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Effect of Oat Lotion Toward Itching Sensation in Hemodialysis Patients with Pruritus at Hospitals

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ABSTRAK

Pruritus merupakan sensasi gatal yang dialami oleh pasien hemodialisis yang menimbulkan rasa tidak nyaman bahkan dapat mempengaruhi kualitas hidup pasien. Pada pasien hemodialisis yang mengalami pruritus, terapi komplementer berupa topikal seperti oat lotion dapat digunakan untuk mengobati gatal. Tujuan penelitian ini adalah untuk melihat pengaruh oat lotion terhadap gatal pada pasien hemodialisis di RSUD Kota Medan yang mengalami pruritus. Data dikumpulkan dengan menggunakan kuesioner yang mencakup kuesioner data demografi, kuesioner 5D-IS, dan formulir yang dilaporkan sendiri. Penelitian ini menggunakan desain eksperimen semu dengan jumlah peserta 80 orang, 40 orang dari kelompok intervensi dan 40 orang dari kelompok kontrol, semuanya dipilih dengan teknik simple random sampling. Hasil uji Mann Whitney U Test menyajikan perbedaan rasa gatal yang dialami kelompok intervensi dan kelompok sensasi pasca pemberian lotion oat (p 0,05). Analisis multivariat dalam penelitian ini menghasilkan temuan bahwa durasi dan frekuensi HD berpengaruh terhadap sensasi gatal pada pasien hemodialisis yang mengalami pruritus. Pemberian oat lotion diharapkan dapat digunakan sebagai terapi topikal pada pasien hemodialisis untuk mengurangi rasa gatal dan meningkatkan kenyamanan.

Kata-kata kunci: Lotion Oat, Pruritus, Gagal Ginjal Kronis

ABSTRACT

Pruritus is an itching sensation experienced by hemodialysis patients which causes discomfort and can even affect the patient's quality of life. In hemodialysis patients who experience pruritus, complementary therapies such as topical oat lotion can be used to treat itching. The purpose of this study was to examine the effect of oat lotion on itching in hemodialysis patients at Medan City Hospital who experienced pruritus. Data were collected using a questionnaire that included a demographic data questionnaire, a 5D-IS questionnaire, and a self-reported form. This study used a quasi-experimental design with 80 participants, 40 from the intervention group and 40 from the control group, all of which were selected by simple random sampling technique. The results of the Mann Whitney U Test presented the difference in itching experienced by the intervention group and the sensation group after giving oat lotion (p 0.05). Multivariate analysis in this study resulted in the finding that the duration and frequency of HD have an effect on itching sensation in hemodialysis patients who experience pruritus. The provision of oat lotion is expected to be used as a topical therapy in hemodialysis patients to reduce itching and increase comfort.

Keywords: *Oat Lotion, Pruritus, Chronic Kidney Failure*

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INTRODUCTION

Hemodialysis is a treatment option for patients with acute kidney disease who require short-term dialysis (within days to weeks), as well as patients with chronic kidney disease who require long-term or permanent dialysis [1]. Hemodialysis is the most widely used renal replacement therapy and continues to increase from year to year. Although hemodialysis is the treatment option with the highest frequency for ESRD, hemodialysis can also cause several complications [2].

According to data from the United States Renal Data System (USRDS) in 2018 in the United States, the incidence of ESRD is 678,383 cases and it is stated that the prevalence of ESRD cases continue to increase by 21,000 cases every year. Indonesia is a developing country with a fairly high rate of chronic kidney disease. Data obtained from the Indonesian Renal Registry, in 2016 recorded that there were 25,446 new patients and 52,835 active patients [3]. Based on data from Basic Health Research (Riskesdas) in 2018, the prevalence of chronic kidney failure in North Sumatra was 1.8 o/oo people recorded from an average of 3.8 o/oo patients with chronic kidney failure throughout Indonesia [4].

The incidence of complications during hemodialysis including itching experienced by patients, there are 5,054 cases recorded in 2016, an increase from the previous year which was only 2,798 cases [5]. The prevalence of pruritus in chronic renal failure is 42 percent, and it is 90 percent in hemodialysis patients [6] where up to 52.5 percent of patients experience the most severe itching during dialysis [7].

Pruritus experienced by hemodialysis patients causes the patient to scratch his skin so that it can damage the protective layer of the patient's skin. Uremia is a toxic clinical syndrome characterized by fluid, electrolyte, and hormonal imbalances, as well as metabolic disorders, as a result of deteriorating kidney function and the harmful effects of azotemia on organ systems [8].

Uremic pruritus is an uncomfortable condition for patients and health care providers that require medication or treatment to help relieving it. Nurses as one of the health service providers strive to overcome patient complaints, both physical and psychological problems of patients. Pruritus, a common skin complaint in hemodialysis patients, necessitates nursing intervention. Nurses can use non-pharmacological therapy to relieve pruritus complaints in hemodialysis patients.

The variety of content of oats shows many functions and dermatological properties that are beneficial for the skin. Oats produce cardio-protective effects including inhibiting atherosclerosis and hypertension, and can function as cleansers, moisturizers, and skin protectors. In addition, oats also exhibit anti-inflammatory, antipruritic, antioxidant, antifungal, and buffering properties of oats to maintain skin hydration and moisture as well as skin PH a previous study by Nebus, Judith (2014) showed that triple oat skin protection lotion was shown to significantly reduce itching ($p<0.05$) and improve moderate to severe dry skin conditions [9].

Based on the above background, the researchers is interested in conducting research on the effect of oat lotion on the itching sensation in hemodialysis patients who experience pruritus at Medan City Hospital.

LITERATURE REVIEW

Hemodialysis

Kidney dialysis is a therapy to replace kidney function by removing excess fluid and accumulating endogenous or exogenous toxins. One type of dialysis is hemodialysis which requires the placement of a venous access and a machine to remove blood from the body, run it through a dialyzer, and return it back to the body (Doenges, et al., 2010).

According to Thomas (2003), hemodialysis is a process to remove metabolic waste products in the form of solutions (ureum and creatinine) and water contained in blood vessels through a semipermeable membrane called a dialyzer.

Hemodialysis is taking nitrogenous substances that are toxic from the blood and maintain fluid, electrolyte, and acid-base balance (Smeltzer, et al., 2010). Meanwhile, according to Shahgholian, et al. (2011), hemodialysis is a therapy performed on patients with end-stage kidney disease aiming to avoid complications and prolong the patient's life. Hemodialysis serves as renal replacement therapy and can prolong life, but this action will not change the course of the underlying kidney disease and also will not restore all kidney function. Patients undergoing hemodialysis will experience several problems and complications. Dialysis therapy complications can include hypotension, which occurs during dialysis therapy when fluids are drained, chest pain that occurs due to decreased pCO2 concomitantly with circulating blood outside the body, pruritus that occurs when end products of metabolism leave the skin, balance disturbances due to shift of cerebral fluid and appearance as convulsions, muscle cramps that occur when fluids and electrolytes quickly leave the extracellular space, frequent nausea and vomiting, and a rare complication of air embolism that occurs when air enters the patient's vascular system (Smeltzer, et al., 2010).

Pruritus

Misery & Stander (2010) define pruritus as an unpleasant sensation on the skin that prompts the sufferer to scratch the skin. Meanwhile, according to Pardede (2010), pruritus is associated with chronic kidney failure often called uremic pruritus which is a problem that often arises in patients with end-stage kidney disease and causes discomfort in these patients. Uremic pruritus is a pruritus that occurs in patients with renal failure due to decreased kidney function and accumulation of protein metabolism residues called uremic toxins.

Uremic pruritus can interfere with activities or work, interfere with sleep, and even can reduce the quality of life. However, repeated scratching will cause excoriations that can lead to dermatological disorders such as lichen simplex, prurigo modularis, keratotic papules, and follicular hyperkeratosis. Excoriation with or without impetigo can occur as a secondary phenomenon and prurigo nodularis occasionally found (Misery & Stander, 2010; Pardede, 2010).

The cause of itching is unknown, but several factors can influence it. Histamine release by mast cells and basophils, skin dryness and skin atrophy, skin mast cell proliferation, skin fat cell atrophy, electrolyte imbalance and accumulation of bile acids, anemia, high pH, hyperparathyroidism, opioids, hypersensitivity to hemodialysis fluids and elevated interleukin levels are among the culprits (Mettang & Kremer, 2013).

The clinical classification of pruritus was created by the International Forum for the Study of Pruritus (IFSI) in 2007. The IFSI classification of pruritus is made by focusing on the clinical presentation of the patient and distinguishing diseases with or without primary or secondary skin disease. defeat." The IFSI pruritus classification in Misery & Stander (2010) consists of two stages, described below.

a. Stage I, patients with pruritus are grouped according to patient history and skin examination. The results are divided into 3 groups, namely pruritus on diseased skin, pruritus of non-painful skin, and chronic scratching lesions.
b. In Stage II, patients with pruritus are grouped according to histological, laboratory, and radiological examinations. The results are divided into six categories: Dermatology (skin diseases such as psoriasis, atopic dermatitis, dry skin, eczema, urticaria); Systemic (diseases of organs other than the skin, such as liver (primary biliary cirrhosis)), kidney (eg, chronic renal failure), hemorrhage (such as Hudkin's disease), and others, neurology (diseases or diseases that are central or peripheral) Nervous system), psychosomatic (somatic form itching with comorbid psychiatric and psychosomatic), mixed (second and coexistence of many diseases, etc.).

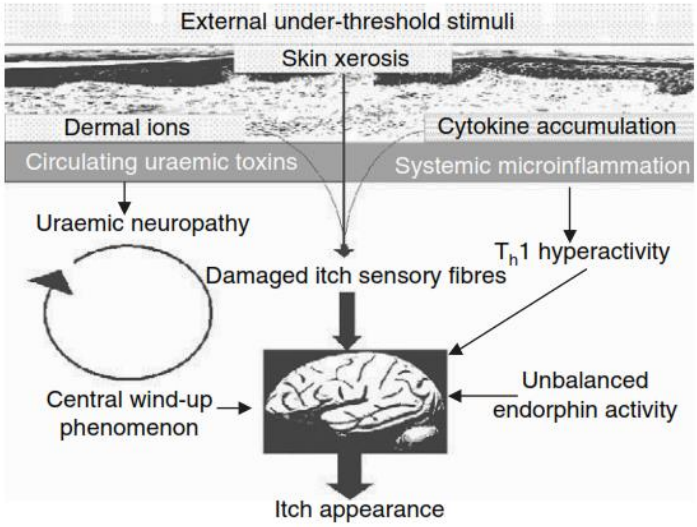

Figure 2.1 Pathogenetic model for uremic itching

Factors Affecting Pruritus

Duration of Suffering from CKD (Chronic Kidney Disease)

Impaired kidney function experienced by CKD patients will cause the accumulation of various substances with pruritogenic effects (Zucker, Yosipovitch, David, Gafter, & Boner, 2003). Impaired renal filtration function will result in increased creatinine levels. High creatinine levels cause a risk factor associated with uremic pruritus. The higher the creatinine level, the greater the intensity of pruritus is (Oliveira, Pigari, Ogata, Miot, Ponce, & Abbade, 2017). The intensity and distribution of pruritus varies from time to time depending on the duration of kidney disease suffered by the patient (Harlim & Yogyartono, 2012).

HD Duration and Adequacy

Dialysis as kidney replacement therapy will not completely replace normal renal endocrine function so that metabolic disorders persist, for example, the waste retention of protein metabolism such as urea (Harlim & Yogyartono, 2012). The intensity of uremic pruritus associated with calcium-phosphorus products and bivalent ions such as calcium, phosphorus, and magnesium also triggers the occurrence of more severe uremic pruritus. The reduced power of calcium excretion in CKD patients, vitamin D supplementation, and the use of phosphorus binders containing calcium such as calcium carbonate or calcium acetate will facilitate the occurrence of itching by forming deposits in the epidermal layer (Manenti, Tansinda, & Vaglio, 2009). The statement that uremic pruritus is related to the duration of hemodialysis in CKD patients is also stated by Magus (2000, in Harlim & Yogyartono, 2012).

Dry Skin/ Skin Hydration Status

Dry skin and hypohidrosis are the result of reduced sweat secretion due to sympathetic nerve damage (Manenti, et al., 2009). This condition causes sweat gland atrophy and dehydration of the stratum corneum layer which acts as a co-factor for the occurrence of uremic pruritus and is one of the potential causative factors for the occurrence of uremic pruritus (Ozen, Cinar, Askin, & Muk, 2018). Other studies have also suggested that dry skin conditions can worsen the itching sensation. Although dryness is not the main cause of pruritus, the presence of dry skin in pruritus has

the effect of exacerbating pre-existing pruritus by reducing the threshold for itching sensation (Zucker et al., 2003).

Temperature

The extreme temperature can affect the itching sensation of patients with pruritus. Different temperature ranges have different effects on the itching sensation. In accordance with the gate control theory that pain can inhibit the sensation of itching. Extreme temperatures will stimulate nerve fibers for pain responses resulting in a blocking effect on incoming stimuli (Zucker, et al., 2003).

Pruritus Treatment

The following is general treatment guidelines to relieve pruritus (Misery & Stander, 2010).

a. Dry climates, heat (e.g., saunas), alcoholic compresses, ice packs, frequent washing, and bathing are all factors that contribute to skin dryness need to avoided.
b. Keeping away from irritable substances (e.g. compresses with rivanol, chamomile, and tea tree oil).
c. Avoiding hot and spicy foods, hot drinks, and large amounts of alcohol.
d. Avoiding overexcitement and stress.
e. Using a mild, non-alkaline, moisturizing soap, or bath oil (low-tensile oil). Using warm water when bathing with maximum time is 20 minutes. After bathing, immediately apply topically taking into account individual skin conditions.
f. In the case of existing dermatosis: drying body skin without vigorous scrubbing as this can cause further damage and exfoliation of already damaged skin.
g. Regular use of moisturizer on the skin with skin care products that hydrate the skin tailored to individual skin conditions.
h. Wearing soft and loose-fitting clothing, such as clothes made of cotton (no wool, no synthetics).
i. Avoiding house dust or house dust mites, which can aggravate pruritus, in the case of atopic people.
j. Applying creams/lotions containing urea, camphor, menthol, polidocanol, tannic acid, moist compresses or cooling, cold baths, and black tea compresses to relieve nocturnal pruritus.
k. Educating the patient to manage pruritus using appropriate methods to stop the cycle of itching and scratching, for example is by using a cold cloth with light pressure. Requesting that the patient refrain from scratching. Distraction and attention of caregivers play a significant role, particularly in children.
l. Relaxation exercises (autogenous training), relaxation therapy, avoiding stress, providing information, and influencing the psychosocial environment are all things that can be done to help people relax.

Oats

Colloidal oatmeal is one of the few natural products recognized by the Food and Drug Administration as an over-the-counter and safe skin care product. Currently colloidal oatmeal extract can be found in creams, lotions, emollients, shampoos, bar soaps, bath soaps, bath treatments, and shaving gels (Cerio et al., 2010).

Colloidal oatmeal is produced without the use of chemical solvents by grinding the grain and boiling it to extract the colloidal components. Wheat with high protein is cleaned and refined to remove imperfect grains and foreign components, such as weed seeds. Then, it is crushed into smaller particles to produce oat powder (Makdisi, et al., 2014).

Due to its diverse content, colloidal oatmeal exhibits many beneficial dermatological functions and properties. Oats produce cardio-protective effects including inhibiting atherosclerosis and hypertension, and can function as a cleanser, moisturizer, and skin protector. Oats also exhibit anti-inflammatory, antipruritic, antioxidant, antifungal, and buffering properties when applied to the skin (Makdisi, et al., 2014).

a. Anti-inflammatory
   Oats can inhibit the development of the proinflammatory arachidonic acid cascade and can relieve inflammation in various skin diseases
b. Anti-pruritic
   Avenanthramides that has oatmeal in ingredient can reduce contact hypersensitivity induced by oxazolone, neurogenic inflammation induced by herbiferatoxin, and compounds induced 48/80 (Pazyar, Yaghoobi, Kazerouni, & Feily, 2012).
c. Anti-oxidant
   In addition to anti-inflammatory and anti-pruritic properties, oats also have anti-oxidant properties. Antioxidants play an important role in preventing and ameliorating chronic disease by reducing intracellular oxidative damage caused by reactive oxygen species.
d. Anti-fungal
   Inoculation with fungal spores induces the production of avenanthramide in oats which inhibits further fungal growth (Makdisi, et al., 2014). Oat seed extract shows high antifungal activity and can be used directly on whole wheat bread to prevent the formation of P. roqueforti colonies (Sorensen, Madsen, Petersen, Andersen, Hansen, & Beck, 2010).
e. Maintaining Skin Hydration and Moisture
   The colloidal suspension of oatmeal builds up on the skin to form a thick occlusive barrier. Colloidal oatmeal has a high concentration of hydrophilic polysaccharides that act to bind to water.
f. Maintaining Skin pH
   Topical application of oat extract is able to lower the skin pH to normal. These results indicate that colloidal oatmeal applied to inflamed skin can be functioned as a buffer to restore the physiological skin pH (Makdisi, et al., 2014).
g. Oat Function
   The clinical application of oats can be done in the following problems (Makdisi, et al., 2014).
   (1) Atopic dermatitis;
   (2) Contact dermatitis;
   (3) Wound healing;
   (4) Sunburn;
   (5) Drug eruption.

METHOD

Research design: Quantitative research with a quasi-experimental design approach was used in this study, and the equivalent control group used the pretest-posttest design method. This research was conducted in two hospitals in the city of Medan, namely University Hospital of North Sumatra and Rasyida Special Kidney Hospital. In this study, 80 people were sampled, and they were split into two groups: control and intervention. The sampling method is simple random sampling, and the sampling technique is probability sampling. This is a method of sample selection that involves selecting a random sample without regard to strata or levels

Treatments: This was an investigator-blinded, randomized study. Subjects applied the triple oat skin protectant lotion to the lower leg area twice a day for the two-week study period.

Determined by:

a. Clinical Evaluations: Performed on Day 0,1,7 and 14
b. Itch Diaries: Completed daily prior to product application, 2 and 30 minutes post-application
c. Self-Assessments: Performed on Day 0,1,7 and 14
d. Adhesive Skin Sampling/Desquamation Measurements: Day 0,1,7 and 14
e. Transepidermal Water Loss Measurements: Day 0,1,7 and 14
f. Imaging: Day 0 and 14.

Univariate Analysis Results

Table 1. Distribution of Data Frequency and Percentage toward Demographic Characteristics of Respondents in Intervention and Control Group (n=80)

Characteristic	Intervention		Control	
	n (40)	%	n (40)	%
Age (years old)				
17-25	-	-	1	2,5
26-35	1	2,5	6	15,0
36-45	7	17,5	6	15,0
46-55	20	50,0	15	37,5
56-65	8	20,0	10	25,0
>65	4	10,0	2	5,0
Gender				
Male	33	82,5	30	75,0
Female	7	17,5	10	25,0
Education				
Elementary School (SD)	1	2,5	3	7,5
Junior High School (SMP)	1	2,5	1	2,5
Senior High School (SMA)	19	47,5	23	57,5
University	19	47,5	13	32,5
Occupation				
Entrepreneur/Employee	12	30,0	22	55,0
IRT	5	12,5	7	17,5
Civil Servant (PNS)/Armed Forces (TNI)/Police	7	17,5	4	10,0
Retired/Not Working	8	20,0	4	10,
Farmer/Trader	5	12,5	2	5,0
Etc.	3	7,5	1	2,5
Length of HD				
< 6 months	5	12,5	3	7,5
> 6 months	35	87,5	37	92,5
Duration of HD				
4 hours	9	22,5	3	7,5
5 hours	31	77,5	37	92,5
Frequency of HD				
2 times per week	31	77,5	37	92,5
3 times per week	9	22,5	3	7,5
URR				
< 65%	1	2,5	-	-
>65%	39	97,5	40	100

RESEARCH RESULTS AND DISCUSSION

The findings described in several analyzes which are univariate, bivariate, and multivariate. The goal of univariate analysis is to determine the characteristics of the respondents, which are shown as frequency and percentage distributions of age, gender, education, occupation, length of hemodialysis, duration, and frequency of hemodialysis. Bivariate analysis is carried out to determine the effect of giving oat lotion on the itching sensation of hemodialysis patients who experienced pruritus and to identify the relationship between duration of HD and HD adequacy on the itching sensation of hemodialysis patients who experienced pruritus. Multivariate analysis is conducted to examine the effect of confounding variables on the itching sensation of hemodialysis patients with pruritus.

Table 1 shows the distribution of respondent characteristics by age in the intervention group. It is concluded that half of the total group aged 46-55 years is 50% and in the control group dominated by respondent aged 46-55 years is at 37.5%. Gender in the intervention group is dominated by male respondent at 82.5% while in the control group male is at 75.0% in control group. The distribution of respondents, according to education in the intervention group, is the most high school and college by 47.5%. However in control group, respondents at the high school education level of 57.5% dominating.

The distribution of respondents according to occupation in the intervention group is mostly self-employed or private employees by 30.0% while entrepreneurs or private employees is taking 55.0% in the control group. The distribution of respondents, according to the length of time undergoing hemodialysis in the intervention group, is the most, namely > 6 months by 87.5% while the most patients with kidney failure > 6 months amounting to 92.5% in control group.

The distribution of respondents according to the duration and frequency of HD in the intervention group is dominated with a duration of 5 hours and a frequency of 2 times/week by 77.5% while in the control group, respondents with a duration of 5 hours and a frequency of 2 times/week dominate in 92.5%. The distribution of respondents according to URR in the intervention group show that there is 1 person with inadequate hemodialysis adequacy or 2.5%, while in the control group all respondents or 100% have adequate hemodialysis adequacy.

Itching Sensation in Hemodialysis Patients

The description of the itching sensation of hemodialysis patients in the control group and the intervention group before and after the intervention in the form of giving oat lotion in both hospitals can be seen in Table 4.2 as follows.

According to table 2, it can be seen that the itching sensation in the intervention group

Table 2. Distribution of Frequency and Percentage of Respondents Itching Sensation in the Intervention Group and Control Group Before and After Giving Oat Lotion (n=80).

Itching Sensation	Intervension				Control			
	Pre		*Post*		*Pre*		*Post*	
	n	%	n	%	N	%	n	%
Mild	8	20,0	3	85,04	25	62,5	13	32,5
Severe	32	80,0	6	15,0	15	37,5	27	67,5
Min-Max	9 – 22		6 - 18		8 - 15		8 - 16	

Table 3. Differences in the Proportion of Pretest and Posttest Itch Sensation in the Intervention Group (n=40)

Itching Sensation	Median (Minimum-Maksimum)	*p-value*
Pre test	12,5 (9-22)	0,000
Post test	10,0 (6-18)	

Table 4.4 Differences in the Proportion of Pretest and Posttest Itch Sensation in the Control Group (n=40)

Itching Sensation	Median (Minimum-Maximum)	*P-value*
Pre test	11 (8-15)	0,001
Post test	12 (8-16)	

before giving oat lotion is mostly in moderate-severe itching as many as 32 respondents (80.0 %) while, in the control group, the majority in mild itching are 25 respondents (62.5 %). In addition, the distribution of respondents after giving oat lotion in the intervention group is the majority on mild itching as many as 34 respondents (85.0 %), while the majority on severe itching in the control group is 27 respondents (67.5 %).

Bivariate Analysis Result

Differences in Itching Sensation of Hemodialysis Patients with Pruritus in the Intervention Group Before and After Giving Oat Lotion and the control group who were not given oat lotion.

The test used is the Wilcoxon Signed Rank Test, which aims to identify differences in the sensation of itching in the dependent variable before and after the intervention in the form of giving oat lotion, which can be seen in Table 3 and Table 4.

According to the results of bivariate analysis using the Wilcoxon Signed Rank statistical test, it is obtained that the significance p-value in the control group is 0.001 ($p < 0.05$). Thus, it can be said that there is a significant difference in itching sensation in the control group before and after the administration of oat lotion.

Table 5 Differences in itching sensation of hemodialysis patients with pruritus in the intervention group giving Oat Lotion with the control group (n=80).

Variable	Intervention Group	Control Group	*p value*
	MR	MR	
Itching Sensation	59,20	21,80	0,000

The results of the Mann-Whitney test obtains that the mean rank value of the control group is 21.80 and the intervention group with oat lotion had a mean rank value of 59.20 with a p-value of 0.0000 ($p < 0.05$). Thus, it can be stated that oat lotion has a significant effect on the itching sensation of hemodialysis patients who experience pruritus.

Multivariate Analysis Results

Table 6 Interaction Variable Test

Variable	Coeff.	S.E.	Wald	df	*p-value*	OR
Lotion oat	-2,655	0,623	18,160	1	0,000	0,070
HD Usage Duration	0,558	1,005	0,309	1	0,578	1,748
HD Duration	-0,965	0,820	1,386	1	0,239	0,381
HD Frequency	0,965	0,820	1,386	1	0,239	2,625
HD Adequacy	-19,266	40192,970	0,000	1	1,000	0,000
Constanta	1,124	1,327	0,718	1	0,397	3,078

Table 6 shows the results of the interaction test in the logistic regression test of the risk factor model to determine the relationship between oat lotion and itching sensation. Variables are said to interact if $p < 0.05$ so that it can be stated that there is no interaction variable in this study.

Table 7 Confounding Test of HD Adequacy Variables

Variable	Coeff.	S.E.	Wald	df	*p-value*	OR
Lotion oat	-2,690	0,622	18,699	1	0,000	0,068
HD Usage Duration	0,545	1,008	0,292	1	0,589	1,724
HD Duration	-0,996	0,821	1,473	1	0,225	0,369
HD Frequency	0,996	0,821	1,473	1	0,225	2,709
Constanta	1,167	1,329	0,771	1	0,380	3,212

Table 7 shows the results of the confounding test of the HD adequacy variable. Variables are considered as confounding variables if the change in OR for the main variable (oat lotion) with candidate confounding variables excluded > 10%. After HD adequacy is removed, there is a change in the OR of the main variables, which is (0.068-0.070) / 0.070 = -2.85%. Thus, the HD adequacy variable is not a confounding variable.

Table 8. Conforming Test for Long Variables Undergoing HD

Variable	Coeff.	S.E.	Wald	df	*p-svalue*	OR
Lotion oat	-2,713	0,621	19,097	1	0,000	0,066
HD Duration	-1,063	0,815	1,701	1	0,192	0,345
HD Frequency	1,063	0,815	1,701	1	0,192	2,896
Constanta	1,731	0,850	4,145	1	0,042	5,644

Table 8 shows the results of the long-term confounding variable undergoing HD. After a long time undergoing HD is excluded, there is a change in the OR of the main variables, which is (0.066-0.068) / 0.068 = -2.94%. Thus, the variable length of time undergoing HD is not a confounding variable.

The variable HD duration and HD frequency have the same p-value, thus, when the researcher excludes one variable, the OR value for the main variable remains the same. Table 9 shows the results of the confounding test of the HD frequency variable. After the HD frequency is removed, there is a change in the OR of the main variables which is (0.085-0.066) / 0.066 = 28.78%. Thus, HD duration and HD frequency are confounding variables.

Table 9 Confounding Test of HD Duration and HD Frequency

Variable	Coeff.	S.E.	Wald	df	*p-value*	OR
Lotion oat	-2,465	0,557	19,606	1	0,000	0,085
Constanta	0,731	0,338	4,688	1	0,030	2,077

Because HD duration and HD frequency are confounding variables, both variables must be included in the model as confounding effect of oat lotion on itching sensation as shown in Table 4.8. From this model, it can be explained that the duration of HD and the frequency of HD 0.066 times can affect the itching sensation in hemodialysis patients who experience pruritus.

DISCUSSION

Data related to the description of the value of itching sensation before intervention in hemodialysis patients who experience pruritus are shown in table 1 that the itching sensation before the intervention is in the mild category as many as 8 (20.0%) respondents, 32 (80.0%) severe category respondents. Thus, the itching sensation of hemodialysis patients who experienced pruritus before the intervention of giving oat lotion in this study is mostly in the

category of severe itching sensation. The cause of pruritus is multifactorial, thus, there are many factors that can affect the itching sensation felt by hemodialysis patients. Several factors that affect the itching sensation of hemodialysis patients who experience uremic pruritus include demographic factors, medication, laboratory values, etc. [10].

Although the exact pathophysiology of uremic pruritus is unknown, there are several factors that contribute to the development of the condition. Blood ure nitrogen (BUN), calcium, phosphorus, and 2-microglobulin all trigger for uremic itching[11]. Excess serum magnesium and vitamin A, aluminum deficiency, anemia, increased erythropoietin, high levels of ferritin, transferrin and albumen, secondary hyperparathyroidism, increased calcium, phosphate and magnesium, and high bad cellular substances such as histamine, interleukin, 2 and proteases. all contribute to uremic itch [12].

Data related to the description of the value of itching sensation after intervention in hemodialysis patients who experience pruritus are shown in table 2 that the value of itching sensation after the intervention of giving oat lotion with the category of mild itching sensation is 34 (85.0%) respondents and the category of severe itching sensation is 6 (15.0%) respondents. After being given the intervention of giving oat lotion, the number of respondents in the severe itching category decreased and increased in the mild itching category. The results of the Wilcoxon Signed Rank test analysis in the intervention group obtained p value = 0.000 ($p < 0.05$), thus, it can be concluded that there is a difference in the value of itching sensation before and after the intervention of giving oat lotion, meaning that the action or intervention carried out has an influence on increasing the respondent's itching sensation.

After being given an intervention in the form of using oat lotion which is applied every day with a frequency of 2 times/day for 2 weeks, the majority of respondents experienced a decrease in score when assessed using the 5D-IS questionnaire, meaning that the majority of respondents experienced a decrease in itching sensation after the intervention. The results of this study are in line with the statement of Nakhaee et al. (2015) who reported in their research results that Avena sativa or oat lotion was proven to reduce three dimensions of pruritus including intensity (p=0.01), complications (p=0.008) , and verbal statement of pruritus (p=0.006).

Although the majority of respondents experienced a decrease in the score of itching sensation, the researchers also found that respondents who did not experience a change in score even experienced an increase in the score of itching sensation. This is because the causes of uremic pruritus are multifactorial and there are many factors that can influence it. Dry skin is an important contributing factor in pruritus. Another study stated that there was an increase in the number of patients experiencing uremic pruritus in HD patients with dry skin compared to HD patients with non-dry skin. HD patients with uremic pruritus have lower water content in the stratum corneum than those without uremic pruritus [14].

The researchers after doing the post test, respondents also revealed that they also experienced dry skin which was considered the result of limiting fluid intake. This condition causes sweat gland atrophy and dehydration of the stratum corneum layer which acts as a co-factor for the occurrence of uremic pruritus and is one of the potential causative factors for the occurrence of uremic pruritus [15]. It is also stated in another study that lower stratum corneum hydration status in patients with uremic and dry pruritus increased the itching sensation by lowering the threshold for pruritus [16].

In addition to dry skin conditions, the dietary pattern of the research respondents was also considered to have contributed to the itching sensation experienced by the respondents. Changes in dietary patterns, namely the type of food from non-vegetarian to vegetarian, have been shown to improve the condition of his uremic pruritus. After changing their diet, their blood levels of high sensitivity C-reactive

protein (hs-CRP) and interleukin-2 decreased, as did their uremic pruritus severity scores [17].

Activity levels are also assessed as contributing to the itching sensation experienced by HD patients. Shrestha & Mathur (2016) in their research stated that pruritus is not affected by rest, activity, cold, and dialysis but exacerbation of pruritus by sleep, dry skin, and also hot temperatures. It shows a positive effect, namely reducing the itching sensation felt and respondents also felt that the skin became moister.

Risk Factors Affecting the Itching Sensation of Hemodialysis Patients with Pruritus

Length of HD

The results of this study indicate that the length of time patients underwent HD therapy in both groups was majority > 6 months, where the intervention group is 35 (87.5%) respondents and the control group is 37 (92.5%) respondents. The same distribution that hemodialysis patients with pruritus are on hemodialysis therapy duration of more than 6 months with a mean and SD = 63.27 ± 60.78 [18]. This is in line with the study of Gatmiri et al. (2013) which showed that the distribution of patients who experienced pruritus was greater in patients undergoing HD therapy > 24 months than patients undergoing HD 24 months.

Research conducted by Wahyuni et al. (2019) also stated that the longer a person undergoes hemodialysis, the higher the pruritus (p = 0.023). Meanwhile, Farmer et al. (2019) in their study found that patients who underwent HD < 1 year had significantly more onset of pruritus before HD while patients who underwent HD 1 year had significantly more onset of pruritus after starting HD therapy. The results of a multivariate analysis in another study by Weng et al. (2018) in China also shows that duration of HD is positively associated with uremic pruritus (p < 0.001).

HD Duration & HD Frequency

The results showed that the HD frequency of respondents from both the intervention group and the control group is the majority 2 times/week, where the intervention group is 31 (77.5%) and the control group is 37 (92.5%). This is in line with the results of the study by Lila Malekmakan et al. (2013) which stated that patients undergoing hemodialysis 2 times/week, they had a greater chance of experiencing pruritus when compared to patients undergoing hemodialysis 2 times/week. The results of this study are different from the results of the study of Saedi, Ghassan, & Alawch (2015) which stated that there was no significant relationship between pruritus and the frequency of HD, as well as stated in the study of Melo et al. (2009) that patients who underwent HD with a frequency of 3 times / week with a duration of 3-4 hours more in number (n = 85) compared to patients with a frequency of HD 6 times / week with a duration of 1.5-2 hours (n = 16).

HD Adequacy

When viewed from the URR (Ureum Reduction Ratio) value as an indicator to measure the effectiveness of hemodialysis therapy, the results of this study showed that all respondents in the control group have adequate hemodialysis adequacy, while in the intervention group there is 1 (2.5%) respondent with inadequate hemodialysis. This study is in line with the study conducted by Lila Malekmakan et al. (2013) which stated that patients with adequate hemodialysis adequacy reported fewer incidents of pruritus in the last 6 months. Decreased kidney function or inadequate renal replacement therapy will lead to the accumulation of substances in the body that cause pruritus in patients. Thus, improving hemodialysis adequacy may reduce the severity of pruritus felt by the patient.

Adequacy of dialysis was assessed by Kt/V as an independent predictor of the intensity of pruritus in hemodialysis patients. Hemodialysis therapy with good or adequate dialysis and the use of a high-flow dialyzer can play a role in reducing the severity of uremic pruritus [25]. The results of his study in the following year also noted that there is an inverse relationship between the severity of pruritus and dialysis dose as assessed by Kt/V [26].

Different results are found in another study which stated that there is no comparison that showed a statistically significant relationship between the presence or the absence of pruritus with urea levels and dialyzer size by comparing serum mineral levels, therefore, the researchers considered that this could also apply to the incidence of pruritus in HD patients because researchers assessed the hemodialysis adequacy of respondents using the URR seen from the patient's urea value before and after HD therapy [27].

DELIMITATION

This research is limited on the analysis of the effect of oat lotion toward itching sensation in hemodialysis patients with pruritus. Other than that, this research only involves two hospitals in the city of Medan, such as University Hospital of North Sumatra and Rasyida Special Kidney Hospital.

RESEARCH ETHICS

This research examines the effects of oat lotion in decreasing itchy sensations in hemodialysis patients. The researchers explain the study's advantages and aims to the respondents. Additionally, this study has been ethically reviewed and approved by University Hospital of North Sumatra and Rasyida Special Kidney Hospital with provide number 1711/III/SP/2019 from USU Nursing Health Research Ethics Commission Approval.

CONFLICT OF INTEREST

No conflict of interest is found in this research.

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CONCLUSION

According to the results of the study and the explanation of the discussion, the following conclusions can be drawn: 1) There is a positive effect of giving oat lotion on the itching sensation of hemodialysis patients who experience pruritus before and after being given oat lotion in the intervention group and the control group who are not given oat lotion; 2) There was a positive effect of giving oat lotion on the itching sensation of hemodialysis patients who experienced pruritus between the intervention group after being given oat lotion compared to the control group who were not given oat lotion; and 3) There is no relationship between the duration of HD and HD adequacy on the itching sensation of hemodialysis patients who experience pruritus, but there is a relationship between the duration of HD and the frequency of HD on the itching sensation of hemodialysis patients who experience pruritus.

In addition, because of the limitation found in this research, further researchers are advised to consider the disease causing Chronic Kidney Failure or comorbidities owned by the sample using a lotion containing pure oats in order to identify more precise results.

REFERENCE

[1] Swift O, Vilar E, Farrington K. Haemodialysis. Med (United Kingdom) 2019. https://doi.org/10.1016/j.mpmed.2019.06.004.

[2] Hsieh HL, Hsu SC, Cheng HS, Chen CY, Huang W, Sue1 YM, et al. The influence of atrial fibrillation on the mortality of incident ESRD patients undergoing maintenance hemodialysis. PLoS One 2020. https://doi.org/10.1371/journal.pone.0228405.

[3] Kustimah K, Siswadi AGP, Djunaidi A, Iskandarsyah A. Factors Affecting Non-

Adherence to Treatment in End Stage Renal Disease (ESRD) Patients Undergoing Hemodialysis in Indonesia. Open Psychol J 2019. https://doi.org/10.2174/1874350101912010141.

[4] Riskesdas. Laporan Provinsi Sumatera Utara Riskesdas 2018. 2018.

[5] Armenian SH, Xu L, Ky B, Sun C, Farol LT, Pal SK, et al. Cardiovascular disease among survivors of adult-onset cancer: A community-based retrospective cohort study. J Clin Oncol 2016. https://doi.org/10.1200/JCO.2015.64.0409.

[6] Aisara S, Azmi S, Yanni M. Gambaran Klinis Penderita Penyakit Ginjal Kronik yang Menjalani Hemodialisis di RSUP Dr. M. Djamil Padang. J Kesehat Andalas 2018. https://doi.org/10.25077/jka.v7i1.778.

[7] Suzuki H, Omata H, Kumagai H. Recent Advances in Treatment for Uremic Pruritus. Open J Nephrol 2015. https://doi.org/10.4236/ojneph.2015.51001.

[8] Zhang M, Xiang H, Fan H, Liu L. Euglycemic diabetic ketoacidosis associated with uremia. Clin Case Reports 2021. https://doi.org/10.1002/ccr3.3720.

[9] Nebus J, Wallo W, Nystrand G, Chu M, Kurtz ES. Alleviating Itchy , Extra-Dry Skin with an Oatmeal Skin Protectant Lotion 2014:2014.

[10] Malekmakan L, Pakfetrat M, Daneshian A, Sayadi M. A comparison of socioeconomic level among hemodialysis patients and normal controls in the fars province, Iran. Saudi J Kidney Dis Transpl 2017. https://doi.org/10.4103/1319-2442.215131.

[11] Ozen N, Cinar FI, Askin D, Mut D. Uremic pruritus and associated factors in hemodialysis patients: A multi-center study. Kidney Res Clin Pract 2018. https://doi.org/10.23876/j.krcp.2018.37.2.138.

[12] Abdelsalam M, Tawfik M, Reda EM, Eldeeb AA, Abdelwahab A, Zaki MES, et al. Insulin Resistance and Hepatitis C Virus-Associated Subclinical Inflammation Are Hidden Causes of Pruritus in Egyptian Hemodialysis Patients: A Multicenter Prospective Observational Study. Nephron 2019. https://doi.org/10.1159/000501409.

[13] Nakhaee S, Nasiri A, Waghei Y, Morshedi J. Comparison of Avena Sativa, vinegar, and hydroxyzine for uremic pruritus of hemodialysis patients a crossover randomized clinical trial. Iran J Kidney Dis 2015.

[14] Abdelghfar SZ. Effect of Aromatherapy on Uremic Pruritus among Patients Undergoing Hemodialysis. IOSR J Nurs Heal Sci 2017. https://doi.org/10.9790/1959-0602082230.

[15] Tosun B, Cinar FI, Topcu Z, Masatoglu B, Ozen N, Bagcivan G, et al. Do patients with diabetes use the insulin pen properly? Afr Health Sci 2019. https://doi.org/10.4314/ahs.v19i1.38.

[16] Shrestha P, Mathur M. Dermatologic Manifestations In Chronic Kidney Disease Patients On Hemodialysis. Nepal J Dermatology, Venereol Leprol 2016. https://doi.org/10.3126/njdvl.v12i1.10594.

[17] Yang Y, Zhang C, Lai C, Zeng G, Huang D, Cheng M, et al. BiOX (X = Cl, Br, I) photocatalytic nanomaterials: Applications for fuels and environmental management. Adv Colloid Interface Sci 2018. https://doi.org/10.1016/j.cis.2018.03.004.

[18] Karadag E, Kilic SP, Karatay G, Metin O. Effect of baby oil on pruritus, sleep quality, and quality of life in hemodialysis patients: Pretest-post-test model with control groups. Japan J Nurs Sci 2014. https://doi.org/10.1111/jjns.12019.

[19] Gatmiri SM, Mahdavi-Mazdeh M, Lessan-Pezeshki M, Abbasi M. Uremic

pruritus and serum phosphorus level. Acta Med Iran 2013.

[20] Wahyuni A, Lawati UZ, Gusti E. Korelasi Lama Menjalani Hemodialisa Dengan Pruritus Pada Pasien Hemodialisa. J Endur 2019. https://doi.org/10.22216/jen.v4i1.3845.

[21] Farmer JR, Foldvari Z, Ujhazi B, De Ravin SS, Chen K, Bleesing JJH, et al. Outcomes and Treatment Strategies for Autoimmunity and Hyperinflammation in Patients with RAG Deficiency. J Allergy Clin Immunol Pract 2019. https://doi.org/10.1016/j.jaip.2019.02.038.

[22] Weng CH, Hu CC, Yen TH, Hsu CW, Huang WH. Uremic Pruritus is Associated with Two-Year Cardiovascular Mortality in Long Term Hemodialysis Patients. Kidney Blood Press Res 2018. https://doi.org/10.1159/000490689.

[23] Malekmakan L, Sayadi M, Pakfetrat M. Assessment of pruritus status and its relation to dialysis adequacy and laboratory factors among hemodialysis patients. Pars Jahrom Univ Med Sci 2013. https://doi.org/10.29252/jmj.11.1.7.

[24] Melo NCV, Elias RM, Castro MCM, Romao JE, Abensur H. Pruritus in hemodialysis patients: The problem remains. Hemodial Int 2009. https://doi.org/10.1111/j.1542-4758.2009.00346.x.

[25] Pan SY, Zhou SF, Gao SH, Yu ZL, Zhang SF, Tang MK, et al. New perspectives on how to discover drugs from herbal medicines: CAM'S outstanding contribution to modern therapeutics. Evidence-Based Complement Altern Med 2013. https://doi.org/10.1155/2013/627375.

[26] Ko MJ, Peng Y Sen, Chen HY, Hsu SP, Pai MF, Yang JY, et al. Interleukin-31 is associated with uremic pruritus in patients receiving hemodialysis. J Am Acad Dermatol 2014. https://doi.org/10.1016/j.jaad.2014.08.004.

[27] Welter E de Q, Frainer RH, Maldotti A, Losekann A, Weber MB. Evaluating the association between alterations in mineral metabolism and pruritus in hemodialysis patients. An Bras Dermatol 2011. https://doi.org/10.1590/S0365-05962011000100003.