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Effectiveness of Emollient Topical Therapy on Hand Dermatitis

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Abstract

Background: Clinically, hand dermatitis manifests as either irritant contact dermatitis (ICD) or allergy contact dermatitis (ACD). Patients with hand dermatitis typically use emollients to reduce transepidermal water loss (TEWL).

Objective: This investigation aims to evaluate the efficacy of emollient topical therapy on hand dermatitis.

Methods: The study's design was based on a literature review, and the research samples were obtained through online searches on Google Scholar, PubMed, and ScienceDirect.

Results: 495 items were subsequently excluded based on the restriction criteria. We obtained eight research articles for evaluation. Hand Eczema Severity Index (HECSI), TEWL, Dermatology Life Quality Index (DLQI), Health-related quality of life (HRQoL), Modified Total Lesion Symptom Score (mTLSS), Investigator Global Assessment (IGA), and Visual analog score (VAS) were used to measure hand dermatitis, and there was a significant increase in these measurements for emollients. In the conclusion of the eight articles, six stated that they were significant, and two stated that emollients were effectively used as topical therapy.

Conclusion: Emollients typically act on the epidermis, particularly the stratum corneum, which can reduce TEWL so that antigen penetration and inflammation spread are not facilitated.

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INTRODUCTION

Hand dermatitis is defined as skin inflammation that manifests clinically as irritant contact dermatitis or allergic contact dermatitis. Hand dermatitis is a primary occupational concern, accounting for over 80% of all dermatitis. In a nursing study in the United States, around 33% of the participants had hand dermatitis. Hand dermatitis or eczema has a variety of etiologies, including atopic endogenous disorders and exogenous causes such as irritating contact dermatitis and allergic contact dermatitis [1]. Clinical symptoms might range from vesicular and erosive to hyperkeratotic and desquamative. Hand dermatitis can be acute, recurring, or chronic as time passes [2]. Chronic hand dermatitis drastically disrupts everyday life by causing discomfort and shame, as well as having a significant economic impact on nurses in the United States. According to research in Canada, the annual cost of hand dermatitis ranges between CAN $390 to $737 million [3].

The prevalence of hand dermatitis varies depending on geography. In Indonesia, the prevalence of contact dermatitis varies widely. According to PERDOSKI 2009, about 90% of occupational skin diseases are contact dermatitis, with the remaining 92.5% being skin infections and the remaining 2.1% being other causes [4]. The prevalence of hand dermatitis was 11% in a Swedish epidemiological survey of 20,000 adults between the ages of 20 and 65 last year, as well as 20-35% of all hand-attacking dermatitis. Women are afflicted more frequently than males (2:1), most likely because of increased exposure to wet work and home pollutants. The most common kinds of hand dermatitis in the Meding study were irritating contact dermatitis (35%), atopic hand derma-titis (22%), and allergic contact dermatitis (19%)[5]. According to researchers recently described in a review paper, risk factors for dermatitis include gender, particularly women, contact allergies, atopic dermatitis, and damp work. The most critical risk factor for hand dermatitis has been identified as atopic dermatitis. Hand dermatitis is connected with female sex, childhood dermatitis, and early age in the general population [6]. Excessive hand washing due to the COVID-19 pandemic (Corona Virus Disease) can increase the frequency of cases of dermatitis [7].

Hand hygiene, physical distance, coughing and sneezing ethics, and wearing facial masks are among the most significant and highly recommended preventive strategies. Due to regular hand washing, there have been reports of increased dermatological consultations for hand dermatitis in health workers and the general population. Because of the prevalence of hand dermatitis, only about 22.1% of the population uses emulsifiers after washing their hands. Higher washing frequencies cause imbalances that cause an increased risk of hand dermatitis. Thus, the American Contact Dermatitis Society (ACDS) anticipates increased hand dermatitis, particularly allergic contact dermatitis, and irritating contact dermatitis, as a result of more frequent washing of hands by using emollients after hand washing [8].

Emolien or moisturizer is very effective in restoring hydration and repairing the corneal stratum. Using emollients can provide protection and strengthen the protective function of the skin. Emolien works mainly by increasing water levels in the skin, especially in the outer corneal stratum. The emollient acts as a physical barrier to lower the Trans Epidermal Water

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Loss (TEWL), which provides water content recharge in the corneum stratum, so it requires the use of emollient after washing hands to reduce the increase in dermatitis due to repeated washing of hands in response to COVID-19 [8]. The effectiveness of various types of emollients has been studied by other authors; according to Corazza, 2014, emollients have been shown to protect against detergents such as sodium lauryl sulfate (SLS) and hydrophilic substances such as NaOH on wet work, but in a study written in article [9]. Stearate acid contained in the emollient, when reacting with NaOH, can increase irritation and then cause irritant contact dermatitis [9]. Because there are contradictory results, the author would like to conduct additional research on the effectiveness of emollients against hand dermatitis.

METHODS

This research method uses literature review methods and research samples obtained from *Google Scholar,* Pubmed, and Science Direct databases using search terms such as "Hand Eczema" OR "Hands Dermatitis" AND "Emollient" OR "Emollients."

Ethical Clearance (EC) number 3188/C.1/KEPK-FKUMS/I/2021 has been issued by the Medical Faculty, Universitas Muhammadiyah Surakarta. The following criteria of journal research restrict this investigation's designs to be included in this scientific search: experimental study methods, comparative causal studies, case studies, cross-sectional, correlation analysis, quantitative studies, and qualitative research. The article selected is written in English.

Based on the question of the clinical problem, then the author can compile the PICO as follows: P: Patient with hand dermatitis, I: The intervention on this scientific search, which discusses the relationship between hand dermatitis and emollient in an article published between 2016 and 2020, the research results utilized are from primary research, not a systematic review. C: Comparison of intervention with placebo or no intervention, O: Outcomes There are clinical differences after intervention.

RESULTS

Boolean operators were used to search Google Scholar, Pub Med, and Science Direct for articles containing the keywords "Hand Eczema" OR "Hands Dermatitis" AND "Emollient" OR "Emollients" on 26 January 2021. According to the search terms, resear-chers identified six articles on Pub Med, 466 articles on Google Scholar, and 23 articles on Science Direct for 495 articles. Fourteen articles were duplicated, resulting in a total of 481 articles, of which 107 were excluded because the full text was unavailable, the abstract was unavailable, or English was not used. Eligibility 374 full-text articles are reviewed and examined following restriction criteria, resulting in the release of 366 articles that do not meet the inclusion and exclusion criteria for the following reasons: 14 articles are systematic reviews, and 352 articles do not discuss the connection between hand derma-titis and emollient, leaving eight articles to be evaluated.

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Table 1. Results of literature searches for research

Writer	Country	Meth-ods	Population	Intervention	Comparison	Outcome
Pavel V. et al. 2020[7]	Ukraine	Cohort	99 contact dermatitis health workers. 65 doctors, 31 nurses, three not answering questions	Emolien For a month	Group 1: Antiseptic alcohol and glycerin, then emollients after contact with Water and/or before sleeping. Group 2: Emoliences every contact with Water and/or before bed. Group 3: Do not use emollients.	The HRQoL of nurses and doctors receiving antiseptics and emollients increased and improved significantly, and there was an increase in the average total score of DLQI P < 001 compared to groups 2 and 3.
Nutthawut Techalert, et al/2020[10]	Thailand	Cohort	18-60 years 26 patients with hand eczema more than 3 or 2 months and frequent recurrence	Petrolatum-based and anti-inflammatory emollients are administered twice a day for four weeks.	Pre-treatment condition	The p-value associated with the HECSI is 0.001. The P value for the P SCH value is 0.001. Similarly, the P value for the P hemoglobin index is also 0.001. The P value for the DLQI is 0.001. Lastly, the P value for the VAS is more remarkable than 0.001. A significant decrease of 74.94% in the Hand Eczema Severity Index (HECSI) compared to the average. This reduction in HECSI scores was accompanied by a noticeable decrease in skin redness on the hands and an improvement in the overall clinical appearance.

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Maryam Soltanipoor,et al/2019[11]	Amsterdam, Netherland	RCT	501 medical personnel with a history of hand dermatitis and wet work	Emolien For a year	Intervention on respondents is Emolien, and respondents are reminded through posters. Control: Emolien only	The statistical significance was observed in the intervention group with a p-value of less than 0.001. Additionally, it was found that 43% of the participants in this group reported being reminded of their motivation to use the emulsifiers, while 94% indicated awareness of the advantages associated with using emollients.
M Santer, et al /2016[12]	United Kingdom	interview-based qualitative research	Fifty-seven nurses provided care for a pediatric patient under the age of five diagnosed with eczema. Study 1 consisted of 25 British whites, 3 British or Asian blacks, two non-English whites, and one mixed English study. Study 2 consists of 23 White English, 1 Black or Asian English, and 2 Non-England white.	Emolien For a year	Study 1 aims to investigate the perspectives and experiences related to treating childhood eczema to provide valuable insights for creating web-based therapies that can effectively facilitate self-care practices. In Study 2, the evaluation includes web-based therapies.	Study 1: The majority of individuals reported better eczema and a reduction in flare-ups. Study 2: All subjects viewed long-term emulsifiers favorably.

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Marie-Dominique Thouvenin MD, et al/2018[13]	France	Open-label study	Forty people with mild chronic hand dermatitis between 18 and 65 were studied.	Emollient	-	Reduced the severity of chronic hand dermatitis (P 0,001), discomfort and pruritus (P 0.001), increased quality of life, and mtLSS = 8.
Alemeh Khademi, et al/2020 [14]	Iran	RCT, Double-Blind Clinical Trial	60 patients with chronic hand dermatitis	Pumpkin-based emollient	Group 1 was given pumpkin emulsifiers. Betamethasone ointment was administered to Group 2. Eucerin ointments were provided to Group 3 Almond oil was given to Group 4	The DLQI scores of patients in both the pumpkin and betamethasone groups exhibited statistical significance. Notably, the pumpkin group showed superior improvements in quality of life compared to the betamethasone group (P=0.001). The efficacy of betamethasone and pumpkin ointments was superior to that of almonds and eucerin, resulting in notable improvements. Additionally, these ointments reduced HECSI scores (P = 0.002 and P = 0.012, respectively).
MohammadrezaSobhan, et al/2020[15]	Iran	RCT, Double Blind	79 patients with chronic hand dermatitis	Emollients formulated with oatmeal	Group 1 was provided with a colloid cream containing 1% oats. Group 2: Fluocinolone ointment	The intervention group showed a drop in the mean values of HECSI and VAS, symptoms did not return to their previous state, and a significant increase in the DLQI score compared to the control group (p-value 0,001).
Hojjat Rouhi Boroujeni, et al/2017[16]	Iran	RCT, Double-Blind Clinical Trial	79 patients with chronic hand dermatitis	AJMT Emolien	Group 1 was given an AJMT emollient cream. Fluocinolone acetonide cream was given to Group 2.	The AJMT creams effectively alleviate symptoms such as burning, itching, redness, pimples, scrapes, and rupture. The therapeutic effects of AJMT on burn, itch, and redness are comparable to those of Fluocinolone creams (P>0.05). However, AJMT

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						demonstrates significantly superior efficacy in alleviating symptoms of bumps, crusts, and cracks (P<0.05).

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DISCUSSION

Emollients are medical moisturizers that can treat various skin conditions, including atopic and hand dermatitis. Emollients create a protective layer on the skin, helping to keep moisture in and shield it from irritants [17]. A randomized study showed that the frequent use of emollients may help treat hand derma-titis. Application of a skincare regimen with a ceramide C-infused cream demonstrated effecttive prevention of contact dermatitis among healthcare professionals [18].

The results of this literature review consist of experimental form articles, case studies, and qualitative analysis, and the researchers obtained eight articles. Hand Eczema Severity Index (HECSI), transepidermal water loss (TEWL), Stratum Corneum Hydration (SCH), hemoglobin index, Dermatology Life Quality Index (DLQI), Health-Related Quality of Life (HRQoL), modified Total Lesion Symptom Scale (mTLSS), Investigator Global Assesment (IGA), and Visual Analog Scale for the intensity of itching (VAS) are the methods used to measure hand eczema, Irritant contact dermatitis is discussed in two articles [7,15]. Chronic dermatitis is in four articles [13–16]; the remaining are non-specific [10–12]. Several emollients, including petrolatum, carrot-based emollients, oatmeal-based emollients, AJMT fenugreek (Trigonella foenum), chamomile (Matricaria chamomilla), hazelnuts (Juglans regia L), and marshmallow (Althae officinalis), have been identified. Some studies examine emollients individually or in combination with other substances, such as steroids.

The first article on the table gives a combination of humectant-type emollient, glycerin, and antiseptic. The second article adds anti-inflammatory to petrolatum-based emollients, the seventh article adds emollient with 1% colloid, and the eighth article mentions an AJMT cream derived from four plants with anti-inflammatory, emollients, anti-bacterial, and anti-fungal properties. Emolien has several properties besides moisturizing, including anti-inflammatory, anti-mitotic, and wound healing [13]. Several tables above compare emollients to betamethasone, eucerin, almond, and fluocinolone ointments.

The entire content of the article discusses clinical improvements in emollient use, exten-ding from four weeks to one year. Six articles reported significant results, four of which showed P=0.03 and P=0.02 significantly improved HRQoL and hand skin improvement, another showed P=0.001 significantly against quality of life, (P0.05) significantly corrected symptoms of redness, bumps, scratches, fissures, as well as burning, and itching, and the last resulted in a significant decrease in severity with P0,0001. This result is consistent with a study on the function of emulsifiers in the case of hand dermatitis, which found that emulsifiers reduce the severity of chronic hand dermatitis symptoms, and a random study in subjects with chronic hand dermatitis showed that regular use of emulsions could extend the time between recurrences [19].

Following is a description of the eight articles by the researchers. Four articles compare the use of emulsifiers contained in butter, oatmeal ointment, and cream AJMT fenugreek (Trigonella foenum), chamomile (Matricaria chamomilla), walnuts (Juglans regia L), and marshmallow (Althae officinalis) with the groups of corticosteroid drugs including betamethasone

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and fluocinolone in chronic hand dermatitis. Corticosteroid use in cases of chronic hand dermatitis has several side effects, including atrophy, striae, rosacea, perioral dermatitis, acne, purpura, and suppression of the hypothalamus-hypophysis axis, so emollient is more recommended as a substitute for topical corticosteroid therapy or as a complementary treatment in cases of chronic hand dermatitis [14–16]. An article that performed qualitative interview methods[16] mainly stated that the emollient effectively fixed eczema and, if used long-term, can prevent flare-ups. In contrast, other research subjects stated that they often forget to use emollients, and emollients feel sticky, so choosing the proper emollients enhances compliance and helps families control eczema faster[12].

Randomized control trials were applied in five publications [11,13–16]. The entire study indicates a clinical improvement. According to an article by Santer, there was a significant improvement in reducing skin dryness and skin irritation in the group that used emollients compared to the control group, so emollient was suggested as a practical strategy to pro-mote skin care among health professionals[12]. The article by Khadami 2020 states that the emollient reduced the severity of chronic hand dermatitis on the eighth and twenty-second days compared to the first day and that the subjects report that it reduces pain pruritus and improves the quality of life[14]. This investigation applies a variety of clinical improvement measurement methods. Emolien's mechanism of action varies depending on the type; however, emolien typically acts on the epidermis, particularly the stratum corneum, to reduce TEWL and prevent antigen, allergen, or irritant penetration and the spread of inflammatory response.

The clinical improvement is because emollient has several other advantages in addition to moisturizing, including First, anti-inflammatory as with glycyrrhetinic acid, palmitoyl-ethanolamine, telmesteine, Vitis vinifera, ceramide, and filaggrin breakdown products that inhibit cyclooxygenase activity, reduce cytokines, and modulate the production of pro-inflammatory prostanoids, as well as soothe dermatitis-affected inflammatory skin. Furthermore, it has anti-inflammatory properties. A water-based moisturizer offers a cooling sensation by facilitating water evaporation on the skin's surface. Specific moisturizing agents may include mint, which produces a chilling effect and alleviates itching symptoms. Antimicrobial Mineral oils possess low-grade epidermal antimycotic properties and have therapeutic value in skin diseases with elevated epidermic mitosis activity, such as psoriasis. Ecuperation of lesions It has been shown that hyaluronic acid accelerates wound healing[20].

CONCLUSION

There are six articles stating that a significant emollient provides a clinical improvement in the case of hand dermatitis, 2 of which do not mention a significant one but do mention that it is effective, so it can be concluded that emollient is an effective topical therapy for hand dermatitis. Emolien has a different me-thod of working depending on the type. In general, emollients act on the epidermis, spe-cifically, the stratum corneum, which can reduce TEWL so that it does not allow antigens, allergens, or irritants to penetrate and spread inflammatory responses.

Separating the types of emollients as repair barriers, humectants, and occlusives could be the

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premise for future research based on this study's suggestion. This research can be used as a preventative measure for epidermis at risk for hand dermatitis, particularly in the health-care industry. The research is anticipated to be utilized as a replacement or anti-inflammatory adjunct therapy, particularly in patients with chronic hand dermatitis. In addition, it serves as the foundation for future research to select more specific emulsifiers for hand dermatitis prevention.

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