

## THE EFFECT OF VIRGIN COCONUT OIL AGAINST SKIN TREATMENT OF LEPROSY PATIENTS

ZUHRIANA K YUSUF\*, NANANG R PARAMATA, WIRDA Y DULAHU

Department of Nursing, Faculty of Sport and Health, State University of Gorontalo, Indonesia.

\*Email: yusufzuhriana@yahoo.co.id

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## ABSTRACT

**Objective:** Leprosy is a major cause of permanent disability among infectious diseases. The important parts of the human body that is disturbed in leprosy patients are the skin and peripheral nerves. Multidrug therapy treatment can kill leprosy germs, but previous existing defects cannot be eliminated. The purpose of this study was to determine the effectiveness of virgin coconut oil (VCO) in improving the skin of lepers.

**Methods:** The methods of this research used a pre- and post-test of the control group of 50 people respondents which consisted of the treatment group of VCO and control group of original coconut oil. All treatment and control groups of respondents were given once per day for 1 month based on non-probability sampling.

**Results:** The results showed that there was a significant effect of VCO on the skin of leprosy patients with a statistical value  $p=0.000$  ( $\alpha=0.001$ ). This was also supported by the observation of the patient's skin which all of patients experience changed in the results of the assessment of the skin after VCO administration intervention. This relates to lauric acid content in coconut oil which can reduce skin moisture levels.

**Conclusion:** Based on the results of this study can be concluded that VCO is effective in improving the skin of lepers. VCO can be used as an alternative intervention in skin care for leprosy patients and to prevent further disability. Therefore, it is important for leprosy patients to obtain information about the use of VCO in the care and moisture of the skin.

**Keywords:** Leprosy, Lauric acid, Patient, Skin, Virgin coconut oil.

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## INTRODUCTION

Leprosy is an infectious disease causing very complex problems. This disease is generally found in developing countries as a result of the country's limitations in the fields of health, education, and socioeconomic welfare [1]. WHO data showed that more than 3 million people around the world are estimated to live with the integrity of skin damage due to this disease [2]. At present, Indonesia is ranked 3<sup>rd</sup> with the highest number of leprosy sufferers in the world.

Leprosy can be transmitted from lepers to other people with close and long direct contact with lepers. This disease attacks the peripheral nerves, then also can attack the skin, oral mucosa, upper respiratory tract, reticuloendothelial system, eyes, muscles, bones, and testicles causing disability, i.e., *Mycobacterium leprae* [2]. This disability if left untreated it will have an adverse effect on the body members of lepers. These impacts include damage to skin integrity which referred to dry skin and damage of nerves that control sweating. Broken skin is usually obtained in the area of the arch/fold of the hand, around the heel, and folds between the toes. Broken skin is a wound which should not be ignored. If not treated, it can be the entrance to infection, if infected wounds can easily spread joints and bones causing loss of fingers [3].

There are several preventions of damage to skin integrity in people who affected by leprosy, namely, the use of Vaseline, olive oil, and coconut oil to prevent damage to the integrity of the skin. The use of coconut oil can reduce the occurrence of damage to skin integrity in lepers.

The use of coconut oil can moisturize and soften the skin. According to Prince (2004) mentioned that coconut oil contained fatty acid medium which was combined as triglycerides having direct antimicrobial action, but bacteria on the skin convert triglycerides to free fatty acids [4].

According to Chaerunisa (2008) stated that coconut oil can maintain skin moisture and skin elasticity while improving the skin regeneration process so that the skin is not easily dry and wrinkled. Dry, broken skin is applied coconut oil with a little massage to relax the skin muscles so that it will be softer, moist, and relaxed. In Gorontalo, coconut oil can be obtained easily, still used as an ingredient and a dry skin moisturizer. Therefore, researchers are interested in conducting research on the use of virgin coconut oil (VCO) in overcoming skin damage in leprosy patients [5,6].

## METHODS

The experimental protocols were approved by the Institutional Animal Ethics Committee as per guidelines of the Health Ethics Committee, Faculty of Medicine, Hasanuddin University, Indonesia Government with registration No. 601/H4.8.4.5.31/PP36-KOMETIK/2017.

In this study, all respondents had signed a research informed consent, which was preceded by an explanation of the research, goals, and risks that could occur from the actions which were given during the research process. The use of instruments in this study was observation sheets using the overall dry skin (ODS) score [7]. Skin moisture assessment was carried out before and after the action. The stages of action before being given VCO in the treatment group and regular coconut oil in the control group, which were begun with an assessment of damage to the patient's skin integrity to determine the level of disability of leprosy patients, both on the patient's hands and feet. Then immersed on the area which was given VCO for 20 min using clean water. After that, it was rubbed and thickened on skin damage with rubbing stones then smeared the oil without drying it [2]. The research was carried out directly by researchers for 1 month with the frequency of administration once per day, using VCO which has been standardized and has gone through laboratory testing. Data collection was carried out in this study, namely, demographic data

in the form of age, sex, occupation, duration of illness, and skin moisture data of patients before and after being given intervention. Data analysis in this study utilized the Wilcoxon statistical test.

## RESULTS

This research was conducted in Gorontalo City, Gorontalo Province. Research time started from May 24 to September 8, 2018. The studied sample units were all leprosy patients who had been on medication from 2013 to 2017 which was noticed as inclusion and exclusion criteria. The obtained samples in this study were 50 respondents who wanted to do an experiment consisting of the treatment group 25 and 25 of the control group. The used instrument in this study was an observation sheet in the form of measurement scale using the ODS score. The results of this study were obtained directly from the results of direct observation and obtained information from respondents as well as health center officers who hold the leprosy program.

## DISCUSSION

### Effectiveness of coconut oil use on skin moisture levels

Based on the results of the study on 50 respondents consisting of 25 treatment groups and 25 control groups, they showed that there was an effect of giving coconut oil to the skin moisture of leprosy patients (Table 1). Before the administration of coconut oil, it was found that the skin condition of lepers was in the form of dry skin, squamous carcinoma, which could occur due to loss or reduced moisture content of the stratum corneum, in lepers. This is caused by leprosy germs attacking the peripheral nerves having three nerves such as autonomic, motoric, and sensory nerves. The autonomic nerves that are innervated by the sweat glands, oil glands, and blood vessels, so when leprosy germs attack the autonomic nerves of the leprosy skin which will automatically dry out and reduce moisture so that it can manifest the skin in patients [5,8].

The diversity of the results of this examination can be caused by several factors, one of which is the age factor, which patients having an older age have a risk of experiencing severe intensity skin damage. Regarding this, the skin tissue will give the change of aging, the skin age, and tissue during aging, cell regeneration in the skin becomes slower in muscle loss and decrease serum albumin levels, inflammatory response, skin elasticity, and cohesion between the dermis and epidermis. The changes of collagen content in the skin reduce the skin elasticity, making it vulnerable to deformation and damage. This is consistent with Lestari's research stated that we get older because the skin will experience aging at the age of 40 in the form of changes such as dry and wrinkled skin. This skin condition starts at the age of 45 years when the oil glands reduce. In lepers, dry skin is caused by damaged glands producing sweat and oil which caused by leprosy germs [9,10].

### Effectiveness of VCO on skin moisture levels

In this study, after being given VCO to the respondent's skin, the results showed that there was a significant effect on the skin of leprosy patients with a value of  $p=0.00$ . This is also supported by the observation of the patient's skin who all patients experience changes in the results of the assessment of the skin after VCO administration intervention (Table 2). This happens due to the content of lauric acid in coconut oil which can help reduce skin moisture levels. Meanwhile, Chaerunisa (2008) also explained that coconut oil can soften the skin because it contains various nutrients in the form of fat-soluble vitamins (Vitamins A, D, E, K, and provitamin A) and as good nutrition for beauty care which can maintain skin moisture and skin elasticity while facilitating skin regeneration [5]. Regarding this, applying coconut oil on dry skin or throughout the body as a massage materials, and apply it to cracked and broken skin with a little massage to relax the skin muscles so that it will be soft, moist, and relaxed [11]. The theory is supported by the Ministry of Health (2006) and applied coconut oil after soaking and rubbing rough parts which pumice can prevent the occurrence of callus due to drought.

This is also in accordance with Widiyanti's research (2015) stated that VCO has several advantages such as high lauric acid content which will

**Table 1: Distribution of respondents by gender**

Gender	Total (n)	Percentage
Treatment group		
Men	13	52
Women	12	48
Total	25	100
Control group		
Men	15	60
Women	10	40
Total	25	100
Total	50	100

**Table 2: Assessment of skin moisture based on the ODS in the treatment group which given virgin coconut oil**

No.	Score of ODS	Total (n)	Percentage
1.	Before treatment		
	++++	3	12
	+++	5	20
	++	4	16
	+	13	52
	Total	25	100
2.	After treatment		
	++++	3	12
	+++	5	20
	++	10	40
	+	7	28
	Total	25	100

ODS: Overall dry skin

**Table 3: Assessment of skin moisture based on the ODS in the control group which given ordinary coconut oil**

No.	Score of ODS	Total (n)	Percentage
1.	Before treatment		
	++++	2	8
	+++	8	32
	++	5	20
	+	10	40
	Total	25	100
2.	After treatment		
	++++	-	-
	+++	3	12
	++	8	32
	+	14	56
	Total	25	100

ODS: Overall dry skin

be converted into monolaurin as antibiotic monoglyceride compound in the body and included antiviral, antibacterial, and anti-protozoa [12]. Therefore, it can increase the human body's resistance against diseases and accelerate the healing process. VCO also contains capric acid which has a moderate chain with the number of 10 carbons. This capric acid is also beneficial for health which will be converted into monolaurin and very useful as an antiviral like the HIV. Various diseases originating from viruses and bacteria can be resisted by consuming VCO, such as bird flu, HIV/AIDS, hepatitis, and other types of viruses and bacteria. In addition, VCO can also overcome obesity, skin diseases, high blood pressure, and diabetes [13].

On the contrary, the processing of ordinary coconut oil is obtained directly from coconut milk with a wet process under controlled temperatures. Wet processing can avoid loss of small active components biologically such as vitamins and polyphenols. In addition, the previous studies had shown that VCO was more beneficial than ordinary coconut oil in reducing low-density lipoprotein oxidation and plasma lipid levels (Table 3) and improving the antioxidant status of experiments which carried out in mice [5].

This is supported by Sumitra research *et al.* who found that there is an effect of giving topical VCO to wound healing. The results show a significant effect of VCO on the components of the intracellular and extracellular matrix and antioxidant profiles during wound healing. The total collagen content of granulation tissue which given VCO was higher than the untreated control group. Collagen is the main component of the extracellular matrix and also the dominant protein of granulation tissue having pivotal role in the healing process. It begins immediately during the injury and continues for several weeks to months, even after the wound is closed [14].

#### CONCLUSION

The results showed that VCO is more effective in improving the skin of lepers which can be utilized as an alternative intervention in skin care for leprosy patients and to prevent further disability.

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#### AUTHORS' CONTRIBUTIONS

Zuhriana Yusuf guided and supervised the research, interpreted the results, and prepared the manuscript. Nanang Paramata and Wirda Dulahu carried out the survey and analyzed the results.

#### CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

#### REFERENCES

1. Department of Health. Profile of Indonesia Health. The Ministry of Health Republic Indonesia. Indonesia: Department of Health; 2015.
2. Ministry of Health. The National Guidance of Leprosy Control Program the Ministry of Health Republic Indonesia. South Jakarta: Ministry of Health; 2012.
3. Dwihartanti R, Listyorini L, Karima M. Self care of leprosy patient. *J Sci Health* 2015;7:1-3.
4. Noor NM, Aziz AA, Sarmidi MR, Aziz R. The effect of virgin coconut oil loaded solid lipid particles (VCO-SLPs) on skin hydration and skin elasticity. *Technol J* 2013;1:39-43.
5. Nevin KG, Rajamohan T. Effect of topical application of virgin coconut oil on skin components and antioxidant status during dermal wound healing in young rats. *Skin Pharmacol Physiol* 2010;23:290-7.
6. Bhat RM, Prakash C. Leprosy : An Overview of Pathophysiology. London: Hindawi Publishing Corporation; 2012. p. 1-6.
7. Soenarto PW, Djauhari T, Tjekyan RS. The effect of urea cream 10% and niacinamid cream 4% on xerosis elderly. *J Med Health* 2015;2:54-60.
8. Ramalho A, Silva CL, Pais AA, Sousa JJ. *In vivo* friction study of human skin: Influence of moisturizers on different anatomical sites. *Wear* 2007;263:1044-9.
9. Sumitra M, Manikandan T, Suguna L, Chettiar G. Study of dermal wound healing activity of *Trigonella foenum-graceum* seeds in rats. *J Clin Biochem Nutr* 2000;28:59-67.
10. Mansor TS, Man BC, Shuhaimi M, Afiq A, NurulK. Physicochemical properties of virgin coconut oil extracted from different processing methods. *Int Food Res J* 2012;19:837-45.
11. Van Veen NH, Meima A, Richardus JH. The relationship between detection delay and impairment in leprosy control: A comparison of patient cohorts from Bangladesh and ethiopia. *Lepr Rev* 2006;77:356-65.
12. Widiarti RA. The Role of Biology and Biology Education in Preparing Superior Generation and Global Competitiveness, Proceedings of the National Seminar on Biological Education, Malang. Vol. 21. Proceeding Seminar Biology Education; 2015. p. 577-84.
13. Winarti S, Jariyah S, Purnomo Y. Preparation of enzymatic method using crude papain. *J Agric Technol* 2007;8:136-41.
14. Zainuddin N, Shah NA, Salim R. Effects of virgin coconut oil as adjunct therapy in the treatment of allergic rhinitis. *J Clin Health Sci* 2016;1:22-8.