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Knowledge, Attitude, and Practices on Sunscreen Use Among Acne Vulgaris Patients: A Cross-Sectional Study in the National Capital Region and Region 4A

Florence Ruiz-Buenaventura, MD, DPDS[1], Cheryl Anne Cera-Dizon, MD, DPDS[2], Catherine Denise Consunji Gloria, MD, DPDS[3]

ABSTRACT

Background: Acne patients often use medications, either over the counter or prescribed by dermatologists, to manage their condition. Dermatologists frequently include sunscreens as part of these treatment plans alongside acne medications. This research aims to determine the level of knowledge, attitudes, and practices regarding sunscreen use among respondents who are confirmed acne patients and have been prescribed sunscreen as part of their treatment regimen.

Objective: This research examines the current knowledge, attitudes, and practices of acne patients regarding sunscreen use as part of their acne treatment regimen, considering demographic factors. The knowledge, attitudes, and practices of the respondents will be compared across different age groups, genders, and employment statuses.

Methods: This study purposefully collected data from patients with active acne on the use of sunscreens alongside acne medications. The sample included males and females aged 18-27, 28-40, and 40+ residing in either the National Capital Region or the CALABARZON Region, with 105 respondents in each group. Data was gathered using a validated Knowledge, Attitudes, and Practices (KAP) questionnaire, consisting of 30 questions that had undergone reliability testing via Cronbach's alpha. Responses were recorded on a 3-point Likert scale to model the interaction of KAP variables. The research material was distributed through Google Forms in June 2024. Data analysis was conducted using R, specifically the psych package, and the Kruskal-Wallis test was applied to compare groups, determining if significant differences existed among them. This test was incorporated within RStudio.

Results: Findings indicated that respondents generally demonstrated a high level of understanding regarding the importance of sunscreen when used alongside acne treatments, particularly acknowledging its role in preventing acne scarring and reducing skin sensitivity caused by treatment products. Additionally, attitudes toward sunscreen use were largely positive, with respondents rejecting common misconceptions about sunscreen. However, actual sunscreen application practices were moderate, with adherence levels varying across the sample. Significant differences in sunscreen use were observed based on employment status, gender, and age.

Conclusion: Acne patients in this study had a high level of knowledge and a positive attitude on the use of sunscreen together with their acne medications. Consistency in sunscreen application was moderate. Unemployed respondents were more receptive to external influences regarding sunscreen use. Female respondents were more informed and proactive than male respondents. Younger respondents were more influenced by social networks. This research highlights the need for continued education on the benefits of sunscreen use to be able to achieve an effective acne vulgaris management.

Keywords: Knowledge, Attitude, Practices, Acne, Sunscreen

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

Acne vulgaris is among the most prevalent skin disorders treated by dermatologists. It is a multifactorial, chronic inflammatory condition of the pilosebaceous units, driven by four main pathogenetic mechanisms: increased sebum production, follicular hyperkeratinization, *Cutibacterium acnes* (C. acnes) colonization, and inflammatory byproducts.

A deeper understanding of acne pathogenesis, along with the availability of new treatments to complement existing therapies, can significantly enhance outcomes for acne management (Rathi, 2011). Acne patients often experience cosmetic disfigurement, which can lead to depression, anxiety, and thoughts of self-harm (Cherynshov, 2024). Acne impacts physical, psychiatric, and psychosocial well-being, thus affecting quality of life (Tan, 2021). The primary objective of dermatologists is to develop a treatment plan tailored to each patient's skin type, acne severity, and the availability of both prescription medications and over-the-counter skincare products, facilitating a patient-specific approach to managing acne vulgaris. Comprehensive acne vulgaris management involves four main components based on the needs of acne-prone and acne-treated skin, as well as current understanding of preserving the structural and functional integrity of the epidermal barrier: (1) cleansing, (2) medicating, (3) moisturizing, and (4) photoprotection (Del Rosso et al., 2015).

Photoprotection, though often overlooked, can significantly improve acne outcomes. Numerous guidelines recommend photoprotection for acne patients. A consensus among experts on holistic skincare for acne advises using broad-spectrum sunscreens with SPF ≥ 30 to mitigate photosensitivity and photodermatitis from topical or systemic treatments. Additional benefits of sunscreen include skin cancer prevention, reduced irritation from acne medications, prevention of post-inflammatory hyperpigmentation, concealing acne scars, UV and visible light protection, and shorter recovery times following treatments like chemical peels and lasers (Piquero-Casals et al., 2023).

Thanks to advancements in technology, sunscreens now come in formulations tailored for acne-prone skin: broad-spectrum SPF ≥ 30, water-based, lightweight, fast-absorbing, and cosmetically pleasing. They are also non-comedogenic, often enriched with antioxidants to reduce oxidative stress, tinted for coverage, sebo-regulating, and contain anti-inflammatory properties (Piquero-Casals et al., 2023). As sunscreen formulations evolve, so does the influence of social media platforms, which play a significant role in disseminating both accurate and misleading information on sunscreen use. A recent study on sunscreen-related tweets found that while 89% of accurate tweets were positively inclined toward sunscreen, over half (54%) of inaccurate tweets had a negative sentiment and, notably, received more engagement than accurate tweets (Fazel et al., 2021).

This research aims to assess the knowledge, attitudes, and practices of acne vulgaris patients regarding their sunscreen use.

METHODS

This research was conducted collaboratively by proponents from various institutions, with some based in the CALABARZON Region and others in the National Capital Region (NCR).

Sampling Method

The study employed purposive sampling, targeting patients diagnosed with acne by dermatologists who were prescribed sunscreen as part of their treatment regimen. The sample size was determined through power analysis (Cohen's F), yielding 105 samples per group, resulting in a total of 210 samples across two groups: one from CALABARZON (Region 4A) and the other from the National Capital Region (NCR). The power analysis was conducted using RStudio and the 'pwr' package (Champley et al., 2022).

Research Instrument

The questionnaire was structured with ten questions each on knowledge, attitude, and practices, designed to assess respondents' understanding, outlook, and usage of sunscreen. The initial section included screening questions to determine respondents' eligibility to proceed with the main survey.

Table 1. Filtering Questions in the Questionnaire.

Questions	Available Response
1. Do you have active acne?	Yes / No
2. Do you have other skin disorders aside from acne?	Yes / No
3. Did a dermatologist diagnose you with acne?	Yes / No
4. Did a dermatologist diagnose you with drug-induced acne?	Yes / No
5. Were you prescribed sunscreen in addition to your acne medications?	Yes / No
6. Are you currently pregnant?	Yes / No
7. Do you have any condition, ailment, disorder, disease, or known allergies that prevent the use of acne medications or sunscreen?	Yes / No
8. Do you know if the sunscreen you use is oil-free or water-based?	Yes / No
9. Do you give your consent to use your data for this study?	Yes (Proceed to the Questions) /No (End this survey).

Respondents were selected based on their answers to the screening questions. It was essential for respondents to answer "yes" to filtering questions one (1) and three (3), as these aligned with the study's focus. In the final question, respondents were asked to provide their consent to participate in the study.

Following the screening questions, the research instrument gathered demographic information from the respondents. Table 2 presents the demographic questions used in the study.

Table 2. Demographic Questions in the Questionnaire.

Questions	Available Response
Age	18 to 27, 28 to 40, 41 and above
Gender	Male, Female
Educational Attainment	Elementary, Junior High School, Senior High School, College Level, and Graduate Studies
Employment Status	Employed and Unemployed
Residency	National Capital Region (NCR), CALABARZON (Region 4A)

In addition to the questions listed in Table 2, respondents were also asked for their full name, though providing it was optional and encrypted to protect their identity in compliance with the Data Privacy Act of 2012 (RA 10173, Philippines). Information on occupation (for those employed), reason for unemployment, specific cities in NCR, and provinces within CALABARZON was also collected but will not be disclosed in this study to adhere to RA 10173 guidelines.

Table 3 displays the questions designed to assess respondents' knowledge regarding the use of sunscreen.

Table 3. Knowledge Questions in the Questionnaire.

Questions	Likert Scale (Available Responses)
1. I understand that using acne treatment products makes the skin more sensitive to UV rays.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
2. I understand that prescriptions for acne treatment often include sunscreens.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
3. I know that using acne treatment products alongside sunscreens helps maintain healthy skin.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
4. I know that acne and acne scars can heal faster with the combined use of acne treatment products and sunscreens.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
5. I know that sunscreens can help prevent acne scars from becoming darker.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
6. I know that tinted sunscreens can help conceal acne.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
7. I know that certain sunscreens can trigger acne.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
8. I know that some sunscreens are non-comedogenic and suitable for acne-prone skin.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
9. I know that oil-free sunscreens can be used for acne-prone skin.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).
10. I know that water-based sunscreens can be used for acne-prone skin.	Yes (3 - Point), No (2 – Point), & I don't know (1 – Point).

The questions in Table 3 were designed to assess the respondents' level of knowledge about sunscreen. The response options provided in the questionnaire were: (a) Yes, (b) No, and (c) I don't know, incorporated within a Likert scale framework.

Table 4. Attitude Questions in the Questionnaire.

Questions	Likert Scale (Available Responses)
1. I am influenced by popular media advertisements regarding the use of sunscreens for my acne.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
2. I am influenced by my family and friends regarding the use of sunscreens for my acne.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
3. I am unlikely to use sunscreen because I am usually in too much of a hurry to apply it.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
4. I am unlikely to use sunscreen because I worry it will clog my pores.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
5. I am unlikely to buy sunscreens because I have oily skin.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
6. I am unlikely to use sunscreens because they feel sticky.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
7. I am unlikely to buy sunscreens in addition to my acne treatment products because it's an extra expense.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
8. I am unlikely to use sunscreens because they leave a white cast on my face.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
9. I am unlikely to use sunscreens because I worry, they will worsen my acne.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).
10. I am unlikely to use sunscreens because I consider them less important than my acne treatment products.	Agree (3 – Point), Neutral (2 – Point), & Disagree (1 – Point).

Table 4 presents the questions related to respondents' attitudes, with available responses being (a) Agree, (b) Neutral, and (c) Disagree. These responses were scaled using a Likert scale ranging from 1 to 3, with one (1) as the lowest and three (3) as the highest. The final section of the questionnaire included questions related to practices, as shown in Table 5.

Table 5. Practice Questions in the Questionnaire.

Questions	Likert Scale (Available Responses)
1. I follow my dermatologist's prescriptions for sunscreens along with my acne treatment products.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
2. I purchase sunscreens that are recommended by my dermatologist.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
3. I buy sunscreens that are popular on social media.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
4. I choose sunscreen ingredients that help prevent acne.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
5. I select specific brands of sunscreens.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
6. I continue to use sunscreens even when I have acne.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
7. I wear makeup alongside my acne treatment products and sunscreens.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
8. I use moisturizer together with my acne treatment products and sunscreens.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
9. I apply only a light layer of sunscreen because I have oily skin.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)
10. I stop using sunscreens once my acne is under control.	Always (3 – Point), Sometimes (2 – Point), Never (1 – Point)

The questions related to respondents' practices offered the following response options: (a) Always, (b) Sometimes, and (c) Never. These responses were also assigned point values, which will be used to calculate the mean score and standard error, helping to identify the overall response trends among the respondents.

Distribution of Research Material

The research material was distributed via Google Forms, accessed through a QR code displayed in the dermatology clinics of the collaborating dermatologists.

Patients visiting the clinics were invited to scan the QR code to complete the survey, and upon completion, they received a free sample of sunscreen. For respondents whose smartphones were incompatible with QR scanning, a shortened URL was provided as an alternative. Data collection was conducted in the CALABARZON Region (Region 4A) and the National Capital Region (Metro Manila).

Statistical Treatment

Respondents' answers were converted to their numerical equivalents to calculate and present the mean score and standard error together.

Table 6. Interpretation of Response based on Mean Score.

I. Knowledge Question Interpretation	Mean Score Range
Yes	2.35-3.00
No	1.68-2.34
I don't know	1.00-1.67
II. Attitude Question Interpretation	**Mean Score Range**
Agree	2.35-3.00
Neutral	1.68-2.34
Disagree	1.00-1.67
III. Practice Question Interpretation	**Mean Score Range**
Always	2.35-3.00
Sometimes	1.68-2.34
Never	1.00-1.67

The table above presents the interpretation of respondents' answers based on mean scores, which were used to support the study's arguments and conclusions. The variables—(a) Age, (b) Gender, and (c) Employment Status—will be tested against respondents' knowledge, attitudes, and practices. The Kruskal-Wallis test will assess differences across age groups, gender, and employment status. Cronbach's alpha was calculated using the R package psych (Revelle, 2024) in RStudio to ensure reliability.

RESULTS AND DISCUSSION

The demographic data of the respondents was based on a total of 105 samples from each of the two groups. Table 7 provides an overview of the respondents' characteristics.

Table 7. Demographic Data of the Study

Variables	Sample (n)	Percentage (%)
No. of Respondents	210	100%
GENDER		
Female	162	77.14 %
Male	48	22.86 %
AGE GROUP		
18 years old to 27 years old	118	56.19 %
28 years old to 40 years old	70	33.33 %
41 years old and above	22	10.48 %
HIGHEST EDUCATIONAL ATTAINMENT		
Elementary	0	0.00 %
Junior High School	8	3.81 %
Senior High School	17	8.10 %
College Level	144	68.57 %
Graduate Studies	41	19.52 %
EMPLOYMENT		
Employed	119	56.67%
Unemployed	91	43.33%

The demographic data from the study on knowledge, attitude, and practices of acne patients regarding sunscreen use as part of their acne treatment regimen reveals a sample of 210 respondents, predominantly female (77.14%) compared to male (22.86%). Most respondents fall within the younger age groups, with 56.19% aged 18 to 27 years old and 33.33% aged 28 to 40 years old, while only 10.48% are aged 41 years or older. This age distribution suggests that younger individuals, who may have higher self-awareness or sensitivity to skincare, are more likely to engage in acne treatment that includes sunscreen use.

Educational attainment among participants is predominantly at higher education levels, with 68.57% having completed college and an additional 19.52% holding graduate degrees. A minor portion (3.81%) reported junior high school as their highest level of education, with no participants indicating elementary-level attainment. This educational profile suggests a potentially higher level of health literacy or greater awareness about acne treatment and skin health, which may influence participants' attitudes and practices regarding sunscreen use.

In terms of employment status, 56.67% of respondents are employed, while 43.33% are unemployed. This relatively high employment rate may be linked to greater access to resources, enabling individuals to seek dermatological care and maintain regular sunscreen use as part of their prescribed acne treatment regimen. Employed respondents may have the financial stability and routines conducive to adhering to such skincare practices, which are essential for effective acne management.

Table 8. Result of Knowledge Questions.

Questions Related to Knowledge	Alpha	Std. Alpha	Score (Mean ± SE)	Interpretation
1. I understand that using acne treatment products makes the skin more sensitive to UV rays.	0.97	1.00	2.65 ± 0.0459	YES
2. I understand that prescriptions for acne treatment often include sunscreens.	0.97	1.00	2.84 ± 0.0321	YES
3. I know that using acne treatment products alongside sunscreens helps maintain healthy skin.	0.97	1.00	2.94 ± 0.0217	YES
4. I know that acne and acne scars can heal faster with the combined use of acne treatment products and sunscreens.	0.97	1.00	2.76 ± 0.0402	YES
5. I know that sunscreens can help prevent acne scars from becoming darker.	0.97	1.00	2.74 ± 0.0393	YES
6. I know that tinted sunscreens can help conceal acne.	0.97	1.00	2.74 ± 0.0407	YES
7. I know that certain sunscreens can trigger acne.	0.97	1.00	2.71 ± 0.0435	YES
8. I know that some sunscreens are non-comedogenic and suitable for acne-prone skin.	0.97	1.00	2.64 ± 0.0484	YES
8. I know that some sunscreens are non-comedogenic and suitable for acne-prone skin.	0.97	1.00	2.64 ± 0.0484	YES
9. I know that oil-free sunscreens can be used for acne-prone skin.	0.97	1.00	2.38 ± 0.0571	YES
10. I know that water-based sunscreens can be used for acne-prone skin.	0.97	1.00	2.39 ± 0.0582	YES
KNOWLEDGE SCORE			2.68 ± 0.0427	**Knowledgeable**

Table 8 displays the results of a knowledge assessment on the use of sunscreen alongside acne treatment products. The Alpha and Standardized Alpha values, both at 0.97, demonstrate a high level of reliability in the responses, indicating that participants consistently understood the questions related to sunscreen and acne management. This strong reliability enhances the credibility of the knowledge assessment results.

The mean knowledge score of 2.68 ± 0.0427 indicates that respondents possess a strong understanding of the importance of sun protection in conjunction with acne treatments. This score suggests that respondents are generally aware of the benefits of using sunscreen alongside acne treatments, likely integrating this knowledge into their skincare routines. The question addressing increased skin sensitivity to UV rays due to acne treatment products (Mean = 2.65) reveals awareness among respondents of the risks associated with UV exposure during acne management. Furthermore, a mean score of 2.84 for awareness that sunscreens are often prescribed alongside acne treatments suggests a solid understanding of integrative skincare, emphasizing sun protection as a crucial element in acne treatment regimens.

Respondents' high scores regarding the combined use of acne treatments and sunscreens (Mean = 2.94) indicate a strong recognition of the synergistic effects that these products can have on skin health. This score reflects a holistic view of acne treatment, where sun protection is seen as essential to effective management. Participants also demonstrated knowledge of sunscreen's role in preventing dark acne scars (Mean = 2.74) and the potential for certain sunscreens to exacerbate acne (Mean = 2.71), showing a nuanced understanding of the need for acne-appropriate sunscreen choices.

Questions about non-comedogenic (Mean = 2.64), oil-free (Mean = 2.38), and water-based sunscreens (Mean = 2.39) also received affirmative responses. Although mean scores for oil-free and water-based sunscreens were slightly lower, they still suggest a general awareness of appropriate sunscreen types for acne-prone skin.

Overall, findings in Table 8 indicate a high level of knowledge among respondents regarding the use of sunscreens with acne treatments. This includes an understanding of increased UV sensitivity, prevention of acne-related scarring, and the importance of selecting suitable sunscreen products, underscoring an informed and holistic approach to acne management among participants.

Table 9. Result of Attitude Questions

Questions Related to Attitude	Alpha	Std. Alpha	Score (Mean ± SE)	Interpretation
1. I am influenced by popular media advertisements regarding the use of sunscreens for my acne.	0.95	1.00	2.20 ± 0.0481	Neutral
2. I am influenced by my family and friends regarding the use of sunscreens for my acne.	0.96	1.00	2.28 ± 0.0502	Neutral
3. I am unlikely to use sunscreen because I am usually in too much of a hurry to apply it.	0.95	1.00	1.45 ± 0.0465	Disagree
4. I am unlikely to use sunscreen because I worry it will clog my pores.	0.97	1.00	1.40 ± 0.0449	Disagree
5. I am unlikely to buy sunscreens because I have oily skin.	0.97	1.00	1.42 ± 0.0454	Disagree
6. I am unlikely to use sunscreens because they feel sticky.	0.95	1.00	1.73 ± 0.0546	Neutral
7. I am unlikely to buy sunscreens in addition to my acne treatment products because it's an extra expense.	0.94	1.00	1.41 ± 0.0428	Disagree
8. I am unlikely to use sunscreens because they leave a white cast on my face.	0.95	1.00	1.59 ± 0.0516	Disagree
9. I am unlikely to use sunscreens because I worry, they will worsen my acne.	0.96	1.00	1.55 ± 0.0499	Disagree
10. I am unlikely to use sunscreens because I consider them less important than my acne treatment products.	0.98	1.00	1.30 ± 0.0399	Disagree
ATTITUDE SCORE			1.63 ± 0.0474	Disagree

Table 9 presents the results of an attitude assessment concerning sunscreen use in conjunction with acne treatments. The reliability coefficients (Alpha and Standardized Alpha) range from 0.94 to 0.98, indicating a high consistency in responses. The overall attitude score of 1.63 ± 0.0474, within the "disagree" range, suggests that respondents generally do not hold negative attitudes toward sunscreen use, which is encouraging for promoting effective skincare practices.

Examining specific attitude-related questions, responses reveal a neutral influence from popular media advertisements (Mean = 2.20) and personal networks, such as family and friends (Mean = 2.28), on sunscreen use. This neutrality indicates that respondents may rely less on external sources for their skincare decisions, suggesting a degree of autonomy in their choices. Importantly, many respondents disagree with common misconceptions about sunscreen use. For example, they do not feel too rushed to apply sunscreen (Mean = 1.45) nor believe that sunscreen will clog their pores (Mean = 1.40), reflecting a positive outlook and awareness of sunscreen's value in their routines.

Additionally, respondents largely disagree with concerns that oily skin (Mean = 1.42) or a sticky feel (Mean = 1.73) would prevent them from using sunscreen. They are also not significantly affected by worries that sunscreen might worsen acne (Mean = 1.55) or leave a white cast (Mean = 1.59), demonstrating an informed and practical approach that values sun protection alongside acne treatment. Furthermore, respondents express a willingness to bear additional costs for sunscreen, disagreeing with the idea that it is an unnecessary expense beyond acne treatments (Mean = 1.41). They also regard sunscreen as important, not viewing it as less essential than their acne treatments (Mean = 1.30).

In summary, the results suggest a generally positive attitude among respondents toward incorporating sunscreen in their skincare regimens. This positive outlook could promote consistent sunscreen use, essential for skin protection during acne treatment. The findings highlight the importance of reinforcing these positive attitudes through educational efforts, encouraging a holistic skincare approach that effectively integrates sun protection.

Table 10. Result of Practice Questions.

Questions Related to Practices	Alpha	Std. Alpha	Score (Mean ± SE)	Interpretation
1. I follow my dermatologist's prescriptions for sunscreens along with my acne treatment products.	0.97	1.00	2.76 ± 0.0337	Always
2. I purchase sunscreens that are recommended by my dermatologist.	0.97	1.00	2.61 ± 0.0389	Always
3. I buy sunscreens that are popular on social media.	0.97	1.00	1.68 ± 0.0352	Sometimes
4. I choose sunscreen ingredients that help prevent acne.	0.97	1.00	2.47 ± 0.0428	Always
5. I select specific brands of sunscreens.	0.97	1.00	2.60 ± 0.0371	Always
6. I continue to use sunscreens even when I have acne.	0.97	1.00	2.72 ± 0.0354	Always
7. I wear makeup alongside my acne treatment products and sunscreens.	0.97	1.00	2.12 ± 0.0549	Sometimes
8. I use moisturizer together with my acne treatment products and sunscreens.	0.97	1.00	2.63 ± 0.0361	Always

9. I apply only a light layer of sunscreen because I have oily skin.	0.97	1.00	2.04 ± 0.0468	Sometimes
10. I stop using sunscreens once my acne is under control.	0.97	1.00	1.34 ± 0.0392	Never
PRACTICES SCORE			2.30 ± 0.0400	**Sometimes**

Table 10 summarizes the sunscreen use practices among participants undergoing acne treatment. The high reliability coefficients (Alpha and Standardized Alpha) of 0.97 across all items indicate strong consistency in responses. The overall practice score of 2.30 ± 0.0400, within the "sometimes" category, suggests that while participants engage in some sunscreens use practices, there is still room to enhance adherence to recommended behaviors.

Examining specific practices, participants reported "always" following their dermatologist's sunscreen prescriptions alongside acne treatments (Mean = 2.76) and purchasing sunscreens recommended by their dermatologist (Mean = 2.61). These responses reflect a strong adherence to professional advice, underscoring the influence of dermatologist recommendations on skincare routines. Participants also reported consistently choosing sunscreen ingredients that help prevent acne (Mean = 2.47) and regularly selecting specific sunscreen brands (Mean = 2.60), indicating a mindful approach to product selection.

However, some practices showed variability. For example, participants "sometimes" buy sunscreens popularized on social media (Mean = 1.68) and "sometimes" wear makeup in combination with their acne treatment products and sunscreen (Mean = 2.12). This variability suggests that while social media may impact product choices, it does not significantly drive their overall sunscreen practices. Additionally, participants "sometimes" apply only a light layer of sunscreen due to oily skin (Mean = 2.04), indicating a cautious approach to application.

Notably, participants indicated that they "never" stop using sunscreen once their acne is under control (Mean = 1.34), reflecting an understanding of the importance of continued sun protection for preventing further skin damage. This perspective may contribute to a sustained commitment to sun safety beyond active acne treatment.

Overall, while the findings showed a foundation of positive sunscreen practices among individuals with acne, the "sometimes" rating points to potential barriers to consistent application and adherence.

Table 11. Comparing the Response of Employed and Unemployed Respondents.

Item	Employed Score	Unemployed Score	Kruskal Walli	P-Value
K1. I understand that using acne treatment products makes the skin more sensitive to UV rays.	2.713 ± 0.065	2.663 ± 0.069	18.514	<0.01
K2. I am influenced by my family and friends regarding the use of sunscreens for my acne.	2.842 ± 0.050	2.901 ± 0.041	24.842	<0.01
K3. I know that using acne treatment products alongside sunscreens helps maintain healthy skin.	2.931 ± 0.035	2.950 ± 0.029	73.730	<0.01

A2. I am influenced by my family and friends regarding the use of sunscreens for my acne.	2.089 ± 0.077	2.307 ± 0.074	15.407	<0.01
A3. I am unlikely to use sunscreen because I am usually in too much of a hurry to apply it.	1.406 ± 0.071	1.436 ± 0.067	24.706	<0.01
A5. I am unlikely to buy sunscreens because I have oily skin.	1.366 ± 0.066	1.426 ± 0.069	17.082	<0.01
P2. I purchase sunscreens that are recommended by my dermatologist.	2.624 ± 0.054	2.673 ± 0.058	21.194	<0.01
P3. I buy sunscreens that are popular on social media.	1.584 ± 0.053	1.673 ± 0.058	19.460	<0.01
P6. I continue to use sunscreens even when I have acne.	2.673 ± 0.058	2.693 ± 0.054	28.622	<0.01

In terms of knowledge, both employed and unemployed respondents showed a strong understanding of sunscreen use with acne treatment, though unemployed respondents consistently scored slightly higher. For example, unemployed respondents indicated a greater influence from family and friends on their sunscreen use (Mean = 2.901) compared to employed respondents (Mean = 2.842) and demonstrated a slightly stronger understanding of sunscreen's role in supporting skin health alongside acne treatments (Mean = 2.950 vs. 2.931). These results suggest that unemployed respondents may be more receptive to social and informational influences regarding sunscreen use.

For attitudes, unemployed respondents again showed slightly higher scores, indicating a greater likelihood of being influenced by family and friends on sunscreen use (Mean = 2.307) than employed respondents (Mean = 2.089). Unemployed respondents also displayed a marginally higher tendency to cite oily skin as a reason to avoid purchasing sunscreens (Mean = 1.426 vs. 1.366). However, both groups similarly disagreed with statements suggesting inconvenience as a barrier to sunscreen use, reflecting shared positive attitudes toward incorporating sunscreen.

Regarding practices, unemployed respondents reported more frequent purchases and use of dermatologist-recommended sunscreens (Mean = 2.673) than employed respondents (Mean = 2.624). They also showed a greater tendency to buy sunscreens popularized on social media (Mean = 1.673) and were more consistent in sunscreen use even when actively managing acne (Mean = 2.693). These findings suggest that unemployed respondents may be more regular in sunscreen application and more open to popular trends.

Overall, the differences between employed and unemployed respondents suggest that unemployment may be associated with slightly higher engagement in social influences and recommended sunscreen practices. This pattern indicates that unemployed individuals might be more receptive to external guidance and social endorsements of sunscreen use. Nonetheless, the overall scores between both groups remain similar, showing that employment status, while impactful, does not significantly alter the high levels of knowledge and generally positive practices regarding sunscreen use in acne treatment among respondents.

Table 12. Comparing the Response of Male and Female Respondents

Item	Male	Female	Kruskal Wallis (X2)	P-Value
K1. I understand that using acne treatment products makes the skin more sensitive to UV rays.	2.595 ± 0.087	2.722 ± 0.072	16.28	<0.01
K2. I understand that prescriptions for acne treatment often include sunscreens.	2.709 ± 0.075	2.873 ± 0.055	28.13	<0.01
K4. I know that acne and acne scars can heal faster with the combined use of acne treatment products and sunscreens.	2.772 ± 0.067	2.671 ± 0.080	19.43	<0.01
A4. I am unlikely to use sunscreen because I worry it will clog my pores.	1.544 ± 0.086	1.316 ± 0.069	23.49	<0.01
A9. I am unlikely to use sunscreens because I worry, they will worsen my acne.	1.595 ± 0.093	1.405 ± 0.080	21.16	<0.01
A10. I am unlikely to use sunscreens because I consider them less important than my acne treatment products.	1.380 ± 0.079	1.165 ± 0.052	19.84	<0.01
P4. I choose sunscreen ingredients that help prevent acne.	2.367 ± 0.079	2.532 ± 0.067	16.57	<0.01
P5. I select specific brands of sunscreens.	2.494 ± 0.072	2.646 ± 0.060	21.06	<0.01
P10. I stop using sunscreens once my acne is under control.	1.418 ± 0.073	1.241 ± 0.058	19.76	<0.01

Table 12 compares male and female respondents' knowledge, attitudes, and practices related to sunscreen use, revealing statistically significant differences ($p < 0.01$) between the two groups.

In terms of knowledge, female respondents demonstrated a stronger understanding of the increased sensitivity to UV rays that acne treatment products can cause (Mean = 2.722 for females vs. 2.595 for males). Females also reported a higher awareness that acne treatment prescriptions frequently include sunscreens (Mean = 2.873 for females vs. 2.709 for males). However, males showed a slightly greater understanding of sunscreens' role in accelerating the healing of acne and acne scars (Mean = 2.772 for males vs. 2.671 for females). This pattern suggests that, while both genders are knowledgeable, females are generally more informed about sunscreen's preventive benefits in acne care.

Regarding attitudes, females are less likely than males to avoid sunscreens due to concerns about pore clogging (Mean = 1.316 for females vs. 1.544 for males) or fears of worsening acne (Mean = 1.405 for females vs. 1.595 for males). They are also less likely to view sunscreens as less important than their acne treatments (Mean = 1.165 for females vs. 1.380 for males), suggesting that females may see sunscreen as an integral part of their skincare regimen rather than an afterthought.

In practice, females prioritize selecting sunscreen ingredients that help prevent acne (Mean = 2.532 for females vs. 2.367 for males) and are more likely to prefer specific sunscreen brands (Mean = 2.646 for females vs. 2.494 for males). They are also less inclined to stop using sunscreen once their acne is under control (Mean = 1.241 for females vs. 1.418 for males), reflecting a commitment to consistent sunscreen use. These findings indicate a more diligent, product-focused approach to sunscreen among female respondents, emphasizing long-term skincare practices.

Overall, these differences suggest that female respondents tend to be more informed, positive, and consistent in their approach to sunscreen use as part of acne management, while male respondents, though knowledgeable, appear relatively more cautious and less consistent in their practices. This highlights a gendered variation in skincare routines, with females more likely to view sunscreen as a critical component of acne prevention and treatment.

Table 13. Comparing the Response from Different Age Groups

Item	18 - 27	28 – 40	41 and above	Kruskal Wallis (X2)	P-Value
K2. I am influenced by my family and friends regarding the use of sunscreens for my acne.	2.922 ± 0.044	2.818 ± 0.051	2.766 ± 0.061	25.368	<0.01
K3. I know that using acne treatment products alongside sunscreens helps maintain healthy skin.	2.974 ± 0.026	2.935 ± 0.039	2.935 ± 0.039	55.724	<0.01
A2. I am influenced by my family and friends regarding the use of sunscreens for my acne.	2.156 ± 0.089	2.221 ± 0.090	2.260 ± 0.091	26.502	<0.01
A3. I am unlikely to use sunscreen because I am usually in too much of a hurry to apply it.	1.286 ± 0.064	1.403 ± 0.077	1.442 ± 0.077	24.883	<0.01
P2. I purchase sunscreens that are recommended by my dermatologist.	2.688 ± 0.065	2.610 ± 0.064	2.558 ± 0.065	30.800	<0.01
P3. I buy sunscreens that are popular on social media.	1.584 ± 0.062	1.727 ± 0.063	1.662 ± 0.063	32.839	<0.01

Table 13 compares responses on sunscreen-related knowledge, attitudes, and practices across different age groups (18-27, 28-40, and 41+), revealing significant differences in behaviors and influences ($p < 0.01$).

For knowledge, younger respondents (18-27) reported the strongest influence from family and friends regarding sunscreen use for acne, with a mean score of 2.922, followed by the 28-40 group (Mean = 2.818) and the 41+ group (Mean = 2.766). This trend suggests that younger individuals may be more receptive to social influences when making skincare decisions. Additionally, the 18-27 age group displays a slightly higher understanding of the importance of using sunscreen with acne treatments for skin health (Mean = 2.974) compared to the older age groups (both with a

mean of 2.935), indicating a proactive stance among younger individuals on skincare knowledge, especially regarding the combination of sunscreen and acne treatment.

In terms of attitudes, the tendency to skip sunscreen due to busy routines increases with age. The youngest respondents (18-27) are the least likely to avoid sunscreen for this reason (Mean = 1.286), with this attitude becoming more common among the 28-40 group (Mean = 1.403) and the 41+ group (Mean = 1.442). This finding suggests that sunscreen application may be a lower priority for older age groups when time is limited.

Regarding practices, younger individuals (18-27) showed the strongest adherence to purchasing dermatologist-recommended sunscreens (Mean = 2.688), with this practice gradually decreasing in the 28-40 group (Mean = 2.610) and the 41+ group (Mean = 2.558). This reflects a greater tendency among younger respondents to follow expert advice on skincare products. However, younger respondents are also more likely to buy sunscreens popularized on social media (Mean = 1.584), compared to the 28-40 group (Mean = 1.727) and those aged 41+ (Mean = 1.662), highlighting a notable influence of social media on younger users' purchasing decisions, which diminishes with age.

In summary, the data suggests that younger age groups (18-27) are more influenced by social sources and follow both dermatologist recommendations and social media trends closely. In contrast, older groups are less impacted by social or online trends and may deprioritize sunscreen use, especially when time pressed. These age-related differences indicate that targeted educational and social influence strategies could help enhance sunscreen practices, particularly among older individuals.

CONCLUSION

The sample was predominantly composed of younger, educated females, suggesting that this demographic may be more inclined to seek dermatological care for acne. Participants displayed a high level of knowledge about the importance of incorporating sunscreen into their topical and/or systemic acne treatment regimen, recognizing that their skin is more sensitive to UV rays and that sunscreen helps prevent acne scarring.

Although participants generally held positive attitudes toward sunscreen, overall practice scores indicated that while they follow their dermatologist's recommendations, their consistency in sunscreen application remains moderate. Among employment groups, unemployed participants appeared slightly more receptive to external influences regarding sunscreen use, suggesting the potential benefit of targeted sunscreen education for this group.

Notable gender differences were also observed. Female respondents demonstrated a more informed and proactive approach to sunscreen use compared to males, showing greater awareness of its protective benefits and being less swayed by negative perceptions. This suggests that females are more likely to maintain consistent sunscreen application.

Additionally, younger respondents in this study were more influenced by social networks in their sunscreen use and choices. This demographic may benefit from additional guidance from dermatologists to help them select appropriate products.

Overall, these findings emphasize the importance of educating acne patients about the need for sunscreen alongside their acne medications. This education is vital to achieving effective acne management and supporting comprehensive skincare routines.

CONFLICT OF INTERESTS

No relevant disclosures.

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Assessing the Harm of the Illicit Tobacco Trade: A Systematic Review of Heavy Metal Contamination in Cigarettes and Their Health Implications

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Background of the Study

According to the study conducted by the World Health Organization in November 2023, tobacco use is responsible for the premature deaths of over 8 million individuals annually[1]. In the WHO report, most cases of premature deaths are caused by direct tobacco use. The evidence of harmful effects of tobacco inhalation on human health is steadily growing. Tobacco comprises an array of toxic constituents, of which at least 69 are carcinogenic. Some toxic substances included arsenic, cadmium, lead, nickel, chromium, and mercury. Smoking has been linked to a higher risk of cancer and respiratory diseases, among other harmful health effects. Moreover, smoking possesses the capacity to affect nearly every human organ, leading to the development of skin and mucosal lesions, cardiovascular diseases, infertility, miscarriage, and low birthweight.

In terms of reducing tobacco use and enhancing public health, tobacco taxation is among the most effective policies. In the Philippines, the Sin Tax Reform Act of 2012 intends to address the country's smoking problem by imposing higher taxes on tobacco products.[2]

Tobacco industry is a substantial source of income for many Filipinos especially in the northern region of the country. Despite significant tobacco production, local tobacco farmers and legitimate tobacco product manufacturers are suffering economically, according to Cervantes (2022)[3], because of the high tax and the vast amount of tobacco goods smuggled into the country by illegal importers and merchants.

There has been a notable surge in the illicit tobacco traffic in recent years. Gonzales (2023) reports that the Philippines lost Php26.19 billion in revenue in 2022 alone, which could have been used to finance housing, medical, and educational initiatives, among others. Illicit manufacturing, counterfeit production, smuggling, and bootlegging include buying cigarettes in bulk from low-tax countries to sell them in high- tax countries. The Philippine Star reported on November 24, 2023 that illicit tobacco trafficking cost P60 billion in taxes for 2023[4]. The Bureau of Internal Revenue defines the four fundamental types of illicit tobacco trade as illicit manufacturing, counterfeit production, smuggling and bootlegging. With the current technology it is difficult to monitor illicit manufacturing of tobacco.[5] At present, twelve policies have been established with the aim of preventing the illicit tobacco trade; nevertheless, a significant portion of these policies remain unimplemented.

[1] WHO Fact Sheet, published July 31, 2023

[2] The Sin Tax Reform Act of 2012 or R.A. 10351 was signed into law on December 19, 2012

[3] Cervantes, F. (2022, November 15). Gov't loses P26B in revenue yearly due to illicit tobacco trade. Philippine News Agency. (https://www.pna.gov.ph/articles/1188668)

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Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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Review Question

This systematic review aims to answer the following research question:

"What are the differences of heavy metal concentration between illicit and registered cigarette brands and their potential health effects?". Stating the question allows a structured approach in the search strategy, selection criteria and synthesis of evidence. Clear definition of the review question is important in maintaining the focus of the study and ensuring that included studies will directly contribute in assessing the primary objective.

Objectives of the Study

General objective: To assess the concentrations of different heavy metals in both illicit and registered cigarettes and their potential effects on human health.

Specific objectives:

- To determine the specific heavy metals present in illicit and registered cigarettes.
- To determine the impact on human health of heavy metals in cigarettes.
- To determine the immediate and long-term health consequences of heavy metals present in both illicit and registered cigarettes

Methodology and Research Strategy

A comprehensive search was done to search relevant studies published in between 2019 and 2023 from electronic databases, such as Cochrane Library, Google Scholar, and PubMed. The electronic search utilized a combination of terms including "heavy metals", "toxic metals" and "Illicit cigarette", "registered cigarette", "cigarette", "tobacco", and "health effects", "lung function" in addition to the controlled vocabulary such as MeSH terms or other subject phrases, synonyms, and search filters. To maximize the retrieval of other relevant studies, Boolean operators (i.e. AND, OR) were also applied. The broad search ensured the inclusion of studies such as randomized controlled trials, observational studies and systematic reviews. There were no limitations on the type of publication or the language used. In addition, a manual examination was conducted on the reference lists of the studies. This approach enhanced the completeness of the review, ensuring that all pertinent studies related to heavy metal concentration in cigarettes and its potential health effects were included.

Two reviewers (E.C. and G.S.) screened the studies for risk of bias. All titles, abstracts and full texts were reviewed using a standardized form. Critical appraisal was done using Newcastle-Ottawa Scale and Cochrane Risk of Bias Tool, used depending on the type of study. This ensured that the quality of the study was assessed eliminating the bias. The discrepancies were resolved by consensus. The independent and duplicated process increased the subjectivity and decreased the subjectivity of the study findings.

A. Eligibility Criteria and Study Selection

This investigation has considered several inclusion criteria. The studies included were selected based on a pre-defined inclusion criterion, with concentration from established electronic databases. The studies that were incorporated in this review were as follows: (i) pertinent randomized controlled trials, case-control studies, observational studies, cohort studies, and systematic reviews (for the purpose of scoping or umbrella reviews); (ii) research involving human

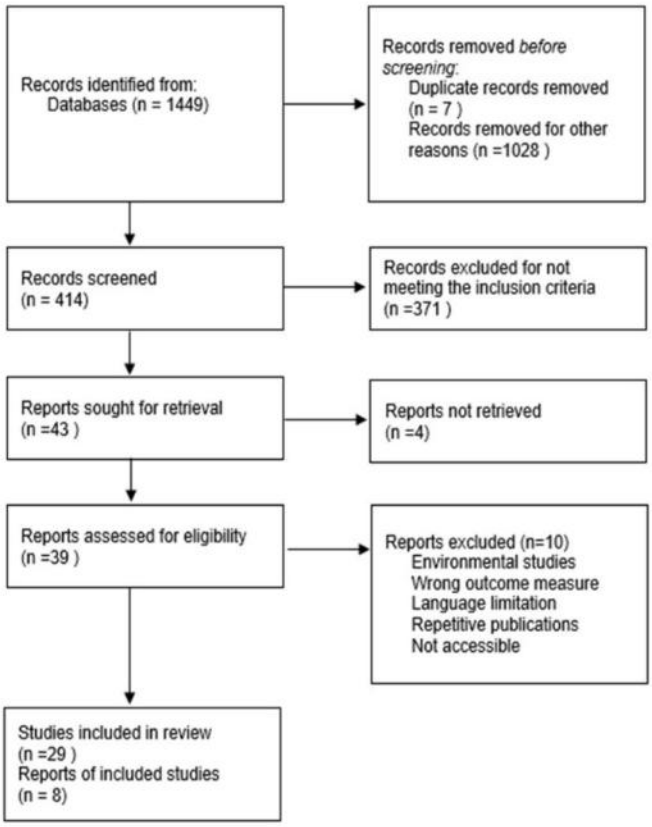
subjects; (iii) laboratory studies; (iv) foreign studies that provided supplementary information; (v) studies examining various heavy metals in cigarettes; (vi) interventions utilizing illicit cigarettes; (vii) controls utilizing registered cigarettes; and (viii) outcomes of interest were included. A comprehensive evaluation of each study was conducted using appropriate resources to guarantee the quality of the evidence. The Cochrane Risk of Bias Tool was utilized for randomized controlled trials and then Newcastle-Ottawa Scale was utilized for observational studies. As a result of this combination, possible biases in the literature were fully addressed during the appraisal process.

B. Risk of Bias

The risk of bias was evaluated for each study in accordance with the domains specified in the Cochrane Handbook for Systematic Reviews of Interventions: Random Sequence generation (Selection Bias), Allocation Concealment (Selection Bias), Blinding of Outcome Assessment (Attrition Bias), Incomplete Outcome Data (Attrition Bias), and any other source of bias. Research studies with a low risk of bias in all relevant domains or in which bias altering outcomes appear unlikely were considered low-risk and were included in the study.

A template developed by Cochrane Collaboration for data extraction of both RCTs and non-RCTs in a systematic review was used for independent, duplicate data extraction. This was used to reduce bias and errors. A pilot phase was done and reviewers were informed regarding how to utilize the form, this ensures uniformity. The important data that were extracted from each study were study design, sample size, demographics and results pertaining heavy metal concentrations and potential health effects. Duplicate extraction procedure was also done to guarantee the validity and dependability of the review.

Figure 1: Flowchart for identifying references for inclusion in systematic review.



Results

The results of the searches yielded eight pertinent studies. Table 1 contains a summary of the studies that were included. The main findings of the included studies regarding the heavy metal content of both illicit and legal cigarettes were compiled using a narrative synthesis.

Table 1. Included Studies

Author, Year, Country	Objective	Population	Results
Ozcan (2019) (Turkey)	To determine heavy metal and macroelement distribution in Turkish-used Indian and imported cigarette brands.	N=26 Five Indian cigarettes vs twenty-one imported cigarettes.	Imported cigarettes are higher in Fe and Mn than Indian cigarettes.
Janaydeh (2019) (Malaysia)	To assess the toxicity of Pb and Cd in 15 tobacco cigarette brands in Selangor, Peninsular Malaysia.	N=10 Fifteen different brands of tobacco cigarettes were purchased from several markets in January 2016 from Selangor state, Malaysia	Pb and Cd contents varied significantly between tobacco cigarette brands and costs.
Pappas (2006) (USA)	To evaluate counterfeit cigarette smoke particle cadmium, lead, and thallium to legitimate US brands.	N=27 Six authentic cigarette brands and twenty-one counterfeit cigarettes.	All counterfeit brands had Greater main smoke particulate cadmium levels than authentic brands.
He (2015) (USA)	To examine US counterfeit cigarette lead and cadmium concentrations.	N=27 Four authentic cigarette brands and twenty-three counterfeit cigarettes.	Pb and Cd concentrations in counterfeit cigarettes were much higher and more variable.
Strungaru (2018) (Roumania)	To detect toxic metal levels of cadmium, lead, cooper, chromium, and nickel in filler tobacco from common cigarette brands obtained from Iaşi City's local and black (illegal) markets.	N=240 Eight different brands were common to every legal shop and black market.	Cadmium and lead concentrations were much greater in black market brands.
Swami (2009) (USA)	To measure trace levels of Be, V, Cr, Mn, Co, Ni, Cu, Zn, As, Se, Mo, Cd, Sb, Ba, Tl, and Pb in cigarette tobacco samples	N=5 Two sets were authentic cigarettes and 3 sets were counterfeit cigarettes.	Counterfeit cigarettes had much higher concentrations of Be, Mn, As, Se, Mo, Cd, Tl, Pb, and Hg than authentic cigarettes.
Ajab (2008) (Pakistan)	To determine the heavy metal content of local and imported cigarette brands used in Pakistan	N=20 Twenty cigarette brands in Pakistan were tested using flame atomic absorption spectrophotometry	The analysis showed that imported brands had the highest concentrations of Mn (84.78 microg/g dry weight), Cd (0.525), and Zn (14.34).
Lisboa (2020) (Brazil)	To compare chromium contents in tobacco, filter, and cigarette ash samples using electrothermal vaporization– atomic absorption spectrometry (ETV-AAS) and sample preparation methods.	N=12 Twelve cigarette samples (different brands) of illicit origin were obtained from a local market with standard reference material of tomato leaves.	Mean Cu and Pb values in contraband cigarette samples were 19.6 and 7.5 µg g-1, respectively.

As shown in the table 1 above, Cadmium and lead concentrations in illicit and registered cigarettes were investigated in four separate studies. Strungaru (2017) measured toxic metals in filler tobacco from typical cigarette brands from the local market as well as the black market in Laşi City, Romania. Results showed that black market brands had much higher cadmium and lead contents. Legal market brands had substantially higher copper levels. He (2015) investigated US counterfeit cigarettes from China, Paraguay, and some unknown sources. Pb and Cd levels were significantly higher in 22 of 23 counterfeit cigarette samples than in equivalent genuine brands. Swami (2009) demonstrated that the levels of Be, As, Mo, Cd, Sb, Tl, Pb, and Hg are greater in counterfeit cigarettes. On the other hand, the levels of V, Cr, Mn, Co, Cu, Zn, Se, and Ba are equivalent between legal and counterfeit cigarettes. Interestingly, registered cigarettes have 2.7-fold higher Ni. The samples were from two genuine and three counterfeit cigarette packs. The mean Pb content of counterfeit cigarettes was 5.69 mg, nearly 10 times that of registered cigarettes. Pappas (2006) examined 21 counterfeit cigarette samples for toxic heavy metals. The findings of the study indicated that

counterfeit cigarettes may pose a significantly higher risk of toxic heavy metal exposure compared to authentic brands, even when nicotine intake differences were accounted for.

Two studies compared local and imported cigarettes. Ajab (2008) showed increased concentrations of Mn, Zn, and Cd were detected in cigarettes that were imported, whereas local brands contained higher concentrations of Co, Pb, and Cu. A study by Özcan (2019) analyzed the heavy metal and macroelement levels of Indian and imported cigarettes in Turkey. The findings indicate that cigarette samples imported from India and utilized in Turkey are abundant in Ca, K, Mg, P, and S. The majority of imported cigarettes contained elevated levels of Cu and Cd in comparison to Indian cigarettes. Janaydeh (2019) showed the Pb and Cd content of different tobacco brands in Selangor state, Peninsular Malaysia.

The study compared cheap versus expensive cigarettes. The Pb and Cd contents varied significantly between tobacco cigarette brands and cost. However, the highest Pb levels were found in cheap tobacco samples and the lowest in expensive samples.

Lisboa (2019) demonstrated that illegal brands have higher harmful element concentrations than genuine brands. Mean concentrations of Cu and Pb in tobacco for the samples of illegal cigarettes in this study were 19.6 and 7.5, respectively.

According to the findings of the study, tobacco cigarettes are one of the primary sources of extremely hazardous heavy metals, including cadmium and lead. These heavy metals are just one of numerous types of compounds that are hazardous, carcinogenic, and addicting that can be found in smoke.

DISCUSSION

Tobacco use is a major risk factor for cancer in almost any part of the body but commonly lung cancer and cardiovascular illnesses. This is due to the weakening of the immune system and direct DNA damage causing uncontrolled cell proliferation. Individuals who are not smokers but are exposed to secondhand smoke also endure the detrimental health consequences associated with tobacco use. Chronic second hand smoke exposure causes lung cancer, coronary heart disease, and respiratory issues.

Majority of the studies show counterfeit cigarettes have significant cadmium and lead levels. Cadmium and lead levels in smokers and non-smokers were examined by Repic (2019)[6]. Smokers have 3.5 and 1.5 times higher blood of cadmium and lead than non- smokers. Smoking habits like number of cigarettes per day, smoking period, cigarette type, and age affected these metals' blood concentrations. Smoking 10 cigarettes a day for 10 years showed significant elevation for blood levels of Cd and Pb. Low-concentration cadmium is hazardous, while lead have both acute and cumulative toxicity. Cadmium overexposure causes acute and chronic poisoning leading to pulmonary edema pneumonitis, acute respiratory distress syndrome from direct destruction of the mucus membrane and acute renal injury through cadmium-matallothionin complex where it burdens the renal tubules and causes damage. On the other hand, lead exposure can damage the nervous system being a neurotoxin, especially in young children, who can acquire learning problems at low levels. This happens thru the production of reactive oxygen species causing oxidative stress causing lipid peroxidation which damages cell membrane causing cell destruction. In adults in can cause paralysis, encephalopathy, coma or even death due to its prolonged half-life of 2 to 3 years in the brain.

The unregulated tobacco growing environment likely causes excessive heavy metal concentrations in counterfeit cigarettes together with poor preparation due to lack of standards and

[6]Repić, A., Bulat, P., Antonijević, B., Antunović, M., Džudović, J., Buha, A., & Bulat, Z. (2019).

quality assurance control. Heavy metal enrichment in cigarettes also depends on soil pH, according to Golia (2007)[7]. Growth of tobacco on severely acidic soil can increase cadmium and other heavy metals by fivefold. Because of quality control measures, major tobacco producers ceased employing these crops, potentially leading to the adoption of them by counterfeit enterprises. Tobacco quality is regulated by major manufacturers of genuine brands in response to environmental conditions. Thus, genuine brands have stable heavy metal content. Cadmium and lead are constantly regulated in cigarette manufacture, according to four studies.

Lack of control over cigarette manufacture and international mobility drives the global trade in illicit tobacco products. This trade is run by illegal organizations that have sophisticated systems for distributing illicit and counterfeit cigarettes. It happens in low- and high-tax jurisdictions. Developing nations have greater illicit trade.

Despite the insights of the current review, limitations such as small sample size and cross-sectional designs in some included studies call for additional research. Future research may aim to conduct well-powered studies or randomized controlled trials to assess further the long-term health effects of heavy metal exposure from cigarette smoke. Investigations regarding the regulatory impact on reducing heavy metal content in cigarettes may be considered since it will also help public health policies. (Lisboa et al., 2020; Dahlawi et al., 2021).

This study confirmed that counterfeit cigarettes present a more significant health hazard in comparison to authentic cigarettes. Accordingly, the public health risks of the illegal cigarette trade increase with counterfeit cigarette market share.

RECOMMENDATIONS

Due to the health risks associated with heavy metals, monitoring of heavy metals throughout the tobacco-growing, refining, and smoking processes should be subject to stringent quality control. Given the prevalence of smoking, epidemiological research on human metal exposure should account for cigarette smoke, therefore minimizing hazardous exposure is essential. The findings of the studies imply that the cigarette market needs proper oversight to protect consumers' health and safety.

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Histopathologic Findings of Psoriatic Lesions of Patients Accessing Care at Ospital ng Manila Medical Center, Manila, Philippines: A Five Year Retrospective Study (2010-2015)

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Abstract

INTRODUCTION Psoriasis is a chronic, immune-mediated polygenic skin disorder characterized by epidermal hyperplasia. Cardinal histopathological features are as follows: hyperkeratosis, parakeratosis, neutrophils in the stratum corneum and spinous layer, hypogranulosis with suprapapillary thinning, acanthosis, clubbed rete ridges, dilated capillaries, and perivascular lymphocytes. As histopathology may be more definitive compared to clinical manifestations, being able to diagnose psoriasis accurately through histopathology may enable early diagnosis and treatment. This could ideally mean a decrease in its progression, prevention of complications, and improvement of quality of life for psoriatic persons.

OBJECTIVES To examine, grade, and compare histopathologic findings of psoriatic lesions with established parameters from previous literature.

METHODS This is a retrospective descriptive study that will examine, grade, and compare all histopathologic findings of psoriatic lesions of patients who have accessed care at Ospital ng Manila Medical Center from 2010-2015 with established parameters from previous literature.

RESULTS All 41 cases (100%) showed parakeratosis, followed in decreasing order by 19 cases (46.34%) with Munro's microabscesses, 15 cases (36.59%) with pustules of Kogo, 15 cases (36.59%) with hypogranulosis, and 11 cases (26.83%) with spongiosis. Using the visual analogue scale of Moorchung N *et al* (2013), 28 cases (68.29%) showed mild inflammatory infiltrates, followed in decreasing order by 19 cases (46.34%) with mild epidermal hyperplasia, 12 cases (29.27%) with mild capillary proliferation, and 4 cases (9.77%) with mild suprapapillary thinning.

CONCLUSIONS Findings of the current study showed histopathologic features of both early and fully developed lesions based on established psoriasis histopathological parameters. Recognized histopathological features were not consistently found in well-developed lesions.

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INTRODUCTION

Psoriasis is a chronic, immune-mediated, polygenic skin disorder characterized by epidermal hyperplasia ([7]). Various environmental triggering factors may elicit this papulosquamous disease including trauma, infections or medications. The characteristic psoriatic lesion is a sharply demarcated erythematous plaque with micaceous scale commonly over the scalp, elbows and knees, followed by the nails, hands, feet and trunk. Lesions may be localized or widespread in distribution.

The pathology of psoriasis involves T cells and their interactions with dendritic cells and keratinocytes amongst other cells involved in innate immunity. Identification of susceptibility genes has pointed to a major role for both the innate and the adaptive immune systems ([7]).

The cardinal histopathological features of psoriasis are as follows: hyperkeratosis with confluent parakeratosis, neutrophils in the stratum corneum (Munro microabscesses) and in the spinous layer (spongiform pustules of Kogoj), hypogranulosis with suprapapillary thinning, regular acanthosis, clubbed rete ridges, dilated capillaries, and perivascular lymphocytes ([10]).

Psoriasis is a systemic disease process as well with an estimated 20–30% of patients developing psoriatic arthritis. For patients with moderate to severe psoriasis, previous literature has described an increased relative risk for metabolic syndrome and cardiovascular disease ([7]). Phototherapy, methotrexate, cyclosporine and biologic therapies that target key immune effector cells and cytokines have been lead to significant clinical improvement.

SIGNIFICANCE OF THE STUDY

Despite the characteristic clinical manifestations of psoriasis, occasionally atypical cases are presented in the clinical setting making its diagnosis difficult. This emphasizes the importance to undertake the histopathological examination of psoriasis. As histopathology may be more definitive in its diagnosis compared to clinical manifestations, being able to diagnose psoriasis accurately through histopathology may enable early diagnosis and treatment. This could ideally mean a decrease in its progression, prevention of complications, and improvement of quality of life for psoriatic persons.

OBJECTIVES OF THE STUDY

General Objective:

1. Determine the histopathologic findings of lesions of psoriatic patients

Specific Objectives:

1. Determine the concordance between the histopathologic findings of psoriatic lesions of patients and established psoriasis histopathological parameters
2. Deteremine the grade of the histopathologic parameters of psoriatic lesions of patients using the visual analogue scale of Moorchung N, Khullar JS, Mani NS, *et al* (2013) ([4])

MATERIALS AND METHODS

Study Design

The study design is hospital based retrospective study conducted in the Department of Dermatology, Ospital ng Maynila Medical Center, Manila, Philippines.

Ethical clearance to access the medical records of the patients with psoriasis was obtained from the Research Consultant of the Department of Dermatology, Ospital ng Maynila Medical Center.

Subject Selection

All cases that were diagnosed as Psoriasis on histopathology from June 2010 to June 2015 at

the Department of Dermatology, Ospital ng Maynila Medical Center, were included in the study. Exclusion criteria included (a) patients with uncontrolled bacterial, viral, or fungal infection at the time of skin punch biopsy and (b) patients on concomitant use of any topical medications at the time of skin punch biopsy.

Study Procedure

The histopathologic specimens and clinical charts of psoriatic patients at the Department of Dermatology, Ospital ng Maynila Medical Center from June 2010 to June 2015 were manually retrieved and reviewed. Relevant data were collected. A total of 41 patients were seen and treated after having undergone skin punch biopsy for histopathological confirmation. Clinical charts were reviewed for age and sex. Histopathologic specimens were reviewed for nine parameters (epidermal hyperplasia, parakeratosis, Munro's micoabscesses and pustules of Kogo, hypogranulosis, spongiosis, suprapapillary thining, inflammatory infiltrate, and capillary proliferation). Grading was done using a visual analogue scale and specimens were graded as 1 to 3 (Moorchung N, Khullar JS, Mani NS, *et al,* 2013) ([4]).

Epidermal hyperplasia

Defined as thickening of the stratum corneum. Graded on a scale (a) Grade 1 - mild (b) Grade 2 - moderate (c) Grade 3 - marked. (Figure 1)

Parakeratosis

Defined as the presence of keratinization with retained nuclei in the stratum corneum. Graded as (+) present or (-) absent. (Figure 2A)

Munro's microabscesses and pustules of Kogo

Defined as the presence of collections of neutrophils in the corneal layer and the stratum spinosum, respectively. Graded as (+) present or (-) absent. (Figure 3A & 3B)

Hypogranulosis

Defined as decreased thickness of the stratum granulosum. Graded as (+) present or (-) absent. (Figure 2B)

Spongiosis

Defined as intercellular edema between keratinocytes in the epidermis. Graded as (+) present or (-) absent. (Figure 2C)

Suprapapillary thinning

Defined as thinning of the stratum granulosum at the tips of the papillae. The elongation of rete pegs was also considered. Graded on a scale (a) Grade 1 - mild (b) Grade 2 - moderate (c) Grade 3 – marked. (Figure 4)

Inflammatory infiltrate

Defined as the degree of the inflammatory infiltrate in the dermis. Graded on a scale (a) Grade 1 - mild (b) Grade 2 - moderate (c) Grade 3 – marked. (Figure 5)

Capillary proliferation

Defined as the proliferation and dilatation of the capillaries at the tips of the papillae. Graded on a scale (a) Grade 1 - mild (b) Grade 2 - moderate (c) Grade 3 - marked. (Figure 6)

Statistical Analysis

The data was entered and tallied using SPSS software version 17.0. Descriptive statistics were generated for all variables. For nominal data, frequencies and percentages were computed.

RESULTS

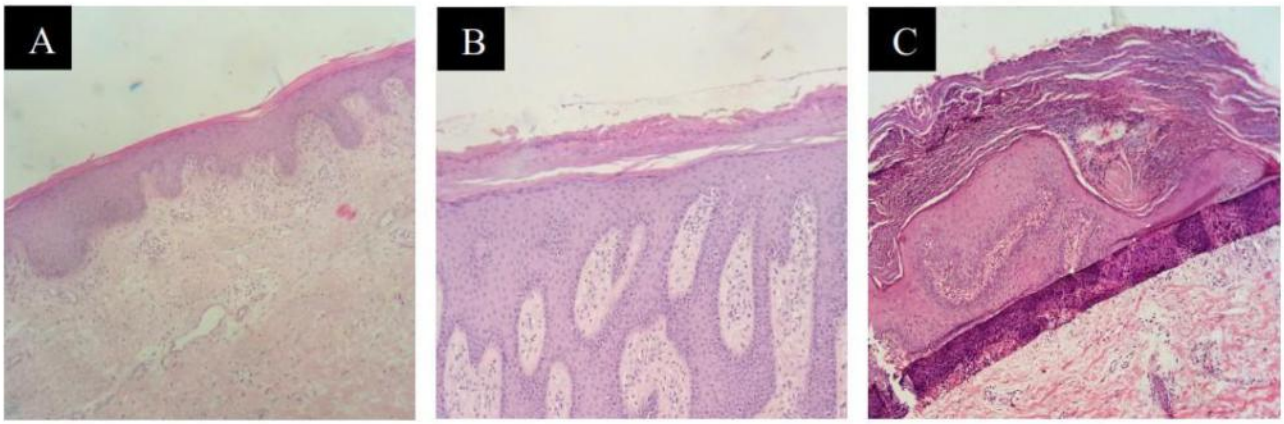
A total of 41 patients with a histopathological diagnosis of Psoriasis was retrieved from the clinical records. Table 1 shows the distribution of the psoriatic patients according to histological parameters. Nineteen cases (46.34%) showed mild epidermal hyperplasia, 18

cases (43.90%) were moderate, and 4 cases (9.77%) were marked. (Figure 1) All 41 cases (100%) showed parakeratosis (Figure 2A), followed by (in decreasing order) 19 cases (46.34%) with Munro's microabscesses (Figure 3A), 15 cases (36.59%) with pustules of Kogo (Figure 3B), 15 cases (36.59%) with hypogranulosis (Figure 2B), and 11 cases (26.83%) with spongiosis (Figure 2C). Four cases (9.77%) showed mild suprapapillary thinning, 19 cases (46.34%) were moderate, and 18 cases (43.90%) were marked (Figure 4). Twenty-eight cases (68.29%) showed mild inflammatory infiltrates, 2 cases (4.88%) were moderate, and 11 cases (26.83%) were marked (Figure 5). Twelve cases (29.27%) showed mild capillary proliferation, 9 cases (21.95%) were moderate, and 20 cases (48.78%) were marked. (Figure 6) [Table 1]

Table 1. Distribution of Psoriatic Patients According to Histological Parameters

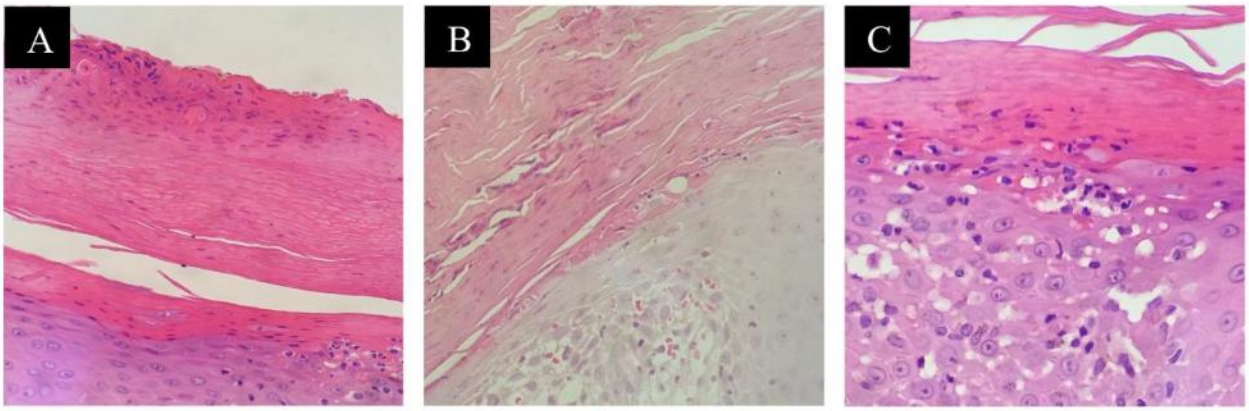
Histopathological parameter	Frequency (n=41)	Percentage (%)
Epidermal Hyperplasia		
Mild	19	46.34%
Moderate	18	43.90%
Marked	4	9.77%
Parakeratosis	41	100%
Munro's microabscesses	19	46.34%
Pustules of Kogo	15	36.59%
Hypogranulosis	15	36.59%
Spongiosis	11	26.83%
Suprapapillary thinning		
Mild	4	9.77%
Moderate	19	46.34%
Marked	18	43.90%
Infiltrates		
Mild	28	68.29%
Moderate	2	4.88%
Marked	11	26.83%
Capillary proliferation		
Mild	12	29.27%
Moderate	9	21.95%
Marked	20	48.78%

Figure 1



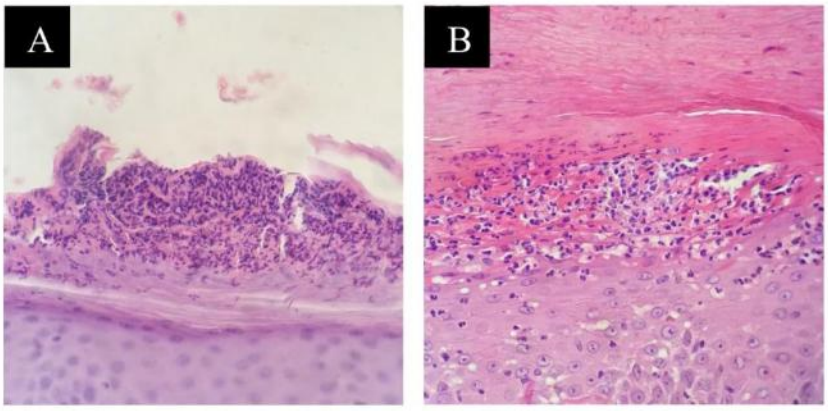
Grades of hyperkeratosis (A) Grade 1 - mild (B) Grade 2 - moderate (C) Grade 3 - marked. (H and E stain, ×40)

Figure 2



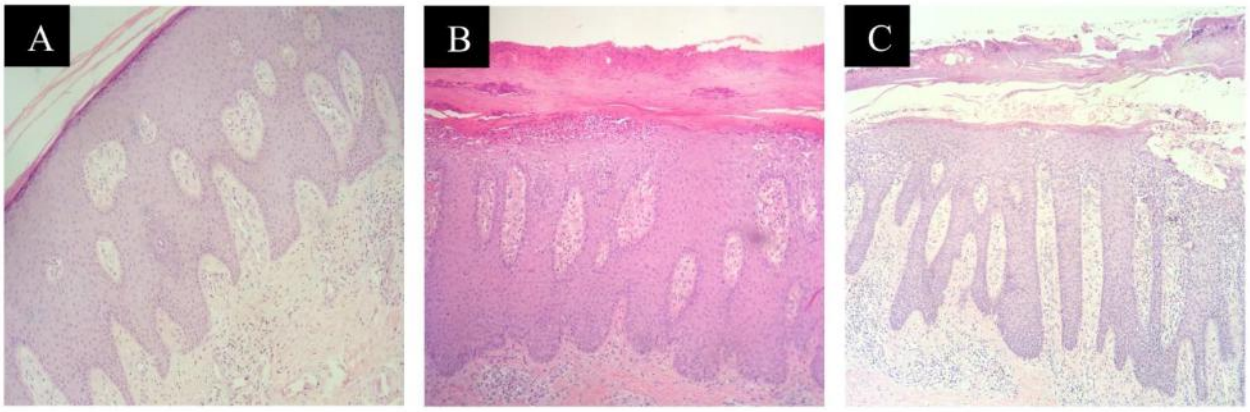
(A) Parakeratosis (B) Hypogranulosis (C) Spongiosis. (H and E stain, ×50)

Figure 3



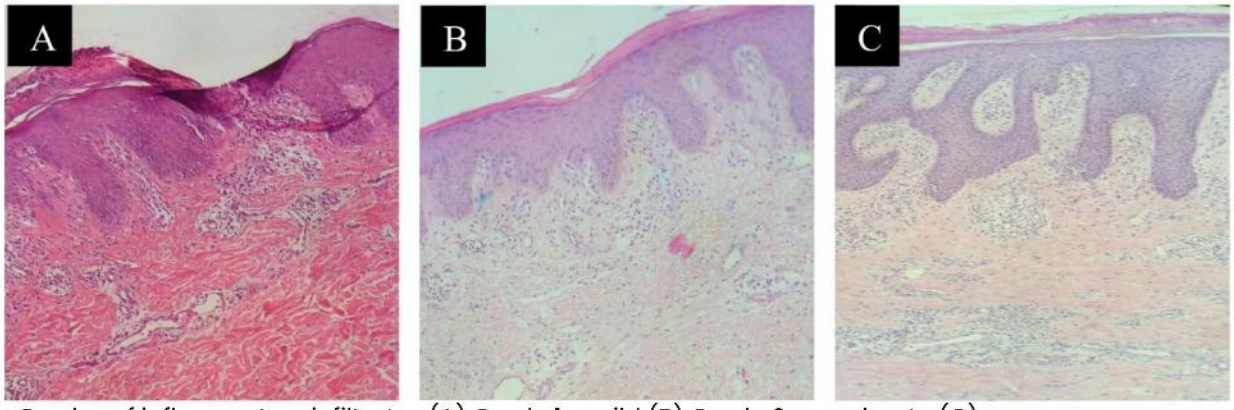
(A) Munro's microabscesses (B) Spongiform pustules of Kogo. (H and E stain, ×50)

Figure 4



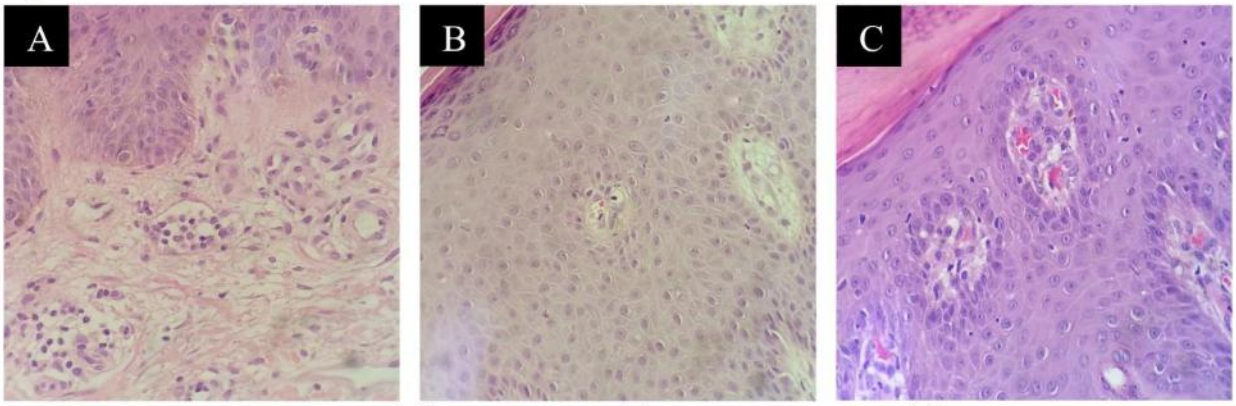
Grades of suprapapillary thinning (A) Grade 1 - mild (B) Grade 2 - moderate (C) Grade 3 - marked. (H and E stain, ×40)

Figure 5



Grades of inflammatory infiltrates (A) Grade 1 - mild (B) Grade 2 - moderate (C) Grade 3 - marked. (H and E stain, ×40)

Figure 6



Grades of capillary proliferation (A) Grade 1 - mild (B) Grade 2 - moderate (C) Grade 3 - marked. (H and E stain, ×50)

DISCUSSION

Psoriasis is the prototype of a psoriasiform pattern in histopathology, which is morphologically defined as epidermal hyperplasia with elongation of the rete ridges, usually in a regular manner ([1]). In the current study, majority of the histopathologic specimens of active psoriatic lesions demonstrated slight epidermal hyperplasia with parakeratosis. Less than half of cases showed Munro's microabscesses, spongiform pustules of Kogo, hypogranulosis, and spongiosis. Moderate suprapapillary thinning, sparse perivascular and interstitial infiltrates of polymorphonuclear lymphocytes, and dilated capillaries in the papillary bodies engorged with erythrocytes and lymphocytes were appreciated as well.

Results showed histopathologic features of both early and fully developed psoriatic lesions lesions. Based on previous literature, a psoriatic lesion in its early stage consists of sparse superficial perivascular infiltrate of mostly lymphocytes (68.29%), dilated tortuous capillaries in the dermal papillae (29.37%), slight epidermal hyperplasia (46.34%), spongiosis (26.83%) in company with a few lymphocytes in discrete foci in the lower part of the epidermis, spongiform and subcorneal pustules within the epidermis (36.59%), hypogranulosis in some foci (36.59%), and mounds of parakeratosis (100%) with neutrophils at their summits staggered within the stratum corneum, sometimes beneath the retained original cornified layer with its basket-woven configuration ([1]).

Fully developed lesions are usually characterized by moderately dense perivascular and interstitial infiltrate of lymphocytes in the upper part of the dermis (26.83%), dilated spiraled capillaries in a thin dermal papillae (48.78%), psoriasiform hyperplasia (9.77%) with rete ridges of equal length, thin suprapapillary plates (43.90%), slight spongiosis (26.83%) in the lower part of the epidermis, and spongioform pustules (36.59%) in the upper reaches of the epidermis. The granular zone of the epidermis is decreased or absent (36.59%), except in association with adnexal structures where it is preserved. Confluent parakeratosis (100%) is also noted within which neutrophils in collections (46.34%) are layered ([1]).

In psoriatic lesions of the later stage, there are sparse superficial perivascular and interstitial infiltrate of lymphocytes (68.29%), subtle fibroplasia in the papillary dermis, dilated tortuous capillaries in dermal papillae (48.78%), psoriasiform hyperplasia of variable extent with rete ridges of equal lengths, slightly thin suprapapillary plates (9.77%), wedge-shaped hypergranulosis, and compact orthokeratosis ([1]).

CONCLUSION

Previous studies have shown that recognized histopathological features of psoriasis are not always found in a well-developed lesion ([5]). The cardinal histopathological features (hyperkeratosis with confluent parakeratosis, Munro microabscesses, spongiform pustules of Kogoj, hypogranulosis with suprapapillary thinning, regular acanthosis, clubbed rete ridges, dilated capillaries, and perivascular lymphocytes) ([10]), may not be present in one section alone.

The disparity between findings of the present study and established histopathological features in an active lesion of psoriasis can be explained by the high possibility that the skin punch biopsies were taken at different stages (early, fully developed, later). Some of the lesions may have also been biopsied when they have been inactive or regions of the lesions from where the biopsies had been taken were inactive.

The above study is a simple one, a straightforward review of the histopathology of psoriasis and its comparison with well-documented parameters of previous literature. Using the visual analogue scale of Moorchung N *et al* (2013) to grade the different histopathologic parameters (epidermal hyperplasia, suprapapillary thining, inflammatory infiltrates, and capillary proliferation), a better understanding of the histopathology of psoriasis was achieved as the differences in grading (mild, moderate, and marked) regarding the same histopathological parameter changed according to the stage of a psoriatic lesion.

RECOMMENDATION

Further research involving other histopathological parameters of psoriatic lesions not included in the study such as edema of the papillary dermis, mitotic figures in keratinocytes, wedge-shaped hypergranulosis, fibroplasia, and orthokeratosis would be able to give a better picture of the histopathology of psoriasis. Also, the parameters that were included the study however graded as present or absent, namely spongiosis, hypogranulosis, parakeratosis, and Munro microabscesses, should be graded from mild to marked as was done to epidermal hyperplasia, suprapapillary thining, inflammatory infiltrates, and capillary proliferation as differences in grading was noted to change according to the stage of a psoriatic lesion.

Future studies can also focus on correlating histopathologic parameters and their occurrence in early, fully developed, and later psoriatic lesions. This would help give a better understanding of histopathological changes during exacerbations and during the remission phase.

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A Cross-Sectional Study on the Factors Associated with Social Media Use in Patients with Acne Vulgaris in a Tertiary Hospital*

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ABSTRACT

Background: Acne vulgaris is one of the common skin diseases prompting dermatologic consult. Although prevalent worldwide, knowledge of the public about acne is still lacking. Due to this, content related to acne vulgaris has been a topic of choice on social media platforms.

Methods: A cross-sectional study was conducted among 120 patients diagnosed with acne vulgaris aged 18–50 years-old consulting via teledermatology and face-to-face consultation at the Rizal Medical Center. Patients completed a self-administered questionnaire and global acne severity was assessed.

Results: A total of 120 newly diagnosed patients with acne vulgaris were included in the study, with a mean age of 23.25 years, with a female predominance, household average monthly income less than PhP 10,957 and with mild to moderate acne severity. Majority of the participants used social media to look for treatment options and to gain more knowledge about the disease. The most used platforms were Youtube, Facebook and Tiktok. Short videos were viewed more often and content from dermatologists were preferred. Most commonly tried products are over-the-counted non-pharmaceutical topical products. There was a significant association between the use of social media with age and educational attainment. Furthermore, a significant association between self-medication practices and average household monthly income was seen. No association was seen between acne severity, social media use and self-medication practices.

Conclusion: In summary, the use of social media to access acne-related content was prevalent among young female patients, of lower socioeconomic status diagnosed with mild-moderate acne severity at a tertiary hospital in the Philippines.

Keywords: *acne, social media, self-medication practices*

INTRODUCTION AND RELEVANCE

Acne vulgaris is a common chronic inflammatory disorder of the pilosebaceous unit which may affect all age groups but is more common during adolescence. [1,2] It is estimated that up to 85% of young people between the ages of 12-24 years of age are affected by acne and some occur and persist until adulthood.[1,3] Acne may present as mild, moderate, and severe forms. In the severe form of acne, nodules and cysts may cause scarring and psychological effects.[4] Acne accounts for approximately 0.3% of the total and approximately 16% of the dermatologic disease burden globally.[1] In the Philippines alone, acne vulgaris is one of the common skin diseases prompting dermatologic consult.[5] Although prevalent worldwide, knowledge of the public about acne is still lacking.[3]

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The internet has been an essential source of health-related information as the number of search queries has been rising continuously every year.[6] Unlike all existing forms of mass media, the internet has exceeded the rest by allowing user-generated content and thus creating a more inclusive and personal aspect to its users.[4] In a study by Braunberger et al.[7], acne vulgaris had the highest number of related posts and hashtags, and was the 4th most inquired topic after skin care, anti-aging and hair products on social media.[8] However, this also creates an avenue for non-experts of the field to share posts about diseases. This can lead to access to unverified, unreliable and uncredible information which can do more harm than good.[9]

This is specifically depicted in a study by Kalidaya et al.[10], where it showed the prevalence of self-medication practices for acne vulgaris patients in Saudi Arabia. It showed that half of the participants in the study use social media platforms as guidance for acne treatment. Another study by Yousaf et al.[11], noted that 45% of the acne vulgaris patient seen at the West Virginia University ambulatory center, West Virginia, USA resulted to social media for expert advice on acne treatment (54% of women vs 31% of men). Furthermore, treatment decisions based on social media did not align with the American Academy of Dermatology (AAD) guidelines. Although severity was measured in both studies, association of acne severity with the use of social media was not quantified. An association between social media use and acne severity was depicted in a study conducted in Turkey by Kayiran et al.[9] Their research showed that the use of social media and the internet to seek information about acne vulgaris was statistically significantly higher among women, with short-term and severe disease, with a moderate family income level.

Based on current and previous studies, we can say that there is an association between acne vulgaris and social media use.[10,11,12] Although, due to the lack of literature focusing on the impact of acne severity and social media use, a direct association cannot be made. The need for verified, credible information prepared by the right people in the field, such as dermatologists was also apparent in the results of previous studies. The lack of current studies, specifically in the Philippines has prompted the researcher to explore more about the topic.

METHODOLOGY

A. Study Design

A cross-sectional study design was conducted among acne patients consulting via Teledermatology at Rizal Medical Center in a 3-month duration to determine the association of acne severity and socioeconomic factors on the use of social media for information gathering and self-medication practices in patients with acne vulgaris.

The study included individuals newly diagnosed with acne vulgaris, aged 18-50 years old[13] seen via teledermatology or face-to-face consultation at the out-patient department or via teledermatology at Rizal Medical Center. Patients diagnosed with acneiform eruptions were excluded from this study.

The primary data collection of the study was done via teledermatology and face-to-face consultation at the out-patient department at Rizal Medical Center by the primary investigator, and was done in a period of 3 months until the recommended sample size was reached. An electronic informed consent via google forms was sent prior to participation in the study.

B. Sampling Design

Purposive sampling was utilized for this study. Sampling size was computed by first obtaining the population size of 136 based on a 3-month average number of new physical and teledermatology acne patients, aged 18-50 years old, seen at the RMC dermatology clinic in 2023

(total new adult acne patients from January 1 to April 30, 2023 is 182, with a monthly mean of 45.5). At 95% confidence level with 0.05 allowable error, the computed sample size for population size of 136 with finite population correction is 101.

C. Validation and Pilot Testing

The questionnaire used was constructed by the researcher based on the questionnaire used in the study of Kaliyadan et. Al[10]. The constructed questionnaire underwent face validity by an expert committee.[14] The panel consisted of five board-certified dermatologists of the Philippine Dermatological Society, who are currently practicing in the field of dermatology. The questionnaire then underwent construct validity by a statistician using SPSS. Once validation was complete, the questionnaire underwent translation in Filipino by a chief language researcher of "Komisyon sa Wikang Filipino" (KWF). A pilot study of at least 10 respondents from the sampling population was done prior to administrating the questionnaire to the sample population.[15] Necessary changes to the questionnaire noted from the pilot study was adapted prior to data collection.

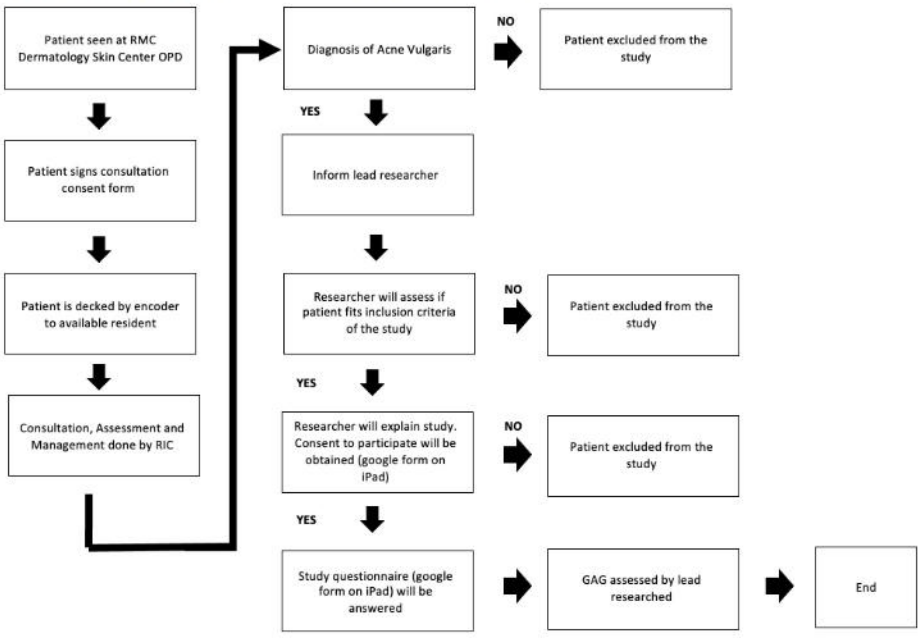
D. Data Collection

Each participant went through the normal consultation process, for both teledermatology and face-to-face consultation followed by Rizal Medical Center Department of Dermatology. The patient was triaged to any available resident.

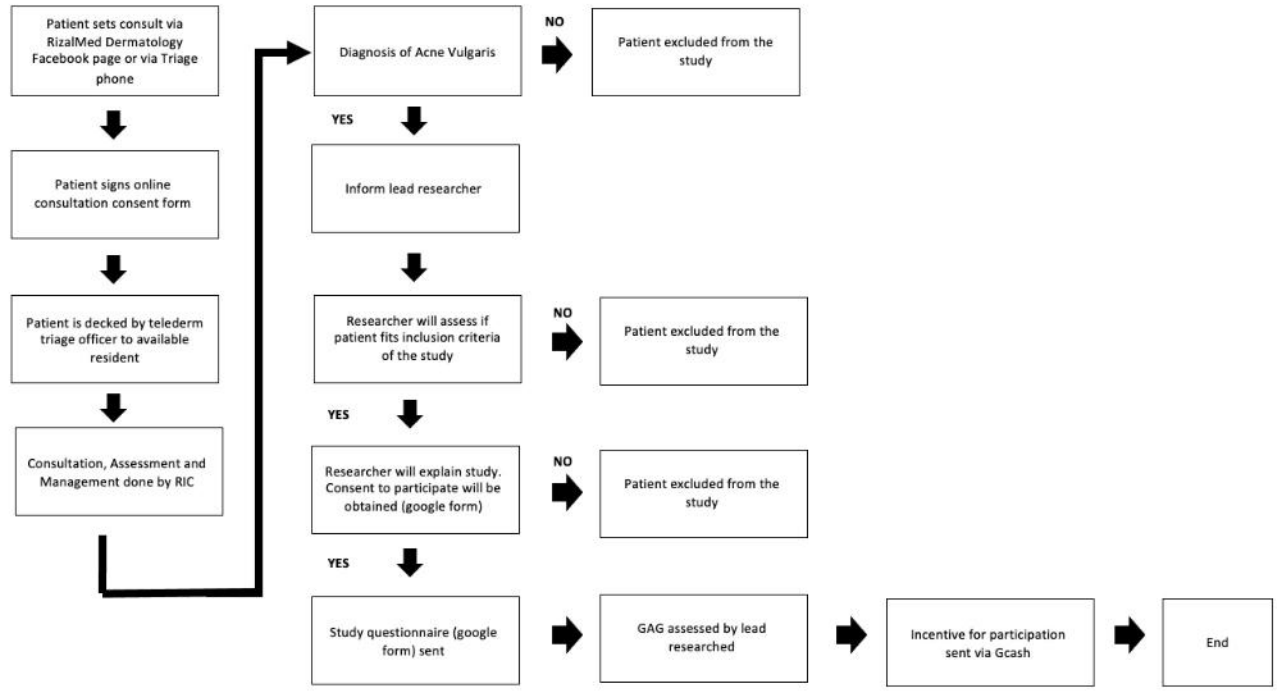
The resident-in-charge was responsible for consultation, diagnosis and management of the patient. All patient diagnosed with acne vulgaris, who fit the inculsion/exclusion criteria were included in the study.

All eligible participants were sent a digital consent form before being included in the study. The respondents were tasked to complete a five-part, fourteen item, Filipino or English, self-administered online questionnaire using Google form. This included biographical data, their source of information, reliability of information obtained, social media preference and habits, reason which prompted dermatologic consult, and self-medication practices. The principal investigator then evaluated the acne severity of the respondent, categorizing it as mild, moderate and severe using the Global Acne Grading System. All participants seen via teledermatology were given an incentive of P15.00, sent via Gcash for their internet data used to participate in the study.

Flowchart for face-to-face consultation



Flowchart for online consultation



Data Analysis

All statistical analyses were performed using IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp. A *p*-value of ≤0.05 was considered statistically significant. Descriptive statistics such as mean, standard deviation, frequency, and percentage were employed to summarize the demographic characteristics, acne severity, social media use, social media preference and credibility of site and information of the respondents. To determine association between social media use to view acne-related content and the following variables: age (years), highest educational attainment, estimated household average monthly income, acne severity, Chi-square test of independence was used.

Results

A total of 120 newly diagnosed patients with acne vulgaris were included in the study, with a mean age of 23.25 years and with female dominance (69.17% vs 30.83%) [Table 1]. In terms of household average monthly income, majority of the respondents reported to have a monthly income less than PhP 10,957 (36.6%7). The distribution of patients across mild and moderate acne severity is nearly equivalent (49.17% vs 45%), whereas 5.83% exhibit severe acne vulgaris.

Table 1. Demographic characteristics and acne severity of the respondents (n=120)

	Frequency (%)
Age, years	
18-25	87 (72.50)
26-35	22 (18.33)
36-45	9 (7.50)
46 and up	2 (1.67)
Sex	
Male	37 (30.83)
Female	83 (69.17)
Highest Educational Attainment	
Elementary graduate	2 (1.67)
High School graduate	25 (20.83)

College undergraduate	48 (40.00)
College graduate	44 (36.67)
Post-graduate	1 (0.83)
Household Average Monthly Income, Php	
Less than 10,957	44 (36.67)
10,957 to 21,914	33 (27.50)
21,915 to 43,828	27 (22.50)
43,829 to 76,699	8 (6.67)
76,700 to 131,484	4 (3.33)
131,485 to 219,140	3 (2.50)
219,141 and above	1 (0.83)
Acne Severity	
Mild	59 (49.17)
Moderate	54 (45.00)
Severe	7 (5.83)

The survey revealed that 96.67% of the patients reported using social media platforms to access content associated with skin health and skin-related issues and 90.83% of those patients view social media content that is centered around topics related to acne [Table 2.1]. The most common reasons for searching and viewing acne-related content include seeking treatment options (79.82%) and understanding the cause/s (77.98%) of acne. Dermatologists (96.33%) are the main sources of information followed by non-medical influencers (57.80%) and non-dermatologist doctors (26.61%) [Table 2.2]. The preferred platforms for accessing content are YouTube (74.31%), Facebook (68.81%) and Tiktok (67.89%). Preferred content formats include short videos (78.90%), followed by long videos (54.13%).

Table 2.1 Social media use among patients with acne vulgaris (n=120)

	Frequency (%)
Do you use social media to access content related to skin health and/or skin concerns?	
Yes	116 (96.67)
No	4 (3.33)
Do you view social media content focusing on acne-related content?	
Yes	109 (90.83)
No	11 (9.17)

Table 2.2. Social media use among patients with acne vulgaris in relation to social media platform, source and content (n=109)

	Frequency (%)
What are your reasons for searching and viewing acne-related content? (multiple response question)	
For entertainment	7 (6.42)
To look for treatment options	87 (79.82)
To diagnose own skin condition	42 (38.53)
To gain knowledge on the causes of acne	85 (77.98)
For product research and recommendations	69 (63.30)
From whose source do you view acne-related content?	
Dermatologist	105 (96.33)
Celebrities/ Influencers	63 (57.80)
Non-dermatologist medical doctors	29 (26.61)
What social media platform do you use in obtaining acne-related information?	
Tiktok	74 (67.89)
Twitter	9 (8.26)
Youtube	81 (74.31)
Facebook	75 (68.81)
Instagram	15 (13.76)
Which type of social media content do you prefer in obtaining acne-related information?	
Blogs	41 (37.61)
Images/ infographics	52 (47.71)
Short Videos	86 (78.90)
Long Videos	59 (54.13)

Table 3 provides an overview of patient behaviors regarding checking the credibility of acne-related content seen on different social media platforms. Among the 101 (92.66%) patients who check the credibility of the information they see online, only 42.57% do so frequently. The most common way of checking the credibility of the source was through doing a background research on their educational background and profession (51.49%). Notably, 48 (47.52%) of the patients have consulted a dermatologist regarding the acne-related content seen online while 52.48% of the respondents did not consult a dermatologist. Out of the 48 patients who did consult a dermatologist regarding the acne content gathered online, only 10.42% of the respondents frequently consulted their dermatologist regarding the content gathered.

Table 3. Credibility checking of acne-related content among patients with acne vulgaris (n=109)

	Frequency (%)
Do you check the credibility of the acne-related information you gather on social media?	
Yes	101 (92.66)
No	8 (7.34)
If yes, how frequently do you check the credibility of the acne-related information you gather on social media? (n=101)	
Rarely	9 (8.91)
Sometimes	16 (15.84)
Often	33 (32.67)
Always	43 (42.57)
How do you check the credibility of the source? (n=101)	
Asking a friend/family member	12 (11.88)
Checking number of subscribers	8 (7.92)
Consulting with my Dermatologist	25 (24.75)
Consulting with a Medical Professional	4 (3.96)
Doing background research on their education background and profession	52 (51.49)
Have you consulted a dermatologist regarding the acne-related content you see online? (n=101)	
Yes	48 (47.52)
No	53 (52.48)
If Yes, how frequent do you consult your dermatologist regarding the acne-related content you see online? (n=48)	
Rarely	11 (22.92)
Sometimes	26 (54.17)
Often	6 (12.50)
Always	5 (10.42)

Table 4.1 illustrates social media use as a guide for acne treatment among individuals with acne vulgaris. Of the 84 patients who have tried social media-recommended acne treatments, topical medications (92.86%) were the most used followed by diet (23.81%), DIY/home remedies (22.62%) and oral medication (17.86%). Specifically, out of the 84 patients, 66 patients were influenced by social media to try recommended cleansers, sunscreen and moisturizers (78.57%) followed by toner/serums and facial masks (73.81%). Medications requiring prescriptions such as topical retinoids (67.86%), oral isotretinoin (20.24%), oral and topical antibiotics (3.57%) were also used based on social media recommendation. Majority of the patients reported minimal improvement (46.43%) after using the acne treatment recommended on social media. Out of all the 120 participants, majority sought consult with a dermatologist due to the increase in severity of their disease (42.50%) [Table 4.2].

Table 4.1 Social media use as a guide for acne treatment among individuals with acne vulgaris (n=109)

	Frequency (%)
Have you tried any skincare products for the treatment of acne recommended on social media?	
Yes	84 (77.06)
No	25 (22.94)
What treatment options have you tried based on the recommendations seen on social media? (n=84)	
Diet	20 (23.81)
Oral medications	15 (17.86)
Topical medication	78 (92.86)
Home remedies	19 (22.62)
What specific products have you tried based on the recommendations on social media? (n=84)	
Cleansers	66 (78.57)
Sunscreen	66 (78.57)
Moisturizer	66 (78.57)
Facial Mask	62 (73.81)
Toners/Serum	62 (73.81)
Oral Isotretinoin	17 (20.24)
Rejuvinating set	17 (20.24)
Oral supplements	57 (67.86)
Tretinoin/Adapalene/Retinol/ Trifarotene	57 (67.86)
Oral antibiotics (Doxyxyxline, Lymecycline, Minocycline, etc)	3 (3.57)
Topical antibiotics (Clindamycin, Erythromycin, Benzoyl peroxide, etc)	3 (3.57)
Did you notice any change after using the products recommended on social media? (n=84)	
No change	8 (9.52)
Minimal improvement	39 (46.43)
Significant improvement	27 (32.14)
Not sure	10 (11.90)

Table 4.2. Motivations in consulting a dermatologist for acne issues (n=120)

	Frequency (%)
What prompted you to consult a dermatologist for your acne related problem?	
Social media influence	19 (15.83)
Increase in severity	51 (42.50)
Current treatment wasn't working	16 (13.33)
Recommendation of family/friends	15 (12.50)
Others, please specify	5 (4.17)
No answer	14 (11.67)

At alpha=0.05, Chi-square test of independence revealed that the use of social media to view acne-related content is significantly associated with the patient's age and highest educational attainment. Crosstabulation of responses in table 5.1 revealed that an associated relationship between highest educational attainment and the use social media platforms to view acne-related content at 0.027 p-value.

Table 5.1 Association of personal data and the use of social media to view acne-related contents (n=120)

	Yes	No	χ^2	p-value
	Frequency (%)			
Age, years				
18-25	82 (94.25)	5 (5.75)	4.443	0.035*
26 and above	27 (81.82)	6 (18.18)		
Highest Educational Attainment				
Elementary/High School Graduate	27 (100.00)	0	7.223	0.027*
College Undergraduate	45 (93.75)	3 (6.25)		
College Graduate/postgrad	37 (82.22)	8 (17.78)		
Household Average Monthly Income				
Less than 10,957	41 (93.18)	3 (6.82)	1.857	0.395
10,958 to 21,914	31 (93.94)	2 (6.06)		
21,915 and up	37 (86.05)	6 (13.95)		
Acne Severity				
Mild	52 (88.14)	7 (11.86)	1.432	0.491
Moderate	50 (92.59)	4 (7.41)		
Severe	7 (100.00)	0		

*Statistical test used: Chi-square test of independence *significant at p<0.05*

Table 5.2 show that there is no significant association between the frequency of checking the credibility of acne-related content and the personal data of participants such as age, education, income, and acne severity. Similarly, there is no significant association between the practice of consulting a dermatologist to cross-check the credibility of the acne-related content seen on social media and the personal data of participants such as age, education, income, and acne severity [Table 5.3].

Table 5.2. Association of personal data and frequency of checking credibility of acne-related content (n=109)

	N	R	S	O	A	χ2	p-value
	Frequency (%)						
Age, years							
18-25	6 (7.32)	5 (6.10)	11 (13.41)	29 (35.37)	31 (37.80)	5.291	0.259
26 and above	2 (7.41)	4 (14.81)	5 (18.52)	4 (14.81)	12 (44.44)		
Highest Educational Attainment							
Elementary/High School Graduate	1 (3.70)	4 (14.81)	1 (3.70)	12 (44.44)	9 (33.33)	11.636	0.168
College Undergraduate	2 (4.44)	3 (6.67)	10 (22.22)	12 (26.67)	18 (40.00)		
College Graduate/ postgrad	5 (13.51)	2 (5.41)	5 (13.51)	9 (24.32)	16 (43.24)		
Household Average Monthly Income							
Less than 10,957	2 (4.88)	6 (14.63)	6 (14.63)	17 (41.46)	10 (24.39)	14.098	0.079
10,957 to 21,914	4 (12.90)	3 (9.68)	4 (12.90)	6 (19.35)	14 (45.16)		
21,914 and up	2 (5.41)	0	6 (16.22)	10 (27.03)	19 (51.35)		
Acne Severity							
Mild	2 (3.85)	3 (5.77)	6 (11.54)	16 (30.77)	25 (48.08)	8.308	0.404
Moderate	6 (12.00)	5 (10.00)	9 (18.00)	16 (32.00)	14 (28.00)		
Severe	0	1 (14.29)	1 (14.29)	1 (14.29)	4 (57.14)		

Legend: N – Never, R – Rarely, S – Sometimes, O – Often, A – Always
*Statistical test used: Chi-square test of independence *significant at p<0.05*

Table 5.3. Association of personal data and consultation with dermatologist on acne-related content online (n=101)

	Yes	No	χ^2	p-value
	Frequency (%)			
Age, years				
18-25	33 (43.42)	43 (56.58)	2.073	0.150
26 and above	15 (60.00)	10 (40.00)		
Highest Educational Attainment ok				
Elementary/High School Graduate	8 (30.77)	18 (69.23)	4.132	0.127
College Undergraduate	22 (51.16)	21 (48.84)		
College Graduate/postgrad	18 (56.25)	14 (43.75)		
Household Average Monthly Income				
Less than 10,957	14 (35.90)	25 (64.10)	3.454	0.178
10,957 to 21,914	15 (55.56)	12 (44.44)		
21,914 and up	19 (54.29)	16 (45.71)		
Acne Severity				
Mild	27 (54.00)	23 (46.00)	2.182	0.336
Moderate	19 (43.18)	25 (56.82)		
Severe	2 (28.57)	5 (71.43)		

Legend: N – Never, R – Rarely, S – Sometimes, O – Often, A – Always
*Statistical test used: Chi-square test of independence *significant at $p<0.05$*

Lastly, there was no significant association between self-medication practices and the personal data of participants such as age, income, and acne severity. However, there is an association between self-medications practices based on social media recommendations and average household monthly income (p-value=0.015) [Table 5.4].

Table 5.4. Association of personal data and use of social media recommended acne treatment (n=101)

	Yes	No	χ^2	p-value
	Frequency (%)			
Age, years				
18-25	61 (80.26)	15 (19.74)	1.609	0.205
26 and above	17 (68.00)	8 (32.00)		
Highest Educational Attainment				
Elementary/High School Graduate	21 (80.77)	5 (19.23)	0.281	0.869
College Undergraduate	33 (76.74)	10 (23.26)		
College Graduate/postgrad	24 (75.00)	8 (25.00)		
Household Average Monthly Income				
Less than 10,957	36 (92.31)	3 (7.69)	8.403	0.015*
10,957 to 21,914	19 (70.37)	8 (29.63)		
21,914 and up	23 (65.71)	12 (34.29)		
Acne Severity				
Mild	37 (74.00)	13 (26.00)	2.360	0.307
Moderate	34 (77.27)	10 (22.73)		
Severe	7 (100.00)	0		

*Statistical test used: Chi-square test of independence *significant at p<0.05*

DISCUSSION

Medicine has largely been impacted by the use of social media, both in the dissemination and delivery of medical knowledge.[15] Previous studies have shown that the internet has become an increasingly popular source of health information.[15] This is significantly seen in the field of dermatology, where skincare and acne has been a popular topic online.[16]

In this study, majority of the participants (96.67%) use social media to view content related to acne vulgaris. This was more common among women, those aged 18-25 years old, with a collage education, with an average household monthly income below PhP 10,957, diagnosed with mild to moderate acne severity. Most of the participants used social media to look for treatment options and to gain more knowledge about the disease. The most used platforms were Youtube, Facebook and Tiktok, where short videos were viewed more often and content from dermatologists were preferred. Our patient demographic and source of acne-related content were consistent with a previous study conducted by Kaliyadan et al.[10] In their study, it was also seen that majority of their participants considered dermatologist to be the most trusted medical source when it comes to acne vulgaris. Although, results of our study also showed that other than content created by dermatologist (96.33%), 57.80% also viewed content created by non-medical field influencers and celebrities. This may pose as a problem in the credibility and accuracy of the content our patients have access to. Our results also showed that

majority of our participants checked the credibility of the source, however only half of the participants consulted their dermatologist about the content seen online. This discrepancy may be due to the fact that all of the participants in this study were newly diagnosed acne patients who did not have previous access to a dermatologist.

The current study found that the self-medication practices of patients with acne vulgaris leaned more towards the use of topical products such as cleansers, sunscreen and moisturizers. These results were parallel to a local study done in another tertiary hospital wherein the most frequently used products based on social media influence were cleansers and astringent.[17] However, a negative finding with the results of our study was that more than half of the participants used topical retinoids (67.86%), a few participants self-medicated with oral isotretinoin (20.24%), oral antibiotics (3.57%), and topical antibiotics (3.57%) without consulting a physician. This poses a big risk for the patients due to the numerous side effects that may result due to improper use of these medications.

Focusing on the factors associated with the use of social media, our study shows a significant association between the use of social media with age and educational attainment. Those aged 18-25 years old and those with at least a college education were more prone to view social media content related to acne vulgaris. This may be due to the fact that acne vulgaris is more common in this age group[18] and that social media use is higher in adults aged 18-29 years old.[19] Furthermore, results of this study showed that there is significant association between self-medication practices and average household monthly income noting where an increase in self-medication practices was seen in patients belonging to the lower income bracket. No association was seen between the demographic factors and checking the credibility of the content seen or consulting with a dermatologist regarding the acne-related content.

Due to the study being focused on acne vulgaris patients in Rizal Medical Center, the conclusion of the study is not applicable to the general population of patients with acne vulgaris and only holds true among the subjects of the study. This is because the research used purposive sampling and no randomization was done. Furthermore, the use of the Global Acne Grading Scale did not capture the true acne severity of the patient because affectation of the chest and back was included in the grading scale. Another limitation of the study is the use of self-administered questionnaires, which were inherently limited by recall bias, lack of self-knowledge and misinterpretation of questions. Recommendations for future research include the use of mixed method design for data collection to be able to further assist the respondents in answering the questionnaire. Further recommendations for future researchers is to include participants under 18 years of age to be able to grasp the full extent of the use of social media by patients diagnosed with acne vulgaris.

CONCLUSION

In summary, the use of social media to access acne-related content was prevalent among young female patients, of low socioeconomic status diagnosed with mild to moderate acne severity at a tertiary hospital in the Philippines. Social media has become a well-known source to obtain different acne care regimens from both medical and non-medical posts. Patient consultations should include a thorough history of self-medication practices and source of information to better educate our patients and to be able to directly address misinformation. Lastly, it is imperative that we as dermatologist understand the importance of social media presence to be able to disseminate reliable, evidence-based medical knowledge while combating false information. The choice of the right social media platform and content are important factors in reaching your target population.

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Hansen's Disease Relapse: A 5-year Multi-center, Retrospective Study on Epidemiological and Clinical Patterns in Selected Tertiary Government Hospitals in the Philippines from November 2016 to October 2021

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Abstract

Background: Efforts to control Hansen's disease have progressed through multidrug therapy implementation. However, documented cases of relapse present challenges to its effective management and eradication. Understanding the contributing factors to relapse is crucial for optimizing treatment strategies and achieving better outcomes against Hansen's Disease.

Objective: To determine the epidemiological profile and clinical patterns of patients diagnosed with Hansen's Disease Relapse in selected Tertiary Government Hospitals in the Philippines from November 2016 to October 2021.

Methodology: This was a multi-center, retrospective study involving a five-year chart review method. Charts of all Hansen's Disease Relapse patients were obtained from participating institutions with necessary approvals. Data collection followed approved forms, and patient profiles were analyzed using descriptive statistics. Pre- and post-relapse profiles were compared using T-tests, Wilcoxon tests, and Fisher's Exact Test. Relapse time across subgroups were assessed using Kruskal-Wallis and Mann-Whitney U tests.

Results: A total of 60 relapse cases were included in the study. Majority were single, unemployed males aged 26-35, with low household screening. The Bacillary Index significantly decreased post-relapse. Documented comorbidities included G6PD deficiency before treatment and lepra reactions during MDT. Patients on 12-month MDT regimens had higher relapse time than those on 24-month regimens.

Conclusion: This study underscores the influence of socioeconomic, gender, and age-related factors on relapse. It emphasizes the imperative for enhanced public health measures in accordance with the WHO Global Leprosy Strategy and the importance of considering clinical factors while advocating for continuous improvements in leprosy management protocols.

Keywords: Hansen's Disease Relapse, Epidemiological Profiles, Clinical Patterns

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Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

Hansen's Disease relapse casts a shadow on the progress made in treating this historically and culturally significant condition. Despite patients having initially completed the standard therapeutic regimen and being declared cured, the re-emergence of new clinical signs and symptoms of active disease challenges the effectiveness of the treatment. This occurrence points towards potential treatment failures, be they partial or complete, and highlights the intricate variability in the duration of incubation periods. Relapse rate is an important indicator to assess the efficacy of therapeutic regimens that is incorporated to reduce the disease transmission in the community.[1]

The World Health Organization has seen a drastic improvement in all parameters after recommending the use of Multi Drug Therapy as the standard treatment regimen in the 1980s. The regimen consists of medicines: dapsone, rifampicin and clofazimine. This treatment regimen lasts six months for pauci-bacillary and 12 months for multi-bacillary cases. However, many countries have started reporting of relapse cases even after treatment completion. This is a matter of concern in the current scenario and that continuous monitoring of relapse cases with relation to treatment completion and drug resistance would be useful to plan the next strategy to contain the disease. [2]

The Philippines achieved the goal of eliminating Hansen's Disease at the national level in 1998; however, concerns persist at the subnational level, with low case numbers still reported in various regions. In response, the National Leprosy Control Program (NLCP) of the Philippines has set a vision for the nation to be leprosy-free by 2022, aiming to sustain significant progress in eliminating the disease and achieving zero transmission and disability.[2]

To ensure heterogeneity and representativeness, we initiated a collaborative endeavor involving three tertiary government hospitals in the Philippines renowned for their strong data management. These hospitals were strategically selected to encompass a wide geographic area across the country, spanning the northern and central regions of Quezon City, as well as the southern territories. This approach is pivotal as it enables our research to offer a comprehensive understanding of healthcare dynamics throughout the Philippines.

In the light of the World Health Organization's worldwide strategy for controlling Hansen's Disease and the adoption of relapses as an indicator for the effectiveness of the program, this study will aim to characterize patients who had been diagnosed to have Hansen's Disease relapse at selected Tertiary Government Hospitals in the Philippines.

Review of Related Literature

Several studies were done to identify the factors contributing to relapse and to profile patients who were identified to have Hansen's Disease relapse. The possibility of therapeutic failure or insufficiency needs to be ruled out and the lack of uniformity of these concepts, the use of different indicators for assessing relapses, and the absence of up-to-date clinical and laboratory criteria for diagnosing relapses makes it difficult to compare different studies and impedes standardization of control programs.

In a comprehensive retrospective study of 126 leprosy relapse cases in Brazil from 2013 to 2018, researchers found that patients receiving 24 doses of Multi-Drug Therapy (MDT) had significantly better outcomes than those receiving six or twelve doses.[3] Most cases (96.03%) were multibacillary, with a median relapse interval of 10 years. Interestingly, many multibacillary patients had

negative bacillary indices, indicating that this measure may not reliably predict relapse risk.

Similarly, a cohort study from January 1994 to December 2004 analyzed 117 relapse cases and identified three key factors: an initial Bacillary Index (BI) over 20, a history of anti-reactional treatment, and the polar lepromatous clinical type.[4] Patients with polar lepromatous leprosy were four times more likely to relapse. The study also noted a higher incidence of relapse among males and a rural-to-urban case ratio of 1.29, suggesting higher rates in rural areas due to factors like limited access to MDT and poor treatment adherence.

Relapse in leprosy can vary based on leprosy type (multibacillary vs. paucibacillary), treatment adherence, and geographical factors. In a 2020 study conducted in the Philippines, researchers reviewed the records of 391 leprosy patients and found that relapse rates among smear-positive patients receiving 12 blister packs were significantly higher than those receiving 24 blister packs, which coincides with findings from international studies.[5] Key predictors of relapse included the clinical spectrum, a bacteriologic index greater than 3.5, and the number of blister packs administered.

While existing studies on leprosy relapse offer valuable insights into general patterns and predictors, our research is crucial for addressing specific gaps, particularly within tertiary government hospitals in the Philippines, where such studies are limited.

Significance of the Study

The implementation of multidrug therapy (MDT) for Hansen's disease control stands as a pivotal measure in reducing the global disease burden. Despite this progress, the emergence of relapse cases within endemic countries remains a significant concern. Understanding why relapses are occurring can lead to the development of strategies to prevent their recurrence, thus safeguarding the advancements made in controlling the disease. By identifying patterns and risk factors associated with relapse, treatment protocols and patient monitoring procedures can be improved, ensuring better outcomes for patients affected by Hansen's Disease. Furthermore, the knowledge gained from this study carries implications beyond the borders of the Philippines. Hansen's Disease is endemic in various parts of the world, and insights gained from this research can contribute to a broader understanding of relapse patterns.

Research Question

What is the epidemiological profile and clinical patterns of patients diagnosed with Hansen's Disease Relapse in selected Tertiary Government Hospitals in the Philippines?

Objectives of the Study

General Objective

To determine the epidemiological profile and clinical patterns of patients diagnosed with Hansen's Disease Relapse in selected Tertiary Government Hospitals in the Philippines.

Specific Objective

1. To describe the demographic and clinical profiles of patients diagnosed with Hansen's Disease Relapse before and after the relapse occurs.
2. To assess the difference in the bacillary index in slit skin smear of patients diagnosed with Hansen's Disease Relapse before and after relapse
3. To compare the relapse time among Hansen's Disease Relapse patients receiving 12 blister packs of multibacillary drug therapy and 24 blister packs of multibacillary drug therapy
4. To describe the precipitating/ aggravating factors (co-morbidities) which may have contributed to Hansen's Disease Relapse

METHODOLOGY

Study Design

This was a multi-center, retrospective study that involved a five-year chart review method. The charts of patients who had been diagnosed with Hansen's Disease Relapse were obtained from the participating institutions following the necessary approval process. The chart review focused on gathering data related to the epidemiological profile, including demographic and clinical profiles, as well as the difference in bacillary index in slit skin smear before and after relapse. Additionally, the study aimed to compare the relapse time between patients who received 12 blister packs and 24 blister packs of multibacillary drug therapy. Furthermore, the study investigated the precipitating and aggravating factors, such as co-morbidities, associated with Hansen's Disease Relapse. The data collection and evaluation took place at three selected tertiary government hospitals in the Philippines with a dermatology residency training program.

Study Setting

This study was conducted in selected tertiary government hospitals in the Philippines. The study spanned from November 2016 to October 2021. All Hansen's disease patients classified as relapse cases, who had undergone face-to-face or teledermatology consultations within this timeframe, were included in the study. The study involved a series of medical chart reviews which were conducted following the approval of the Department of Health-Single Joint Research Ethics Board and the Institutional Review Board (IRB) of each participating institution.

Population and Sampling Method

The study included all Hansen's Disease Relapse patients in selected tertiary government hospitals in the Philippines from November 2016 to October 2021. The researcher included everyone who met the inclusion criteria. Hence, no sampling was done since the study sample was too small for sampling.

Inclusion Criteria

All patients 15 years old and above who had been treated for Hansen's Disease by the standard regimen, released from treatment, and exhibited laboratory and clinical signs and symptoms indicating relapse in selected tertiary government hospitals in the Philippines from November 2016 to October 2021.

Exclusion Criteria

All Hansen's Disease Relapse who had insufficient record information.

Withdrawal Criteria

This study only utilized medical chart records of patients diagnosed with Hansen's Disease Relapse. Hence, there were no withdrawal criteria.

Sample Size

This study assumed that approximately 900 Hansen's Disease patients were eligible for the study. This number was based on the five-year count of one institution, multiplied by three institutions. The study by Nascimento (2021) reported a relapse rate of 11.9%, and this was also used in the sample size computation. The study proposed three sample sizes depending on the precision desired by the study. These values were computed using a 95% confidence interval and a design effect of 1.25, considering the multi-center study.

Precision	Minimum Sample
5%	171
7%	95
10%	49

With the table above, the study aimed to collect a minimum of 49 up to 171 patients to have an estimate of relapse time with a precision of 5% to 10%. This sample size estimation was computed using OpenEpi

Data Collection Tool and Method

Patient data from selected tertiary government hospitals was collected using data collection forms and chart reviews. The gathered information was methodically encoded and safeguarded within a password-protected Microsoft Excel file to ensure confidentiality. Strict security measures were enforced to guarantee that the data remained exclusively designated for the purposes of this study. All data will be deleted after a period of ten years.

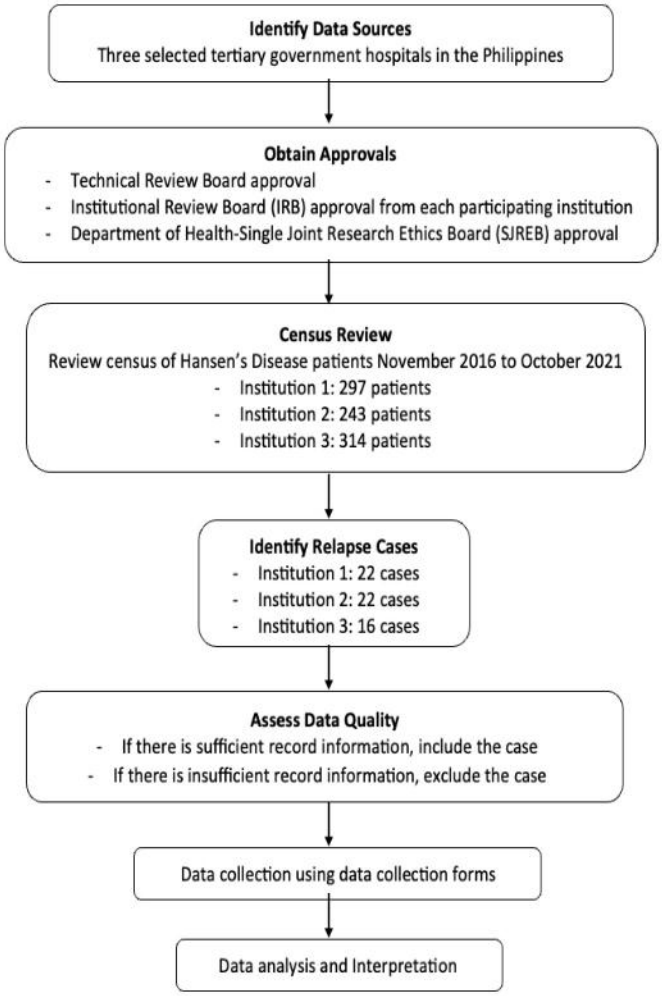
Statistical Analysis

Descriptive statistics were used to describe the demographic and clinical profiles of patients diagnosed with Hansen's Disease Relapse. This included using means and standard deviations or medians and interquartile ranges to present continuous information, and counts and percentages for categorical information.

To assess the profiles before and after relapse among patients, descriptive statistics were employed to portray subgroup characteristics. Paired T-tests or Wilcoxon signed-rank tests were used for non-parametric data or continuous characteristics. Alternatively, Fisher's Exact Test was employed for categorical characteristics.

Relapse time was calculated by evaluating the occurrence of relapse throughout the aggregated person-time of the patients. It was also disaggregated depending on therapy received. Descriptive statistics were used to present the distribution of relapse time (days before relapse after treatment) per subgroup. To assess differences across multiple groups, the Kruskal-Wallis test was utilized, while the Mann-Whitney test was employed for comparisons between two groups. Additionally, comparative boxplots were employed to provide visual representations. Moreover, descriptive statistics, comprising counts and percentages, were employed to illustrate the distribution of factors potentially contributing to the occurrence of Hansen's Disease Relapse.

Figure 1. Flowchart of Methodology



Results

Table 1.1 Profile of Hansen's Disease Relapse Patients

Characteristics	Valid N	Mean (SD)	Median (IQR
Number of Household Members	39	4 (2)	4 (3-5)
Relapse Time (days)	60	3330 (4530)	693 (254 - 5129)
Bacillary index in SSS (Initial Diagnosis)	60	2 (2)	4 (2-6)
Bacillary index in SSS (After relapse)	60	2 (1)	1 (1 - 3)
	Categories	**Count**	**%**
Age	15-25	8	13.30
	26-35	16	26.70
	36-45	12	20.00
	46-55	5	8.30
	56-65	15	25.00
	66-75	4	6.70
Sex	Male	47	78.30
	Female	13	21.70

Occupation	Unemployed	27	45.00
	Self-Employed	16	26.70
	Employed	11	18.30
	Student	6	10.00
Civil Status	Single	38	63.30
	Married	21	35.00
	Widow	1	1.70
Household members screened for Hansen's Disease	Yes	7	11.70
	No	53	88.30
Initial MB Type	Borderline Tuberculoid (BT)	3	5.00
	Borderline Borderline (BB)	4	6.70
	Borderline Lepromatous (BL)	10	16.70
	Lepromatous Leprosy (LL)	43	71.70
Diagnosis_Before	Clinical	0	0.00
	Laboratory	0	0.00
	Clinical and Laboratory	60	100.00
Previous Treatment	MDT 12 months	40	66.70
	MDT 24 months	20	33.30
Clinical Form of Relapse	Borderline Tuberculoid (BT)	1	1.70
	Borderline Borderline (BB)	7	11.70
	Borderline Lepromatous (BL)	14	23.30
	Lepromatous Leprosy (LL)	38	63.30
Diagnosis After	Clinical	11	18.30
	Laboratory	4	6.70
	Clinical and Laboratory	45	75.00
Time Until Relapse	180 below	9	15.00
	181-364 days	18	30.00
	365-545 days	2	3.30
	546 -729 days	1	1.70
	730 days	30	50.00
Bacillary index in SSS (Initial Diagnosis)	0	0	0
	1	9	15.00
	2	9	15.00
	3	7	11.70
	4	9	15.00
	5	4	6.70
	6	22	36.70
Bacillary index in SSS (After relapse)	0	6	10.00
	1	25	41.70
	2	10	16.70
	3	10	16.70
	4	5	8.30
	5	2	3.30
	6	2	3.30

Table 1.1 presents the profile of Hansen's Disease relapse patients, revealing that the most common age group was 26-35 years old (26.70%). The majority of the participants were male (78.3%), unemployed (45%), single (63.3%), and resided in households with an average size of four. Only one in every ten patients' household members were screened for Hansen's Disease. Most patients had LL (71.7%) as the initial MB Type, diagnosed through both clinical and laboratory methods (100%). Majority of the patients experienced relapse with a median time of 693 days (IQR: 254-5129). Around half of the 20 relapses occurred at the two-year post-treatment mark. 40 patients received MDT at 12 months (66.7%) and 20 patients at 24 months (33.3%). Following relapse, the majority of patients still displayed the LL clinical form (63.3%). BI in SSS had a median of four (36.7%) before relapse and one (41.7%) after relapse.

Table 1.2 Co-morbidities of Patients

Comorbidities	Valid N	With		Without	
		Count	%	Count	%
Co-morbidities (with or without)	60	28	46.70	32	53.30
G6PD deficiency (with or without)	58	15	25.90	43	74.10
Hypertension (with or without)	58	7	12.10	41	87.90
Diabetes Mellitus (with or without)	58	0	0.00	58	100.00
Tuberculosis (with or without)	58	2	3.40	56	96.60
Asthma (with or without)	58	1	1.70	57	98.30
Allergies (with or without)	58	2	3.40	56	96.60
Others (with or without)	58	3	3.40	56	96.60
Tuberculosis (N/A = 23)	37	2	8.10	34	91.90

Among the 60 patients studied, less than half (46.7%) had comorbidities, as shown in Table 1.2. The most prevalent comorbidities were G6PD deficiency (25.9%) and hypertension (12.1%). Additionally, a smaller percentage (3.40%) of patients had tuberculosis, allergies, and other infections. Only one patient (1.70%) had asthma, and there were no cases of diabetes mellitus (DM) within the sample.

Table 1.3 Newly Developed Conditions Post-Treatment

Newly developed conditions	Valid N	With		Without	
		Count	%	Count	%
Conditions that developed during MDT treatment	58	37	63.80	21	36.20
Lepra reaction (with or without)	58	30	51.70	28	48.30
Anemia (with or without)	58	23	39.70	35	60.30
Kidney Disease (with or without)	58	2	3.40	56	96.60
Liver Disease (with or without)	58	3	5.20	55	94.80
Infection (with or without)	58	6	10.30	52	89.70
Others (with or without)	58	1	1.70	57	98.30

Table 1.3 shows that 37 patients (63.80%) developed new conditions during treatment. Among these conditions, lepra reaction emerged as the most prevalent, affecting 30 patients (51.70%). Other patients developed anemia (39.70%), infections (10.30%), liver disease (5.20%), and kidney disease (3.40%).

Table 2. Within-Group Comparison of the Bacillary Index (BI) in SSS Before and After Relapse according to the Clinical Form of Relapse

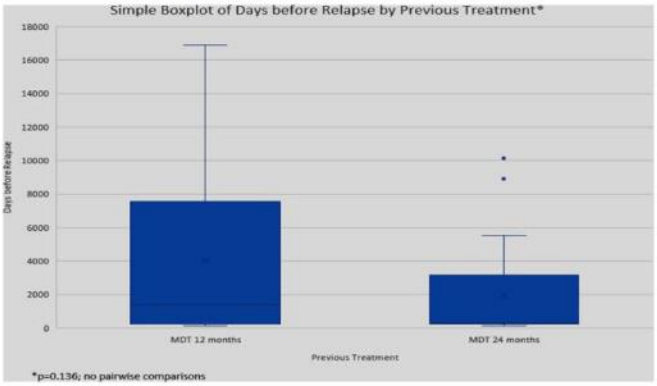
Clinical Form of Relapse	Valid N	Bacillary Index (BI) in SSS				z-value	p-value (Two-Tailed)
		Before Relapse		After Relapse			
		Median (Md)	IQR	Median (Md)	IQR		
Total	60	4	2 – 6	1	1 – 3	5.07†	0.001
Borderline Tuberculoid (BT)	1	2	2 – 2	1	1 – 1	1.00	1.000
Borderline Borderline (BB)	7	3	2 – 5	1	0 – 1	2.40†	0.016
Borderline Lepromatous (BL)	14	3	2 – 5	1	1 – 3	2.91†	0.004
Lepromatous Leprosy (LL)	38	6	2 – 6	2	1 – 3	3.90†	0.001

Table 2 shows that the median bacillary index before relapse was four (IQR = 2 to 6), while became one (IQR = 1 to 3) after the relapse. Comparative analyses showed that the median bacillary index after relapse was significantly lower than before the relapse (z=5.07, p=0.001). It can also be noted that the bacillary index after relapse for borderline borderline (BB; z=2.40, p=0.016), borderline lepromatous (BL; z=2.91, p=0.004), and lepromatous leprosy (LL; z=3.90, p=0.001) were significantly lower compared to their respective median scores before relapse.

Table 3.1 Comparison of Relapse Time by Treatment

Previous Treatment	Days before Relapse						P-value
	Count	Mean	SD	Median	IQR	Range (Min-Max)	
MDT 12 months	40	4017	4991	1409	263 - 7562	143 - 16882	0.136
MDT 24 months	20	1957	3100	301	251 - 2528	106 - 10145	

Figure 2. Comparative Baseline of Relapse Time by Treatment Group



The data presented in Table 3.1 suggests that there is insufficient evidence to definitively conclude that relapse time significantly varies based on the type of treatment received (p=0.136). However, it is noteworthy that among the 20 patients who received MDT over 24 months, relapse occurred at a median of 301 days (IQR: 251 - 2528). In contrast, among the 40 patients who received MDT over 12 months, relapse was observed at a median of 1,401 days (IQR: 263 – 7562).

Table 3.2 Within Group Comparison of Relapse Time by Treatment

Clinical Form of Relapse	Previous Treatment	Days before Relapse			p-value
		Valid N	Median	IQR	
Borderline Tuberculoid (BT)	MDT 12 months	1	611	611 - 611	.
	MDT 24 months	0	.		
Borderline Borderline (BB)	MDT 12 months	5	476	253 - 774	0.857
	MDT 24 months	2	275	275 - 275	
Borderline Lepromatous (BL)	MDT 12 months	10	321	230 - 901	0.106
	MDT 24 months	4	214	143 - 255	
Lepromatous Leprosy (LL)	MDT 12 months	24	4681	795 - 10507	0.113
	MDT 24 months	14	619	279 - 5344	

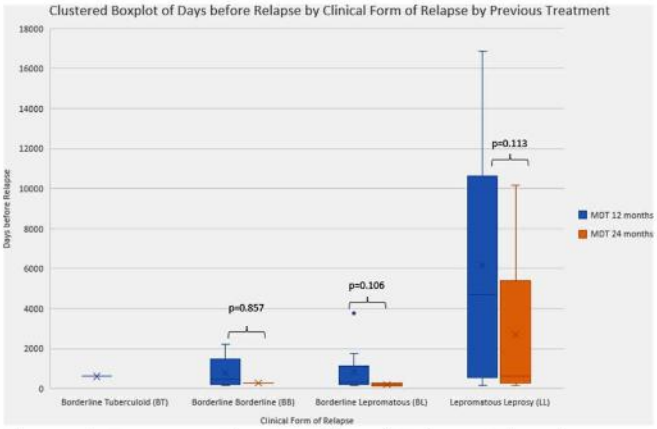


Figure 3. Comparative Baseline of Relapse Time by Treatment Group Grouped by Treatment

The results presented in Table 3.2 showed that within each subgroup, the available evidence does not support the conclusion that relapse time significantly varies based on the treatment administered (p>0.05).

DISCUSSION

Clinical Profile

The profile of 60 Hansen's Disease relapse patients provided valuable insights into demographics and clinical characteristics. Notably, there is a predominance in the 26-35 age group, comprising 26.70% of cases, with a significant majority being males (78.30%). Additionally, a substantial proportion of patients are unemployed (45%), single (63.30%), and experienced relapse with a median time of 693 days (IQR: 254-5129), with around half of the relapses occurring at the two-year post-treatment mark. These percentages suggest that gender, socioeconomic factors, and a prolonged incubation period may play significant roles in relapse risk. These findings align with an international study conducted by Gitte et al. in 2018, where they also identified a higher prevalence of relapse among males in the age group between 20-45, with relapse times ranging from one to 33 years. This parallel finding underscores the consistency of this trend across different studies.

The heightened exposure observed in individuals within this particular gender and age demographic can be attributed to their typical role as primary breadwinners for their families. This role leads to increased community interactions and, consequently, a potentially elevated risk of disease exposure. Additionally, socioeconomic factors, such as elevated unemployment rates in the context of a developing country, may contribute to lower levels of education and awareness about the disease. This educational gap could potentially result in delays in seeking medical treatment or adhering to prescribed treatment regimens.

The findings of our study further reveal important insights into the screening of household contacts of Hansen's Disease patients. Among the patients included in our study, a majority resided in households with an average size of four. However, it is noted that only one in every ten patients' household members (88.3%) underwent screening for Hansen's Disease. This low rate of screening can be attributed to the lack of consent given by family members, which is often rooted in a lack of understanding or education about the risk of contracting the disease. It is imperative to highlight that contacts of multi-bacillary (MB) leprosy patients face a significantly higher risk of developing leprosy, up to five to eight times higher, compared to individuals not living in such households. [6] Furthermore, our study underscores the significance of interventions such as chemoprophylaxis, as outlined in Pillar 2 of the WHO Global Leprosy Strategy 2016–2020, "Accelerating towards a leprosy-free world." In this context, the

feasibility and acceptability of chemoprophylaxis gain added importance, as it has been shown to be not only effective but also socially acceptable for household contacts of leprosy patients.

Majority of relapse patients studied received MDT for 12 months (66.70%), while 33.3% received 24-month MDT regimen. It is also noteworthy that the LL clinical form of the disease predominated at the initial diagnosis among the relapse cases (71.70%). These findings are significant and aligns with the observations from a local study where they concluded that relapse rates among smear-positive leprosy patients receiving 12 blister packs vs. those receiving 24 blister packs were statistically higher. [7]

Following relapse, a substantial proportion of patients continued to display the LL clinical form (63.3%). Before relapse, the majority of patients exhibited a BI in SSS of six (36.7%), while after relapse, the majority had a BI in SSS of one (41.7%). This shift in BI in SSS highlights the potential changes in bacterial load associated with relapse, which is a critical factor in disease management and echoes the significance of BI changes noted in various studies.

Co-morbidities

Among the 60 patients studied, comorbidities were observed in less than half (46.7%), as depicted in Table 2.2. The most prevalent comorbidity was G6PD deficiency (25.9%). Furthermore, a smaller percentage (3.40%) of patients presented with other conditions. It is noteworthy that comorbidities can influence the development of clinical manifestations of Hansen's Disease (HD) or its reactional states. They pose a significant challenge in the treatment of HD, as asymptomatic latent infections can reactivate when immunosuppressive therapy is administered for HD. [8]

In the context of our study, while it is evident that G6PD deficiency may have led to some patients not taking dapsone, it is important to recognize the potential consequences of discontinuing this bactericidal drug. This discontinuation could allow the bacterial load to persist or even increase, potentially contributing to relapse. Moreover, drug resistance may also play a key factor. These findings underscore the complexity of drug resistance patterns in Hansen's Disease and further emphasize the necessity for a comprehensive understanding of drug resistance in the context of this disease.

Conditions that developed during treatment

Many patients developed new conditions during treatment, with lepra reactions being the most frequently observed. Other conditions included anemia, infections, liver disease, and kidney disease. While lepra reactions do not directly contribute to relapse risk, they complicate management, especially when corticosteroids are required. Additionally, other conditions may pose challenges, as treatments for these issues can complicate overall management.

Bacillary Index

A comprehensive analysis of the bacillary index (BI) at initial diagnosis and at relapse revealed that the median BI before relapse was four (IQR: 2 to 6), decreasing to one (IQR: 1 to 3) after relapse, a statistically significant change ($z=5.07$, $p=0.001$). This reduction suggests a decrease in bacterial burden, and even a minor increase in BI should be considered substantial evidence for diagnosing relapse in previously negative patients.

The concept of "persisters"—dormant microorganisms surviving within the host despite adequate chemotherapy—warrants consideration, as they can be present in about 10% of MB patients, potentially at higher rates in those with elevated BI.[9] This highlights the importance of monitoring changes in BI for relapse diagnosis and the role of persisters in Hansen's Disease recurrence.

Relapse Time

The findings presented in Table 3.1 and Table 3.2 provide valuable insights into the relationship between treatment duration, clinical form at relapse, and relapse times in patients with Hansen's Disease. While the statistical analysis did not yield definitive evidence to suggest that relapse time significantly varies based on the type of treatment or treatment duration, these results offer several significant implications highlighting the potential flexibility in treatment regimens for Hansen's Disease patients. It suggests that the choice of treatment duration may not be the sole determining factor influencing relapse time. Moreover, it also showcased the intricate interplay between clinical form, treatment duration, and relapse times.

According to WHO, the estimated risk of relapse is a mere 0.77% for MB (multibacillary) patients and slightly higher at 1.07% for PB (paucibacillary) patients, nine years after discontinuing Multidrug Therapy (MDT). Moreover, various other studies, which utilize person- years of observation, have reported relapse rates ranging from 0.65% to 3.0% for PB leprosy and from 0.02% to 0.8% for MB leprosy. These global estimates provide essential context for analyzing the findings of this study.

The observed relapse time may be attributed to various underlying factors, including patients' clinical profiles, adherence to treatment regimens, drug resistance or the presence of particularly virulent strains of Mycobacterium leprae. Additionally, the reported variations in relapse rates in this study underscore the ongoing need for improving and refining Hansen's Disease management guidelines on a global scale.

CONCLUSION

The findings of this study provided valuable insights into the intricate dynamics and complexities of Hansen's Disease relapse. The comprehensive analysis of demographic and clinical profiles revealed compelling trends, emphasizing the impact of socioeconomic factors, gender, and age on relapse risk. The low rate of household screening for Hansen's Disease within the study population underscored the necessity for enhanced public health interventions and the importance of comprehensive screening and chemoprophylaxis, in accordance with the WHO Global Leprosy Strategy.

Patients receiving 12-month MDT regimens experienced higher relapse rates than those on 24-month regimens. While a 24-month MDT regimen appeared to be more effective in preventing relapses, it was essential to recognize that the clinical form of leprosy could significantly influence treatment outcomes. Additionally, the prevalence of comorbidities among patients and the development of conditions during treatment, while not direct causes of relapse, could impact disease management.

RECOMMENDATION

Based on the findings of this study, it is recommended that treatment surveillance and screening strategies for Hansen's disease be enhanced to improve post-treatment outcomes. The current National Leprosy Control Program (NLCP) guidelines advocate for follow-ups every three months for the first two years and annually for the subsequent five years. However, given the observed relapse times, a thorough evaluation of this surveillance framework is warranted.

The study also emphasizes the need to address risks among household contacts of Hansen's Disease patients, particularly due to low consent rates for screening. To effectively mitigate these risks, it is suggested to implement improved educational programs and awareness campaigns aimed at dispelling misconceptions and stigma associated with the disease. These initiatives should facilitate the implementation of the contact tracing and chemoprophylaxis guidelines established by the WHO. By adopting this proactive

approach, the potential for identifying latent infections among household contacts increases, which can significantly reduce the risk of re-infection and lower relapse rates. This comprehensive strategy is crucial not only for the well-being of individual patients but also for advancing global efforts to eradicate Hansen's Disease.

Lastly, to explore the complexities of relapse further, it is recommended to employ more sophisticated study designs, such as prospective cohort studies. This approach enables the systematic collection of data over time, allowing for a deeper exploration of causal relationships between treatment types, baseline clinical forms, and the likelihood of relapse. Future studies could also integrate data from a larger number of institutions, encompassing both relapsed and non-relapsed cases, to provide a more accurate representation of overall relapse risk within the population and contribute to a robust understanding of disease dynamics

SCOPE AND LIMITATION OF THE STUDY

The study was limited only to three selected tertiary government hospitals in the Philippines from November 2016 to October 2021

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Impact of the COVID-19 Pandemic on Internal Medicine Residency in the Philippine General Hospital*

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Abstract

Rationale and Objectives

The COVID-19 pandemic and the subsequent designation of the Philippine General Hospital lead to necessary adjustments in internal medicine residency training. This study investigated the impact of the COVID-19 pandemic on internal medicine (IM) residents in the Philippine General Hospital.

Methodology

A questionnaire was developed and distributed among internal medicine residents employed in the years 2020 and 2021. Qualitative data was then gathered through online and face-to-face interviews.

Results

A total of 43 Internal Medicine residents responded. This study found that the pandemic significantly affected internal medicine residents and their overall training. The participants reported changes in the number and profile of patients seen, the limited outpatient clinical exposure, the difficulties of telemedicine, and the reduced interactions with consultants and subspecialty fellows. Infection control protocols and workforce limitations also affected the number of procedures done by the residents. Resident participants reported that they were able to allot more time to studying from the textbook because of the skeletal schedules and decreased number of patients. Other learning avenues were shifted to online conferences and lectures.

The COVID-19 pandemic also brought about changes in residents' day-to-day routines, schedules, and rotations. Communicating with patients and relatives was also reported to be more difficult. Lifestyle changes varied among residents. Socialization also shifted to online avenues and social messaging platforms. Having colleagues who test positive for COVID and subsequently requiring quarantine lead to constant changes in workforce dynamics. This lead to feelings of anxiety and isolation among its trainees.

However, a number of participants still believed that the pandemic allowed them to become better physicians. This was brought about by a sense of service and pride, camaraderie among colleagues, commitment to finishing the program, financial stability, and administrative support. Still, the participants stated areas for improvement, including more consistent protocol measures, additional financial compensation, added workforce, and more transparent administrative support. All in all, participants felt that they were still able to meet the learning outcomes and minimum competencies. Majority of the participants believed the experiences brought about by the pandemic helped them become a better internist.

Conclusion

Ultimately, the new challenges from the pandemic strengthened the sense of service, resilience and clinical acumen of the residents.

Keywords: COVID, Impact on IM residents, training

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

* Philippine General Hospital

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INTRODUCTION

The Philippine General Hospital (PGH) is the national university hospital and premier referral center of the country. It has served as home to many training programs, producing specialists in various fields to serve the underserved Filipinos. It has honed many aspiring physicians, with the aim of producing doctors who are at the forefront of training, service and research while placing honor and excellence at the core. Residents are simultaneously employees and students of the institution, and thus training programs have the responsibility to ensure that quality service is delivered while at the same time developing residents' competencies (1). Residency training activities include patient rounds, academic learning sessions, research, and evaluation through examinations (2). Residents are also expected to supervise and teach medical students rotating in the hospital. They are also expected to collaborate with nurses, pharmacists, fellows-in-training and other allied health care workers.

The Internal Medicine residency training program is a three-year program accredited by the Philippine College of Physicians. It is dedicated to the prevention, diagnosis and treatment of internal diseases in adults. The mission of the PGH Department of Medicine is "to attain excellence and relevance in Internal Medicine and its specialties through the implementation of effective quality programs in primary to tertiary levels of service, training and research." (9)

In three years, trainees rotate in various parts of the hospital, acting as the primary physician-in-charge of patients, under the guidance of department consultants. The first-year residents rotate in the General Medicine wards, pay services, and ICUs. Second-year resident trainees rotate in the emergency room, subspecialty rotations, and receive referrals for co-management. The third-year residents act as the seniors of each General Medicine Service and physicians-in-charge at the ICU. Other activities of residents include monthly written examinations, annual oral examinations, department conferences and research.

However, in March 2020, PGH was designated as one of the COVID referral hospitals. This led to changes in policy, infrastructure, processes, and strategies. More importantly, this designation led to restructuring of the residency and fellowship training programs in the hospital, including the internal medicine residency training program, because of two mains reasons: restriction of the variability of admissions in the hospital to accommodate COVID-19 confirmed patients, and the closure of the outpatient department.

The new set-up necessitated limiting patient interactions, both to reduce the risk of infection and to promote efficient use of already scarce resources. These limitations have subsequently lowered the clinical exposure of trainees (1). Elective surgeries and face-to-face outpatient consults were suspended for weeks while inpatient non-COVID admissions were limited. Institutions also implemented skeletal schedules (e.g. one week on, one week off routines) and subspecialty rotations were also temporarily put on hold. Department conferences, face-to-face lectures and grand rounds were also postponed (2).

As a response to these changes, PGH, like other institutions, has been compelled to adapt new ways to educate and train its residents. Learning activities have shifted towards webinars, video lectures, and online conferences. Though useful, these still seem to be inadequate to replace the lost clinical exposure, especially for surgical fields (1, 2, 3). Schwartz et al (2020) describes that the remoteness of learning is complemented by interactive, question-based learning to engage the audience and encourage critical thinking (4). Other measures such as implementation of telemedicine, synchronous and asynchronous online structured learning activities, virtual patients, and simulators

have also been proposed and implemented (1, 3, 5). Self-directed learning remains an essential part. While clinical exposure has become limited, trainees have been encouraged to continue self-directed learning and pursuit of research endeavors (4). In the UP-PGH Department of Medicine, monthly online exams have also been done as part of trainees' evaluation (6).

The suspension of routines and traditional structures of training have placed trainees at a unique position. Fear, anxiety, uncertainty, and vulnerability are common among trainees as they are fielded on the frontlines of the pandemic. Common concerns among residents include the fear of the disease itself and of infecting others, the difficulties in acquiring and using personal protective equipment (PPE), the ethical dilemmas in dealing with critical patients, and questions of their own competency (2, 7, 8). Jaiswal (2020) also cites "lack of decisive leadership, poor infection control practices, and lack of communication" as additional problems during this time (2). Despite these, trainees continue to render service and fulfill their commitment, considering it a privilege to serve these patients (2, 6, 7).

Residents-in-training are then placed at the receiving end of many of these changes. By identifying and understanding the key issues they face with rapidly changing roles and new challenges in the context of a pandemic, we may be able to propose evidence-based solutions. Thus, we would like to investigate: what is the impact of the COVID-19 pandemic on Internal Medicine (IM) residents in PGH?

OBJECTIVES

General Objective: The main objective of this study was to describe the impact of the COVID-19 pandemic on IM residents and residency training in PGH. Specifically, this study aimed:

1. To develop a questionnaire to measure the residents' perceptions to the changes implemented during a pandemic
2. To describe changes in roles and responsibilities of IM residents during the COVID pandemic
3. To identify gaps in training from the perspective of IM residents
4. To identify solutions to the issues regarding the transition and identified gaps in training

METHODOLOGY

Design: This study made use of mixed methods (Explanatory). It consisted of 2 parts - Phase 1 is quantitative and Phase 2 is qualitative.

Population:

All male and female first to third year IM residents from the PGH Department of Medicine in 2020-2021

Inclusion and Exclusion Criteria

Inclusion criteria

- Filipino males and females
- 21 years old and above
- Employed as IM residents in UP-PGH in the years 2020 and 2021
- Consent to participate in the survey

Exclusion criteria

- Those who went on leave for more than 20% of the total number of work days during the COVID pandemic
- Residents from other residency training programs in PGH
- Resident investigators of this study

Ethical Considerations

The study was conducted in compliance with the ethical principles set forth in the Declaration of Helsinki, the Data Privacy Act of 2012, and the National Ethical Guidelines for Health and Health-Related Research of 2017. The study was reviewed and approved by UPMREB 2020-0737-01.

RESULTS AND DISCUSSION

The investigators underwent a workshop training on qualitative research methods through the efforts of the Department of Medicine Research

Committee in 2020, and developed a questionnaire. Pre-test was done on 10 residents from other departments. Informed consent was secured.

From the feedback and suggestions of those who participated in the pre-test, the questionnaire was improved by clearer questions, including durations, and putting emphasis on time points by capitalizing words such as "before", "during". It was also suggested to provide choices for most questions. The revised questionnaire was then administered to the study population.

A total of 43 Internal Medicine residents completed the survey questionnaire from a total population of 76 residents for a response rate of 56.6%.

Table 1. Distribution of Respondents According to Sociodemographic Characteristics, N=43.

Variable	Results
Age in years, Mean, Sd	27.98, 1.78 (24-35)
Sex (male), N (%)	26 (60.47%)
Civil Status, N (%)	
Single	41 (95.35)
Married	2 (4.65)
Year of entry into residency	
2018	10 (23.62)
2019	8 (18.60)
2020	18 (41.68)
2021	7 (16.28)
Year of Licensure	
2016	2 (4.65)
2017	11 (25.58)
2018	11 (25.58)
2019	16 (37.21)
2020	3 (6.98)
Living Arrangements during the COVID-19 Pandemic	
Lived alone	27 (62.79)
Lived with roommates/ housemates other than family	10 (23.26)
Lived with family	5 (11.63)
Lived with wife	1 (2.33)

During the pandemic years of training from 2020-2022, none of the residents from all year levels actually resigned or went on absence without leave. Absences or leaves were typically due to sickness from COVID-19 or other common infections like respiratory tract infections. A few went on leave because of mental health issues. When asked about their motivations to continue their residency, these were the most common answers: desire to finish training (39/43, 90.70%); financial security (31/43, 72%); commitment and sense of accomplishment, and desire to train and acquire competencies and skills (both 30/43,69.77%), and desire to serve (17/43, 39.53%).

The COVID-19 pandemic created a significant impact on internal medicine residents, and affected various aspects such as training, day-to-day changes, and lifestyle changes.

TRAINING CHANGES

The COVID-19 pandemic shifted certain aspects of the PGH Department of Medicine training experience due to a number of reasons.

Patient exposure differed in terms of patient number. The doctor-patient ratio even prior to the COVID 19 pandemic differed per area per year level. During the pandemic, roles were ever-changing and the department transitioned into a shift-based work schedule to limit COVID exposure of healthcare workers. Pre-pandemic, a first year resident rotating in the service wards handled 8-15 patients at a time. During the pandemic, the first year residents were divided into the COVID and non-COVID areas -- handling 11 - 15 and 5-6 patients respectively. A second year resident at an ER post handled 10-15 patients during a 24-hour duty pre-pandemic times. During the COVID-19 pandemic, a second year resident was assigned either in the COVID wards or at the ER and s/he may be handling 8-15 and 2-4 patients per area respectively. Prior to the pandemic, a third year resident acted as the senior of the service in the charity wards, with 15-20 patients at a time, or as

the senior resident in the ICU, handling 1-2 patients. With the COVID pandemic, third year residents were still assigned to the medical critical care unit, reporting for work i 8-hour shifts. In the ICU, each resident handled 8-12 patients per shift at the height of the COVID-19 admissions. For some, the number was initially manageable as patients only had COVID and simple comorbidities, but in the succeeding months, the complexity of cases grew and became similar to the quality of patients handled pre-pandemic. The participants reported that the patient number was less in certain areas of assignment, particularly in the non-COVID areas, during the pandemic. Although there was a reduction in the patient number, there were still a variety of cases. The residents who were rotating both at the nonCOVID and COVID areas report that the set-up allowed exposure both to must-know cases and this then new disease entity. Residents who were assigned to the ICU report that there was improved clinical acumen in handling the severe forms of diseases (i.e. Acute Respiratory Distress Syndrome was not as commonly seen compared to pre-COVID period). Some informants felt fortunate that in Internal Medicine, training was not compromised since COVID patients are still largely medical, in contrast to surgical fields whose operations were significantly decreased due to reduction in elective admissions.

The participants' outpatient clinic exposure suffered from the COVID-19 pandemic and the consequential quarantine restrictions. The traditional in-person consults have been halted for months, and with the eventual transition to telemedicine. While the participants viewed telemedicine as the only way to follow-up patients at that time, many found it difficult for the following reasons: no proper training was received; near-impossible comprehensive assessment was frustrating; the process of sending materials back and forth was tedious; and consults were subjected to many technical difficulties. Expertise on managing cases of ambulatory clinic quality was compromised and the telemedicine practice failed to fill in the gaps. It was also OPD training that was also the last to adapt back to face to face consults, which only resumed fully in 2022.

Consultant guidance varied among different areas. In the wards during the pre-pandemic times, consultants were assigned to a service for a month. They do rounds with the trainees on varying frequency, from twice weekly to once in two weeks. With the COVID-19 pandemic, consultant assignment was initially on a daily basis. Virtual rounds through Zoom happened almost daily, but this eventually became less frequent. The participants report that they felt the lack of bedside endorsement especially in the COVID wards something that can be improved on. Residents also mentioned that the opportunity for consultants to provide feedback on demo/return-demo procedures was significantly decreased. In addition to this, interaction with subspecialty fellows which was helpful before the pandemic and was viewed as an opportunity to discuss patient cases and reinforce residents' knowledge of the case declined during the pandemic, with conversations and questions coursed mostly through messaging. In contrast, residents rotating in the COVID ICU report that the daily multidisciplinary conference, though virtual, was immensely helpful.

Procedures traditionally honed during training include endotracheal intubation, paracentesis, and thoracentesis to name a few. The participants rotating in the COVID ICU report that these procedures were performed less often due to the protocols in place - this means that these cases are referred to subspecialty or other services (e.g. pulmonology or interventional radiology). Even intubations during peak of the pandemic were deferred to the Anesthesiology Airway team, hence there were less opportunities then to try these procedures. They also cite that the use of PPE, particularly the hazmat suit with goggles and face shield was prohibitive. These reasons make the residents feel less confident in

performing the procedures by themselves. In contrast, residents rotating in the ER report that they performed more procedures because of the limited workforce provided in the ER setting. Because of the absence of other members of the healthcare team like the medical interns, residents had to carry out orders made, such as blood extraction of stat laboratories, arterial blood gases and collection of microbiologic cultures.

Time spent studying the textbook (Harrisons Principles of Internal Medicine) and guidelines was reportedly increased during the pandemic period. The 2-week off period for every 1 week of work shift provided time to study. The participants cite that there were less distractions (commercial entertainment or leisure activities were prohibited), objectively less work, and studying diverted their attention and took their minds away from the anxiety due to the global crisis. Before the pandemic, it was almost impossible to study for a first year resident rotating in the wards due to the heavy workload. Learnings mainly came from the cases encountered and it was difficult to keep up with the matrix for the periodic examinations. However, during the pandemic, the first year residents were able to cover a great portion of the coverage of these exams - reportedly studying for almost 2 hours daily for a period of two weeks. Examinations during the pandemic were done online via Google form, open over a 3 day period, taken at a convenient time for the resident. Some participants report that they favored the previous set up in the sense that there was a more structured approach before and after the pandemic - there was more pressure to study and the exam proper setting set the mood. Others say that more patient exposures before the pandemic helped because handling the cases personally helped with knowledge retention beyond the scope of exams.

Conferences were an avenue for learning for the participants. During the pandemic, there was a shift to virtual setting with 2-3 weekly webinars and Zoom lectures from the consultants. Participants report that the skeletal schedule allowed them to attend these conferences with a present mind, while others prefer the in-person department conferences and lectures which evidently dwindled with the pandemic. Postgraduate conferences outside of PGH were limited as well -- which was an opportunity to go out and participate in quiz bees. With the COVID-19 pandemic, conferences increased in number, but these were mostly, if not all, virtual. A participant felt that these were a lot less engaging hence less fruitful.

THE RESIDENCY EXPERIENCE

Changes in Day-to-Day Patient Care

The bedside dynamic in patient care was also affected by the changes brought about by the pandemic. In general, resident's schedules and rotations became more unpredictable and would change on a weekly or monthly basis based on the need and some residents had difficulty adjusting to these sudden changes and uncertainties.

Majority of the participants said there were added steps to seeing patients, including the donning and doffing of PPE and the safety protocols that must be followed, and the "mental and psychological pressure" and the "asphyxiating feeling" of staying 8 hours in PPE. Some residents felt that doffing the PPE to take a break in between the 8 hours was wasteful, and would just push through the entire 8 hour shift. As a structural barrier, the PPE also affected the way patient interaction was carried out, making it harder to hear patients and communicate with them, and affecting bedside examinations such as auscultation. Despite the PPE, there was also the psychological torture and fear of contracting the disease, at a time when very few information was available about the disease, and patients and fellow doctors were dying left and right.

With the 8-hour shift-based work, establishing rapport with and getting to know the

patient on a deeper level, which used to be easy before the pandemic, was a challenge. Instead of being the resident in charge, some residents felt that they did not know the full picture of the patient, just the current problems, and what was going on at the moment. At the time when management of COVID was new and no formal guidelines have been released yet, residents also felt the need to rely on Infectious Disease Service's direction in patient management. Residents also mentioned feeling the need to go the extra mile by being more perky and friendly in order to establish rapport.

Communicating with the relatives also proved to be more difficult. Especially for invasive procedures in patients who could not give their own consent, There are instances where it is the first time a COVID critical patient is managed by a resident and at times, where a patient deteriorates and expires in a shift, the ICU physician on duty feels like a stranger, introducing himself to the family for the first time, at such a crucial moment to relay the bad news. In times like these, residents strive to adapt in order to convey empathy rather than to make the process simply transactional.

Personal Lifestyle Changes

For some residents, there were also personal lifestyle changes that resulted from the pandemic. For some, it was a shift to a more sedentary lifestyle as they stayed at home more, and shifted to food deliveries for convenience. Despite the free time they got from weeks off there was little motivation to workout. However for the others, the pandemic made them put greater importance on their health as they started to become more active and have healthier food choices. There was also more time for rest and sleep, particularly in the initial 1 week duty, 2 weeks off duty cycle.

Another lifestyle change among residents was the inability to socialize as much face to face. Previous vacations and dinners outside which were often used to destress were all halted in the pandemic. For some though, the pandemic was an opportunity for them to use social messaging apps in order to update their loved ones and keep in touch with their families more frequently. For some the habit of asking family members daily how they are feeling has been carried over to this day.

According to the participants, the pandemic brought about feelings of anxiety from too many changes occurring rapidly, including having to cover for workmates who test positive; isolation due to inability to come home to loved ones, limiting the much needed sanity breaks; and burn out due to the repetitive nature of work.

MOTIVATION DESPITE PANDEMIC

Through the key informant interviews, the researchers were able to delve into the residents' motivation to proceed with the Internal Medicine Residency Training Program despite the challenges brought about by the COVID-19 pandemic.

Sense of service was one of the most cited reasons for staying in the program. Working in a COVID referral center, the participants felt that they had their key role as physicians during a time of health crisis. It was an obligation the residents felt proud to fulfill. As the hospital system was overwhelmed, the participants saw that there was really a need to stay in the workforce.

Camaraderie within the hospital, or particularly within the department was highlighted during the pandemic. Hierarchical barriers from seniority were broken down. There came a time when consultants and fellows go on 24-hour duties, senior residents shared the roles with the junior residents, and there was an open line of communication within the team. Trust was built among the participants and other members of the health care team.

The participants also cited that the **commitment to the program** pushed them to carry on. Finishing the program aligns with the

participants' career plan - which was ultimately to become an internist. It also gave them a **sense of pride** to have served during a pandemic. Internal medicine is a field of interest of the participants, and working at a COVID referral helped pave the way to be up to date on the latest evidence and practice on this new disease.

The training program provided **financial stability** for the participants in the form of a steady source of income at a time of economic uncertainty. A number of participants were earning for the first-time and felt secure in having a regular paycheck.

Administrative support also helped the residents continue to perform their duties. The Executive Committee members composed of the senior consultants directly kept in touch with the residents. Consultation and debriefing were done especially for major changes in the work flow. Small group discussion or processing was done with a Psychiatry consultant. The strong support from the Department of Medicine to the residents gave the latter reassurance despite the concerns for safety, and ever-changing expectations and roles.

What was Good, and What Needed Improvement

All the residents appreciated the support that came in different forms, such as counseling services and psychosocial processing sessions with the Department of Psychiatry which played a big role in easing out issues and anxieties. There was also support in the form of a steady supply of PPE from the hospital. Furthermore, public support in terms of food packages and goodies for frontliners were appreciated.

Despite this, others wished for improved quality of support specifying a more empathic and healthcare worker centered approach, "taking care of the ones who take care of the patients." In particular, some residents would have wanted a more consistent protocol of the hospital in terms of quarantine rules when exposed to a positive case and duration of isolation. There were some who felt that the duration was shortened for Department of Medicine residents and that the threshold for testing and isolation was different compared to other departments, just because Internal Medicine was the "most frontline specialty" in the pandemic. Although these residents understand that if the same protocol was applied to the department, the number of duty residents will be critically low, along the way it made them feel like a pawn in battle, and wished that the department would have been more assertive and protected its residents more.

Others wished for more support from their colleagues especially for those who were incidentally positive but asymptomatic, in sharing the load of clinical work left behind particularly for work that can be done remotely such as seeing Telemedicine patients. Finally, for others, additional financial incentive/compensation for the amount of effort IM residents put in as front liners would have been appreciated. Others felt that the hospital should have hired more staff since lack in manpower and shortcomings in patient service is often compensated for by residents who do the procedures (ABG, extractions, blood run).

In terms of support from the hospital, others would have appreciated more transparency and consultation with stakeholders. Some residents felt that it was all commands coming from the higher ups and one had no choice but to comply with the top down, more than bottom up approach. For them, plans could have been relayed earlier so there was time to digest and react before a change is implemented. Others added that they wished for more visibility among consultants and hospital administrators, and hoped that they listened more.

HOW THE PANDEMIC SHAPED THEM AS AN INTERNIST

In general, when asked if they would have been a different internist without the pandemic, all said yes. In terms of competencies, some felt that

they were able to achieve the learning outcomes and minimum competencies, set by residency, however they felt that they would have been a "well-seasoned internist" in terms of the variety of patients seen and they would have been more confident doing procedures independently if not for the pandemic.

Contrary to this, others felt that it was the same because what was lacked in quantity was made up for in quality. In addition, they believed they had an advantage because of the pandemic, learning to be an "intensive internist" being more equipped in handling ICU cases.

The pandemic removed the monotony of the everyday life of an Internal Medicine resident in terms of routine. It was a different kind of push in the aspect of character building compared to regular residency, and because of this, majority felt that the pandemic made them a better internist in terms of character, attitude and resilience. Others added that seeing patients die alone and with an audio recording or a voice call as their family's only last line of communication, the pandemic further emphasized the humanistic side of medicine for them. Furthermore, the pandemic reaffirmed the sense of duty residents had to their patients and brought forth selflessness and moral courage, leaving a stronger batch of residents and a stronger department for it.

The limitations of the study include: some sensitive information might have been withheld by interviewed participants because there was only one interview session. Participants may not have enough time to discuss their experiences in its entirety.

The investigators recommend correlating outcomes such as grades, procedure log, and patient census to have an objective measure of outcomes pre and during the COVID 19 pandemic. Future studies can explore the long-term impact of the consequent training adjustments made during the pandemic. Mental health issues triggered and/or unmasked during the pandemic can be examined deeper. The study did not specify a particular post-pandemic timeline - an area of study which can be probed further now that we have transitioned to this "new normal" globally.

Conclusions

The residents of the Philippine General Hospital Department of Internal Medicine were tested by the challenges from the COVID-19 pandemic, being at the forefront of a COVID referral center. Necessary adjustments have to be made to make up for the lack of manpower and in compliance with national and local health policies. Consequently, these have impacted on the number and profile of patients seen, procedures done, and bedside clinical skills practiced. The global crisis also stirred feelings of anxiety and isolation in the participants. A lot of the participants feel that the COVID-19 pandemic, while posing restrictions, helped shaped them to become better physicians. Ultimately, the new challenges from the pandemic strengthened the sense of service, resilience and clinical acumen of the residents.

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Comparison of the Surgical Outcomes of Minimal Incision and Elliptical Excision in Treating Epidermal Inclusion Cysts: A Single-Center, Randomized Controlled Trial*

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Abstract

Introduction: Epidermal inclusion cysts require surgical intervention to prevent recurrence and symptoms. Elliptical excision is definitive but results in longer scars, while minimal incision techniques offer better cosmetic outcomes despite higher recurrence rates probably due to incomplete excision. To date, there are currently no local studies published.

Methodology: A randomized controlled trial was conducted from October 2023 to May 2024 at a dermatology center in the Philippines. Patients were randomly assigned to minimal incision or elliptical excision techniques. Key metrics included operation time, scar length, post-operative complications, Hollander wound evaluation score (HWES), and histopathological completeness of excision.

Results: Median operation duration was 31.86 minutes, with no significant difference between techniques ($p = 0.5795$). Post-operative scars were longer in the excision group (mean: 2.38 ± 0.66 cm) versus the minimal incision group ($p < 0.001$). Completeness of excision was higher in the excision group (83%) compared to the minimal incision group (27%) ($p = 0.0123$). Follow-up scar length was shorter in the minimal incision group (mean: 0.44 ± 0.21 cm) versus the excision group (mean: 2.1 ± 0.63 cm) ($p < 0.001$). HWES scores showed no significant difference in wound healing and aesthetic satisfaction.

Conclusion: Minimal incision technique results in shorter scars but lower completeness of excision compared to elliptical excision. Both techniques have similar long-term outcomes in wound healing and aesthetic satisfaction, with no recurrences or complications beyond two weeks. The choice should balance scar length and completeness of cyst removal, considering patient-specific factors.

INTRODUCTION

Epidermal inclusion cyst typically present as slow-growing, benign, mobile, subcutaneous or dermal nodules with a central punctum. It can either be congenital or acquired, and usually arises from plugged pilosebaceos units. In 2022, 80 cases of Epidermal inclusion cyst was seen at EAMC Department of Dermatology, 46 of which were newly diagnosed cases. Without surgical treatment, epidermal inclusion cyst seldom resolves spontaneously. Treatment is usually not necessary unless desired by a patient for cosmetic purposes or before it results in an increase in symptom severity (such as infection and/or pain).

Complete elliptical surgical excision or destruction of the cyst with its wall intact is the definitive treatment, and is required to prevent

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recurrence of the lesion. (1) An alternative surgical procedure is minimal incision technique with the extraction of the intact cyst through the defect created on the lesion. In comparison to the standard surgical excision technique, minimal provides better cosmetic outcomes; however, recurrence rates from 1-8% have been observed in the minimal incision technique (2).

To date, the literature is poor regarding the comparison of surgical outcomes of minimal incision technique and elliptical excision techniques, especially in our local setting. Hence, the primary investigator aspires to fill the gaps in this knowledge in a prospective, randomized study among Filipino patients with Epidermal Inclusion Cyst.

OPERATIONAL DEFINITION

Sex- Gender assigned at birth (Male or Female)

Site- Truncal (lesions involving the chest, abdomen, and back)
Non-truncal (lesions involving the extremities and head)

EIC Duration- Duration in years from the time the lesion was first noted by the patient until consult with the primary investigator

EIC Diameter- Largest measured diameter of the lesion in millimeter

Operation Duration- Time, in minutes, from start of incision/excision to closing of the wound

Scar Length- Longest length of post-operative scar measured in millimeter

Completeness of excision based on histopathology- is defined as the absence of sebaceous glandular tissue or remnants of the cyst wall in the examined tissue sample. A complete excision would show no evidence of residual sebaceous glandular tissue, cystic structures, or inflammation associated with the cyst.

Table 1. Hollander Wound Evaluation Score

Incision Attribute	Score if Absent	Score if Present
Step-off borders	0	1
Contour Irregularities	0	1
Margin Separation	0	1
Edge Inversion	0	1
Excessive Distortion	0	1
Overall Appearance	0 (satisfactory)	1 (unsatisfactory)
Total Hollander Score	0 (best)	(worse)

REVIEW OF RELATED LITERATURE

Treatment of stable, uninfected epidermoid cysts is optional; however, intermittent drainage of malodorous keratinous debris, secondary bacterial infection, and cosmetic concerns may urge patients to seek removal of the lesion (3). There are different techniques done in removing epidermoid cysts which include elliptical excision, minimal incision technique, milia excision technique, and punch technique. In all approaches, it is best to completely remove the lining or wall in all cyst to decrease the risk of recurrence. Ideally, epidermal inclusion cysts are surgically removed when noninfected, noninflamed, and non-ruptured.

Elliptical excision is considered the gold standard of treatment, especially for ruptured, inflamed, or previously infected cysts that may be scarred and attached to surrounding tissue (4). This technique involves the excision of the entire cyst and surrounding tissue as a whole, and has almost no recurrence compared to other less invasive techniques. However, this technique is more time-consuming and often results in longer linear wounds and scar, which can be approximately the same size of the cyst, raising cosmetic concerns among patients (3).

The minimal incision technique is an alternative approach in removing uncomplicated epidermoid cysts. A small incision, approximately 1/3 the diameter of the cyst, is made with a no. 11 surgical blade; the contents of the cyst are then expressed by exerting a lateral pressure on the

cyst, and the cyst wall is removed through the incision (5).

The minimal incision technique causes smaller scar and better cosmetic results than the standard excision and is the preferred procedure for cysts in cosmetically sensitive areas. However, it has the risk of leaving residual cyst wall which may result in recurrence of the cyst. Recurrence rates of approximately <1 to 8 percent have been reported with the minimal incision technique (2, 6 ,7). In a prospective, randomized study done by Alijanpour et al in 2018 (8), minimal incision technique lead to smaller mean length of wounds, and shorter operative time producing a superior cosmetic result. In the same study, the recurrence rate after a 24-month follow-up in elliptical excision (3.3%) was not significantly different from that of the minimal incision group (2.8%).

SIGNIFICANCE OF THE STUDY

At present, there has only been a few studies directly comparing surgical outcomes of minimal incision technique and the traditional elliptical excision technique in a prospective, randomized method. Moreover, to the best of the investigator's knowledge, there has not been any similar study in our local setting. Hence, the purpose of this study is to compare the cosmetic outcomes, average operation time, and postoperative complications, completeness of excision based histopathology results of minimal incision technique versus the traditional elliptical excision technique in the removal of epidermal inclusion cyst.

Comparing elliptical excision versus minimal incision surgery in the surgical removal of epidermal inclusion can have various clinical impacts on different stakeholders, including patients, clinicians, institutions, and future research.

1. Patients:
    - Clinical outcomes: The study can provide insights into the efficacy and safety of both techniques, allowing patients to make informed decisions about their treatment options.
    - Cosmetic results: Patients may benefit from understanding the potential differences in scarring and wound healing between the two approaches.
    - Recovery and post-operative care: The study findings can help patients understand the expected recovery time, pain levels, and post-operative care requirements for each technique, aiding in their decision-making process.
2. Clinicians:
    - Treatment selection: The study can assist clinicians in selecting the most appropriate surgical technique based on factors such as the size, location, and characteristics of the sebaceous cyst, as well as the patient's preferences and clinical considerations.
    - Surgical outcomes: Clinicians can use the study findings to evaluate the effectiveness of their current approach and consider modifications to optimize patient outcomes.
    - Standardization: The study may contribute to establishing standardized protocols or guidelines for the management of sebaceous cysts, ensuring consistent and evidence-based care.
3. Institutions:
    - Resource allocation: Understanding the clinical impact of each technique can help institutions allocate resources, such as surgical equipment and training, to support the chosen approach.
    - Cost-effectiveness: Comparative studies can provide insights into the cost-effectiveness of different surgical techniques, helping institutions make

informed decisions regarding reimbursement and resource allocation.

4. Future research:
    - Advancing knowledge: The study can contribute to the existing body of knowledge regarding the surgical management of epidermal inclusion cysts, potentially prompting further research in related areas.
    - Methodological improvements: Findings from the study may highlight limitations or areas for improvement in the current techniques, stimulating research aimed at refining surgical procedures or developing new approaches.
    - Comparative effectiveness research: The study can inspire additional comparative studies to explore different surgical techniques or compare them to non-surgical approaches in removing epidermal inclusion cysts.

RESEARCH QUESTION

Is minimal incision technique superior to elliptical excision technique in the surgical management of epidermal inclusion cyst?

OBJECTIVES

General

The goal of the study is to compare the minimal incision technique versus the elliptical excision technique in the surgical management of epidermal inclusion seen at the Department of Dermatology from October 2023 to May 2024.

Specific

The specific objectives are:

1. To compare minimal incision versus elliptical excision of epidermal inclusion cyst on the basis of operation time, scar length, post-operative complications, and Hollander wound evaluation score (HWES).
2. To compare minimal incision versus elliptical excision of epidermal inclusion cyst in terms of completeness of excision based on histopathology.

METHODOLOGY

Study Design

This study employed a single-center, randomized controlled trial design.

Study Setting

The study was conducted at the Out-Patient Department of the East Avenue Medical Center Department of Dermatology, a tertiary government hospital located in Quezon City, Metro Manila, from October 2023 to May 2024.

Study Population

Subjects were recruited from the patients seen at the Out-Patient Department of the East Avenue Medical Center Department of Dermatology.

Inclusion Criteria

- Male or female aged over 18 years.
- Diagnosed with epidermal inclusion cysts less than 3 cm in size.
- Received a clinical diagnosis of an epidermal inclusion cyst at the East Avenue Medical Center Department of Dermatology's Out-Patient Department or through Teledermatology.

Exclusion Criteria

- Refused to consent to participate in the study.
- Had epidermal inclusion cysts greater than 3 cm in maximum diameter.
- Exhibited signs of active infection or had suspicion of malignancy.
- Had recurrent epidermal inclusion cysts.
- Had clinically diagnosed epidermal inclusion cysts with a final histopathologic diagnosis inconsistent with epidermal inclusion cysts.
- Were likely to be lost to follow-up.

- Had an allergy to Lidocaine.
- Did not consent to any of the procedures in the study.
- Had underlying systemic illness or conditions such as uncontrolled diabetes, bleeding disorders, or compromised immune function.
- Were pregnant.

Withdrawal Criteria

Subjects could withdraw from the trial at any time without any implications for their medical care. Reasons for withdrawal included:

- Participant request: Participants had the right to withdraw from the study at any time for any reason, including discomfort, adverse effects, or personal reasons.
- Adverse events: Participants experiencing significant adverse events or complications related to the sebaceous cyst removal procedure during the study could be withdrawn from further participation.
- Medical reasons: Participants who developed a medical condition or experienced a change in health status that affected their eligibility for the study or posed a risk to their well-being could be withdrawn.
- Loss to follow-up: Participants who became unreachable or failed to attend scheduled follow-up visits without providing a valid reason could be withdrawn from the study.

Sampling Design

Patients with epidermal inclusion cysts seen at the Out-Patient Department of the East Avenue Medical Dermatology Department were recruited for the study.

Subjects were randomly assigned into two groups using block randomization through a Microsoft Excel number generator: treatment A (minimal incision group) and treatment B (elliptical excision group). Randomization was carried out by a co-author who did not perform the surgical procedures.

For all patients who agreed to participate, photography of the affected site (with standardized angle, lighting, and position) and measurements of the lesion length were documented from baseline to follow-up. Photography was conducted by the primary investigator in a consistent room and background setting for all participants. A ruler was included in the frame to provide a size reference for the lesion. The distance and angle between the camera and the lesion were kept consistent to enable accurate comparison of photographs over time. Standard patient poses were used for consistent framing.

To protect the anonymity of participants, each participant was assigned a unique identification code upon enrollment. These codes were used in the summary of results instead of names or other possible identifiers.

Sample Size

A sample of 23 subjects was recruited, accounting for an anticipated dropout rate of 20%, with a target actual sample size of 16 subjects satisfying the inclusion criteria. The study aimed to include at least eight subjects in each group subjected to minimal incision and elliptical excision techniques for removing epidermal inclusion cysts. The sample size calculation was based on the comparison of wound lengths between two similar techniques as described by Chen et al. (2006). The comparison factor, wound length, was selected for its feasibility in power analysis compared to other factors in related studies. A two-sided, two-sample t-test between the technique groups with a significance level of 0.05 and power of 0.8 indicated that approximately 7-8 subjects per group would be sufficient to detect differences between the groups.

Study Outcomes

The primary outcomes of the study were the average procedure time, average scar length, and completeness of excision based on histopathology. Secondary outcomes included

complications and Hollander wound evaluation score (HWES).

Data Collection Tool and Method

Participants were recruited from the Out-Patient Department of the East Avenue Medical Center Department of Dermatology, following approval from the Institutional Ethics and Review Board of the East Avenue Medical Center.

The co-author carried out the recruitment of participants. Informed consent was obtained from those who qualified for the study after the study protocol, benefits, and risks were explained before treatment commenced. Participants were informed of the two possible treatments to which they could be assigned.

Surgical Procedure

All surgical procedures were performed by the primary author. The minimal operative surgery was based on the method described by Nakamura (9) and Rao et al (5).

1. The skin was prepped, and the area around the cyst was anesthetized with 1% lidocaine with epinephrine.
2. Using a #11 blade, an incision approximately 1/3 the size of the cyst was made on the central part of the cyst.
3. The contents of the cyst were expressed through the incision by applying compression.
4. After complete expression, the cyst wall was removed using a hemostat via the incision opening. In cases where the cyst wall could not be completely exuded, careful dissection using a hemostat and/or scissors was performed to aid in complete evacuation.
5. The wound was examined to ensure the entire cyst wall was removed.
6. Direct pressure was applied to the post-operative wound using sterile gauze, and interrupted and deep buried stitches were used to close the wound.
7. A topical antibiotic ointment and appropriate dressing were applied, and all patients were instructed to self-dress the wound until all signs of discharge disappeared.
8. The entire extracted cyst wall and contents were sent for histopathologic examination.

The conventional elliptical excision was based on the method described by Suliman (10). Preoperative preparation and anesthesia were identical to those described for the minimal incision technique. An elliptical excision was made based on the size of the cyst and the skin tension lines, with the major axis designed to be as small as possible for optimal cosmetic results.

1. An ellipse was drawn over the cyst with the punctum in the middle.
2. Using a no. 15 blade, a full-thickness skin incision was made along the drawn ellipse.
3. The skin was undermined to separate it from the cyst wall, and the angles of the ellipse were released first to facilitate dissection and removal of the cyst.
4. Finally, the whole cyst was dissected out, and the wound was closed with interrupted and deep buried stitches.
5. A topical antibiotic ointment and appropriate dressing were applied, and patients were instructed to self-dress the wound.
6. The extracted cyst wall and contents were sent for histopathologic examination.

Data including the date of operation, age and sex of the patient, location (truncal vs non-truncal), size of the cyst (maximum diameter in millimeters), length of the wound (maximum length in millimeters), procedure time (in minutes, from first incision to wound closure), and histopathology results were recorded.

Patients were followed up with a 2-week post-operative visit to measure the scar length (in millimeters), Hollander wound evaluation score (HWES), and identify complications. Follow-up

consults were conducted at 1 and 3 months post-operation to record complications and HWES scores. The co-author who did not perform the surgical procedures conducted the evaluations during follow-up consults.

Statistical Analysis

Univariate analysis

To summarize the general and clinical characteristics of the participants, descriptive statistics were employed. Nominal variables were evaluated using frequency and proportion, non-normally distributed interval/ratio variables were assessed using median and range, and normally distributed interval/ratio variables were evaluated using mean and standard deviation.

Shapiro-Wilk

The Shapiro-Wilk test was used to assess the distribution of numeric variables. Those not deviating from normality will be further assessed using parametric tests while those deviating from normality will be assessed using non-parametric tests.

Bivariate analysis

To determine the differences in mean, median, and frequency between two groups, independent T-test, Mann-Whitney U test, and Fisher's Exact/Chi-square test were utilized, respectively. These were performed to compare the distributions between the minimal incision and excision groups. Tests were performed with a two-sided hypothesis.

Missing variables were not replaced or estimated, and the null hypothesis was rejected at a 0.05α-level of significance. Data analysis was conducted using R 4.3.1.

Limitations of the Study

The sample size of this study was limited to the number of epidermal inclusion cyst cases seen at the Outpatient Department of East Avenue Medical Center that met the inclusion criteria.

ETHICAL CONSIDERATION

The study protocol was submitted to the Technical Review Board and Institutional Ethics and Review Board of the East Avenue Medical Center for review and approval. The study adhered to the guidelines outlined in the NEGRIHP 2022 and complied with the legal requirements of the DATA PRIVACY ACT 2012. Data gathered, including age, gender, location, and dermatologic diagnosis of the participants, were kept confidential. The identity, privacy, and confidentiality of all participants were protected. The identity of the participants remained anonymous throughout the study. All reference materials and sources used in the study were properly cited. The study was an individual-initiated research project required for residency training under the Department of Dermatology. The primary investigators were not associated with any sponsors or organizations and did not receive any monetary or other benefits for conducting this research. There were no conflicts of interest to declare.

RESULTS

Table 1. Demographic and procedure profile of participants by procedure techniques.

	Total (n=10)	Minimal Incision (n=11)	Excision (n=12)	p-value
	Frequency (%) Mean ± SD; Median (IQR)			
Age, years	Mean: 48.74 ± 14.53, Median: 52 (19-71)	Mean: 41.64 ± 17.52, Median: 41 (19-71)	Mean: 55.25 ± 6.8, Median: 55 (43-66)	**.0315**[t]
Sex				.6843[f]
Male	11 (47.83)	6 (54.55)	5 (41.67)	
Female	12 (52.17)	5 (45.45)	7 (58.33)	
Site				.6957[c]
Face	2 (8.7)	2 (18.18)	0	
Right cheek	1 (4.35)	1 (9.09)	0	
Neck	1 (4.35)	0	1 (8.33)	
Right neck	1 (4.35)	1 (9.09)	0	
Right axilla	1 (4.35)	0	1 (8.33)	
Back	7 (30.43)	4 (36.36)	3 (25)	
Upper back	3 (13.04)	1 (9.09)	2 (16.67)	
Right upper back	1 (4.35)	0	1 (8.33)	
Left back	1 (4.35)	0	1 (8.33)	
Right back	1 (4.35)	0	1 (8.33)	
Lower back	4 (17.39)	2 (18.18)	2 (16.67)	
EIC Diameter, cm	Mean: 1.25 ± 0.69, Median: 1 (0.3-2.9)	Mean: 1.44 ± 0.73, Median: 1.5 (0.3-2.8)	Mean: 1.07 ± 0.62, Median: 0.9 (0.5-2.9)	.1936[m]
Operation duration, minutes	Mean: 31.86 ± 15.5, Median: 28.83 (8.68-79)	Mean: 32 ± 19.61, Median: 27.95 (8.68-79)	Mean: 31.73 ± 11.45, Median: 30.06 (17.75-62.97)	.5795[m]
Scar length, cm	Mean: 1.59 ± 1.01, Median: 1.6 (0.1-4.1)	Mean: 0.72 ± 0.39, Median: 0.7 (0.1-1.5)	Mean: 2.38 ± 0.66, Median: 2.2 (1.6-4.1)	**<.001**[t]

Statistical test used: t – Student's t-test, m – Mann-Whitney U test, f – Fisher's exact test, cs – Chi-square test with simulated p-value

In this randomized controlled trial, we compared the surgical outcomes of minimal incision and elliptical excision techniques in treating epidermal inclusion cysts (EIC) at a single center. Table 1 summarizes the demographic and procedural profiles of patients, illustrating key differences and similarities between the two techniques. Patients had a mean age of 48.74 years; those undergoing minimal incision were significantly younger (41.64 years) than those undergoing excision (55.25 years) (p=0.0315). The sex distribution was equal, with no significant differences between techniques (p=0.6843). The most common site was the back (30%), followed by the lower back (17%). Sites around the head were all treated with minimal incision, while those on the back were predominantly treated with excision, though this was not statistically significant (p=0.6957). The median EIC diameter was 1.25 cm, with no significant size difference between techniques (p=0.1936). The median operation duration was 31.86 minutes, with no significant difference between procedures (p=0.5795). The mean scar length was significantly shorter in the minimal incision group (0.72 cm) compared to the excision group (2.38 cm) (p<0.001). This finding suggests that while both procedures take a similar amount of time, minimal incision results in less scarring.

Table 2. Outcomes of EIC removal, by technique.

	Total (n=23)	Minimal Incision (n=11)	Excision (n=12)	p-value
	Frequency (%); Mean ± SD			
Completeness of excision				.0123[f]
Yes	13 (56.52)	3 (27.27)	10 (83.33)	
No	10 (43.48)	8 (72.73)	2 (16.67)	
Two – week follow up				
Scar length at 2 weeks, cm	Mean: 1.3 ± 0.97, Median: 1.2 (0.1-3.3)	Mean: 0.44 ± 0.21, Median: 0.5 (0.1-0.7)	Mean: 2.1 ± 0.63, Median: 2.05 (1.2-3.3)	<.001[m]
HWES at 2 weeks	Mean: 0.96 ± 0.64, Median: 1 (0-2)	Mean: 0.91 ± 0.54, Median: 1 (0-2)	Mean: 1 ± 0.74, Median: 1 (0-2)	.7777[m]
Complications at 2 weeks				
Dehiscence	2 (8.7)	2 (18.18)	0	.2174[f]
Drainage	2 (8.7)	2 (18.18)	0	.2174[f]
Tenderness	2 (8.7)	2 (18.18)	0	.2174[f]
One – month follow up				
HWES at 1 month	Mean: 0.35 ± 0.49, Median: 0 (0-1)	Mean: 0.36 ± 0.5, Median: 0 (0-1)	Mean: 0.33 ± 0.49, Median: 0 (0-1)	.9110[m]
Complications at 1 month	0	0	0	
Recurrence at 1 month	0	0	0	
Three – month follow up				
HWES at 3 months	Mean: 0.3 ± 0.47, Median: 0 (0-1)	Mean: 0.36 ± 0.5, Median: 0 (0-1)	Mean: 0.25 ± 0.45, Median: 0 (0-1)	.5892[m]
Complications at 3 months	0	0	0	
Recurrence at 3 months	0	0	0	

Statistical test used: m – Mann-Whitney U test, f – Fisher's exact test

Table 2 summarizes and compares the outcomes between procedures. Complete excision by histopathology was found in 56% of patients, with a significantly higher completeness in the excision group (83%) compared to the minimal incision group (27%) (p=0.0123). The median scar length after 2 weeks was significantly shorter in the minimal incision group (0.44 cm) compared to the excision group (2.1 cm) (p<0.01). The median HWES at 2 weeks was 1, with no significant difference between procedures (p=0.7777). Complications such as dehiscence, drainage, and tenderness were reported in 2 patients, all from the minimal incision group, but this difference was not significant (p=0.2174). After 1 month, the median HWES was 0, with no complications or recurrences reported (Appendix). This trend continued at the 3-month follow-up, with a median HWES of 0 and no further complications or recurrences reported.

DISCUSSION

Epidermal inclusion cysts (EICs) are common benign lesions of the skin, often requiring surgical intervention when symptomatic,

aesthetically concerning, or potentially prone to complications such as infection.There are several surgical techniques for EIC removal including elliptical excision and the minimal incision technique. The elliptical excision, which is considered the gold standard of treatment, involves a larger elliptical-shaped incision to ensure complete removal of the cyst and its capsule, thereby minimizing the risk of recurrence. However, this method often results in a longer scar, which can be cosmetically displeasing to patients. In contrast, the minimal incision technique, which uses a smaller incision to extract the cyst, offers the benefit of shorter scars but may compromise the completeness of cyst removal.

Despite the use of several techniques, there is limited evidence directly comparing their surgical outcomes, particularly in terms of scar length, completeness of excision, and postoperative complications. This study seeks to address this gap by conducting a randomized controlled trial to compare the outcomes of the two techniques. The study examines key factors such as scar length, operation time, completeness of excision, complication rates, and long-term wound healing and cosmetic satisfaction.

Patient Demographics

Patients undergoing the excision technique were significantly older than those receiving the minimal incision technique (mean ages of 55.25 ± 6.8 years vs. 41.64 ± 17.52 years, respectively; p = 0.0315). This age difference is important because younger patients typically have better skin elasticity and healing capacity, which could influence the outcomes like scar formation and healing time [12]. However, this age disparity introduces a confounding factor, making it difficult to attribute differences in outcomes solely to the surgical technique without considering the impact of age.

Operation Time

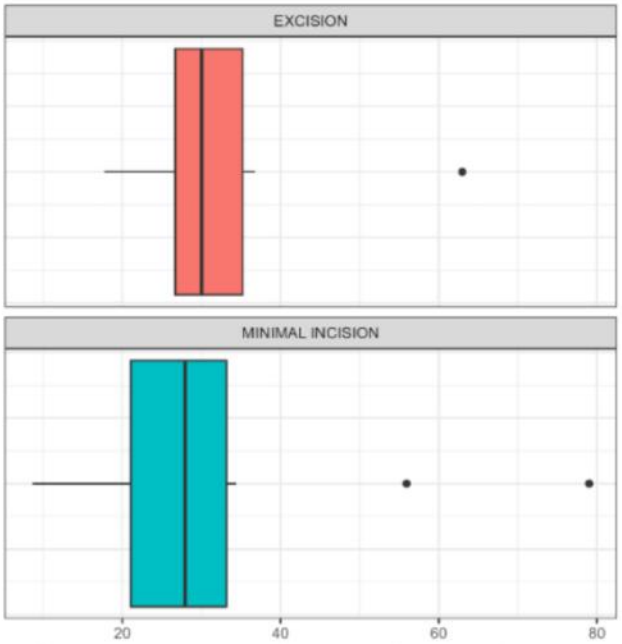

Figure 1. Total operation duration, in minutes.

Figure 1 shows the total duration in minutes of both elliptical excision and minimal incision techniques. The median operation duration of 31.86 minutes, with no significant difference between minimal incision and elliptical excision procedures (p=0.5795), can be explained by the fact that while minimal incision aims to reduce the size of the surgical opening, taking out larger cysts through smaller openings can be more challenging and time-consuming [2].

A smaller incision restricts the access of the surgeon to the cyst, making it more difficult to see and manipulate the tissue. This can increase the difficulty of properly grasping and removing the entire cyst without leaving behind remnants that could lead to recurrence.

This added difficulty may offset the time savings expected from a smaller incision, leading to a comparable overall operation duration between the two techniques.

Scar Length

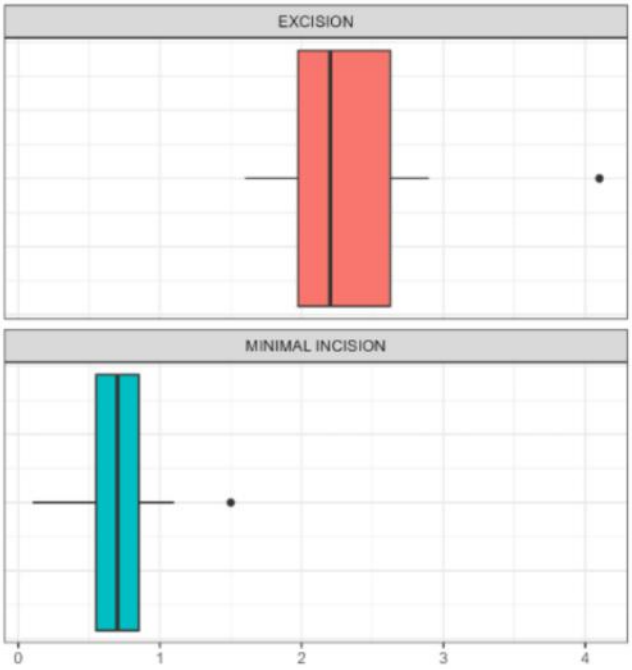

Figure 2a. Scar length after operation,in centimeters.

The excision technique resulted in significantly longer scars (mean: 2.38 ± 0.66 cm) compared to the minimal incision technique (mean: 0.72 ± 0.39 cm), with a significant p-value of <0.001 (Figure 2a). This finding is consistent with the nature of the techniques, where excision requires a larger incision to fully remove the cyst, whereas minimal incision involves a smaller incision.

In a study done by Alijanpour et al comparing the surgical outcomes of minimal excision and elliptical excision techniques in treating epidermal inclusion cysts, the average wound length in the minimal excision group was 2.4 ± 0.50 cm, with no wound exceeding 3 cm, regardless of the cyst's original size. Meanwhile in the ellipitcal excision group, the wounds were still larger, especially for cysts over 1 cm, due to the need to maintain a long axis two to three times the length of the short axis [8].

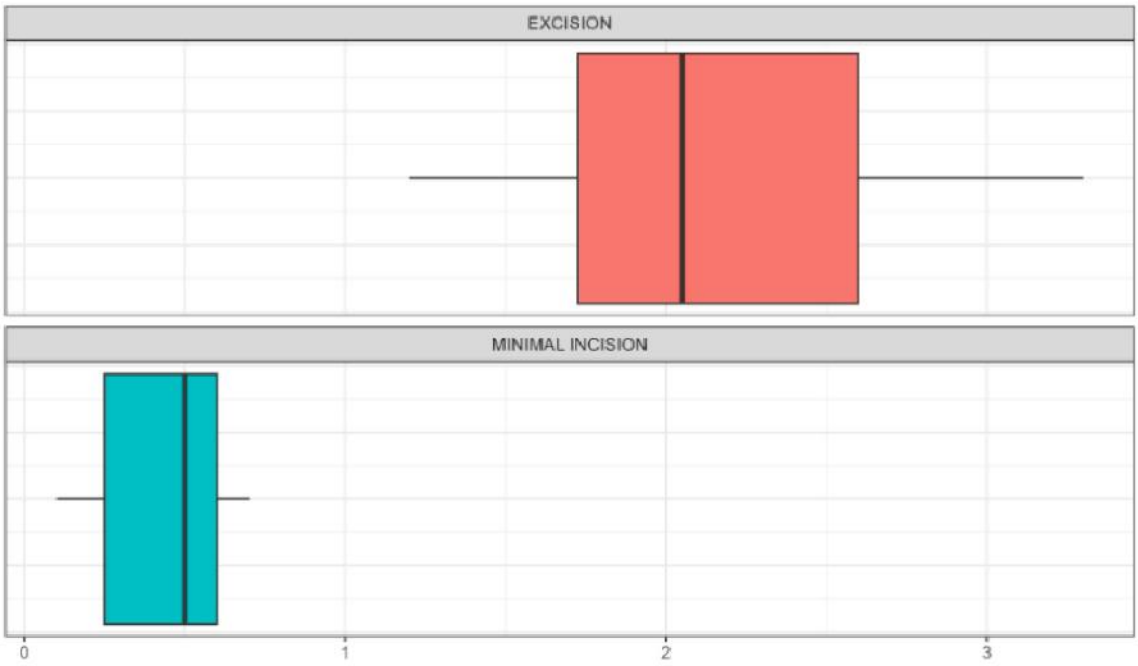

Figure 2b. Scar length after 2 weeks, in centimeters.

At the two-week follow-up (Figure 2b), the scar lengths remained significantly shorter in the minimal incision group (mean: 0.44 ± 0.21 cm) compared to the excision group (mean: 2.1 ± 0.63 cm), reinforcing the initial observations. The healing process after a larger excision involves more extensive tissue repair, which can prolong scar maturation and result in longer visible scars even weeks after the procedure. The minimal incision technique, by virtue of its smaller wound size, undergoes a quicker healing process with less extensive scar tissue formation, leading to shorter and less noticeable scars over time.

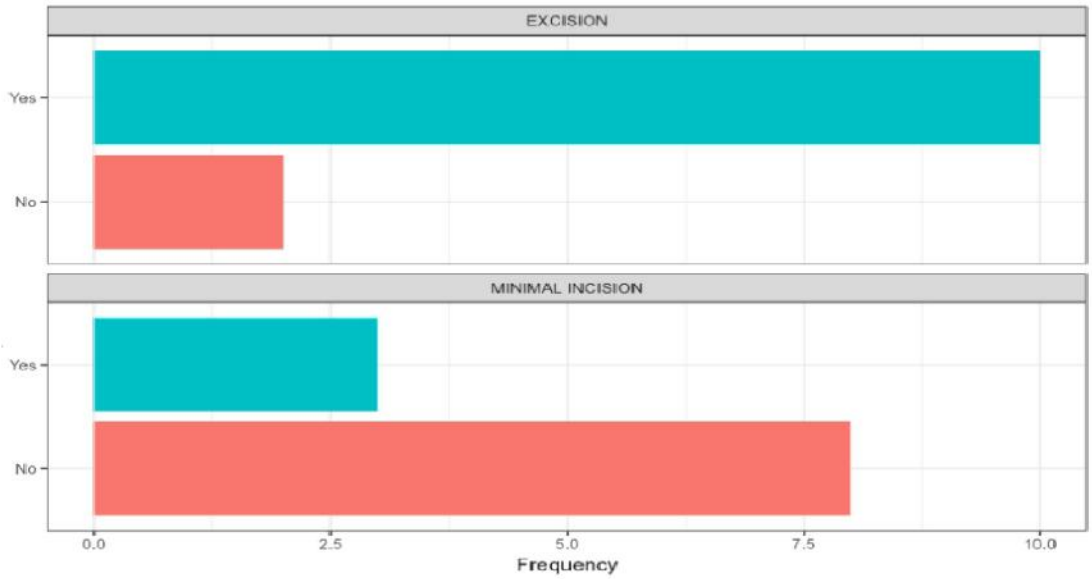

Figure 3. Completeness of excision.

Figure 3 shows that the excision technique had a significantly higher rate of complete excision (83%) compared to the minimal incision technique (27%) with a p-value of 0.0123. This suggests that while the excision method may lead to longer scars, it is more effective at fully removing the cyst, reducing the risk of recurrence.

The elliptical excision technique involves a larger and more comprehensive removal of both the cyst and the surrounding tissue, which includes the cyst capsule. This thorough approach minimizes the likelihood of leaving behind residual cystic material, which is a common cause of recurrence in less extensive procedures . The larger incision and excision margins allow for better visualization and access to the entire cyst, facilitating a more complete removal.

The minimal incision technique, on the other hand, is designed to minimize scarring, but this may come at the cost of less extensive tissue dissection. The smaller incision restricts the ability to fully explore the cyst cavity and ensure that all remnants of the cyst and its capsule are removed. This limitation can lead to incomplete excision, with portions of the cyst remaining, which subsequently increases the risk of recurrence.

Complications

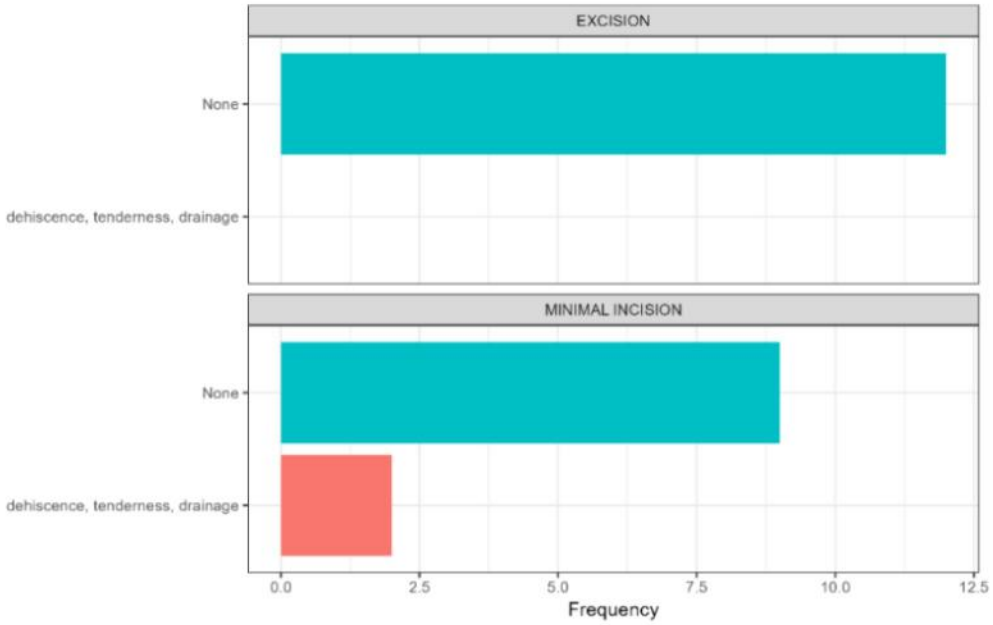

Figure 4. Complications at 2 weeks

At the two-week follow-up, complications such as dehiscence, drainage, and tenderness were reported in the minimal incision group but not in the excision group. Although these complications were not statistically significant ($p = 0.2174$), their clinical significance should not be overlooked, especially considering the higher rate of incomplete excision in the minimal incision group.

For the long-term outcomes, no complications were reported at the one-month and three-month follow-ups in either group, indicating that both techniques are effective in the long term with respect to wound healing and the absence of recurrences.

The minimal incision technique has a higher rate of incomplete excision, which can leave behind remnants of the cyst or its capsule. These remnants can lead to ongoing inflammation, resulting in complications such as drainage and tenderness as the body attempts to expel the remaining cystic material. This incomplete excision increases the risk of postoperative complications, including wound dehiscence, as the unresolved inflammation can impair wound healing.

The lack of complications at one and three months suggests both techniques are effective for long-term wound healing. This can be attributed to the natural healing process, including collagen deposition and tissue remodeling, which resolves initial issues like inflammation and tenderness. Even if early complications occur, they are usually temporary and resolve as the wound heals. By one month, any cystic material causing early problems would have been absorbed or expelled, and scar tissue formation helps stabilize the area, leading to similar long-term outcomes for both techniques.

Wound Healing and Aesthetic Satisfaction

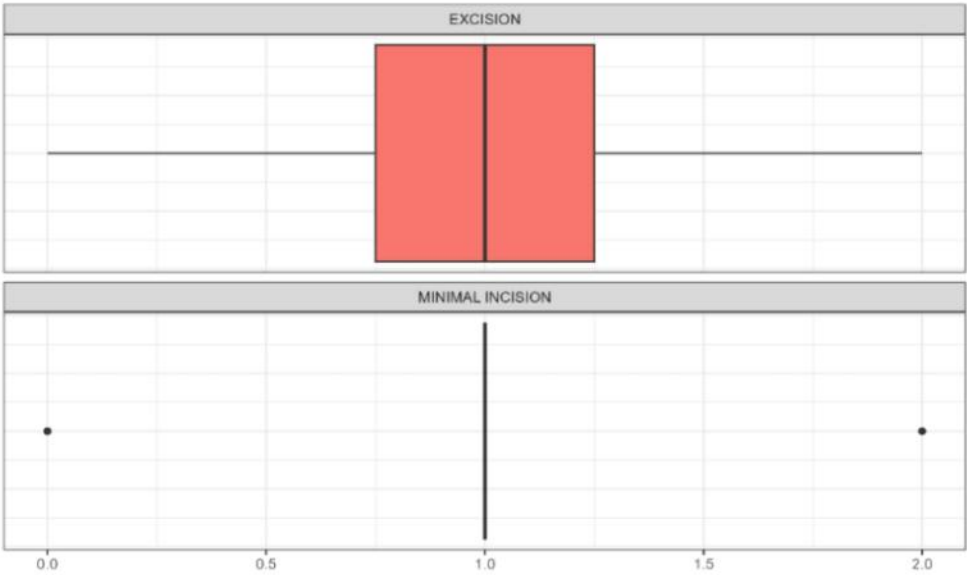

Figure 5. Holland Wound Evaluation Score (HWES) at 2 weeks.

Despite the differences in scar lengths, the HWES remained similar between the two groups at two weeks, one month, and three months. This suggests that from a patient satisfaction and healing perspective, both techniques are comparable in the long run.

While elliptical excision often results in longer scars, patient satisfaction is influenced by various factors such as scar color, texture, visibility, and overall integration into the surrounding tissue rather than just length. Some studies indicate that patients tend to adapt to the presence of scars over time, with initial concerns about scar length diminishing as the scars heal and mature. This psychological adaptation may explain why satisfaction scores, such as the Hollander Wound Evaluation Score (HWES), converge over time despite differences in initial scar lengths [13].

LIMITATIONS

The smaller sample size for minimal incision patients in the analysis of older patients limits the generalizability of these findings.

The significant age difference between the two groups could influence the outcomes, particularly regarding healing and scar formation, which should be considered when interpreting the results.

While the study reported outcomes at two weeks, one month, and three months, these follow-up periods may not be sufficient to capture late complications or recurrences, particularly in cases of incomplete excision. Longer follow-up would be necessary to fully understand the long-term efficacy and safety of both techniques.

CONCLUSION AND RECOMMENDATIONS

Both the minimal incision and excision techniques are viable options for EIC removal, with specific advantages and disadvantages. The excision technique offers a higher likelihood of complete cyst removal at the cost of longer scars, whereas the minimal incision technique provides better cosmetic outcomes in terms of scar length but with a higher risk of incomplete excision and potential complications. Clinicians should weigh these factors, along with patient preferences and specific clinical scenarios, when deciding on the appropriate surgical technique.

Future studies should aim to include a larger sample size to increase the statistical power of the findings. A larger cohort would allow for more reliable subgroup analyses and more definitive conclusions about the efficacy and safety of the two techniques.

To control for the potential confounding effect of age, future studies should either match patients by age or stratify the randomization process to ensure comparable age distributions between groups. This approach would help isolate the effect of the surgical technique on outcomes.

To better understand the long-term outcomes, including late complications and recurrence rates, future studies should include longer follow-up periods, ideally extending to one year or more. This would provide a more comprehensive assessment of the durability and safety of both surgical techniques.

Future research should expand the assessment of patient-reported outcomes beyond HWES scores. Including measures of pain, functional outcomes, and psychological impact would provide a more holistic understanding of how these surgical techniques affect quality of life of the patients.

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APPENDIX

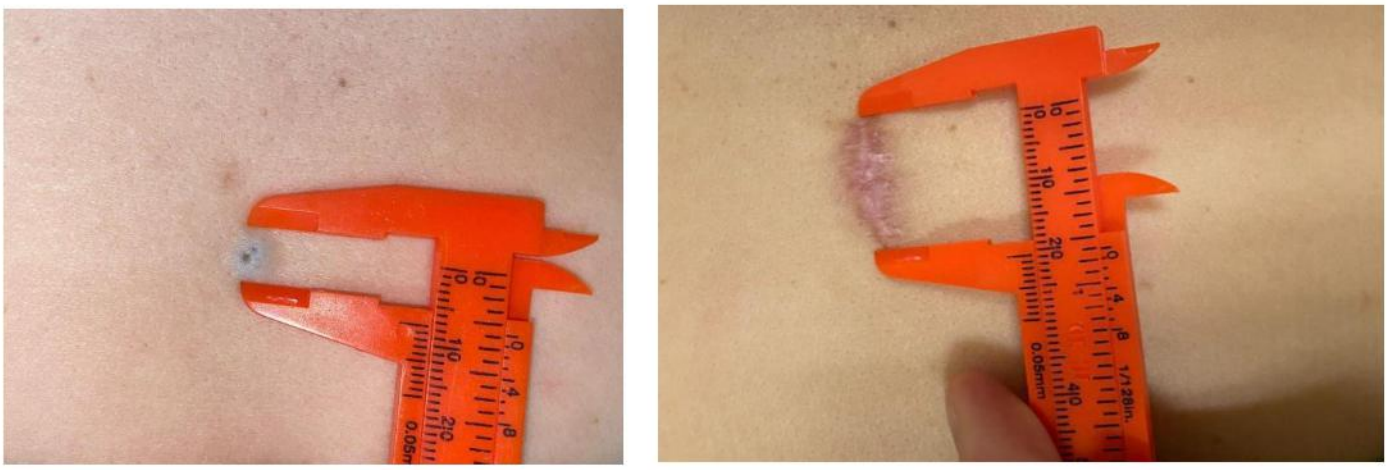

Figure 1a. EIC before excision technique. **1b**. EIC 1 month post-excision technique.

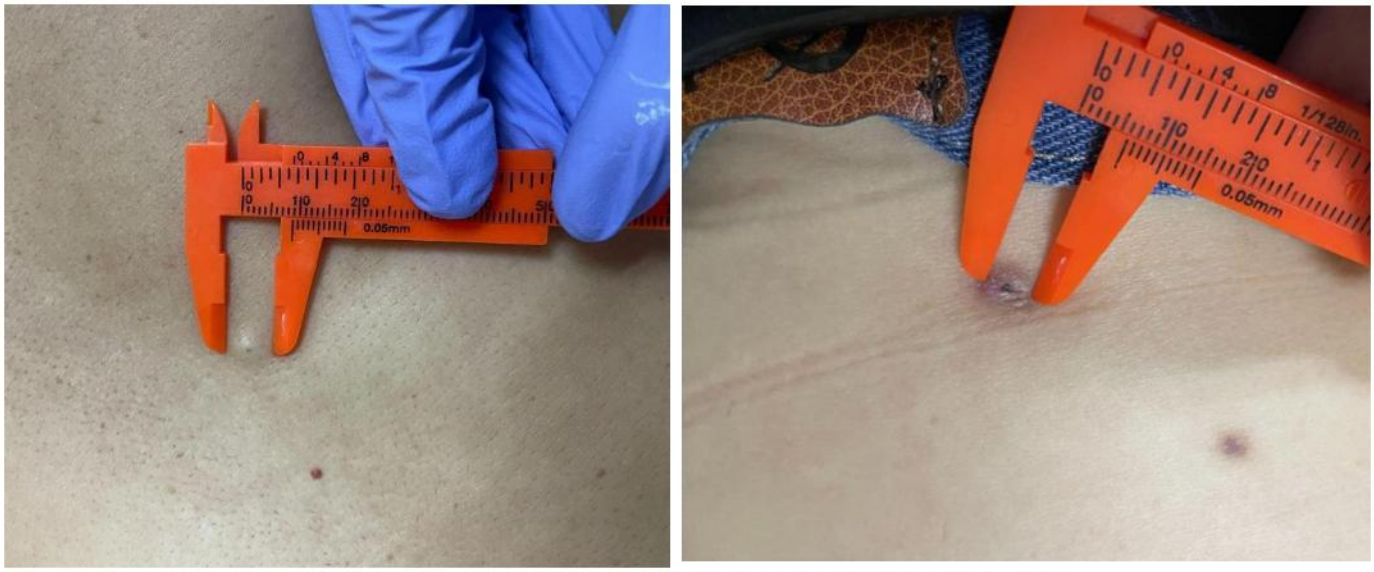

Figure 2a. EIC before minimal incision technique. **2b**. EIC after minimal incision technique.

Use of Complementary Medicine by Patients Seen in the Dermatology Out Patient Department of Region 1 Medical Center

Krizza D. Singson-Cristobal, MD, DPDS[1], May F. Gonzales, MD, FPDS, MPH[2]

Abstract

Background/Objectives: The use of complementary and alternative medicine (CAM) has increased over the years. Although the incidence of CAM use among general and disease-specific groups has been researched, little is known about CAM use among Filipino dermatological patients. This study aims to determine the extent and nature of complementary medicine use among patients with dermatologic problems seen in this institution.

Methods. This is a descriptive, prospective study that made use of a researcher-created questionnaire to determine the prevalence of complementary and alternative medicine. Six months of research were undertaken at the Dermatology clinic of a tertiary hospital. It utilized convenience sampling technique consisting of patients who visited the Dermatology clinic for an in-person consultation.

Results: Sixty-five percent of the participants had attempted at least one kind of CAM to treat their dermatological condition, with the majority of participants between the ages of 18 and 25 (25.3%). The most prevalent condition treated with CAM was allergies (36.7%) of unknown etiology, followed by fungal infection (17.7%) and eczema (11.4%). Herbal medicine (65.8%) was the most popular method among respondents, followed by folk medicine, which was primarily recommended by family/relatives. The majority of CAM users were influenced by others, and several were financially challenged. Most CAM users reported no or minimal disease improvement, and the majority do not recommend CAM to others.

Conclusions: This is the first study to investigate the use of complementary and alternative medicine in dermatologic diseases in general in the country. Board-certified dermatologist should keep an open mind towards patients who might seek out other types of treatment, either as an adjunct or an alternative, given the high prevalence of CAM users among dermatology patients.

Keywords: complementary medicine, dermatology, herbal medication

INTRODUCTION

Complementary and alternative medicine (CAM) therapies are becoming acceptable to the general public and are increasingly used worldwide. In dermatology, CAM is defined as methods of diagnosis and treatment that are used to supplement or substitute conventional dermatologic practice. It is also referred as 'holistic dermatology' because it considers the well-being and entirety of the individual. It includes modalities such as ancient traditional Chinese medicine,

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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functional medicine, and psychosomatic modalities.[1] The integration of CAM into the conventional medical system has been encouraged by World Health Organization (WHO) to improve the quality of care in the health for all strategy.[2]

The National Center for Complementary and Alternative Medicine (NCCAM) defines CAM as "a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine".[3] Currently, CAM is classified into the following categories: alternative medical systems (acupuncture, ayurveda, homeopathy, and naturopathy), biologically based therapies (chelation, folk, herbal medicine, nonvitamin nonmineral natural products, diet-based therapies, megavitamin therapy), manipulative and body-based therapies (chiropractic care, massage), and mind-body therapies (biofeedback, relaxation techniques, hypnosis, yoga, Tai Chi, Qi Gong, healing rituals, energy healing, or Reiki). Estimates of CAM use among adults with dermatologic diseases in the United States have varied from 50% to 62%.[4] In the Philippines, the study of CAM is limited to psoriasis with no further mention on other dermatologic condition. As a country rich in culture, resources and superstitious beliefs, we have the benefit of maximizing the use of complementary medicine in our field of practice.

The use of complementary medicine has continued to increase over the past years prompting research into the possible factors and motivators associated with its use. This study aims to determine the extent and nature of complementary medicine use among patients with dermatologic problems seen in the outpatient department of Region 1 Medical Center.

Furthermore, as educators and community leaders, it is paramount to learn the efficacy, benefits, and risks of the various CAM therapies for its proper use and better insight. Doctors have a critical role in preventing improper use of CAM. As care providers, we should be educated about all therapeutic modalities our patients are using for a holistic approach to the attainment of health and general well-being.

Objectives of the Study

General Objectives

The main objective of this study is to determine the prevalence of complementary medicine use among patients in the Dermatology OPD of Region 1 Medical Center.

Specific Objectives

1. To describe the socio-demographic characteristics of patients using complementary medicine in the Dermatology OPD of Region 1 Medical Center with the following variables:
    a. Age
    b. Sex
    c. Civil Status
    d. Educational attainment
    e. Occupation
    f. Estimated annual income
2. To determine the common modalities of complementary medicine used to treat dermatologic conditions among patients seen in the Dermatology OPD of Region 1 Medical Center
3. To determine the common dermatologic conditions to which complementary medicine is used among patients seen in the Dermatology OPD of Region 1 Medical Center
4. To determine the possible factors or reasons why complementary medicine is used among patients seen in the Dermatology OPD of Region 1 Medical Center
5. To assess the relationship between the use and non-use of complementary medicine and the sociodemographic profile of patients seen in the Dermatology OPD of Region 1 Medical Center

6. To assess the relationship between use of complementary medicine and the dermatologic conditions among patients seen in the Dermatology OPD of Region 1 Medical Center

METHODS

Study Design/Setting

A descriptive, observational study design was conducted through an IRB-approved validated questionnaire and interview (see annexed questionnaire). The survey was administered and conducted at the outpatient department of the Department of Dermatology in Region 1 Medical Center (R1MC) from December 2021 – May 2022.

Study Population

The study population consisted of OPD patients of the Dermatology Department of the Region 1 Medical Center (R1MC) who sought face-to-face consult from December 2021 – May 2022. Approximately 10% of the population was computed as the sample size. Convenience sampling was utilized. New or follow-up patients with general dermatologic diseases seen at the dermatology OPD were eligible to join the study. Patients under the age of 18 are eligible if they are accompanied by an adult guardian.

This study excluded new and follow-up dermatology outpatients who sought consult via teleconsultation, as well as those who refused to answer the questionnaire. Patients under the age of 18 who lacked a legal guardian were likewise excluded. Participants who refuse to provide informed consent and those who seek to withdraw at any moment were both regarded to have withdrawn.

Study Procedure

The protocol was approved by the Research Board Committee of the hospital and assigned a protocol number. All patients who sought face-to-face consult at the Dermatology OPD were invited to participate in the survey. With a dermatology facility and training, Region 1 Medical Center is a suitable site to conduct this study. There were no incentives or compensation given to the respondents. Qualified patients were asked to sign an informed consent form before answering the study questionnaire. For patients below 18 years old, the questionnaires were completed by their guardian of legal age.

A researcher-made questionnaire with nine items was used to assess the participants' demographic, complementary and alternative medicine use, the most frequent method used, reason for CAM use, and other related factors. Some questions can have multiple answers. The surveys have been reviewed by the investigator for completion. Patients were asked and clarified for incomplete and inconsistent answers in the questionnaires, and their answers were recorded on their questionnaires as final response.

The gathering of data started on December 2021. The prevalence of complementary medicine use among patients seen in the Dermatology OPD of Region 1 Medical Center was determined. Descriptive statistics was used to summarize baseline characteristics. Categorical variables were presented as frequencies and percentages. Fisher's exact test was used to determine differences or associations between categorical data, and a rank-biserial correlation to measure the association between ordinal and dichotomous variables. A p-value less than .05 was considered statistically significant. Data were entered and analyzed using SPSS v. 26.

Ethical Considerations

The research protocol was approved by the hospital's Institutional Review Board (IRB). Prior to inclusion, informed consent forms were collected

that included information about the objectives, conditions for voluntary participation, withdrawal, and confidentiality. All personally identifiable information was kept confidential. All data collection forms were stored in a secure location during the duration of the study. Participants did not receive any gifts or financial support. There is no conflict of interest. The author did not receive financial grants or research funding for this study.

RESULTS

There were 120 respondents in the survey, and 77 (64.2%) of them were women and 43 (35.8%) were men. Young adults (26.7%) and early middle-aged adults (20.8%) make up the majority of the responses. Forty-one (34.2%) of the participants had never used any complementary and alternative medicine, while 79 (65.8%) of the participants had used at least one form of complementary and alternative medicine to treat their dermatological condition.

Of the patients who had employed complementary and alternative medical techniques, there were 24 men and 55 women (30.4% and 69.6%, respectively). CAM use was most prevalent in the 18-25 (25.3%) age group followed by 26-35 (20.3%) group. There is an almost equal ratio between single (n=39, 49.4%) and married (n=37, 46.8%) individuals. Of those that utilized CAM, 30 (38%) had a college degree, 5 (6.3%) had a postgraduate degree, 5 (6.3%) had taken vocational training, 33 (41.8%) had a high school diploma, 4 (5.1%) had completed elementary school, and 2 (2.5%) were illiterate. The majority of respondents who use CAM are unemployed (51.64%), and 57% of them primarily rely on family or relatives for financial support. Table 1 displays the participant demographics in relation to the use and non-use of complementary and alternative medicine. No significant relationship was found between CAM therapy use and the age (p=.345), sex (p=.109), civil status (p=.118), educational attainment (p=.554) and income (p=.426) of the patients when compared statistically.

Table 1. Sociodemographic characteristics of patients seen in the Dermatology Out Patient Department of Region 1 Medical Center

Characteristics	Frequency (%)			*p*-value
	Total (N=120)	Use of Complementary Medicine		
		Yes (n=79) 65.8%	No (n=41) 34.2%	
Age (in years)				
▪ <18	12 (10%)	7 (8.9%)	5 (12.2%)	.345
▪ 18-25	32 (26.7%)	**20 (25.3%)**	12 (29.3%)	(r_s = -0.087)
▪ 26-35	25 (20.8%)	16 (20.3%)	9 (22%)	
▪ 36-45	16 (13.3%)	11 (13.9%)	5 (12.2%)	
▪ 46-60	19 (15.8%)	14 (17.7%)	5 (12.2%)	
▪ >60	16 (13.3%)	11 (13.9%)	5 (12.2%)	
Sex				
▪ Female	77 (64.2%)	**55 (69.6%)**	22 (53.7%)	.109
▪ Male	43 (35.8%)	24 (30.4%)	19 (46.3%)	
Civil Status				
▪ Single	65 (54.2%)	**39 (49.4%)**	26 (63.4%)	.118
▪ Married	49 (40.8%)	37 (46.8%)	12 (29.3%)	
▪ Separated	1 (0.8%)	0	1 (2.4%)	
▪ Widow	5 (4.2%)	3 (3.8%)	2 (4.9%)	

Educational Attainment				
▪ None	4 (3.3%)	2 (2.5%)	2 (4.9%)	.554
▪ Elementary	8 (6.7%)	4 (5.1%)	4 (9.8%)	(r_s = 0.055)
▪ High School	42 (35%)	**33 (41.8%)**	9 (22%)	
▪ Vocational	7 (5.8%)	5 (6.3%)	2 (4.9%)	
▪ College	54 (45%)	30 (38%)	24 (58.5%)	
▪ Postgraduate	5 (4.2%)	5 (6.3%)	0	
Employment				
▪ Unemployed	77 (64.2%)	**51 (64.6%)**	26 (63.4%)	1
▪ Employed	43 (35.8%)	28 (35.4%)	15 (36.6%)	
Barangay health worker	*1 (0.8%)*	*1 (1.3%)*	*0*	
Canteen staff	*1 (0.8%)*	*1 (1.3%)*	*0*	
Cashier	*1 (0.8%)*	*0*	*1 (2.4%)*	
Construction worker	*1 (0.8%)*	*0*	*1 (2.4%)*	
Domestic helper	*1 (0.8%)*	*1 (1.3%)*	*0*	
Electrician	*1 (0.8%)*	*1 (1.3%)*	*0*	
Farmer	*1 (0.8%)*	*1 (1.3%)*	*0*	
Finance staff	*1 (0.8%)*	*0*	*1 (2.4%)*	
Government employee	*2 (1.7%)*	*0*	*2 (4.9%)*	
Health care worker	*1 (0.8%)*	*1 (1.3%)*	*0*	
Manicurist	*2 (1.7%)*	*2 (2.5%)*	*0*	
Messenger	*1 (0.8%)*	*0*	*1 (2.4%)*	
Nurse	*4 (3.3%)*	*1 (1.3%)*	*3 (7.3%)*	
Office clerk	*4 (3.3%)*	*2 (2.5%)*	*2 (4.9%)*	
Overseas Filipino worker	*1 (0.8%)*	*1 (1.3%)*	*0*	
Pharmacist	*1 (0.8%)*	*0*	*1 (2.4%)*	
Physician	*5 (4.2%)*	*5 (6.3%)*	*0*	
Retired teacher	*1 (0.8%)*	*1 (1.3%)*	*0*	
Saleslady	*2 (1.7%)*	*2 (2.5%)*	*0*	
Self-employed	*6 (5%)*	*5 (6.3%)*	*1 (2.4%)*	
Social worker	*1 (0.8%)*	*1 (1.3%)*	*0*	
Teacher	*1 (0.8%)*	*0*	*1 (2.4%)*	
Therapist	*1 (0.8%)*	*0*	*1 (2.4%)*	
Tricycle driver	*2 (1.7%)*	*2 (2.5%)*	*0*	
Estimated Annual Income				
▪ Dependent	65 (54.2%)	**45 (57%)**	20 (48.8%)	.426
▪ <Php 40,000	19 (15.8%)	12 (15.2%)	7 (17.1%)	(r_s = 0.073)
▪ Php 40,000-59,000	13 (10.8%)	9 (11.4%)	4 (9.8%)	
▪ Php 60,000-99,000	7 (5.8%)	2 (2.5%)	5 (12.2%)	
▪ Php 100,000-249,000	8 (6.7%)	5 (6.3%)	3 (7.3%)	
▪ >Php 250,000	8 (6.7%)	6 (7.6%)	2 (4.9%)	
r_s-spearman correlation coefficient				

The most common condition for which complementary and alternative medicine was used was allergies with non-specified cause (36.7%), followed by fungal infection (17.7%%) and eczema (11.4%) (Table 2). Leprosy, psoriasis, seborrheic dermatitis, boils, and scabies are a few examples of additional disease groups included in this analysis. However, there was no statistically significant relationship in CAM therapy use and dermatologic diagnosis.

Table 2. Skin condition/Diagnosis of patients seen in the Dermatology Out Patient Department of Region 1 Medical Center

Skin condition/Diagnosis	Frequency (%)			*p*-value
	Total (N=120)	Use of Complementary Medicine		
		Yes (n=79)	No (n=41)	
• Allergies	45 (37.5%)	**29 (36.7%)**	16 (39%)	.844
• Atopic Dermatitis/ Eczema *(Asthma sa balat)*	11 (9.2%)	**9 (11.4%)**	2 (4.9%)	.328
• Seborrheic dermatitis *(Dandruff)*	3 (2.5%)	3 (3.8%)	0	.550
• Fungal infection *(Buni, Hadhad, An-an)*	16 (13.3%)	**14 (17.7%)**	2 (4.9%)	.086
• Leprosy *(Ketong)*	10 (8.3%)	6 (7.6%)	4 (9.8%)	.734
• Psoriasis	10 (8.3%)	7 (8.9%)	3 (7.3%)	1
• Scabies *(Galis)*	5 (4.2%)	3 (3.8%)	2 (4.9%)	1
• Boil *(Pigsa)*	5 (4.2%)	4 (5.1%)	1 (2.4%)	.660
• Others	33 (27.5%)	20 (25.3%)	13 (31.7%)	.520
Acne	*5 (4.2%)*	*3 (3.8%)*	*2 (4.9%)*	1
Alopecia areata	*2 (1.7%)*	*2 (2.5%)*	*0*	.546
Burn	*1 (0.8%)*	*1 (1.3%)*	*0*	1
Epidermal inclusion cyst	*1 (0.8%)*	*0*	*1 (2.4%)*	.342
Herpes zoster	*1 (0.8%)*	*1 (1.3%)*	*0*	1
Hidradenitis suppurativa	*1 (0.8%)*	*0*	*1 (2.4%)*	.342
Lichen simplex chronicus	*1 (0.8%)*	*1 (1.3%)*	*0*	1
Measles	*1 (0.8%)*	*0*	*1 (2.4%)*	.342
Mole	*1 (0.8%)*	*1 (1.3%)*	*0*	1
Molluscum contagiosum	*1 (0.8%)*	*0*	*1 (2.4%)*	.342
Pediculosis capitis	*2 (1.7%)*	*2 (2.5%)*	*0*	.546
Pityriasis rosea	*1 (0.8%)*	*0*	*1 (2.4%)*	.342
Pityriasis rubra pilaris	*1 (0.8%)*	*1 (1.3%)*	*0*	1
Shingles	*2 (1.7%)*	*1 (1.3%)*	*1 (2.4%)*	1
Skin tag	*3 (2.5%)*	*1 (1.3%)*	*2 (4.9%)*	.269
Squamous cell carcinoma in situ	*1 (0.8%)*	*1 (1.3%)*	*0*	1
Telogen effluvium	*1 (0.8%)*	*1 (1.3%)*	*0*	1
Urticaria	*2 (1.7%)*	*1 (1.3%)*	*1 (2.4%)*	1
Vitiligo	*1 (0.8%)*	*0*	*1 (2.4%)*	.342
Warts	*4 (3.3%)*	*3 (3.8%)*	*1 (2.4%)*	1

With 52 (65.8%) users, herbal medicine was the most frequent method among the respondents, followed by folk medicine (53.2%). Homeopathy (1.3%), therapeutic massage (2.5%), reflexology (2.5%), faith healing (6.3%), and aromatherapy (26.6%) were also occasionally employed techniques (Table 3). The majority of respondents used more than one CAM modality.

Table 3. Common modalities of complementary medicine used to treat dermatologic conditions among patients seen in the Dermatology OPD of Region 1 Medical Center

Response	N = 79	
	Frequency	%
• Herbal Medicine	**52**	**65.8**
• Folk Medicine/ Albularyo	**42**	**53.2**
• Aromatherapy	**21**	**26.6**
• Faith Healing	5	6.3
• Therapeutic Massage	2	2.5
• Reflexology	2	2.5
• Homeopathy	1	1.3

Table 4 shows possible factors in CAM use. Most were recommended by their family or relatives (69.6%) and friends (38%). Others were recommended by a quack doctor (10.1%), other health care practitioner such as nurse or pharmacists (5.1%), and some via social media marketing (5.1%). The top two reasons given by those who used CAM were being influence by others (49.4%) and financial difficulties (38%). Twenty-four patients (30.4%) favor natural therapy, whereas 13.9% are worried about the adverse consequences of conventional medicine. Seven (8.9%) of the respondents utilize complementary and alternative medicine (CAM) out of curiosity, 5.1% feel better in control of their health when doing so, and 2.5% believed that conventional therapy was ineffective. Only one respondent mentioned using CAM practices due to difficulty accessing medical services.

Majority of patients who used CAM said their dermatologic conditions remained largely unchanged (46.8%), and 43% said CAM techniques were less effective. While just 26.6% of respondents say they would suggest CAM to others, the majority (73.4%) say they would not. In addition, 42 (53.2%) were open to using complementary medicine in addition to conventional medication, and 43 (54.4%) agreed that complementary medicine should be taken into account when conventional treatment has failed to provide relief.

Table 4. Possible factors or reasons why complementary medicine is used among patients seen in the Dermatology OPD of Region 1 Medical Center

Response	N = 79	
	Frequency	%
Who recommended the treatment to you?		
▪ Family/Relative	**55**	**69.6**
▪ Friend	**30**	**38.0**
▪ Commercial Ads on TV or social media	4	5.1
▪ Doctor	3	3.8
▪ Other health care practitioner (nurse, pharmacist, etc)	4	5.1
▪ Quack doctor/ Faith Healer *(Albularyo)*	8	10.1
Why did you use a complementary therapy?		
▪ Concern about conventional treatment side effects	11	13.9
▪ Conventional medicine not working	2	2.5
▪ Feel more in control of my health or treatment than with conventional medicine	4	5.1
▪ Like the idea of a natural therapy	24	30.4
▪ Influenced by others	**39**	**49.4**
▪ Curiosity	7	8.9
▪ Financial difficulties	**30**	**38.0**
▪ Other: Inaccessible of health facility	1	1.3
Did you find the treatment more or less helpful than conventional medicine?		
▪ More helpful	8	10.1
▪ Less helpful	34	43.0
▪ Much the same	**37**	**46.8**
Would you recommend complementary therapies to others?		
▪ Yes	21	26.6
▪ No	**58**	**73.4**

Do you think complementary medicine should be considered when conventional medicine has been unhelpful?		
▪ Yes	**43**	**54.4**
▪ No	36	45.6
Do you think complementary medicine should be alongside conventional medicine?		
▪ Yes	**42**	**53.2**
▪ No	37	46.8

DISCUSSION

The use of complementary and alternative therapies as part of traditional Filipino medicine is increasing in our country. Numerous research on the use of CAM by dermatology patients in the United States and Europe have been published, but there are few data on this topic in the Philippines.

Among 120 participants of our study, 79 (65.8%) were CAM users, and 41 (34.2%) were nonusers. Previous studies have revealed a considerable rate of CAM use among dermatological patients. At least once a year, CAM methods are used by 75% of French, 70% of Canadians, 48% of Australians, 42% of Americans, 40% of Saudi Arabians, 38% of Belgians, and 25.7% of Singaporeans.[5,6] In our study, approximately two-thirds (65.8%) of patients had used at least one method of complementary and alternative medicine for their skin condition. These data indicate that the prevalence of CAM use varies significantly between countries and there is a considerable degree of interest in CAM throughout the world.

A majority of CAM users in our study were women (69.6%%), highschool graduates (71.2%), single (49.4%) and unemployed (64.6%). In a study by Ching et al. (2016) on the use of CAM on non-dermatologic problems among residents in upland Cavite, Philippines, CAM therapy is prevalent across all age groups in the study, with the majority of participants holding only a secondary education degree which was similar with our study.[7] In patients younger than 30 and older than 50, Chen et al. (2003) discovered a larger percentage of users. While there was no significant difference among age groups in our study, the percentage of use of the CAM method was high amongst individuals in the 18-25 age group.[8] Overall, there was no significant relationship between CAM therapy use and the sociodemographic profile of the patients when compared statistically in our study. Regardless of patient age, sex, civil status, educational attainment and income, our patients used complementary and alternative therapies for their skin disease. This was consistent with findings from earlier studies on particular diseases.[9,10] Chen et al. stated that variations could be the result of various methodologies, which would also affect the prevalence of dermatological disorders and the age distribution of these disorders in study samples.[8]

The study by Landis et al. (2014) found evidence of CAM use for a variety of skin conditions, with dermatitis of unknown cause being the most prevalent diagnosis (9.1% of CAM skin disease diagnoses).[11] Similarly, allergies with an unknown cause (36.7%) were the most prevalent condition for which CAM was used in our study. According to a study by Bilgili et al. (2013), contact dermatitis, acne, fungal infections, and warts were the most frequently treated dermatological conditions with CAM.[12] As these dermatologic problems are chronic, may be burdensome and uncomfortable for patients, and may have an impact on their psychosocial status, patients may have been compelled to attempt alternative treatments.[13]

Herbal therapy consisted of about 90% of the CAM method used by patients in the study by Dastgheib et al. (2017).[14] Another study on CAM in the Philippines (Morfe, et al, 2001) found that herbal medicine, manipulative and aromatherapies were the most popular CAM forms.[15] Herbal medication was again the most popular treatment among the respondents in our study, with 52 (65.8%) users, followed by folk medicine (53.2%). The widespread use of herbal remedies among our participants may be attributable to the products' accessibility and availability in our area, people's perceptions of them as being more natural than other treatments, or a result of their frequent application in Filipino traditional medicine.[15]

According to several research, patients chose the CAM technique because it has fewer side effects, they wanted to try it out of curiosity, they were unsatisfied with the medical therapy, and they believed it was a more natural method.[16,17,18,19] In the study by Eser et al. (2010), patients frequently use CAM because they think it is more natural and less expensive.[10] To compare, the top two reasons in our study were being influenced by others and financial difficulties. Twenty-four patients favor natural therapy, whereas 13.9% are worried about the side effects of conventional medicine. Most medical herbs and other CAM-related substances in our country are more widely available and less expensive than prescription drugs. This may be a contributing factor in developing nations like the Philippines favoring the CAM approach.

In an Iranian study, the vast majority of patients who used complementary and alternative medicine (CAM) reported no or minimal disease improvement, and the vast majority do not recommend CAM to others.[5] The findings were comparable to our study. The majority of these patients were referred by members of their social circle. It is essential to recognize the impact that community members have on one another's health-related behavior. Eser et al. stated that intimate relationships are regarded to mirror the cultural traits of communities, where issues are frequently shared with close relationships and there are strong ties between families, neighbors, and friends.[10]

CONCLUSION

This is the first study to employ researcher-created questionnaires to investigate the use of complementary and alternative medicine use in patients with skin diseases at a dermatology clinic in a tertiary hospital. This research identified CAM therapies and determined the factors that could influence their use in our setting.

The utilization of complementary and alternative medicine, particularly herbal therapy, is widespread among our dermatology patients. People with secondary education and patients with allergies, fungal infection, and eczema utilized CAM substantially more than others, despite the fact that it was recommended to them mostly by their social circle and not by health care professionals. Our patients employed complementary and alternative therapies for various skin conditions regardless of their age, sex, civil status, level of education, and income. The majority of respondents did not recommend CAM to others due to a lack of efficacy or minimal efficacy of CAM treatments for their problems.

We conclude that the behavior of community members who use CAM without proper information may have a substantial influence on others. As it is a prevalent matter, we should consider strategies to educate the general public about CAM practices and their advantages and possible hazards, and encourage our health care professionals to interact with patients more effectively. In addition, further studies will not only enhance the present medical management of certain skin diseases but likewise disprove those practices which may aggravate their condition.

CAM represents an intriguing and relatively untapped area in dermatology. Though its clinical

efficacy may not be consistently adequate, the medical community may learn a great deal from alternative medical systems, notably in imparting a greater sense of autonomy to patients and in providing extensive patient participation and individualized care. Given the prevalence of CAM use in this study, integrating CAM discussion in medical training and continuing medical education courses could keep the board-certified dermatologists updated and competent in providing reliable CAM information to their patients. Therefore, it would be prudent for board-certified dermatologists to inquire and be aware of patients' use of nonconventional therapies as part of a holistic approach to achieving optimal health.

LIMITATIONS AND RECOMMENDATIONS

We acknowledge the following limitations of this study. The research was conducted in a single institution, therefore the findings may not apply to other community-based dermatological clinics or the remainder of the dermatological patient population in the Philippines. Additionally, it should be highlighted that our study is limited to dermatology patients and that the results cannot be applied to other conditions. The author suggests a more comprehensive questionnaire that may include specific CAM modalities or procedures and their outcomes to assess their efficacy and safety. As the CAM method may be influenced by cultural norms and ethnic experience, the findings of this study can be used for cross-cultural comparisons.

CONFLICTS OF INTEREST

The author has no conflict of interest to disclose and no funding or research grants were received for this study.

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Pregabalin, A Neuropathic Drug Used as an Antitussive In A Pediatric Child With Acute Cough
A Case Report

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Abstract

Cough is a very common symptom causing medical consult. Several remedies are readily available in the market however these are currently not recommended among the pediatric population due to a few reasons which include the benign nature of acute cough, limited effectivity and lack of support from the United States Food and Drug Administration (USFDA) due to abuse potential.

We report a case of a 2-year-old male, no known co-morbidities with a 2 week history of upper respiratory tract infection. Initial assessment showed viral infection hence patient was given medications for symptomatic treatment. However, 1 week after, patient still presented with symptomatic persistent coughing that disrupted his activities of daily living, hence antitussive medication was already prescribed. After another 7 days, there was still persistence of symptoms, hence patient was given a trial medication of Pregabalin 0.7 milligram/kg/dose which noted instant cough relief one hour after the initial intake. Patient also reported to be more playful, improved sleep at night and improved appetite. Patient received total of 2 doses of Pregabalin in the span of 48 hours. On the third day, patient was still coughing but reported to be significantly less frequent and more productive, hence medication was then put on hold. Patient continuously improved after 5 more days and was eventually cough free.

This case report demonstrates the adequacy of Pregabalin as a supportive antitussive medication in a patient with an acute cough secondary to a viral infection

INTRODUCTION

Cough is one of the most common symptoms in children. Acute cough in the pediatric population is one the most common cause of caregivers seeking medical consult.[1] Unlike in the adult population, the definition of acute cough in the pediatric community is not well established and it varies according to different sources. According to Vogelberg, C etal, (2023), acute pediatric cough lasts from 4-8weeks, however, other experts defined it as cough lasting from 2-8 weeks. [2]

Acute cough is mostly caused by a benign upper respiratory tract infection. Although there may be numerous different possible etiologies, viral source is still the most common. Infection or foreign particles in the airway causes bronchospasm causing continuous coughing. Acute cough is also believed to function as a protective reflex to help clear excessive secretions in the respiratory tract. [2,3]

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Acute pediatric cough with viral etiology would usually resolve on its own without treatment. Even so, there have been significant number of medications that has been formulated for cough suppression that has been sold readily in the market. Among which include Dextromethorphan, Antihistamines, Vapor Rubs, Honey, Codeine, Promethazine, Benzonatate and Inhaled Corticosteroids. [1]

Among the available cough medications, a lot has not been proven to be very much effective and many are still not regulated by the United States Food and Drug Administration (FDA). On top of this, acute cough has been regarded to be benign and self-limiting for majority of the upper respiratory tract infections. These reasons have caused a lot of pediatricians to shy away from prescribing antitussives to this certain diagnosis and its use has not been recommended by the pediatric treatment guidelines. However, persistent cough can significantly affect both the lives of families and children as it can greatly influence the child's quality of life.[1,3] Continuous coughing among children is a great source of stress among caregivers most especially if the child refuses to eat, gets an undisrupted sleep and decreased level of activity. [2]

Antitussives although not routinely recommended to very young children can be considered if there is parental concerns or the medication is proven to be effective with little side effect[1,3]

OBJECTIVES

1. To present a Pediatric Case of cough neuropathy.
2. To present the use of low dose Pregabalin in the symptomatic treatment of a Child with Neuropathic Cough

SIGNIFICANCE

Acute cough in the pediatric population has not received the same treatment strategies unlike the adult population. The lack of effectivity of most available drugs and the fear of exposing a vulnerable population to new treatments makes it hard to look and try for new possible more effective medication. This case report presents the use of Pregabalin in the management of acute neuropathic type of cough.

CASE HISTORY

This is a case of a 2-year-old male patient who had 2 weeks history of persistent dry neurogenic cough. The case informant is the child's mother with 80% reliability. The patient lives with his parents and a sibling in a 2-story home with exposure to secondhand smoke. Patient had an unremarkable prenatal, birth and post-natal history. There was no history of hospitalizations, allergies, or comorbidities and is also known to have complete vaccination for age.

3 days prior to consult, our patient presented with high-grade fever (39-40 degrees Celsius) associated with coryza, conjunctivitis and non-productive cough. This was initially not associated with vomiting, diarrhea, rashes or change in appetite. There was a history of exposure to sick relatives who presented similarly. This prompted consult and remarkable physical examination showed purulent bilateral eye discharges and rhinorrhea. Patient was given Paracetamol at 15 milligram/kg/dose every 4 hours alternating with ibuprofen at 10 milligram/kg/dose every 6 hours as needed for fever, Cetirizine 2.5 milligram

2 times a day, Montelukast 4 milligram once a day and Salbutamol nebulization 1.25mg + normal saline solution 3x a day. Sodium Chloride nasal spray with nasal suctioning was also done as needed.

Interim there was resolution of fever, conjunctivitis and coryza however there was note of persistence of dry cough, neurogenic in

character. Hence 4 days after, follow-up was done where patient was given additional medications which include: Levodropropizine syrup at a dose of 1milligram/kg 3x a day, Manuka Honey 5mL once a day and chest physiotherapy.

7 days after, patient was then brought back for consultation due to persistence of cough. Mother reported that the coughs frequency is every 30 seconds while patient was able to report his throat to be very itchy causing persistent coughing. He was unable to eat and sleep due to the persistent cough with occasional post-tussive vomiting. On further examination, patient was awake, alert but did not want to leave his mother. He lost 2 pounds from baseline weight. There were no retractions, clear breath sounds, normal heart rate and rhythm for age, abdomen soft and non-tender, full pulses, and decreased skin turgor. Mother was offered to be admitted, however refused.

Patient was then given Pregabalin 0.7 milligram/kg and was then advised to wait for observation. One hour after the intake, there was note of resolution of cough. The patient was then able to take his regular meal then went to afternoon nap lasting for 2 hours. Upon waking up, patient was up and about, still with minimal occasional coughing episodes but was able to tolerate take his regular meals. Patient was sent home and was advised to make a diary on patients' behavior, sleep, cough and feeding pattern.

Patient was reported to have uninterrupted sleep with no coughing episodes at night, good appetite, and playful behavior. 20 hours from the initial intake of Pregabalin, there was note of recurrence of persistent coughing episodes with associated poor appetite and post-tussive vomiting. Another dose of Pregabalin of 0.7milligram/kg was given which was seen to take effect after one hour. The medication was subsequently given as needed (20-24 hours interval) for the persistent coughing but not more than two times a day.

The patient continuously improved after 3 days from the initiation of medication, still with coughing episodes but significantly less frequent. He had good appetite, was playful and good sleeping pattern, hence medication was discontinued.

11/10/2023 Medications: Cetirizine, Salbutamol Nebulization, Montelukast, Nasal Suctioning		
Cough	Bad	Dry cough every 30 seconds
	Good	
Sleep	Bad	Poor sleep due to cough
	Good	
Appetite	Bad	Poor appetite, unable to take favorite food
	Good	
Activity	Bad	Refused to play.
	Good	
11/11/2023 Medications: Cetirizine, Salbutamol Nebulization, Montelukast, Nasal Suctioning, Pregabalin 0.7mg/kg/dose (1 dose only at 1pm in the afternoon)		
Cough	Bad	
	Good	Approximately 1 hour after pregabalin, the coughing stopped
Sleep	Bad	
	Good	Slept 3-5:30 pm (regular nap time) and was able to sleep overnight uninterrupted with coughing episodes.
Appetite	Bad	
	Good	Fair appetite and was able to request fried chicken for dinner.
Activity	Bad	
	Good	Was able to separate from his mother and watch his favorite television show, afterwards he was able to play with his sister.
11/12/2023 Medications: Cetirizine, Salbutamol Nebulization, Montelukast, Nasal Suctioning; Pregabalin 0.7mg/kg/dose (2nd dose given at 9 AM in the morning)		
Cough	Bad	Before the intake of second dose of pregabalin, recurrence of frequent coughing
	Good	Resolution of cough 1 hour after intake of Pregabalin
Sleep	Bad	
	Good	Was able to sleep the night before but woke up with recurren ce of coughing
Appetite	Bad	
	Good	Improving appretise as compared to 11/11/23
Activity	Bad	
	Good	Playful
11/10/2023 Medications: Cetirizine, Salbutamol Nebulization, Montelukast, Nasal Suctioning, Pregabalin put on hold		
Cough	Bad	
	Good	With intermittent productive cough
Sleep	Bad	
	Good	Good sleep
Appetite	Bad	
	Good	Good appetite
Activity	Bad	
	Good	Playful

Table 1: Diary created by patient's caregiver

DISCUSSION

We presented a case of a 2-year-old make with acute cough initially coming from a viral illness. Patient was initially treated symptomatically including cough suppressants however, there was note on persistence of symptoms causing the child to have poor quality of life.

Acute viral cough is known to be self-limiting. It can present to be dry or productive in character. For the pediatric population, symptomatic treatment is usually not recommended because these treatments are known to be not more than effective that placebo. Primary medical approach in the treatment for viral infection is limited to hydration.

The American Academy of Pediatrics (AAP) recommend against the use of over-the-counter antitussive medications stating that it is no more effective than placebo for reducing cough from viral respiratory infection in children. [4]

The use of antitussives in the pediatric community have been in question for so many years now, however, the over-all adverse event rate has been very low. In the study of Lam, S et al, (2021), stated that in an extensive review done in a multisystem surveillance program, the adverse event rate of cough and colds medication in children younger than 12 years of age was 1 case per 1.75 million units sold. 0.6% (20/3251) resulted in death wherein none involved a therapeutic dose.

The self-limiting nature of acute cough in children have led many physicians not to make it a major symptom to be addressed. However, there are instances wherein cough becomes debilitating to very small children. Cough is not merely a respiratory symptom, it can also be controlled via the central mechanism known as: Reflex, voluntary and evoked type of cough. The initiation and inhibition of cough reflex is under the control of higher neurological centers. While there are many central nervous system conditions causing increased cough reflex sensitivity, a simple viral infection can cause post viral vagal neuropathy. According to Mohammed A.B, etal. (2022), cough reflex hypersensitivity from vagal neuropathy can present as cough spells triggered by low threshold stimuli in a patient's regular daily activities (exposure to a changing temperature, aerosols, perfumes, odors, or during talking or laughing). It can either be acute or chronic but always manifests predominantly as cough. [9]

Pregabalin is a voltage gated calcium channel blocker that decreases synaptic release of several neurotransmitters. It was initially formulated as an antiepileptic drug however is now approved by the FDA to be primarily used as a treatment for neuropathic pain only in the year 2007. It has several off-label use and one of which is for chronic cough for adult patients[5,6] Several studies have shown Pregabalin have been used as a possible treatment of chronic refractory cough.[10,11] In the pediatric population, it has been studied as an adjunctive therapy for focal onset seizure. In a recent paper made by Chan, P. et al, (2021), they recommended that as an adjunctive antiepileptic medication, Pregabalin should be used with the following doses.

1. 3.5 milligram/kg/day (maximum of 150 milligram/day) divided as two to three doses for <30 kilograms
2. 2.5 milligram/kg/day (maximum of 150 milligram/day) divided as two to three doses for >/=30 kilograms.

There are no available data on the use of pregabalin as a cough suppressant in the pediatric population. The development of pediatric drug use, safety and dosing is generally difficulty as the subjects involved are vulnerable, making it hard to collect subjects.

To the best of our knowledge, this is the first case report regarding the use of Pregabalin as a cough suppressant in a pediatric patient suffering a neurogenic type of cough.

RECOMMENDATIONS

The Model-Informed Drug Development is a powerful tool that was developed last 1990. According to Bi, Y. et al., (2021), the tool can integrate and leverage the existing knowledge from different sources to narrow gaps. In can hasten the development of new medication and has been shown to result in better estimation of medication dosing especially in the pediatric population.[8] Our case report recommends the use of this tool for possibly the development and use of Pregabalin in the neurogenic type of cough in the pediatric population.

CONCLUSIONS

The introduction of new drugs to the pediatric population is difficult. Careful titration of medication to determine the effective and right dosing is important. Our study has demonstrated the effectiveness of using Pregabalin as a supportive antitussive drug in the treatment of a Filipino child with an acute cough.

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Acrodermatitis Continua of Hallopeau in a 32-Year-Old Female: A Case Report*

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ABSTRACT

Acrodermatitis continua of Hallopeau (ACH) is a rare, chronic, and recalcitrant inflammatory disorder classified as a localized variant of pustular psoriasis. Patients usually present with relapsing episodes of subungual pustules, nail dystrophy, and scaling. We report a case of ACH in a 32-year-old female, which developed following a nail infection and exacerbated during pregnancy, with no medication for 2 years. She presented at the clinic with severe manifestations of anonychia and multiple bone resorption on the distal phalanges. The patient was started on topical medication of combination corticosteroid and vitamin D analogue and oral methotrexate initially at 10mg/week then increased to 15mg/week due to poor response. Despite compliance to medications and avoidance of possible irritants, the patient still had relapse of pustules on the nails.

Several treatment options for ACH are available such as topical steroids, vitamin D analogue, systemic biologics, and non-biologics such as methotrexate and cyclosporine. However, systemic biologics are considered the most efficacious for ACH but financial constraints often limit their use in resource-poor settings.

KEYWORDS: Acrodermatitis continua of hallopeau; nail disorder; subungual pustules; pustular psoriasis; Methotrexate; case report

INTRODUCTION

Acrodermatitis Continua of Hallopeau (ACH) is a rare, chronic, and often recalcitrant pustular eruption of the fingers and toes. Its etiology is still unknown but it is considered as a subtype of pustular psoriasis. Treatment for ACH involves all the possible treatment options for plaque type psoriasis which are topical steroids, topical vitamin D analogue, methotrexate, cyclosporine, systemic retinoid, phototherapy, and biologics[1-3]. In an ideal setting, recalcitrant acrodermatitis continua of Hallopeau should be shifted to biologic therapy as these provide higher chances of remission. However, in a resource poor setting, the options we can offer our patients are very much limited.

CASE REPORT

A 32-year-old woman presented in our clinic with a 2-year history of relapsing episodes of pustulation, onycholysis, and anonychia on the fingers of both hands. The patient reported an unrecalled nail infection prior to the onset of lesions.

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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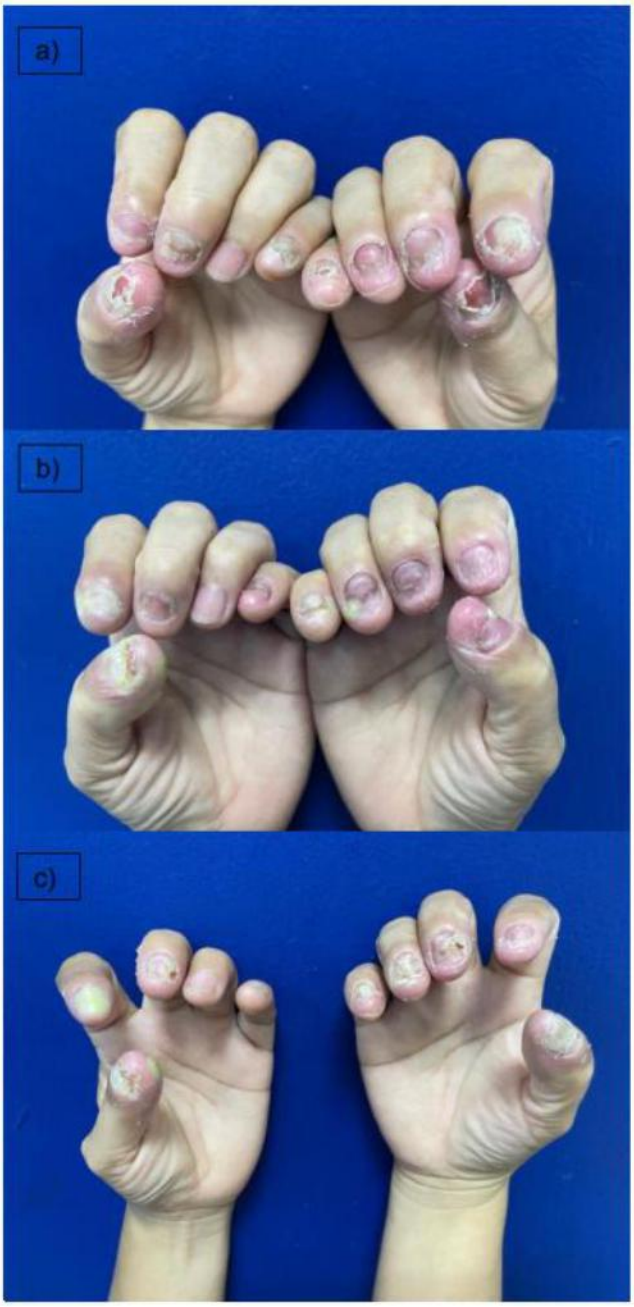
subungual and periungual areas. She reports rapid worsening of conditions during pregnancy.

Upon consultation and work-up at our institution, the patient was already found to have anonychia on the 3rd and 4th digits of the right hand and 2nd digit of the left hand as well as bone resorption finding on the distal phalanges of the 1st, 2nd, and 3rd digits of both hands on x-ray. She also complains of pain on the distal interphalangeal joints of both thumbs.

Differential diagnoses for this case such as onychomycosis, bacterial paronychia, irritant contact dermatitis, parakeratosis pustulosa, and palmoplantar pustulosis, were ruled out clinically and through diagnostics such as nail biopsy, periodic acid-Schiff (PAS) staining, KOH, and culture. Histopathological findings of confluent parakeratosis, hypogranulosis, psoriasiform hyperplasia with marked epidermal acanthosis and elongated rete ridges with suprapapillary plate thinning as well as dilated vessels within the papillary dermis and markedly dense superficial and perivascular infiltrates consisting mainly of neutrophils and lymphocytes strengthened the diagnosis of ACH.

The patient was then started on combination topical medication of corticosteroid and vitamin D analogue ointment: betamethasone dipropionate 0.05% + calcipotriol 0.005% ointment 2x a day for 2 weeks. She was also advised to avoid wet work and other possible irritants. Baseline laboratories were also requested prior to initiation of systemic medication. On follow up and finding of normal laboratory results, the patient was ideally to be started on biologics but due to financial constraint, patient was started on methotrexate initially at 10mg per week which she continued for 1 month. Despite compliance to treatment, the patient still would have relapsing episodes of pustulation, onychodystrophy, and onycholysis on all the nails of the hands except for the 4th digit of the left hand. Oral methotrexate was later increased to 15 mg per week. The patient was advised to come back after 2 weeks but was then lost to follow up

Figure 1. Nail dystrophy, anonychia, and pustules **(a)** pre-treatment, **(b)** 2 weeks of medications and **(c)** 8 weeks of medications



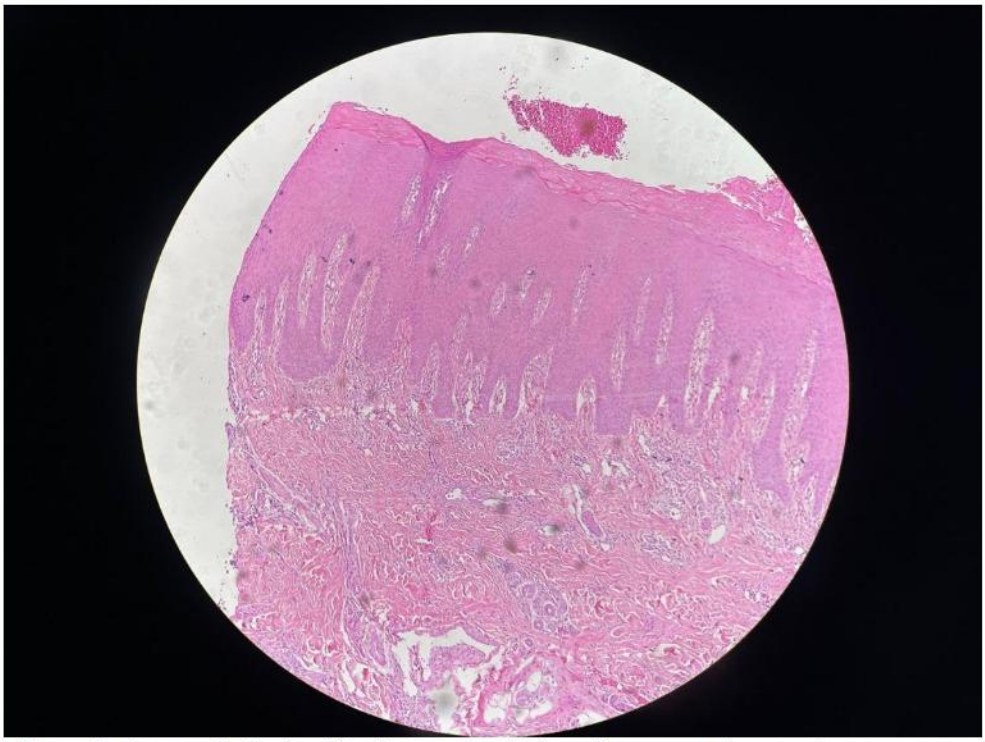


Figure 2: Histopathological findings revealed confluent parakeratosis, hypogranulosis, psoriasiform hyperplasia with marked epidermal acanthosis and elongated rete ridges with suprapapillary plate thinning as well as dilated vessels within the papillary dermis and markedly dense superficial and

Figure 3: Radiographic evidence of bone resorption of the distal phalanges of the 1st, 2nd, and 3rd digits of both hands.

DISCUSSION

Acrodermatitis continua of Hallopeau (ACH) is a rare, chronic, and often obstinate inflammatory disorder. It is classified as a localized pustular psoriasis characterized by sterile pustules which initially affect the tips of the fingers[1-3]. A consensus statement from the European Rare and Severe Psoriasis Expert Network (ERASPEN) defines ACH as a primary, persistent (or more than 3 months) sterile, macroscopically visible pustules affecting the nail apparatus[4].

ACH is more common in middle-aged women, with very rare occurrence in childhood. Smoking history is common among patients but the reason is still unknown. ACH often begins after localized trauma or infection on a single digit[1]. Current evidence demonstrates that ACH is associated with a variety of genetic mutations in the genes IL36RN, CARD14, and AP1S3. The IL36RN gene encodes the IL-36 receptor antagonist (IL-36Ra), which normally acts to inhibit such pro-inflammatory signaling[3].

Pustule formation on the nail bed and nail matrix almost always occurs and may lead to severe onychodystrophy or even to anonychia. This eventually causes inflammation and sclerosis of the underlying soft tissue. Late stage of ACH can affect the bones resulting in atrophy of the distal phalanx. Spontaneous improvement is rarely observed and in some cases, elderly patients can progress to have generalized pustular psoriasis[1-3].

Treatment for ACH is mostly based on empirical data due to the paucity of case reports and research on this disease. Currently, the accepted treatment options include topical steroids, topical vitamin D analogue, methotrexate, cyclosporine, systemic retinoid, phototherapy, and biologics. Long-term strategy should be considered for the treatment of ACH due to its recalcitrant nature. Methotrexate is one of the most commonly used therapies due to its wide availability and price. However, very little is known about its effectiveness for ACH.

In countries where systemic biologics such as adalimumab, guselkumab, and secukinumab are widely used and available, most patients are given biologic medications early on, leading to less complications and higher chances of remission. However, the high cost of these medications makes them inaccessible to many patients, particularly in resource-poor settings. This financial barrier is a significant challenge in the treatment of ACH. A resource-poor setting should consider what the patient can sustain in the long run. Setting up financial aids for patients and modifying treatment regimen to suit what the patient can afford may also be tried, but safety and efficacy should be prioritized[1-3].

In conclusion, ACH is a rare and challenging condition to manage due to its recalcitrant nature and the paucity of research on effective treatments. Early and aggressive intervention is critical to prevent disease progression and improve patient outcomes. While biologics have shown the most promise in achieving long-term remission, their high cost limits access for many patients. In a resource-poor setting, treatment strategies must prioritize sustainability and cost-effectiveness while ensuring that patients receive the safest and most effective care possible.

INFORMED CONSENT

A written and signed consent for publication of this case report and its accompanying images was obtained from the patient.

DISCLOSURE

None of the authors were funded for this case report. There are no competing interests.

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