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THE EFFECT OF BATH SOAP USE, BATH WATER TEMPERATURE, BATH DURATION, AND MOISTURIZER USE ON THE SEVERITY OF XEROSIS CUTIS IN THE ELDERLY AT THE DERMATOLOGY AND VENEREOLOGY CLINIC OF GOTONG ROYONG HOSPITAL

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ABSTRACT

Background*: The number of elderly people is increasing over time. Aging is a natural process influenced by intrinsic and extrinsic factors, leading to xerosis cutis, a common dermatological complaint in the elderly that is often overlooked. By identifying factors such as the type of soap used, bath water temperature, duration of bathing, and moisturizer use, xerosis cutis can be prevented and managed effectively.* ***Objective****: To explain the effect of soap use, bath water temperature, bathing duration, and moisturizer use on the severity of xerosis cutis in the elderly at the Dermatology and Venereology Polyclinic, Gotong Royong Hospital, Surabaya.* ***Methods****: This study was an observational quantitative analytical study with a cross-sectional approach. Samples were obtained using a consecutive non-probability sampling technique. The sample size was calculated using the Lemeshow formula, resulting in 38 samples. Data were collected through clinical observation by Sp.DV physicians to classify the severity of xerosis cutis and through questionnaire completion at the Dermatology and Venereology Polyclinic, Gotong Royong Hospital, Surabaya, from September 1–October 31, 2024. The Spearman correlation test was then performed using SPSS version 27.* ***Results****: The study showed a significant effect of bath soap use (p=0.000) and moisturizer use (p=0.000) on the severity of xerosis cutis among respondents. In contrast, there was no significant effect of bath water temperature (p=0.621) or bathing duration (p=0.056) on the severity of xerosis cutis.* ***Conclusion****: Despite the statistical findings, soap use, bath water temperature, bathing duration, and moisturizer application may influence the severity of xerosis cutis. Irritating soap ingredients, prolonged exposure to hot water during bathing, and inadequate moisturizer use tend to worsen the severity of xerosis cutis, and vice versa.*

Keywords*: Xerosis cutis; Bath soap; Water temperature; Bath duration; Moisturizer; Elderly*

INTRODUCTION

According to the World Health Organization (WHO), the elderly are individuals who have entered the age of 60 years and above.[1] The elderly population has experienced significant increases in recent decades.[2] According to the Ministry of Health of the Republic of Indonesia, the number of elderly people in Indonesia in 2021 was around 10%, and in 2025 it is estimated to increase to 11,8%.[3] The percentage of elderly people in Surabaya City in 2018 was 8,53%, in 2019 it was 8,84%, and in 2020 it reached 9,16%, indicating that the percentage of elderly people in Surabaya City is increasing.[4]

The aging process is a natural event experienced by everyone, and as the population ages, new problems arise, such as an increase in chronic diseases, including skin diseases, which are often reported by the elderly.[2] Skin aging is influenced by a combination of intrinsic and extrinsic factors, which can cause the skin to become dry (xerosis cutis), a major dermatological complaint among the elderly.[5]

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Xerosis cutis is the most common age-related skin disorder, with an estimated worldwide prevalence of 5,4%–85,5%.[6,7] To date, epidemiological data on xerosis cutis in the elderly remain limited.[8] Based on data from the Dermatology and Venereology Clinic of Gotong Royong Hospital, Surabaya, for the period July–December 2023, 21 patients presented solely with complaints of xerosis cutis out of 121 elderly patients (17.35%). However, this does not rule out the possibility that the remaining 100 elderly patients were not diagnosed with xerosis cutis because they were not examined specifically for this condition. This situation highlights the importance of conducting further research and systematic data collection on xerosis cutis in the elderly.

Xerosis cutis, or dry skin, is a condition in which the skin feels dry to the touch, caused by a lack or loss of moisture in the outermost layer of the skin.[9] Xerosis cutis is a condition that is often found in the elderly and is frequently overlooked.[2] Xerosis cutis is characterized by skin that feels dry and tight, is itchy and rough, has fine scales, sometimes coarse scales, cracks, and appears reddish.[9] Several factors that can cause xerosis cutis in the elderly include age-related factors, medical conditions, side effects of medications, environmental factors, nutrition, and lifestyle.[10,11]

Skin diseases in the elderly are often not recorded or reported, leading to them being ignored, and can reduce the quality of life of elderly patients.[12] Although skin problems may seem minor compared to other systemic diseases, proper diagnosis and management can have a positive impact on quality of life.[13] By identifying bathing habits, including the use of bath soap, bath water temperature, bathing duration, and moisturizer use in elderly individuals, as well as the severity of xerosis cutis, appropriate preventive measures can be applied to address the most common skin complaints in this population, thereby improving quality of life and supporting successful aging.

METHODS

This study was an observational quantitative analytical study with a cross-sectional approach. Sampling was conducted using a non-probability consecutive sampling technique by selecting participants who met the inclusion and exclusion criteria of the study. The inclusion criteria were elderly individuals who visited the Dermatology and Venereology Clinic of Gotong Royong Hospital, Surabaya; were diagnosed with xerosis cutis; were aged ≥ 60 years; were willing to participate as respondents; were in good physical and mental health; were able to read; and were able to complete the questionnaire independently without assistance. The exclusion criteria were incomplete questionnaires; elderly individuals who bathed by soaking; those with comorbid skin diseases, including dermatitis, psoriasis, bacterial infections, fungal infections, and parasitic infections; those with congenital diseases, including thyroid disease, kidney disease, liver disease, atherosclerosis of the lower legs, autoimmune diseases, neurological disorders that reduce sweating, diabetes mellitus, HIV, hepatitis B, and hepatitis C; and those who took certain medications, including diuretics, beta-blockers, contraceptives, retinoids, long-term use of topical steroids, lipid-lowering drugs, antiandrogens, and radiation therapy.

The study was conducted from September 1–October 31, 2024, at the Dermatology and Venereology Clinic of Gotong Royong Hospital, Surabaya. The population in this study consisted of all elderly patients who visited the Dermatology and Venereology Clinic of Gotong Royong Hospital, Surabaya. Patients' medical records were first reviewed to evaluate the inclusion and exclusion criteria. Patients who met the criteria received an explanation through the Information for Consent sheet and signed the Informed Consent form, after which they completed questions related to the exclusion criteria. Subsequently, an evaluation was conducted, and patients who met both the inclusion and exclusion criteria continued as study respondents and were included as samples.

Data collection was carried out through direct observation conducted by a Sp.DV physician to classify the severity of xerosis cutis experienced by respondents using the ODS (Overall Dry Skin) score, which was categorized into scores of 1, 2, 3, and 4. Afterward, respondents completed the research questionnaire. The number of samples in this study was 38. The collected data were analyzed using the Spearman correlation test with the Statistical Package for the Social Sciences (SPSS) version 27.

RESULT

Table 1. Distribution of respondent characteristics based on bath soap use.

Bath Soap Use	n	%
Use bath soap that contains moisturizer or baby soap	17	44.7
Use bath soap that contains antiseptics, fragrances, SLS	21	55.3

Table 1 shows that most respondents in this study used soap containing antiseptics, fragrance, and SLS (55.3%), compared to respondents who used bath soap containing moisturizers or baby soap (44.7%).

Table 2. Distribution of respondent characteristics based on bath water temperature

Bath Water Temperature	n	%
Normal	21	55.3
Warm/hot	17	44.7

Table 2 shows that most respondents in this study bathed with normal water temperature (55.3%), compared to those who bathed with warm or hot water temperature (44.7%).

Table 3. Distribution of respondent characteristics based on bath duration.

Bath Duration	n	%
<10 minutes	20	52.6
≥ 10 minutes	18	47.4

Table 3 shows that the respondents in this study were almost evenly divided between those whose bath duration was <10 minutes (52.6%) and those whose bath duration was ≥10 minutes (47.4%).

Table 4. Distribution of respondent characteristics based on moisturizer use

Moisturizer Use		n	%
Uses moisturizer ≥2x/day and uses moisturizer that does not contain fragrance	Yes	16	42.1
	No	1	2.6
Does not use moisturizer ≥2x/day and uses moisturizer that does not contain fragrance	Yes	18	47.4
	No	3	7.9

Table 4 shows that 42.1% of respondents answered "yes" to the statement "using moisturizer ≥2x/day and using a moisturizer that does not contain fragrance," while only 2.6% answered "no." For the statement "not using moisturizer ≥2x/day and using a moisturizer that contains fragrance," more respondents answered "yes" (47.4%), and only 7.9% answered "no."

Table 5. Distribution of respondent characteristics based on severity of xerosis cutis

Severity of Xerosis Cutis	n	%
Score 1	6	15.8
Score 2	13	34.2
Score 3	11	28.9
Score 4	8	21.1

Table 5 shows that most respondents in the study received a score of 2 (34.2%) and a score of 3 (28.9%), while those who received a score of 1 were the fewest (15.7%), and those who received a score of 4 accounted for 21.1%.

Table 6. Analysis of bath soap use on severity of xerosis cutis

Use of Bath soap	Degrees Severity Xerosis Cutis 1 n (%)	2 n (%)	3 n (%)	4 n (%)
Uses bath soap containing moisturizer / soap baby	6 (35.3)	8 (47.1)	3 (17.6)	0 (0)
Uses bath soap containing antiseptic, fragrance, SLS	0 (0)	5 (23.8)	8 (38.1)	8 (38.1)

Table 6 shows that respondents who used bath soap containing moisturizers or baby soap exhibited a higher proportion of mild-to-moderate xerosis cutis, with 35.3% at score 1 and 47.1% at score 2. In contrast, respondents who used bath soap containing antiseptics, fragrance, or SLS exhibited a higher proportion of severe-to-very severe xerosis cutis, with 38.1% at scores 3 and 4. The Spearman correlation test yielded a *p* value of 0.000 (<0.05), indicating that soap use is significantly correlated

with the severity of xerosis cutis. At a 95% confidence interval and α = 5%, the correlation direction was negative (-), with a strong correlation strength (r = 0.661).

Table 7. Analysis of bath water temperature on severity of xerosis cutis

Bath Water Temperature	Degrees Severity Xerosis Cutis			
	1 n (%)	2 n (%)	3 n (%)	4 n (%)
Normal	4 (19.05)	7 (33.3)	6 (28.6)	4 (19.05)
Warm/hot	2 (11.8)	6 (35.5)	5 (29.4)	4 (23.5)

Table 7 shows that respondents who bathed using normal water temperature exhibited a moderate-to-severe degree of xerosis cutis, with 33.3% at score 2 and 28.6% at score 3. Similarly, respondents who bathed using warm or hot water temperatures also exhibited a moderate-to-severe degree of xerosis cutis, with 35.3% at score 2 and 29.4% at score 3. The Spearman correlation test yielded a *p* value of 0.621 (>0.05), indicating that bath water temperature is not correlated with the severity of xerosis cutis. At a 95% confidence interval and α = 5%, the correlation direction was negative (-), with a very low correlation strength (r = 0.083).

Table 8. Analysis of bathing duration on severity of xerosis cutis

Long Bath Duration	Degrees Severity Xerosis Cutis			
	1 n (%)	2 n (%)	3 n (%)	4 n (%)
<10 minutes	5 (25)	7 (35)	6 (30)	2 (10)
≥ 10 minutes	1 (5.6)	6 (33.3)	5 (27.8)	6 (33.3)

Table 8 shows that respondents who bathed for <10 minutes exhibited a degree of xerosis cutis severity that tended to be mild-to-moderate, with 25% at score 1, 35% at score 2, and 30% at score 3. In contrast, respondents who bathed for ≥10 minutes exhibited a degree of xerosis cutis severity that tended to be moderate-to-very severe, with 33.3% at score 2, 27.8% at score 3, and 33.3% at score 4. The Spearman correlation test yielded a *p* value of 0.056 (>0.05), indicating that bathing duration is not correlated with the severity of xerosis cutis. At a 95% confidence interval and α = 5%, the correlation direction was negative (-), with low correlation strength (r = 0.313).

Table 9. Analysis of moisturizers use on severity of xerosis cutis

Long Bath Duration	Degrees Severity Xerosis Cutis			
	1 n (%)	2 n (%)	3 n (%)	4 n (%)
Uses moisturizer ≥ 2x/day and uses moisturizer that does not contain fragrance	5 (31.25)	9 (56.25)	2 (12.5)	0 (0)
Does not use moisturizer ≥ 2x/day and uses moisturizer that does not contain fragrance	1 (100)	0 (0)	0 (0)	0 (0)
Does not use moisturizer ≥ 2x/day and uses moisturizer that contains fragrance	0 (0)	4 (22.22)	6 (33.33)	8 (44.44)
Uses moisturizer ≥ 2x/day and uses moisturizer that contains fragrance	0 (0)	0 (0)	3 (100)	0 (0)

Table 9 shows that respondents who used a moisturizer ≥2x/day and used a moisturizer that did not contain fragrance exhibited a degree of xerosis cutis severity that tended to be mild-to-moderate, with 31.25% at score 1 and 56.25% at score 2. Respondents who did not use a moisturizer ≥2x/day and used a moisturizer that did not contain fragrance exhibited mild xerosis cutis, with 100% at score 1. Respondents who did not use a moisturizer ≥2x/day and used a moisturizer that contained fragrance exhibited a degree of xerosis cutis severity that tended to be severe-to-very severe, with 33.33% at score 3 and 44.44% at score 4. Respondents who used a moisturizer ≥2x/day and used a moisturizer that contained fragrance exhibited severe xerosis cutis, with 100% at score 3. The Spearman correlation test yielded a *p* value of 0.000 (<0.05), indicating that moisturizer use is significantly correlated with the severity of xerosis cutis. At a 95% confidence interval and α = 5%, the correlation

direction was negative (-), with a strong correlation strength (r = 0.673).

DISCUSSION

Respondents who used soap containing antiseptics, fragrances, and SLS tended to experience more severe xerosis cutis, with 38.1% at scores 3 and 4. In contrast, respondents who used soap containing moisturizers or baby soap tended to experience milder xerosis cutis, with 35.3% at score 1 and 47.1% at score 2.

The amount of lipids in the stratum corneum decreases with age, which can lead to impaired skin barrier function. This mechanism causes the skin of older individuals to become drier and more susceptible to external factors, such as soaps containing irritants.[14] Soaps with an alkaline pH can act as surfactants. Synthetic surfactants, such as Sodium Lauryl Sulfate (SLS), are often added to soap. Using alkaline soap can increase the skin's pH, disrupt the acidic protective layer, promote the degradation of barrier lipids, and reduce defense against skin infections.[15] Additionally, using bath soap that does not contain moisturizers can trigger xerosis cutis.[16]

Respondents who bathed with warm or hot water tended to experience more severe xerosis cutis, with 35.3% at score 2 and 29.4% at score 3. In contrast, respondents who bathed with normal water temperatures tended to experience milder xerosis cutis, with 33.3% at score 2 and 28.6% at score 3.

Exposure to warm or hot bath water can increase transepidermal water loss (TEWL), raise skin pH, affect sebum production, and exacerbate the loss of natural oils, leading to dry skin.[17] Bathing with warm or hot water can also damage the skin's barrier function, making the skin more susceptible to xerosis cutis.[18]

Respondents who showered for ≥10 minutes tended to experience more severe xerosis cutis, with 33.3% at score 2, 27.8% at score 3, and 33.3% at score 4. In contrast, respondents who showered for <10 minutes tended to experience milder xerosis cutis, with 25% at score 1, 35% at score 2, and 30% at score 3.

Taking long showers can cause the skin to become dry, leading to swelling of the corneocytes, the formation of large water collections in the intercellular space, and disruption of the intercellular lipid layer of the stratum corneum. Frequent contact with water can also reduce intercellular lipids and natural moisturizing factors (NMF), resulting in impaired barrier function.[15,17,19] It is recommended that baths should not be too long, with a maximum duration of 10 minutes.[20]

Respondents who did not use a moisturizer ≥2x/day and used a moisturizer containing fragrance tended to experience more severe xerosis cutis, with 33.33% at score 3 and 44.44% at score 4. In contrast, respondents who used a moisturizer ≥2x/day and used a moisturizer that did not contain fragrance tended to experience milder xerosis cutis, with 31.25% at score 1 and 56.25% at score 2.

A moisturizer is a product that replenishes the lipid layer and functions to increase hydration of the stratum corneum, making the skin soft.[8,21] Moisturizers can be classified into three main types: occlusives, humectants, and emollients. Occlusive-based moisturizers provide barrier support that reduces transepidermal water loss (TEWL) and protects inflamed skin from external irritants, improving moisture retention and allowing barrier repair. Humectant-based moisturizers hydrate the skin by attracting and binding water from the epidermis and the environment. Emollient-based moisturizers mimic the lipid components of the skin, helping to retain water in the stratum corneum.[22]

Moisturizers are important for managing xerosis cutis, and it is highly recommended to apply them regularly by gently rubbing them into the skin within 3 minutes after bathing, as this has been shown to help maintain skin moisture.[14,23]

Moisturizers are effective in treating xerosis cutis by increasing skin hydration and moisture.[18]

CONCLUSION

Based on the results of the analysis conducted in this study on the effects of bath soap use, bath water temperature, bath duration, and moisturizer use on the severity of xerosis cutis in the elderly at the Dermatology and Venereology Clinic, Gotong Royong Hospital Surabaya, it can be concluded that:

- Respondents who used bath soap containing antiseptics, fragrances, and SLS tended to experience more severe xerosis cutis, whereas respondents who used bath soap containing moisturizers or baby soap tended to experience milder xerosis cutis.

- No statistically significant effect was found, but respondents who bathed with warm or hot water tended to experience more severe xerosis cutis, whereas respondents who bathed with normal water temperatures tended to experience milder xerosis cutis.
- No statistically significant effect was found, but respondents who showered for ≥10 minutes tended to experience more severe xerosis cutis, whereas respondents who showered for <10 minutes tended to experience milder xerosis cutis.

Respondents who did not use a moisturizer ≥2x/day and used a moisturizer containing fragrance tended to experience more severe xerosis cutis, whereas respondents who used a moisturizer ≥2x/day and used a moisturizer that did not contain fragrance tended to experience milder xerosis cutis.

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