Vol. 36 / No. 3 / December 2024
Sinta 2 (Decree No: 200/M/KPT/2020)
Online ISSN : 2549-4082 ; Print ISSN : 1978-4279
Available online at https://e-journal.unair.ac.id/BIKK

Berkala Ilmu Kesehatan Kulit dan Kelamin

Original Article
Periodical of Dermatology and Venereology

The Relationship of Over the Counter (OTC) Facial Soap Usage and Acne Risk in Sebelas Maret University Medical Students

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ABSTRACT

Background: Acne vulgaris (AV) is a common inflammatory skin disorder among young adults. The use of over-the-counter (OTC) facial soap is a common practice for managing AV, but the impact of its frequency on acne severity remains unclear. **Purpose:** This study aims to determine the relationship between the frequency of OTC facial soap usage and the severity of acne vulgaris among medical students at Sebelas Maret University. **Methods:** This observational analytical study utilized a cross-sectional approach and involved 57 medical students at Sebelas Maret University. The questionnaire focused on the frequency of OTC face wash usage among participants. Data were analyzed using Chi-square tests and Spearman-Pearson correlation methods. **Result:** There is a significant relationship (p = 0.089) between the frequency of OTC face wash usage and the risk of acne vulgaris, with a weak negative correlation (r = -0.226, p = 0.092). This study set a significance level of 0.1, higher than the conventional 0.05, which limits the generalizability of the results. This decision was made to balance the accuracy of the findings with the available resource constraints. **Conclusion:** There's a significant correlation between OTC facial soap usage and acne risk in Sebelas Maret University medical students, with more frequent use linked to reduced acne severity.

Keywords: Acne vulgaris, over-the-counter (OTC) facial soap, frequency of use, risk factors.

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| Article info |
Submited: 04-05-2024, Accepted: 16-07-2024, Published: 30-11-2024

BACKGROUND

Acne vulgaris (AV) is a chronic inflammatory skin condition involving sebaceous follicles, triggered by hormonal fluctuations, excessive sebum production, and *Cutibacterium acnes* proliferation. It predominantly affects adolescents and young adults, with a higher prevalence in females.[1,2] The pathogenesis of AV involves complex interactions between hormonal changes, genetic predisposition, and environmental factors, leading to the formation of comedones, papules, pustules, and cysts[1]. Increased sebum production and bacterial colonization trigger an inflammatory response, manifesting as acne lesions[2].

People widely use over-the-counter (OTC) facial soaps and skincare products to manage AV by controlling excess oil and cleansing pores, which are essential for maintaining skin health.[3,4] These products, including cleansers, moisturizers, and sunscreens, can be used independently or in combination with prescription medications to prevent new lesions, reduce inflammation, and enhance the skin's protective barrier.[4] Key active ingredients in OTC products offer specific benefits: salicylic acid and glycolic acid help exfoliate the skin and improve texture; niacinamide and retinol reduce inflammation and accelerate skin cell turnover; ceramides restore the skin barrier and retain moisture; tea tree oil provides antimicrobial protection; and vitamin C supports skin healing and collagen stabilization.[5–10]

DOI : 10.20473/bikk.V36.3.2024.191-195

Skincare practices aim to maintain the structural and functional integrity of the skin. These practices can involve self-care with OTC products, consultations with healthcare providers, or treatments at beauty clinics.[3] While OTC facial soaps play a crucial role in managing acne by controlling oil and cleaning pores, overuse can lead to dryness and irritation, whereas insufficient use might exacerbate acne.[11,12] Studies have shown that medical students frequently use OTC facial soap for acne management.[13] This study aims to investigate the relationship between OTC facial soap usage and acne risk in Sebelas Maret University medical students to clarify effective acne management strategies.

METHODS

This observational analytical study utilized a cross-sectional approach among medical students from the class of 2023 at Sebelas Maret University's Medical Study Program. The focus was on students who used over-the-counter (OTC) facial soaps, selected based on specific inclusion and exclusion criteria. Inclusion criteria mandated regular use of OTC facial soaps, while exclusion criteria eliminated smokers, individuals with autoimmune diseases, those taking medications like contraceptives or corticosteroids, and those with conditions such as polycystic ovary syndrome (PCOS) or hyperandrogenism.

Participants were selected using purposive sampling, resulting in a sample size of 57, calculated based on binomial proportions. We collected primary data by administering a structured questionnaire via Google Forms and taking diagnostic photographs from three angles using a DSLR camera. The researchers created a questionnaire that covered topics such as the frequency of facial washing, purchasing habits related to new facial soaps, participants' satisfaction with their washing routine, their knowledge of facial soap ingredients, and their preferences for products suitable for their skin types. The reliability of the questionnaire was evaluated using Cronbach's alpha, yielding a coefficient of 0.75, indicating it was a reliable instrument.

The data analysis process involved univariate analysis, which was used to determine the frequency distribution of variables, and bivariate analysis, which used chi-square and Spearman's rank correlation tests to examine relationships between variables,using SPSS 29 for Windows. The Ethics Committee at RSUD Dr. Moewardi approved the study, assigning review number 1.396/V/HREC/2024.

RESULT

A final sample of 57 medical students from Sebelas Maret University's class of 2023 remained after the exclusion of 33 out of the initial 90 participants. The study took place between April and May 2024, with the majority of participants being female (Table 1).

Table 1. Respondent characteristic

Characteristic Gender	Frequency (person)	Percentage (%)
Male	14	24.6
Female	43	75.4
Total	57	100

According to the dermatologist's diagnoses for the 57 respondents, 36 had acne, and 21 had no acne. Within these numbers, 47 were categorized as "none – mild" acne severity, while 10 were categorized as "moderate – severe". The questionnaire results revealed that 46 respondents used OTC facial soap two times or more daily, whereas 11 used it less frequently, or less than twice a day (Table 2).

Table 2. Distribution of Acne, Severity, and Daily OTC Facial Soap Usage.

	Frequency (person)	Percentage (%)
Diagnosis		
Acne vulgaris	36	63.2
Non-acne vulgaris	21	17.8
Acne severity		
None - mild	47	82.5
Moderate - severe	10	17.5
Daily OTC facial soap usage		
2 times or more	46	80.7
Less than 2 times or infrequently	11	19.3
Total	57	100

OTC: over the counter

We also examined common OTC ingredients in facial soaps used by the students (Table 3). The findings revealed that salicylic acid was the most prevalent ingredient, present in 38.6% of the products. Niacinamide was the second most common ingredient, found in 29.8% of the soaps. Other frequently encountered ingredients included ceramide and tea tree oil, each accounting for 14% of the products. Each soap contained 10.5% of vitamin C and glycolic acid. Notably, 22.8% of respondents were unsure about the active ingredients in their facial soaps.

Table 3. Distribution of ingredients used in facial soap

Ingredients	Frequency	Percentage (%)
Salicylic acid (BHA)	22	38.6
Niacinamide	17	29.8
Ceramide	8	14
Tea tree oil	8	14
Vitamin C	6	10.5
Glycolic acid (AHA)	6	10.5
Unsure	13	22.8
Total	80	100

BHA: beta hydroxy acid; AHA: alpha hydroxy acid

A bivariate analysis was performed to assess the relationship between the frequency of OTC facial soap usage and the severity of acne vulgaris using the Chi-square test (Table 4), Spearman & Pearson Correlation test (Table 5).

Table 4. Chi-Square Correlation Test

Frequency of OTC facial soap usage	Acne Vulgaris		P-Value	*Total*
	None - mild	Moderate - Severe		
2 times or more	36	10	0,089*	46
Less than 2 times or infrequently	11	0		11
Total	47	10		57

Table 5. Spearman and Pearson Correlation Test

	Value	Approximate Significance
Spearman Correlation	-0.226	0.092*
Pearson's R	-0.226	0.092*

* To balance precision with resource constraints, this study set a significance level of 0.1, higher than the conventional 0.05, though this may limit the generalizability of the results

The Chi-square test results indicate a p-value of 0.089, which is below the significance threshold of 0.1. This suggests a statistically significant association between the frequency of over-the-counter (OTC) facial soap usage and the severity of acne vulgaris among medical students at Sebelas Maret University. This significance level implies that there is a meaningful relationship between how often facial soap is used and the severity of acne.

Additionally, the Spearman and Pearson correlation coefficients, both at -0.226 with significance values of 0.092, demonstrate a weak negative correlation. This means that while there is a tendency for more frequent facial soap use (twice daily or more) to be associated with less severe acne, the strength of this association is relatively weak. The correlation coefficients' negative value indicates a weak link between increased facial soap use and a reduction in acne severity.

DISCUSSION

This study results show that more frequent use of OTC facial soap is weakly associated with a lower risk of severe acne among medical students at Sebelas Maret University. While regular use of OTC facial soap may help reduce the risk of developing severe acne, it does not ensure complete prevention. Other factors are likely to influence acne development, suggesting that OTC facial soap should be considered as part of a comprehensive acne management strategy rather than a sole solution.

These results support recent studies emphasizing the significance of consistent facial cleansing in managing acne severity. Harlim (2023) established a correlation between frequent facial washing and a reduction in acne severity.[14] Additionally, Kumtornrut et al. (2019) underscore the importance of regular facial cleansing for acne management. While excessive washing can cause irritation, consistent use of suitable cleansers helps prevent acne exacerbation.[15]

Active ingredients in OTC facial soaps also play a crucial role. Salicylic acid and niacinamide are effective in managing acne due to their respective properties. Salicylic acid helps exfoliate and prevent pore blockages, while niacinamide reduces inflammation, improves skin texture, and reduces post-inflammatory hyperpigmentation (PIH).[16,17,18] Other ingredients like glycolic acid and tea tree oil contribute by improving skin texture and reducing inflammation.[19,20,21]

The discussion on the use of over-the-counter (OTC) facial soap in managing acne highlights its role in reducing the severity of acne by cleansing the skin, removing excess oil, and reducing bacterial load on the skin's surface. While regular use of OTC facial soap can help prevent severe acne by minimizing pore clogging and inflammation, it does not guarantee complete prevention due to the multifactorial nature of acne vulgaris. Hormonal changes, genetic predisposition, diet, stress, and environmental factors influence acne development and can still lead to acne lesions despite proper facial hygiene practices.[1,20,21]

Hormonal fluctuations, especially during adolescence, can increase sebum production and promote the growth of acne-causing bacteria like *C. acnes,* triggering an inflammatory response and acne

lesion formation. Genetic factors can also impact how the skin responds to hormones and inflammation. Dietary choices, such as consuming high-glycemic index foods, can exacerbate acne by affecting insulin levels and sebum secretion. Stress can further worsen acne by disrupting hormonal balance and increasing cortisol levels. Environmental factors like humidity and pollutants can also contribute to acne development by clogging pores and irritating the skin.[22,23]

Moreover, excessive use of facial soaps, particularly those with harsh ingredients, can strip the skin of its natural oils, leading to dryness and potential irritation. This can paradoxically stimulate the skin to produce more sebum, exacerbating acne by further clogging pores and promoting bacterial growth. Therefore, while OTC facial soaps are essential in acne management, they should be part of a comprehensive skincare routine that considers individual skin types, acne severity, and other contributing factors. Combining facial soap with other treatments like topical medications, moisturizers, and lifestyle modifications can provide a more holistic approach to managing acne effectively.[24]

This study has several limitations that should be noted. As a cross-sectional study, it captures data at a single point in time, which limits the ability to establish causal relationships between the use of OTC facial soap and acne severity. The relatively small sample size of 57 participants, all from Sebelas Maret University, may also restrict the generalizability of the findings to other populations. Additionally, while this study focused on the frequency of OTC facial soap use, it did not account for variations in specific soap ingredients, nor did it control for other factors like diet, stress, hormonal changes, and environmental conditions, which are known to influence acne development.

In conclusion, this study suggests a relationship between the frequency of OTC facial soap use and a reduced risk of acne among medical students at Sebelas Maret University. However, due to limitations such as its cross-sectional design, small sample size, and lack of control over other acne-influencing factors (e.g., specific soap ingredients, diet, stress, and hormonal changes), further research is essential. A comprehensive approach, considering both skincare habits and lifestyle factors, is recommended for effective acne risk management.

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