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ORIGINAL ARTICLE

THE EFFECTS OF TOPICAL PEPPERMINT AROMATHERAPY ON REDUCING UREMIC PRURITUS IN CHRONIC KIDNEY DISEASE PATIENTS UNDERGOING HEMODIALYSIS

Friska Sembiring*, Siti Saidah Nasution, Yesi Ariani

Faculty of Nursing, Universitas Sumatera Utara, Indonesia

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***Corresponding Author**
Friska Sembiring
friskasembiring09@gmail.com

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ABSTRACT

Uremic pruritus is one of the chronic renal failure patients' complaints, which is an uncomfortable and itchy sensation with multifactorial causes. Peppermint complementary therapy is an essential oil with the main component of menthol (50-60%), which provides a cold sensation to the skin. The instrument used in this quasi-experimental study was demographic data and the 5-D itch scale questionnaire. The total sample was 98 participants. The intervention was carried out by administering topical peppermint essential oil. The results showed that the uremic pruritus scale decreased to a mild degree of 51.0%. After being tested by Wilcoxon and Mann Whitney statistical tests, the intervention group had a p value of 0.000 <p = 0.05 and in the control group there was a p value of 0.102 so there was an effect of giving peppermint aromatherapy in reducing uremic pruritus. Peppermint aromatherapy is safe to use and is easy to obtain so therefore it can be applied topically to improve coping strategies for patients who experience uremic pruritus.

Keywords: Aromatherapy; uremic pruritus; chronic kidney failure; hemodialysis

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INTRODUCTION

Kidney failure occurs when the kidneys cannot remove metabolic waste from the body or carry out their regulatory functions. One of the types of kidney failure is chronic kidney disease where the kidney function is damaged for years. This type is progressive and irreversible. (Smeltzer & Bare, 2015).

One of the complaints that can occur in patients with chronic kidney disease is uremic pruritus. It is an uncomfortable itching sensation that can reduce the quality of life of patients undergoing hemodialysis therapy. It was discovered that more than 40% of patients undergoing hemodialysis therapy experienced uremic pruritus (Nakhaee et al, 2015).

Uremic pruritus has multifactorial causes. The intensity and spatial distribution of pruritus occur very significantly over time. The mortality rates during hemodialysis therapy can increase (Combs et al., 2015) in patients with varying scales of the kidney disorder duration (Abdelghfar et al., 2017) and severe uremic pruritus.

There are many metabolic factors that have been implicated in the pathogenesis of itching, which consist of hypercalcemia, hyperphosphatemia, secondary hyperparathyroidism, and hypermagnesemia. To clarify the risk factors for the severity of uremic pruritus, the relationship between clinical and laboratory data needs to be analyzed as well as the severe tendency of uremic pruritus in a large number of patients undergoing chronic hemodialysis (Narita et al, 2006).

Based on a longitudinal study, uremic pruritus is generally reduced in patients who are about to start hemodialysis than in patients who have been on dialysis for more than 3 months who usually have moderate to severe pruritus on a scale of 42%,according Stats (2017) in the United States in 2014, as many as 118,000 people underwent chronic kidney disease treatments in both transplantation and dialysis therapies and 662,000 people underwent hemodialysis

therapy. In Indonesia, there has been an increase in the number of patients undergoing hemodialysis therapy since 2017 (Agustiyowati, 2019). The prevalence in 2016 in Indonesia was 52,835 for patients actively undergoing therapy and 25,446 for patients experiencing early suffering. Specifically, in Haji Adam Malik General Hospital, Medan where this study was conducted, 275 patients underwent hemodialysis therapy in 2016 and 293 patients in 2017.

Some types of treatment management in patients with uremic pruritus include pharmacological, psychological, and complementary therapies (Abdelghfar, 2017). There are various kinds of essential oils used in several studies that have positive impacts on the reduction of pruritus, such as lavender, tea tree, sunflower, peppermint, jojoba essential oils, and many others.

Peppermint (mentha piperita) is one of the aromatherapy oils derived from the mint family. This plant contains essential oils of which menthol is a major component (50—60%). It provides a cold sensation on the skin and can reduce the itching caused by histamine. The mechanism of menthol effects that can cure itching is not yet clearly known. Research findings only showed that menthol can inhibit the itching by activating A-delta fibers and K-opioid receptors (Abdelghfar, 2017).

According to Amjadi et al. (2012, peppermint also has a positive effect in reducing pruritus in pregnant women and in patients with chronic kidney failure undergoing hemodialysis therapy when applied with other essential oils (Abdelghfar et al., 2017).

Bearing in mind the impact that can be caused by uremic pruritus, researchers were interested in researching the effects of peppermint aromatherapy in reducing uremic pruritus in patients with chronic kidney disease undergoing hemodialysis.

METHOD

Study Design

This quantitative research used the quasi-experimental design with intervention and control groups. The control group of nursing care was carried out according to hospital procedures and evaluated on the scale of pruritus before and after hemodialysis.

Sample and Data Collection

The population in this study were all patients with chronic kidney disease in Haji Adam Malik General Hospital Medan, which amounted to 727 people. The research was conducted from April to May 2019. The sample amounted to 98 respondents who were counted using power analysis by using non-probability sampling with a consecutive technique. The inclusion criteria in the sampling were respondents who received hemodialysis therapy twice a week, did not experience allergies to the aromatherapy given, experienced mild to severe pruritus, did not have dermatological problems other than pruritus, were aged 18—65 years, and did not experience open wounds in the intervention application area.

Intervention

The intervention in this study used the products of CV Subur Kimia Jaya Bandung with 100% peppermint essential oil content without a mixture of other substances as evidenced by the Refractive Index statement. The results of 1,460 were with specification values of 1.45-1,465 in each 10 ml container with a total of 10 black bottle containers. One to two drops were smeared topically on to the area of itching.

Instrument and Data Analysis

The itching measurement was carried out before the intervention (pretest) and after the intervention (posttest). The second week after the last intervention, the 5-D Itch Scale questionnaire was used consisting of 5 dimensions of questions that have been validated. It was found to be reliable with a CVI value of 0.90 and the reliability coefficient with Cronbach's alpha of 0.97 making the instrument feasible to use. Statistical analysis with a dependent t-test was also employed to determine the pretest-posttest effects between variables.

Ethical consideration

This study received ethical approval from the Health Research Ethics Commission of the Faculty of Nursing, Universitas Sumatera Utara (Registration No. 1668/III/SP/2019).

RESULT

The characteristics of the majority of respondents in this study were the age of late elderly (56-65 years) (with 26.5% in the intervention group and 32.7% in the control group) , the majority were male (61.2% in the intervention group and 69.4% in the control group), the duration of pruritus was more than 6 weeks with a percentage of 100% in both the intervention and control groups, the duration of hemodialysis was more than 1 year with the intervention group at 39% and the control group at73.5%, the highest level of education was high school with the intervention group at49% and the control group at 55.1%, the employment status was unemployed with the intervention group at 73.5% and the control group at 67.3%, and the comorbidity was hypertension with the intervention group at 73.5% and the control group at 71.4%.

The characteristics of respondents can be seen in Table 1

Table 1. Frequency distribution and percentage of respondent characteristics

Variable	Intervention group		Control group	
	n	%	n	%
Gender				
Male	30	61.2	34	69.4
Female	19	38.8	15	30.6
Age				
17-25 years old	3	6.1	4	8.2
26-35 years old	7	14.3	7	14.3
36-45 years old	9	18.4	10	20.4
46-55 years old	13	26.5	12	24.5
56-65 years old	13	26.5	16	32.7
Duration of pruritus				
>6 weeks	49	100	49	100

Variable	Intervention group		Control group	
	n	%	n	%
<6 weeks	0	0	0	0
Hemodialysis period				
3 months	1	2	2	4.1
6 months	0	0	1	2.0
1 year	9	18.4	10	20.4
>1 year	39	79.6	36	73.5
Employment status				
Unemployed	36	73.5	33	67.3
Entrepreneur	7	14.3	9	18.4
Farmer	1	2.0	1	2.0
Government Employee	5	10.2	6	12.2
Education				
Elementary School	9	18.4	27	55.1
Middle school	7	14.3	10	20.4
High school	24	49.0	2	4.1
College	9	18.4	10	20.4
Disease history				
Hypertension	36	73.5	35	71.4
DM	9	18.4	9	18.4
DM and gout Arthritis	1	2	0	0
Gout and arthritis	2	4.1	2	6.1
DM and hypertension	1	2	3	4.1

Table 2. Analysis before giving peppermint aromatherapy in chronic kidney failure patients who underwent hemodialysis therapy (n = 49)

Degree of Pruritus	Intervention Group				Control group			
	Pre-Intervention		Post Intervention		Pre-Control		Post Control	
	n	%	n	%	n	%	n	%
Mild	12	24.5	25	51.0	13	15.9	8	9.8
Moderate	29	59,2	24	49.0	28	34.1	34	41.5
Severe	8	16.3	0	0	8	9.8	7	8.5

Based on Table 2, the majority of respondents experienced uremic pruritus of a moderate intensity, both in the intervention group (59.2%) and in the control group (34.1%) before the intervention. Meanwhile, the majority of respondents experienced a decrease on the uremic pruritus scale after the intervention, which was within the limit of mild intensity (51.0%) but it was moderate in the control group (41.5%).

Table 3. Comparison in the degree of uremic pruritus between the intervention and control groups

Group	Pre-test		Post-Test		P
	M±SD	Min-max	M±SD	Min-Max	
Intervention group	25.0±14.2	5-30	1.49±0.50	5-20	0.000
Control group	1.90±0.65	6-28	1.98±0.55	7-30	0.102

Based on Table 3 and by using the Wilcoxon test, it resulted in a p value of 0.000 for the intervention group and a p value of 0.102 for the control group. There is an effect of peppermint aromatherapy in reducing uremic pruritus in patients with chronic renal failure undergoing hemodialysis therapy.

DISCUSSION

Before the intervention, the results showed that the intensity of uremic pruritus experienced by the majority of respondents was moderate with a hemodialysis frequency of twice a week. Providing adequate and controlled hemodialysis measures can reduce uremia and uremic pruritus. Therefore, it was found that respondents who regularly receive hemodialysis experienced a lower incidence of uremic pruritus (Mathur et al., 2010).

Germain (2017) stated that more than 40% of patients with chronic kidney disease (end-stage) who underwent hemodialysis experienced uremic pruritus starting from moderate to severe intensity.

Hemodialysis that has been carried out for a longer period can increase the incidence of uremic pruritus (Germain, 2017; Lin et al., 2012). Following the results of the study, it was found that the majority of respondents who experienced uremic pruritus were respondents who had spent years undergoing hemodialysis (more than one year). However, this study is not in line with the results of research conducted by Tarp (2017). It was discovered that more patients experienced uremic pruritus in the first 3 months after hemodialysis and even 6 to 12 months in a row after hemodialysis.

According to Narita et al. (2006), the causes of uremic pruritus are not yet clearly known but there are several risk factors (i.e. it is multifactorial). In Kimata et al.'s (2014) study, the latest theory identified that uremic pruritus is associated with a decrease in the immune system.

In this study, the age of the early elderly (46—55 years) and late elderly (56—65 years) constitute the majority of those suffering from uremic pruritus. This can be attributed to the elderly age in which there is a decrease in bodily functioning, specifically a decrease in endurance. Consequently, elderly people are more prone to uremic pruritus. Another study that had the same results as this study was conducted by Berger & Steinhoff (2011), which stated that elderly age has a relationship with the tendency or severity of uremic pruritus in chronic kidney disease respondents. However, it does not have the same results as a study conducted by Szepietowski et al. (2002), which states that age does not affect the occurrence of uremic pruritus.

In several studies, it was found that the gender factor also influences the occurrence of uremic pruritus. In this study, male respondents experience more uremic pruritus than women. In this case, gender is associated with the pathogenesis of uremic pruritus (Berger & Steinhoff, 2011; Lin et al. 2012; Combs et al. 2015; Aval et al. 2018).

Another factor that can aggravate the occurrence of uremic pruritus is having comorbidities such as hypertension and diabetes mellitus (Kimata et al., 2014). In this study, the majority of respondents experienced the comorbidities of hypertension and diabetes mellitus. This can occur where the comorbidity itself or drugs consumed can trigger uremic pruritus (Mettang et al., 2015; Nakamoto et al., .2019). Nonetheless, Narita et al. (2006) found that comorbidities such as diabetes and hypertension are not independent factors that can aggravate the occurrence of uremic pruritus.

The impact of uremic pruritus on the majority of respondents experiencing sleep disturbance was measured through the 5-D Itch scale questionnaire consisting of five question domains along with the distribution of the itch felt by the respondent. Patients experiencing difficulty sleeping and sometimes waking up at night due to pruritus was at 46.9%. This is in line with Mathur's (2010) and Combs et al.'s (2015) statements who found that patients who experience uremic pruritus will experience sleep disorders.

Research conducted by Kimball et al. (2016) stated that in general, uremic pruritus can interfere with sleep. As a result, it inhibits or interferes with work activities due to the lack of sleep. In this study, the majority of respondents who did not work was 51.3%. This study is in line with the research of Lin et al. (2012) who found that uremic pruritus can affect social activities and work productivity.

Another statement in the study of Simonsen et al. (2017) was that respondents who experience uremic pruritus also experience an interference with social activities and quality of life. Therefore, it can increase mortality.

The duration of uremic pruritus experienced by respondents in the study comprises 49% with a duration of <6 hours/day over the last 2 weeks, while 4.1% had the highest duration of 18-23 hours/day. The intensity of uremic pruritus felt by the majority of respondents was moderate. The tendency of uremic pruritus felt by the majority of respondents (44.9%) was that it was getting worse over the last two weeks. This is attributed to the tendency of uremic pruritus to fluctuate over time. The stable pruritus will arise episodically because it occurs throughout the bloodstream or it is systemic due to urea buildups. This occurs because the kidneys are unable to filter, clean the blood of foreign substances that enter the body through daily consumption of food and drinks, and excrete maximally. This is in line with what is stated by Combs et al. (2015) and Berger and Steinhoff (2011) that uremic pruritus is felt by the respondents almost every day intermittently or sometimes it is on and off.

The distribution of pruritus varies but the most commonly experienced by respondents in this study is in the area of the back with the results obtained as much as 77.6%. But, the areas of the buttocks and abdomen are also frequent problem areas. The back area is the most common because it is the most extensive and often stressed. It has the same results as found by Berger and Steinhoff (2011), Simonsen et al. (2017), and Minato, et al. (2020) that the most common site of pruritus is on the back.

After the intervention, the pruritus intensity experienced by respondents was mild (6—14). Abdelghfar et al. (2017) stated that providing a complementary intervention such as essential oils, especially the one containing menthol, can alleviate the uremic pruritus felt by respondents. Another study presented by Elsaie et al. (2016) affirms that peppermint essential oil can reduce pruritus not only in patients with chronic kidney disease but also in patients with diabetes mellitus and liver disorders by giving it for two weeks. In Amjadi's research (2012), it is also stated that pruritus in pregnant women can decrease by giving peppermint essential oil through inhalation.

The uremic pruritus felt by respondents had decreased but the duration experienced by the majority took place in less than 6 hours. The tendency of pruritus that did not interfere with sleep was 61.2%. Nevertheless, the distribution of pruritus remains dominant in the respondent's back, abdomen, and extremities. This is due to the uremic pruritus occurring in one-third of the respondent's body area even after the intervention. It will occur episodically to a mild intensity if the effects of peppermint essential oil have begun to disappear or diminish.

Several complementary intervention studies that have been carried out to reduce the scale of pruritus due to kidney failure, diabetes, or liver disease have given good results. Various oils such as lavender essential oil, baby oil, and peppermint essential oil have had a positive impact on patients with uremic pruritus in respondents experiencing chronic kidney disease. This is in line with research conducted by Abdelghfar et al. (2017) and Elsaie et al. (2016).

Aromatherapy is a common complementary and alternative treatment modality, which involves herbal medicines that utilize various oils extracted from plants and trees that can be given through skin absorption or inhalation (Mapp and Hostetler, 2020).

Based on the results of this study, there are effects of peppermint aromatherapy interventions in reducing uremic pruritus in patients with chronic kidney disease undergoing hemodialysis therapy through the skin or topical medication.

Orchard and Vuuren (2017) state that essential oils are one of the most popular natural products, with one of the main applications being skin medication. Combs et al. (2015) stated that one of the therapies used as a treatment for reducing uremic pruritus is a topical treatment because it can also improve skin hydration, where one of the factors that cause uremic pruritus is a dry skin condition.

The peppermint essential oil has effects in reducing the scale of uremic pruritus. This is due to the peppermint content that has menthol, which can provide a cold sensation on the skin that can work as an antihistamine. Moreover, its major component is menthol in a concentration of 50—60% (Abdelghfar et al., 2017).

The nursing theory used in this research is Kolcaba's Comfort Theory (2001) where the roles of nurses comprise providing patient comfort physically, psychologically, spiritually, and socially. The comforting context can be seen through physical, psycho-spiritual, environmental, and social values from the 3 ideas put forward by Kolcaba (2001) namely relief, ease (tranquility), and transcendence (helping patients in trouble) (Alligood, 2014). This is in line with the results of research showing peppermint aromatherapy can reduce the pruritus scale and provide comfort by using the 5-D Itch Scale questionnaire measurement tool. The scale consists of 5 categories of questions namely duration (how long the pruritus has been felt for), intensity (how severe the pruritus is), the tendency (whether the pruritus is getting better or worse), impact (on sleep, social, personal, and work activities), and distribution (spread of pruritus to other parts of the body). The limitation of this research is that it does not control the laboratory values associated with elevated uremic levels.

CONCLUSION AND RECOMMENDATION

Peppermint essential oil complementary therapy has positive effects on patients with chronic kidney disease who experience uremic pruritus. Peppermint aromatherapy is a safe therapy that is applied topically and can reduce the severity of pruritus. The implication of this research is that providing atopical complementary therapy with peppermint essential oilcan reduce the scale of uremic pruritus in addition to pharmacological (antipruritic) medication.

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