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The Role of Health Education on the Level of Knowledge of Contact Dermatitis in the Elderly

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ABSTRACT

Background: Contact dermatitis is a skin condition resulting from exposure to external substances that provoke allergic or irritant reactions. Individuals aged 60 and older are particularly susceptible to this condition due to the physiological changes in their skin accompanying aging. **Purpose:** To analyze the role of education regarding contact dermatitis in the elderly. **Methods:** The sampling technique used in this study is a total sampling technique using the pre-experimental one-group method, and presented the results in an analytical descriptive format. **Result:** The study demonstrated a significant impact of the educational intervention on contact dermatitis regarding the knowledge levels of the research subjects. Analysis using the Wilcoxon test revealed a significance value of 0.001 ($p < 0.05$). This finding indicates that the educational intervention resulted in a notable improvement in knowledge from before to after it. **Conclusion:** There is a significant impact of the educational intervention on the knowledge levels of the elderly, as observed before and after the intervention.

Keywords*:* Education, contact dermatitis, elderly, human and health, aging.

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BACKGROUND

Contact dermatitis is a skin condition resulting from exposure to external substances that provoke allergic or irritant reactions.[1] Chemicals or compounds that contain irritants, toxics, small reactive chemicals, or contact allergens can cause contact dermatitis by modifying proteins and inducing an immune response (dominated by a T cell response).[2] Symptoms may include redness due to the dilation of blood vessels, swelling or bruising from fluid accumulation in the tissues, vesicles, intense itching, skin thickening, scratch marks, and changes in skin color.[3]

Allergic Contact Dermatitis (ACD) and irritant Contact Dermatitis (ICD) are the two types of contact dermatitis.[4] Contact with a specific exogenous allergen causes allergic contact dermatitis, an inflammatory skin reaction in people who have already become sensitized to the allergen.[5] The hallmark manifestation of allergic contact dermatitis is pruritic eczematous dermatitis, typically located at the primary site of allergen exposure. The primary symptom of allergic contact dermatitis is pruritus, which occurs more frequently than a burning sensation. Physical examinations may include skin biopsies and complete blood tests. Patch testing is considered the gold

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standard for identifying the allergens responsible for allergic contact dermatitis.[5]

Disruption of the skin's protective barrier can result in an increase in the population of bacteria and fungi, which may ultimately lead to irritant contact dermatitis. Unlike allergic contact dermatitis, which primarily presents with cutaneous inflammatory infiltrates, irritant contact dermatitis mainly manifests as disturbances in the epidermis. Symptoms include redness, fissuring, oozing, and pain. In the chronic phase, epidermal thickening and changes in skin pigmentation may occur. Patch testing, laboratory tests, and imaging studies can support the diagnosis of irritant contact dermatitis.[6] Despite the differences in their pathogenic mechanisms, allergic and irritant contact dermatitis are often difficult to differentiate clinically, histologically, and at the molecular level.[7]

According to the World Health Organization (WHO), the elderly are individuals aged 60 years and older.[8] The Indonesian Ministry of Health classifies age into two categories: pre-advanced age (45-59 years) and advanced age (over 60 years) (Minister of Health of the Republic of Indonesia). This demographic represents a vulnerable segment of the population that requires careful attention regarding contact dermatitis.[9] Throughout the aging process, the skin experiences changes linked to degenerative and metabolic processes. The structural, physiological, and functional modifications in the skin of older adults are significant factors in the onset of contact dermatitis within this demographic.

Nearly 3.92% of both outpatients and inpatients in a Japanese cross-sectional survey involving 67,448 cases across 170 clinics had contact dermatitis.[10] The Indonesian Ministry of Health (2017) attributed 97% of 389 skin disease cases to contact dermatitis, classifying 66.3% as irritant contact dermatitis and 33.7% as allergic contact dermatitis based on epidemiological data. Additionally, a study by Layla (2017) in Jakarta found that 56.1% of the elderly had a history of dermatitis.[11] According to Putri et al.'s report, from 2019 to 2020, xerosis cutis was the most common skin disease among the elderly at URJ Skin and Gender General Hospital Dr. Soetomo Surabaya, affecting 87 patients (29.79%).[12]

Xerosis cutis, or dry skin, is a condition characterized by damage to the skin barrier, making it a significant risk factor for contact dermatitis, particularly among the elderly.[13] Prakoeswa et al. observed a statistically significant difference in the awareness of contact dermatitis among batik makers before and after health education on the subject. This conclusion was drawn from their observational study involving 30 batik makers aged 15 to 60 years.[14]

Currently, there is limited data on the profile of contact dermatitis in the elderly and the impact of health education on their knowledge of the condition. Therefore, we conducted this study to evaluate how education can prevent contact dermatitis in the elderly, aiming to lower its prevalence in this population.

METHODS

This research design is a pre-experimental one-group study that uses pre-test and post-test data. Its objectives include evaluating the profile of contact dermatitis using a data collection sheet, assessing the elderly's level of knowledge about contact dermatitis using a questionnaire, and analyzing the role of education in preventing contact dermatitis among the elderly. A total of 25 participants completed the survey at the elderly Posyandu (Integrated health service post) affiliated with the Universitas Airlangga Faculty of Medicine. The hypothesis of this study is that education has an effect on the level of knowledge regarding contact dermatitis, which can serve as a preventive measure for the elderly. The Ethics Committee at the Faculty of Medicine, Universitas Airlangga, has reviewed and approved this research (No. 208/EC/KEPK/FKUA/2023).

RESULT

The research sample includes 25 elderly individuals aged 60 years and older who are members of the elderly posyandu administered by the Dharma Wanita, Faculty of Medicine, Universitas Airlangga. The inclusion criteria for this study are elderly individuals aged 60 years and older who are willing to participate and do not have any severe illnesses that hinder mobility. Conversely, the exclusion criteria apply to elderly individuals aged 60 and older who have severe illnesses that affect their mobility. We conducted the research from June to December 2023. The Dharma Wanita, Faculty of Medicine, Universitas, carried out this study by administering pre- and post-test questionnaires to 25 elderly participants at the elderly posyandu to assess their level of knowledge about contact dermatitis.

Table 1. Age, Gender, History of Previous Illnesses, and Habit and Behaviour History Distribution of Participants

Subject Characteristic	Number	%
Patient enrolled	25	100
Age, years		
Median	69	
Range	60 to 77	
History of previous illness		
Atopic dermatitis	10	40
Allergic conjunctivitis	0	0
Allergic rhinitis	12	48
Asthma	2	8
Skin disease (worms, itching, urticaria)	5	20
Dry skin	15	60
Habit and Behavior History		
Potentially irritant ingredients (oil / body wash / hand sanitizer / facial cream)	25	100
Potentially allergenic ingredients (moisturizers, cosmetics, rubber, metal)	21	84

In this study, there were 25 participants, including 4 individuals aged 60 years (16%) and 21 who were over 60 years (84%). The group consisted of 22 women (88%) and 3 men (12%). Some participants also reported having a history of previous illnesses on the questionnaires.

Among the participants, 19 elderly individuals had a history of atopy, including 10 subjects who experienced atopic dermatitis, characterized by severe itching that can disrupt sleep. Additionally, there were cases of allergic conjunctivitis, marked by redness and itching of the conjunctiva, where exposure to allergens in the eyes can exacerbate dermatitis, asthma, or other allergy related conditions; however, no participants received a diagnosis of allergic conjunctivitis. Twelve participants had allergic rhinitis, exhibiting symptoms such as sneezing, nasal congestion, runny nose, and itchy nose upon exposure to allergens. Furthermore, 2 subjects had asthma, presenting with wheezing, shortness of breath, chest tightness, and coughing. Five elderly individuals reported a history of skin diseases, including itching, scabies, and urticaria, while 15 had a history of dry skin. Two participants had both a history of atopy and skin disease, as well as dry skin. In this study, all 25 participants utilized potentially irritating products (such as oils, body washes, hand sanitizers, and facial creams), and 21 participants used potentially allergenic ingredients (including moisturizers, cosmetics, rubber, and metal). It is important to note that each individual may have experienced simultaneous exposure to both allergens and irritants.

The distribution of knowledge among 25 research subjects in the pre-test prior to the intervention is shown below:

Table 2. Pre-Test Result Data of Research Subjects

Number	Question	True	False
1	Are older people more prone to contact dermatitis?	19	6
2	Does irritant contact dermatitis often affect the whole body?	12	13
3	Can overexposure to soapy water or detergent cause contact dermatitis?	16	9
4	Does frequent washing of dishes without hand protection cause red skin?	15	10
5	Can frequent stays in air-conditioned rooms cause dry skin?	20	5
6	Does bathing in hot water cause dry skin?	14	11
8	Does the aging process cause dry skin?	22	3
9	Can the daily use of soaps and skincare products, such as moisturizers and lotions with fragrances, cause contact dermatitis?	9	16
10	Can using moisturizer immediately after showering reduce the risk of contact dermatitis?	19	6
11	Can using pH-neutral soap reduce the risk of contact dermatitis?	21	4

The distribution of knowledge among 25 research subjects in the post-test following the intervention is shown below:

Table 3. Data on Post-Test Results of Research Subjects

Number	Question	True	False
1	Are older people more prone to contact dermatitis?	21	4
2	Does irritant contact dermatitis often affect the whole body?	19	6
3	Can overexposure to soapy water or detergent cause contact dermatitis?	18	7
4	Does frequent washing of dishes without hand protection cause red skin?	14	11
5	Does frequent exposure to air-conditioned rooms cause dry skin?	22	3
6	Does bathing in hot water cause dry skin?	18	7
7	Does the aging process cause dry skin?	24	1
8	Can the daily use of soaps and skincare products, such as moisturizers and lotions with fragrances, cause contact dermatitis?	18	7
9	Can using moisturizer immediately after showering reduce the risk of contact dermatitis?	20	5
10	Can using pH- neutral soap reduce the risk of contact dermatitis?	22	3

Due to the sample size being less than 50, we conducted a normality test using the Shapiro-Wilk method after collecting the pre-test and post-test data. A significance value greater than 0.05 in the Shapiro-Wilk normality test indicates a normal distribution of the research data, while a value less than 0.05 suggests non-normality. We found the pre-test significance value to be 0.127, confirming the normal distribution of the pre-test data. In contrast, the post-test significance value was 0.007, suggesting that the data did not follow a normal distribution. Therefore, the researchers utilized the Wilcoxon test to evaluate the average difference between the paired samples. When the data fails to meet the assumptions of normality, this test serves as an appropriate alternative to the Paired Sample T Test.

Table 4. Ranks of Pre-Test and Post-Test Results using the Wilcoxon Test

Ranks

		N	Mean Rank	Sum of Ranks
Post test - Pre test	Negative Ranks	2[a]	15.50	31.00
	Positive Ranks	22[b]	12.23	269.00
	Ties	1[c]		
	Total	25		

a. Score post test < pre test. b. Score post test > pre test. c. Score post test = pre test

Table 5. Statistical Test of Pre-Test and Post-Test Results using the Wilcoxon Test

Statistical Test

	Post test - Pre test
Z	-3.553[b]
Asymp. Sig. (2-tailed)	.000

a.Wilcoxon Signed Ranks Test b.Based on negative ranks

Tables 4 and 5 detail the analysis of pre-test and post-test data using the Wilcoxon test. Negative ranks indicate a decrease in scores from the pre-test to the post-test, with 2 participants showing a decline in their results. Conversely, positive ranks reflect an increase, with 22 participants demonstrating improvement from the pre-test to the post-test. Ties represent instances where the results were identical between the pre-test and post-test, with 1 participant showing no change in scores. The decision criterion stipulates that accepting the hypothesis is possible if the significance value is less than 0.05. In this study, the statistical test yielded a significance value of 0.001 ($p < 0.05$), leading to the acceptance of the hypothesis and confirming a significant increase in scores from pre-intervention to post-intervention.

The study's results revealed an increase in correctly answered questions from 1 to 10. The post-test results revealed that more than 50% of the research subjects correctly answered at each question point. This indicates that there is a significant impact on the knowledge levels of the research subjects following the intervention in the form of health education.

DISCUSSION

This study implemented an intervention in the form of health education about "Contact Dermatitis in the Elderly," which covered topics such as the definition of contact dermatitis, its symptoms and signs, the different types of contact dermatitis, and prevention

strategies. The data analysis revealed a significant effect of the health education intervention on the knowledge levels of the research subjects. The Wilcoxon test obtained a significance value of 0.001 ($p < 0.05$), allowing for the acceptance of the researcher's hypothesis. This demonstrates a significant increase in knowledge from before to after the intervention.

Changes in skin structure and physiology due to aging and immunosenescence influence the incidence and clinical manifestations of contact dermatitis in elderly patients. Additionally, individual-specific sensitization to certain materials is a dynamic process. Cumulative exposure to sensitizers and irritants persists throughout a person's lifetime.[15,16]

In Indonesia, demographically, the proportion of women is greater than men. In this study, there were 22 elderly women (88%) and 3 elderly men (12%). We found that women made up a greater proportion of the research subjects than men. Participants at the posyandu, Faculty of Medicine, Universitas Airlangga are mostly women. As a result, women predominated the study's subjects.

Among the 25 subjects in this study, 19 elderly individuals (76%) had a history of atopy which included atopic dermatitis, characterized by severe itching that can disrupt sleep, and allergic conjunctivitis, characterized by redness and itching of the conjunctiva. Exposure to eye allergens could potentially exacerbate dermatitis, asthma, or other allergy-related conditions.Additionally, allergic rhinitis presents symptoms such as sneezing, nasal congestion, a runny nose, and an itchy nose when exposed to allergens. Asthma symptoms included wheezing, shortness of breath, chest tightness, and coughing. Five elderly individuals reported a history of skin disease, while 15 elderly individuals (60%) had a history of dry skin disease. Furthermore, 2 participants (8%) had a concurrent history of atopy, skin disease, and dry skin. A study conducted by Hari Suryo Utomo, published in 2007 in the Journal of Skin and Gender Diseases, indicated that 51.3% of patients with irritant contact dermatitis had a history of atopy. Atopy is characterized by an unusual or excessive hypersensitivity reaction resulting from exposure to environmental allergens.[18] The results of this study indicate that individuals with a history of atopy are more susceptible to irritant contact dermatitis compared to those without such a history. These findings align with Sularsito's statement (2007), which asserts that individuals with a history of atopy are at greater risk for developing irritant contact dermatitis than those who do not have an atopic history.[19] Various factors, such as work duration, personal hygiene, length of exposure, history of atopy, and prior skin conditions, can cause contact dermatitis. One significant risk factor for contact dermatitis is dry skin.[20] Previous studies indicate that xerosis cutis, or dry skin, is a condition characterized by damage to the skin barrier, making it a significant risk factor for contact dermatitis, particularly in the elderly.[13]

All 25 research subjects (100%) used products with potential irritants (such as oils, body washes, hand sanitizers, and facial creams), while 21 participants (84%) used items that could act as allergens (including moisturizers, cosmetics, rubber, and metals). Exposure to both allergens and irritants increases the risk of contact dermatitis. Previous studies indicate that contact dermatitis is a multifactorial condition influenced by factors such as chemical properties, exposure characteristics, environmental conditions, personal hygiene, hobbies, occupations, use of protective equipment, contact duration, frequency, temperature, humidity, and atopic history.[21] According to PERDOSKI (2021), the clinical diagnostic criteria for allergic contact dermatitis include a history of exposure to allergens, while for irritant contact dermatitis, the criteria involve a history of exposure and a temporal relationship with irritants. The data collected from questionnaires can help assess the risk of developing contact dermatitis among research subjects. Additionally, a study by Reni and Sumardiyono identified a history of chemical exposure as the primary risk factor for contact dermatitis, among various factors.[22] The study results indicated an increase in the number of research subjects who answered correctly from questions 1 to 10. The post-test data revealed that over 50% of participants answered each question correctly, demonstrating a significant improvement in their knowledge following the health education intervention.

This study acknowledges certain limitations. One key limitation is the variation in intervention methods used on the research subjects, as multiple interventions were conducted. The research team from the Department of Dermatology and Venereology at Dr. Soetomo General Hospital directly delivered education through a PowerPoint presentation in the first intervention.In subsequent interventions, the team used an educational video created by the researcher team, which may introduce confounding factors. Therefore, this research is not free from errors, and the researchers welcome constructive feedback and critiques on this work.

In conclusion, 22 research subjects showed an increase in their scores from pre-test to post-test, with an average score of 12.23, while 2 subjects experienced a decrease, with an average score of 15.50. Overall, there was a notable increase in the level of knowledge among the elderly at the Dharma Wanita elderly posyandu, Faculty of Medicine, Universitas Airlangga, with a significance value of 0.001 ($p < 0.05$) following the health education intervention.

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