

Original Research Article

EFFECTIVENESS OF VIRGIN COCONUT OIL TO XEROSIS IN HEMODIALYSIS PATIENTS

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Abstract

Background: Progressive and irreversible decline in renal function in chronic renal failure requires renal replacement therapy. The most commonly used renal replacement therapy is hemodialysis. Hemodialysis therapy can maintain patient survival and control uremia syndrome. However, uremic toxins cannot be completely resolved by hemodialysis. The uremic toxins that accumulate on the patient's skin can cause xerosis (dry skin). Xerosis can be overcome by providing a moisturizer that has emollient content. One of the natural ingredients that contain emollients and can be used for skin care for hemodialysis patients is virgin coconut oil (Las Alas, Carpio, Lim & Frez, 2014)

Objectives: This study aimed to determine the effectiveness of virgin coconut oil (VCO) administration against xerosis in patients undergoing hemodialysis.

Methods: This research is a quantitative study with a quasi-experimental design approach using one group pre and post-test approaches without control group design. The research was conducted in the hemodialysis room RST III Reksodiwiryoyo Padang. Sampling was done by consecutive sampling technique with a sample size of 11 people. The study inclusion criteria were willingness to be a respondent, patients undergoing routine hemodialysis, age 36-45 years, ODSS score > 0. Exclusion criteria were allergy with VCO, patients whose skin had sores and lesions. VCO intervention was carried out for 12 days, 2 times a day. Score of xerosis before and after intervention was assessed by Overall Dry Skin Score (ODSS). ODSS was developed by European Group on Efficacy Measurement of Cosmetics and other Topical (Las Alas et al., 2014). The Research result were analyzed using the paired T-test.

Results: The mean score of xerosis before VCO administration was 3.06 and after VCO administration was 1.39. Based on the statistical test, it was found that the p value = 0.001 ($p < 0.05$), meaning that virgin coconut oil was effective in overcoming the problem of xerosis in patients undergoing hemodialysis at RST III Dr. Reksodiwiryoyo Padang.

Conclusion: Virgin coconut oil can be used for skin care to treat xerosis problems in chronic kidney failure patients undergoing hemodialysis.

Keywords: Hemodialysis, xerosis, virgin coconut oil.

INTRODUCTION

Chronic renal failure is a disease of kidney damage that causes a progressive and irreversible decline in kidney function (Sukandar, 2013). In chronic renal failure, there is a decrease in glomerular filtration rate (GFR) <15 ml / minute or 1.73 m² for more than 3 months. This can cause kidney function to decrease where there is an imbalance of fluids and electrolytes, and the end products of metabolic waste accumulate in the body. Chronic renal failure is a health problem whose incidence rate continues to increase. The results of Riskesdas 2018 showed an increase in the prevalence of kidney failure sufferers in Indonesia, namely 0.38% compared to 2013 which was only 0.2%. The prevalence of chronic kidney failure in West Sumatra was 0.2% in 2013 and increased to 0.4% in 2018 (Kemenkes RI, 2018).

To replace kidney function, kidney replacement therapy is needed. One of the renal replacement therapy is hemodialysis. The main purpose of hemodialysis is to control uremia toxin, fluid overload, and electrolyte balance that occurs in patients with kidney failure. Toxin uremia is not completely resolved by hemodialysis therapy. In the body of patients undergoing hemodialysis, there is still a buildup of metabolic waste substances in the form of uremic toxins which will cause uremia syndrome (Sukandar, 2013; Black & Hawk, 2014).

One of the manifestations of uremic syndrome is dry skin (xerosis). Xerosis occurs due to the accumulation of uremic toxins in the patient's skin (Sukandar, 2013; Black & Hawk, 2014). Based on research by Kolla et al. (2012) found that 52% of patients undergoing hemodialysis experienced xerosis. The accumulation of uremic toxins in the skin causes atrophy of the sebaceous glands, impaired function of external secretions, and impaired hydration of the stratum corneum with reduced moisture due to loss of lipids and natural moisturizing factors in the stratum corneum so that the skin becomes dry. The ongoing condition will cause the surface of the

skin to crack and crack resulting in irritation and inflammation. If the depth of the fracture is deep enough to the dermis layer, it will cause bleeding which can lead to fungal and bacterial infections. The further impact resulted in physical and psychological problems in the patient. Xerosis with a poor prognosis affects the quality of life of patients and increases health care costs (Kolla et al., 2012; Sukandar, 2013; Black & Hawk, 2014).

Xerosis treatment can be done by using a moisturizer that contains emollients and functions to keep the skin moist. One of the emollients that can be used is virgin coconut oil (VCO). VCO has an occlusive and humectant mechanism to increase moisture content and soften rough skin. The increase in water content on the surface of the skin through an occlusive mechanism of action forms a thin film layer over the skin surface, whereas through the mechanism of action of humectants it allows water to be attracted to the stratum corneum. Emollients contained in VCO can soften the skin by filling in the keratinocyte desquamation spaces (Prise, 2008; Purwanto, 2014).

Several previous studies have looked at the effectiveness of using VCO for skin care. Research results Asri and Zuryati (2018) tested the effectiveness of VCO on pruritus in chronic kidney failure patients undergoing hemodialysis. The results of this study proved to be effective in reducing pruritus in hemodialysis patients and this study recommends that VCO can be used for skin care. Dewi, Kristiyawati, and Purnomo (2014) research results tested the effect of VCO on reducing itching in DM patients.

The results of this study recommend that VCO can be used as a moisturizer for the skin and treat itching. The content of solid lipid particles in VCO (VCO-SLPs) can increase skin hydration and increase skin elasticity. The results of the research by Noor et al. (2013) stated that VCO-SLPs can increase skin hydration and elasticity by 24.8% and 2.6% from day 0 to day 28 when VCO is applied to the skin. Previous studies have examined the effect of VCO on the skin, but Previous studies

looked at its effectiveness on pruritus symptoms, skin hydration and skin elasticity. Based on this, this study will assess the effectiveness of VCO administration against xerosis in hemodialysis patients.

Methods

Study Design

This research is a quantitative study with a quasi-experimental method using one group pre and posttest without control group design.

Research Subject

The sampling was done through non-probability sampling technique with consecutive sampling. The study inclusion criteria were willingness to be a respondent, patients undergoing routine hemodialysis, age 36-45 years, ODSS score > 0. Exclusion criteria were allergy with VCO, patients whose skin had sores and lesions. The sample size in this study was 11 people.

Setting

This research was carried out in the hemodialysis room of RST III Dr. Reksodiwiryo Padang.

Instruments

The intervention variable in this study was the provision of Virgin Coconut Oil and the dependent variable was the degree of xerosis. The degree of xerosis was assessed using the Overall Dry Skin Score (ODSS). ODSS was developed by European Group on Efficacy Measurement of Cosmetics and other Topical (Las Alas et al., 2014). The details of the ODSS assessment are in table 1 below:

Table 1 Overall Dry Skin Score (ODSS)

Score	Characteristics
0	Absent
1	Fine scalling, faint roughness and dullness
2	Small scales, few large scales, slight roughness, whitish appearance
3	Small and large scales uniformly distributed, definite roughness,

	slight redness and few superficial cracks
4	Dominated by large scales, advanced roughness, redness, eczematous changes and cracks

Data Source: Las Alas et al., 2014.

Intervention

The intervention in this study was topical administration of VCO. Topical use of VCO by applying to the skin of the respondent, especially on the arms and legs. VCO is given 2 times a day after bathing in the morning and evening. The intervention was given for 12 days. Monitoring is done by filling out a checklist sheet if the respondent has used VCO in the morning and evening. The pretest xerosis score was assessed before the first day of intervention and the posttest xerosis score was assessed on the 13th day.

Data Analysis

The analysis was done to see the effect of virgin coconut oil on xerosis. The test used was paired-t-test because the data is normally distributed.

Ethical Consideration

This research has gone through an ethical test and obtained permission from RST III Dr. Reksodiwiryo Padang with license number B/214/VIII/2019.

RESULTS

Xerosis Score Before and After the Intervention

The xerosis score in hemodialysis patients in the intervention groups, before and after implementation virgin coconut oil, can be seen in the following table.

Table 2 Xerosis Score Before and After Implementation Virgin Coconut Oil in Intervention Groups in the Hemodialysis Room of RST III Dr. Reksodiwiryo Padang during Twelve Days (n = 11).

Measurement	n	Mean \pm SD	Min-Max
Before	11	3.06 \pm 0.74	2 – 4
After	11	1.39 \pm 0.66	1 – 3

Sources: Primary data of Questionnaire, 2020.

From the table above, the average xerosis score before the treatment in the intervention group was 3.06. On the other hand the mean value of xerosis score after treatment were 1.39.

Analysis of the Differences in Xerosis Score Before and After the Intervention using Paired-T-Test

Table 3 Result of the Analysis of the Differences in Xerosis Score Before and After the Implementation Virgin Coconut Oil in Intervention Groups in the Hemodialysis Room of RST III Dr. Reksodiwiryo Padang during Twelve Days using Paired-T-Test (n = 11).

Variable	Mean	SD	Mean Difference	p
Xerosis Score				
Before	3.06	0.74	1.67	0.001*
After	1.39	0.66		

Sources: Primary data of Questionnaire, 2020.

Based on the table above, the difference in the mean score of the degree of xerosis before and after giving VCO was 1.67 for 11 respondents. Based on the statistical test t-dependent test (paired test), the p value = 0.001 ($p < 0.05$), meaning that virgin coconut oil is effective in overcoming the problem of xerosis in patients undergoing hemodialysis at RST III Dr. Reksodiwiryo Padang.

DISCUSSION

Based on the results of research from 11 respondents with dry skin (xerosis) before being given VCO (Virgin Coconut Oil) application, the mean score of the degree of xerosis was 3.06, with a standard deviation of 0.74 in patients undergoing hemodialysis at RST III Dr. Reksodiwiryo Padang. Based on the mean xerosis score before being given VCO (Virgin Coconut Oil), it can be interpreted that the description of the skin condition is in the form of uniformly distributed coarse fine

scales, clearly visible rough skin, mild redness and some superficial cracks. The incidence of xerosis in patients with chronic renal failure is due to the accumulation of urea in the patient's skin due to the inability of the kidneys to secrete metabolic waste. In hemodialysis patients, urea buildup can be reduced because hemodialysis therapy can remove metabolic waste products in the form of urea through a filtering process by a dialyser (Kolla et al, 2012).

The condition of xerosis in chronic renal failure patients undergoing

hemodialysis is also caused by the accumulation of urea in the skin resulting in changes in the maturation of corneocytes in the skin. In addition, the buildup of urea also causes atrophy of the sweat and sebaceous glands so that skin nutrition is lacking. Changes in the sweat and oil glands also cause the skin to lose its natural ability to hydrate itself so that the skin becomes dry and cracked (Akhyani et al., 2005).

Based on the research results, the mean score of xerosis degree after being given skin care intervention using VCO for 2 weeks was 1.39. The mean score of the degree of xerosis decreased after the intervention was given. If we look at the characteristics of the respondent's skin based on ODSS, after the intervention the respondent's skin condition was fine scales, rough and minimal skin. Judging from the results of the statistical t-dependent test (paired test), the p value = 0.001 ($p < 0.05$), meaning that virgin coconut oil is effective in overcoming the problem of xerosis in patients undergoing hemodialysis at RST III Dr. Reksodiwiryo Padang.

The results of this study are in line with the research of Las Alas, Carpio, Lim and Frez (2014) who conducted a VCO trial to treat xerosis in patients with chronic kidney failure. In the research of Las Alas et al. (2014) VCO was given for 4 weeks. VCO is given 2 times a day on the feet of the respondent. The results of research by Las Alas et al. (2014) showed that the xerosis problem was resolved in 77.3% of respondents.

The results of research by Agero and Verallo-Rowell (2004) comparing the effectiveness of VCO with mineral oil as a moisturizer for adults with mild to moderate xerosis suggest that VCO and mineral oil are equally effective in

increasing surface lipid levels and skin hydration. Agero and Verallo-Rowell (2004) concluded that the application of VCO on the skin and mineral oil is effective against xerosis and is safe to use as a skin moisturizer.

Virgin coconut oil has been used as a moisturizer in Indonesia. VCO is obtained from fresh and ripe coconut kernels (The content of medium chain triglycerides and fatty acids in VCO can function as a replacement for lipids lost in the skin barrier, including lauric acid, capric, caprylic and myristic acid. In addition, VCO also contains antiseptic properties. VCO has an occlusive and humectant action mechanism to increase moisture content and soften rough skin. Increased water content on the skin surface through an occlusive action mechanism to form a thin film over the skin surface, whereas through the humectant action mechanism allows water to be bound by being attracted to the stratum corneum (Agero & Verallo-Rowell, 2004).

As an emollient, the main component of VCO is about 90% saturated fatty acids and 10% unsaturated fatty acids. VCO contains about 53% lauric acid and about 7% caprylic acid. The content of fatty acids (especially lauric and oleic acids) in VCO is to soften the skin. In addition, the content of vitamins A, C, and E are effectively used as a moisturizer for the skin, so that it can increase skin hydration and accelerate wound healing (Prise, 2008; Purwanto, 2014).

Emollient contained in VCO can soften the skin by filling the keratinocyte desquamation spaces. Emollients also provide an occlusive coating which reduces transepidermal water loss. The mechanism of action of VCO above can reduce the symptoms of xerosis in the skin of patients

with chronic renal failure who undergo hemodialysis. The fatty acid content of virgin coconut oil can replace fat between skin corneocytes. VCO that is applied to the surface of the skin will routinely penetrate into the deeper layers in the stratum corneum and strengthen the structure of the fat so that there is increased cohesion between corneocyte cells and is able to prevent xerosis (Prise, 2008; Purwanto, 2014; Las Alas et al. al., 2014).

CONCLUSION

According to the results of the study, it was found out that virgin coconut oil is effective in decreasing the xerosis in hemodialysis patients.

SUGGESTION

Virgin coconut oil can be used as a skin care for patients with chronic renal failure undergoing hemodialysis to prevent and treatment xerosis.

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DECLARATION OF CONFLICTING INTEREST

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AUTHOR CONTRIBUTION

Ria Desnita: Prepare research proposal, conducting, research permit, selecting samples based on criteria, intervening virgin coconut oil, compile research report, writing manuscript and presentation result report.

Vivi Syofia Sapardi: Assist in preparing proposal, collecting pre and post test data, perform data processing, analyses data, assist in the preparation of publication.

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