuti Taslim et al. (2024) on hyperglycemic rats , oral administration of snakehead fish extract significantly increased the number of fibroblasts in the proliferation phase of the acute wound healing process. Although not significant, snakehead fish extract can also reduce the number of neutrophils in wound tissue in the acute wound inflammation phase. Macroscopically, decreased erythema and less crust formation were seen in the intervention group compared to the control group.

CONCLUSION

Based on the results of the identification and review in this literature review , then can made conclusion that o The land of snakehead fish (Channa striata) contains protein, albumin, carbohydrates , fat and Zn which helps in the healing process diabetic ulcer and can lower level glucose blood.Processed snakehead fish (Channa striata)

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