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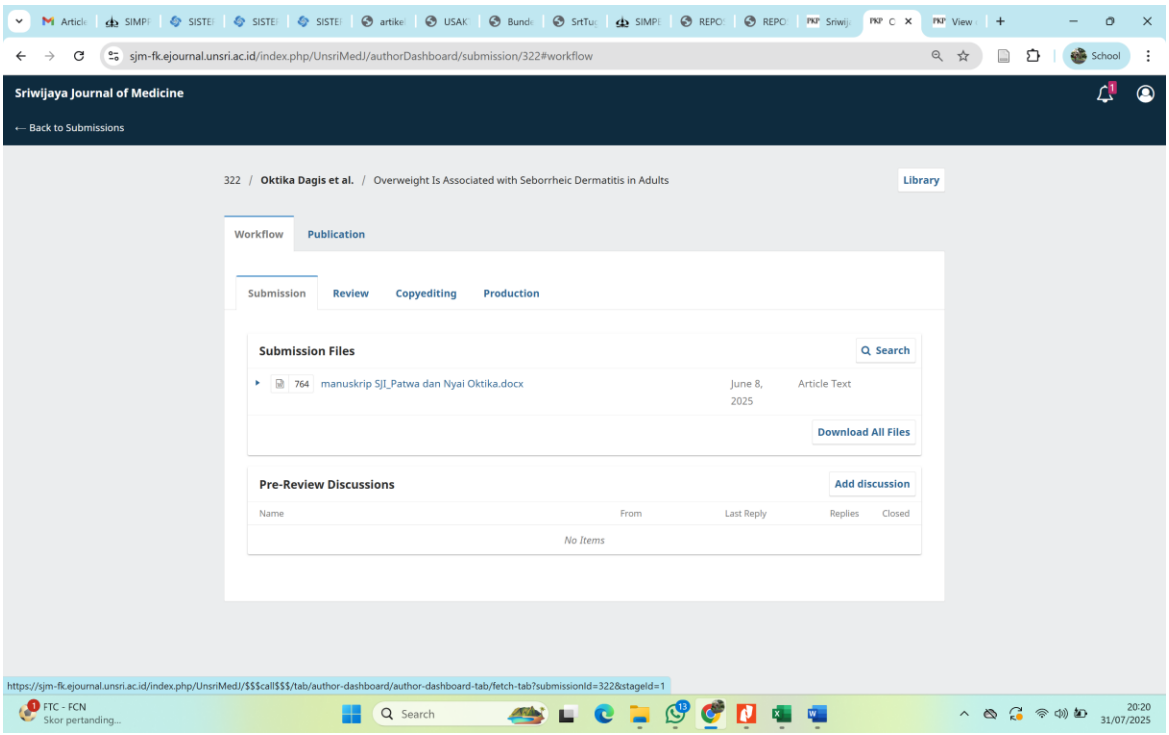

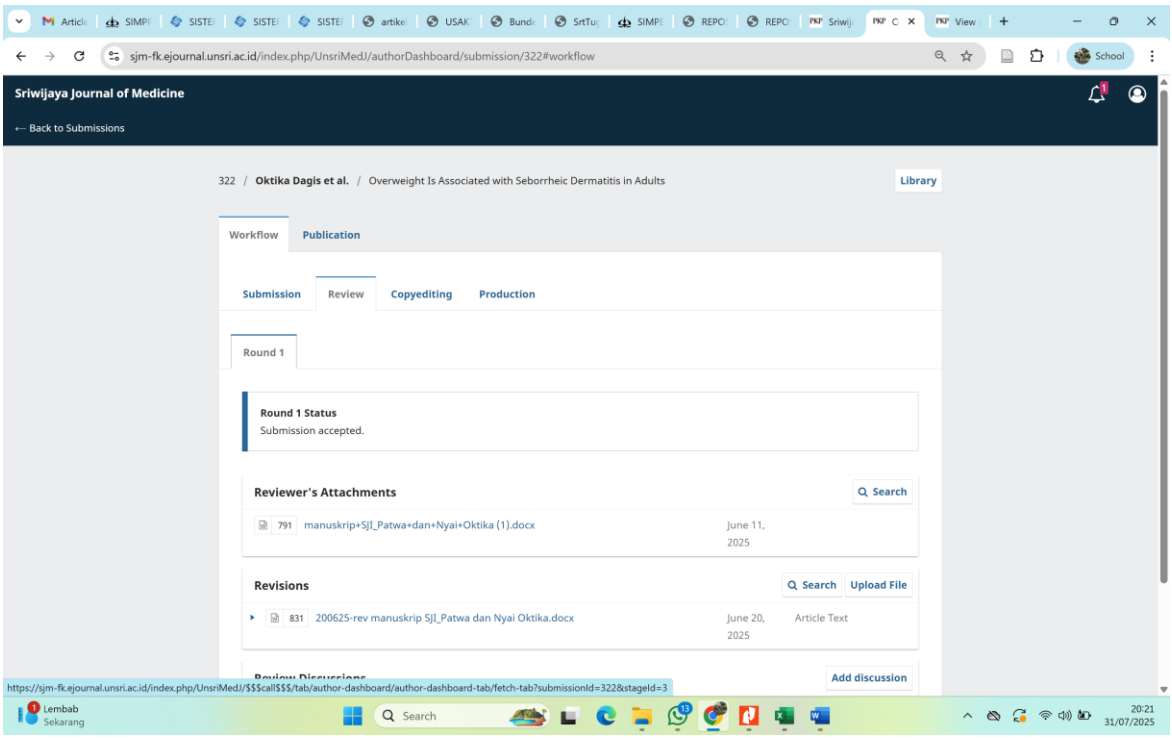

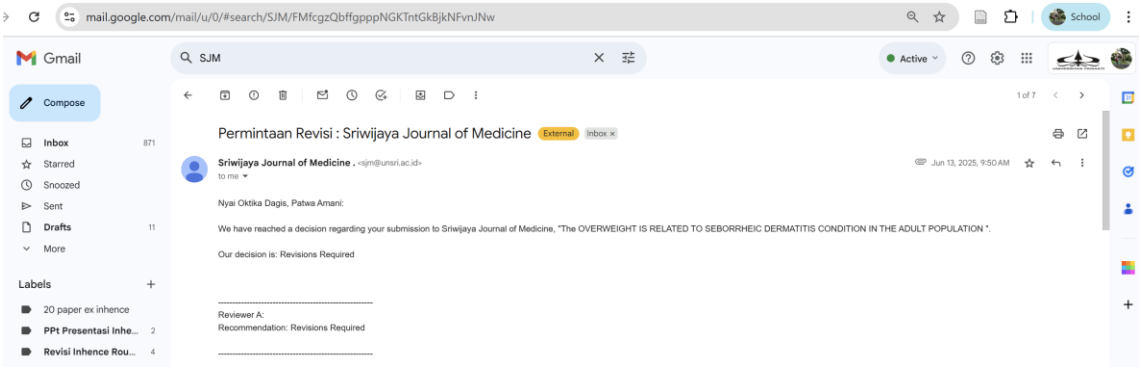

Nyai Oktika Dagis, Patwa Amani:

We have reached a decision regarding your submission to Sriwijaya Journal of Medicine, "The OVERWEIGHT IS RELATED TO SEBORRHEIC DERMATITIS CONDITION IN THE ADULT POPULATION ".

Our decision is: Revisions Required

Reviewer A:
Recommendation: Revisions Required

Further comments on the paper for author

Mohon sertakan nomor kaji etik dan komite etik yang memberikan kaji etik
Mohon jelaskan panduan pembagian karateristik indeks masa tubuh menggunakan sumber dari mana
Mohon disebutkan diagnosis dermatitis serborik ditentukan darimana? Apakah ada tenaga kesehatan yang menetukan diagnosis dermatitis seborik untuk menghidnari bias?
Bahasa indonesia
Tuliskan pada akhir diskusi further recomendation and limitation of the study
Mohon agar kesimpulan tidak di buat dalam bentuk poin namun dalam bentuk pargraf

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Reviewer B:
Recommendation: Revisions Required

Further comments on the paper for author

Data collection time is inconsistent: stated as March–June in some places, April–May in others.
BMI categorization is non-standard. Merging "overweight", "at risk", and both obesity classes raises risk of bias by oversimplifying a gradient variable.
Important confounding variables (e.g., diet, hygiene, hormonal conditions, socioeconomic status) were not adjusted or discussed --> preffered to be inclued in limitation of the study
There is no mention of ethical clearance or IRB approval, which is mandatory for studies involving patient data.

TURNITIN

Overweight Is Associated with Seborrheic Dermatitis in Adults

Nyai Oktika Dagis[1], Patwa Amani[2]*

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Abstract

Seborrheic Dermatitis (SD) is a prevalent dermatological condition marked by papulosquamous lesions, frequently found on the scalp, face, and other regions abundant in sebaceous glands. Although rarely life-threatening or communicable, SD can exert a considerable psychological influence owing to the social shame linked to inadequate hygiene, particularly among adults. This study sought to examine the correlation between body mass index (BMI) and standard deviation (SD) in the adult demographic. The study employed a cross-sectional observational methodology. Data were obtained through the examination of medical records. This study comprised 126 samples, including 44 men (66.7%) and 39 women (65.0%), aged between 26 and 45 years. Our study determined that overweight is associated with SD conditions in the adult population (p = 0.004).

Keywords: Seborrheic Dermatitis, Body Mass Index, Adult Populations

1. Introduction

Seborrheic dermatitis (SD) is a prevalent dermatological disorder marked by papulosquamous lesions, frequently found on the scalp, face, and other regions abundant in sebaceous glands. These lesions exhibit a spectrum of severity, from mild dandruff to pronounced inflammation accompanied by erythema.[1-2] While not life-threatening or contagious, seborrheic dermatitis can exert considerable psychological effects due to the societal stigma linked to inadequate hygiene.[3-4] A 2019 study by Lausarina revealed that 41.9% of individuals with seborrheic dermatitis reported a detrimental impact on their quality of life.[4]

The global prevalence of SD is estimated to account for 3-5% of the world's population.[5] In Indonesia, from 2013-2015, SD cases accounted for 0.99% to 5.8% of total skin and genital clinic visits.[2] DS incidence is common in early childhood, puberty, and adulthood (40-60 years).6 In the United States, the prevalence of SD in adults ranges from 1-3%, increasing to 3-5% in young adults.[6] A study at Meuraxa Regional General Hospital, Banda Aceh City in 2018 reported a prevalence of 31.1% in adults aged 36-45 years.[7] In children in Indonesia, SD affects approximately 10% of boys and 9.5% of girls.8 Risk factors for SD include immune system disorders, organ transplantation history, HIV/AIDS, chronic alcoholic pancreatitis, hepatitis C virus infection, cancer history, increased sebaceous gland activity, stress, advanced age, male gender, and being overweight.[1] Consumption of high-fat foods is also suspected to contribute to SD development, possibly through increased free fatty acids and excessive sebum production. The correlation between BMI and the risk of sexual dysfunction remains ambiguous, with scant study undertaken.[9] Numerous studies have examined the association between BMI and the prevalence of sexual dysfunction. A 2019 study at RSUD DR. H. Abdul Moelek, Lampung identified a statistically significant association between the two variables, however a subsequent 2020 study revealed no significant correlation.[9-10] These contradictory findings underscore the necessity for additional research.

This study seeks to examine the correlation between Body Mass Index (BMI) and the prevalence of seborrheic dermatitis in adults. We anticipate that this research will enhance comprehension of the pathogenesis of SD and its possible therapeutic ramifications. Comprehending the significance of BMI in the risk of skin disorders may provide novel insights for preventive measures and treatment methodologies, hence enhancing patient care and quality of life for those afflicted with this dermatological condition.

2. Method

The research design utilized an analytical observational study using a cross-sectional strategy, employing secondary data from the medical records of Cengkareng Regional Hospital. The Trisakti University Medical Faculty research ethics committee has granted approval for this research, assigned ethical clearance number 20/KER-FK/II/2024.

A non-probability sampling method, specifically sequential sampling, was employed to gather data from patients diagnosed with seborrheic dermatitis between March and June who satisfied the inclusion criteria. The study's sample size was 126, including data from patients with and without a diagnosis of seborrheic dermatitis. The diagnosis of seborrheic dermatitis was derived from the hospital's medical records. The subject's body mass index data was categorized according to the WHO Asia Pacific classification. The inclusion criteria for this study encompass individuals aged 26 to 45 years who attended the dermatology clinic at Cengkareng Regional Hospital between January 2021 and January 2024, and had comprehensive medical records (age, gender, weight, height, and diagnosis). The exclusion criteria for this study encompass patients diagnosed with additional skin disorders alongside seborrheic dermatitis (such as psoriasis and eczema), individuals with a history of immunocompromised conditions (including HIV/AIDS, organ transplantation, and malignancy), and patients with multiple diagnoses of seborrheic dermatitis was verified by medical records.

Univariate data analysis was utilized to characterize the independent variable (seborrheic dermatitis) and the dependent variable (body mass index). This analysis was performed for each variable, producing distributions and percentages for the variables examined. Bivariate analysis was used to evaluate the relationship between the independent variable (seborrheic dermatitis) and the dependent variable (body mass index). The Chi-Square statistical test was employed to assess the significance of the association between the two variables, utilizing a significance level (α) of 0.05, which corresponds to a confidence level of 95%. A p-value below 0.05 signifies a statistically significant association between body mass index and seborrheic dermatitis. A p-value of 0.05 or higher signifies the absence of a statistically significant association between body mass index and seborrheic dermatitis. The methodology encompasses a description of the research approach, study subjects, execution of the research procedure, utilization of materials and instruments, data collecting, and analytical techniques.[2]

3. Result

A study examining the correlation between body mass index and the prevalence of seborrheic dermatitis in an adult population was performed at Cengkareng General Hospital, West Jakarta, from March to June 2024. The study comprised a sample size of 126, including data from patients diagnosed with and without seborrheic dermatitis, collected between January 2021 and January 2024.

Table 1. Respondent characteristic distribution

Characteristic	Frequency (n=126)	Percentage
Age		
Early Adulthood (26-35 year old)	76	60,3
Late Adult (36-45 year old)	50	39,7
Gender		
Male	66	52,4
Female	60	47,6

Table 1 displays data regarding the distribution of respondent characteristics for seborrheic dermatitis in relation to age and gender. There are two age categories: early adulthood, with 76 respondents, and late adulthood, consisting of 50 respondents. The gender distribution indicates 66 male responses and 60 female respondents. The predominant age group is early adulthood, comprising 76 respondents, while the most prevalent gender is male, with 66 respondents.

Table 2. Subject's body mass index data

Body Mass Index	Frequency (n=126)	Percentage
Underweight	5	4,0
Normal	32	25,4
Overweight	5	4,0
At risk	26	20,6
Obese I	49	38,9
Obese II	9	7,1

Table 2 displays categorical data categorizing respondents according to Body Mass Index (BMI). There are six BMI categories: underweight (BMI < 18.5) with 5 respondents, normal (BMI 18.5 - 22.9) with 32 respondents, overweight (BMI > 23) with 5 respondents, at risk (BMI 23-24.9) with 26 respondents, obesity I (BMI 25-29.9) with 49 respondents, and obese II (BMI > 30) with 9 respondents. The predominant category is obese I, with a frequency of 49 responses.

Table 3. Seborrheic dermatitis data

Characteristic	Frequency (n=126)	Percentage
Seborrheic Dermatitis		
Yes	83	65,9
No	43	34,1

Table 3 displays information regarding seborrheic dermatitis among 126 participants. The data is categorical, with two categories: Yes and No. The "yes" group denotes respondents with seborrheic dermatitis, whereas the "no" category signifies respondents without seborrheic dermatitis. Table 10 indicates a minimum frequency of 43 respondents for the "No" group and a maximum frequency of 83 respondents for the "Yes" category. The predominant category in this table is "Yes," with a frequency of 83 responses.

Table 4. Relationship between age and sex index and seborrheic dermatitis

Variable	Seborrheic Dermatitis Yes n (%)	Seborrheic Dermatitis No n (%)	P Score
Age			
Early Adulthood	49 (64,5%)	27 (35,5%	0,683*
Late Adult	34 (68,0%)	16 (32,0%)	
Gender			
Male	44 (66,7%)	22 (33,3%)	0,844*
Female	39 (65,0%)	21 (35,0%)	

**Chi-square test*

The test results in Table 11 indicate that the frequency distribution of sample characteristics of seborrheic dermatitis is more prevalent in early adulthood (49 respondents) than in late adulthood (34 respondents). Statistical research indicated no significant correlation between age and seborrheic dermatitis in the adult population. p = 0.683. Table 11 indicates that the frequency distribution of seborrheic dermatitis characteristics comprises 44 male patients and 39 female subjects. Statistical analysis indicated no correlation between gender and seborrheic dermatitis in the adult population (p = 0.844).

In the initial research plan, Body Mass Index (BMI) was categorized into six classifications according to WHO standards: underweight, normal, overweight, at risk, obese I, and obese II. However, subsequent statistical analysis failed to satisfy the chi-square criterion, prompting the amalgamation of categories. The non-overweight group integrated underweight and normal, while the overweight group consolidated overweight, at risk, obese I, and obese II. Table 5. The correlation between body mass index and seborrheic dermatitis.

Table 5. Relationship between body mass index and seborrheic dermatitis

Variable	Seborrheic Dermatitis Yes n (%)	Seborrheic Dermatitis No n(%)	p Score
BMI			
Non-overweight	22 (48,9%)	23 (51,1%)	0,003
Overweight	61 (75,3%)	20 (24,7%)	

* Chi-square test

Table 5 presents the correlation between Body Mass Index (BMI) and the occurrence of seborrheic dermatitis at Cengkareng Hospital. Statistical research indicated a strong correlation between BMI and seborrheic dermatitis in the adult population (p = 0.003).

4. Discussion

Research conducted at Cengkareng Regional General Hospital indicates that the prevalence of seborrheic dermatitis predominantly occurs in early adulthood, specifically among individuals aged 26 to 35 years, with 76 respondents reporting this condition. The findings align with the research conducted by Tarroe et al., which indicates that the incidence of seborrheic dermatitis peaks

between the ages of 18 and 40 years.[20] The heightened activity of sebaceous glands, which peaks during puberty and progressively escalates over subsequent decades, significantly contributes to the elevated prevalence of seborrheic dermatitis among individuals aged 18 to 40.[7] This study's findings contrast with those of Nabillah's 2018 research, which identified the majority of respondents in late adulthood (36-45 years) among a sample of 50 individuals. The risk of seborrheic dermatitis escalates significantly with advancing age. Sanders et al. elucidated that this phenomenon arises from various physiological alterations, including a reduction in lipids within the stratum corneum and the thinning of both the epidermis and dermis, rendering the skin more vulnerable to irritation in advanced age.[19]

The majority of data, totaling 86 respondents, were collected from men based on gender frequency. This aligns with studies by Silvia et al., which indicated that among 72 respondents, the predominant gender was male, with 45 participants, attributed to higher levels of androgen hormones in men, leading to increased sebum production. Excessive sebum production might lead to the accelerated proliferation of Malassezia and trigger dandruff symptoms.[9] In contrast to the study of Sugiarto et al., which primarily involved female participants, comprising 71 responses.[10]

The research findings on Body Mass Index (BMI) indicated that the largest prevalence was observed in the obese I group, with 49 respondents exhibiting a high BMI. Obese individuals possess elevated fat levels, resulting in increased free fatty acid concentrations and heightened sebum hydrolysis by endothelial lipoprotein lipase, thereby elevating sebum levels.[6] These findings align with the research conducted by Silva et al., which identified 30 obese respondents.[9] Furthermore, the notion posited by Clark et al. asserts that the elevation of sebum can be metabolized by Malassezia fungi on the skin, resulting in the production of free fatty acids that may compromise the skin barrier.[19]

Malassezia flourishes in lipid-rich environments, so the availability of free fatty acids facilitates fungal proliferation. Inflammation induces hyperproliferation of the stratum corneum and results in inadequately differentiated corneocytes, hence altering the barrier and functionality of the stratum corneum. In contrast to the findings of Sugiarto et al., which indicated that the majority of respondents possessed a normal body mass index, specifically 65 respondents.[10] This study identified that 83 subjects experienced seborrheic dermatitis, a dermatological condition characterized by pink patches and plaques on the scalp with indistinct borders and oily scales.[21] The findings align with the study by Sugiarto et al., which identified 61 respondents with seborrheic dermatitis.[10] Conversely, Silvia et al. reported a balanced incidence rate of 50% for both those affected and unaffected by seborrheic dermatitis.[9]
The bivariate study of age and the incidence of seborrheic dermatitis, utilizing the chi-square statistical test, yielded a result of $p = 0.683$, indicating a value greater than 0.05. This suggests that age does not have a significant correlation with the incidence of seborrheic dermatitis. This finding is not corroborated by other studies indicating that the association between the two variables is nonexistent. Tarroe et al.[20] demonstrated that seborrheic dermatitis predominantly manifests between the ages of 18 and 40 years. Sebaceous gland activity increases during adolescence, significantly contributing to the elevated prevalence of seborrheic dermatitis in this demographic, and continues to escalate in subsequent decades.

Nonetheless, these findings diverge from other studies that reported a p value of 0.008 ($p < 0.05$), indicating a significant correlation between age and the prevalence of seborrheic dermatitis.[8] This is corroborated by the theory posited by Sanders et al., which asserts that the incidence of seborrheic dermatitis escalates with age due to various physiopathological alterations. One of them

will reduce the lipid content in the stratum corneum and diminish the thickness of the epidermis and dermis.[19] This may lead to increased sensitivity to external stimuli in the elderly. Malak et al. assert that diminished endurance can render older individuals susceptible to different ailments, including seborrheic dermatitis.[20]

This study revealed no significant correlation between gender and the prevalence of seborrheic dermatitis in the adult population ($p = 0.844$). The findings align with the study by Sugiarto et al., which reported no significant association between gender and the incidence of seborrheic dermatitis ($p\text{-value} > 0.05$).[10] Conversely, this contradicts the research by Silvia et al., which indicated a significant relationship between gender and the incidence of seborrheic dermatitis, with a p-value of 0.008 ($p < 0.05$). This suggests that there are inherent differences between male and female skin, observable in the quantity of hair follicles, sebaceous glands, sweat glands, and hormonal influences.[9] Male skin possesses predominant hormones, specifically androgens, which can result in increased perspiration and hair growth. In men, the activity of sebaceous glands, which influences sebum excretion, is heightened due to the effects of androgen hormones. Androgen hormones induce an enlargement of sebaceous glands, enhance sebum synthesis, and promote keratinocyte proliferation within the sebaceous gland duct and acroinfundibulum. The sebaceous glands will continuously produce sebum and secrete it to the skin surface via the hair follicle pores. Sebaceous glands release lipids via holocrine secretion. Sebum secretion is regulated by hormones.[5]

Statistical study indicated a significant correlation between Body Mass Index (BMI) and the prevalence of seborrheic dermatitis, with a p-value of 0.04, which is less than 0.05. A higher body mass index correlates with an increased incidence of seborrheic dermatitis. This aligns with research by Silvia et al., which indicates that an elevated body mass index correlates with an increased incidence of seborrheic dermatitis.[9] Statistical analysis yielded a p-value of 0.001, indicating significance ($p < 0.05$), with an r-value of 0.282, demonstrating a significant relationship between body mass index and the occurrence of seborrheic dermatitis. Individuals with elevated BMI or obesity are at a greater risk for dermatitis due to hyperandrogenism, the primary catalyst for sebum production. Elevated sebum levels can be readily decomposed by Malassezia spp fungus on the skin, leading to the production of free fatty acids that compromise the skin barrier, thus causing hyperproliferation and renewed sebum production.[9]

Lausarina et al. indicated that obese patients exhibit elevated levels of free fatty acids. The elevation of free fatty acids resulting from excessive fat accumulation also suppresses lipogenesis, so hindering the clearance of serum triacylglycerol and leading to elevated blood triglyceride levels (hypertriglyceridemia). Individuals with seborrheic dermatitis exhibit elevated triglyceride and cholesterol levels on the skin surface.[8] Conversely, the study conducted by Sugiarto et al. reported a p-value of 0.427, indicating no significant correlation between body mass index and the occurrence of seborrheic dermatitis.[10]

5. Conclusion

Our research finds that overweight is associated with seborrheic dermatitis in the adult population, with a p-value of 0.003.

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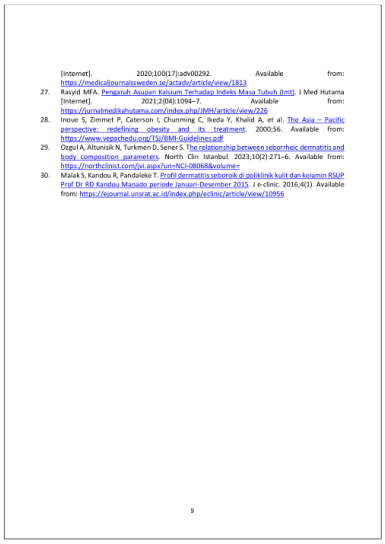

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Overweight Is Associated with Seborrheic Dermatitis in Adults

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Abstract

Seborrheic Dermatitis (SD) is a prevalent dermatological condition marked by papulosquamous lesions, frequently found on the scalp, face, and other regions abundant in sebaceous glands. Although rarely life-threatening or communicable, SD can exert a considerable psychological influence owing to the social shame linked to inadequate hygiene, particularly among adults. This study sought to examine the correlation between body mass index (BMI) and standard deviation (SD) in the adult demographic. The study employed a cross-sectional observational methodology. Data were obtained through the examination of medical records. This study comprised 126 samples, including 44 men (66.7%) and 39 women (65.0%), aged between 26 and 45 years. Our study determined that overweight is associated with SD conditions in the adult population ($p = 0.004$).

Keywords: Seborrheic Dermatitis, Body Mass Index, Adult Populations

1. Introduction

Seborrheic dermatitis (SD) is a prevalent dermatological disorder marked by papulosquamous lesions, frequently found on the scalp, face, and other regions abundant in sebaceous glands. These lesions exhibit a spectrum of severity, from mild dandruff to pronounced inflammation accompanied by erythema.[1-2] While not life-threatening or contagious, seborrheic dermatitis can exert considerable psychological effects due to the societal stigma linked to inadequate hygiene.[3-4] A 2019 study by Lausarina revealed that 41.9% of individuals with seborrheic dermatitis reported a detrimental impact on their quality of life.[4]

The global prevalence of SD is estimated to account for 3-5% of the world's population.[5] In Indonesia, from 2013-2015, SD cases accounted for 0.99% to 5.8% of total skin and genital clinic visits.[2] DS incidence is common in early childhood, puberty, and adulthood (40-60 years).[6] In the United States, the prevalence of SD in adults ranges from 1-3%, increasing to 3-5% in young adults.[4] A study at Meuraxa Regional General Hospital, Banda Aceh City in 2018 reported a prevalence of 31.1% in adults aged 36-45 years.[7] In children in Indonesia, SD affects approximately 10% of boys and 9.5% of girls.[8] Risk factors for SD include immune system disorders, organ transplantation history, HIV/AIDS, chronic alcoholic pancreatitis, hepatitis C virus infection, cancer history, increased sebaceous gland activity, stress, advanced age, male gender, and being overweight.[1] Consumption of high-fat foods is also suspected to contribute to SD development, possibly through increased free fatty acids and excessive sebum production. The correlation between BMI and the risk of sexual dysfunction remains ambiguous, with scant studies undertaken.[8] Numerous studies have examined the association between BMI and the prevalence of sexual dysfunction. A 2019 study at RSUD DR. H. Abdul Moelek, Lampung identified a statistically significant association between the two variables, however a subsequent 2020 study revealed no significant correlation.[9-10] These

contradictory findings underscore the necessity for additional research.

This study seeks to examine the correlation between Body Mass Index (BMI) and the prevalence of seborrheic dermatitis in adults. We anticipate that this research will enhance comprehension of the pathogenesis of SD and its possible therapeutic ramifications. Comprehending the significance of BMI in the risk of skin disorders may provide novel insights for preventive measures and treatment methodologies, hence enhancing patient care and quality of life for those afflicted with this dermatological condition.

2. Method

The research design utilized an analytical observational study using a cross-sectional strategy, employing secondary data from the medical records of Cengkareng Regional Hospital. The Trisakti University Medical Faculty research ethics committee has granted approval for this research, assigned ethical clearance number 20/KER-FK/II/2024.

A non-probability sampling method, specifically sequential sampling, was employed to gather data from patients diagnosed with seborrheic dermatitis between March and June who satisfied the inclusion criteria. The study's sample size was 126, including data from patients with and without a diagnosis of seborrheic dermatitis. The diagnosis of seborrheic dermatitis was derived from the hospital's medical records. The subject's body mass index data was categorized according to the WHO Asia Pacific classification. The inclusion criteria for this study encompass individuals aged 26 to 45 years who attended the dermatology clinic at Cengkareng Regional Hospital between January 2021 and January 2024, and had comprehensive medical records (age, gender, weight, height, and diagnosis). The exclusion criteria for this study encompass patients diagnosed with additional skin disorders alongside seborrheic dermatitis (such as psoriasis and eczema), individuals with a history of immunocompromised conditions (including HIV/AIDS, organ transplantation, and malignancy), and patients with multiple diagnoses of seborrheic dermatitis, as verified by medical records.

Univariate data analysis was utilized to characterize the independent variable (seborrheic dermatitis) and the dependent variable (body mass index). This analysis was performed for each variable, producing distributions and percentages for the variables examined. Bivariate analysis was used to evaluate the relationship between the independent variable (seborrheic dermatitis) and the dependent variable (body mass index). The Chi-Square statistical test was employed to assess the significance of the association between the two variables, utilizing a significance level (α) of 0.05, which corresponds to a confidence level of 95%. A p-value below 0.05 signifies a statistically significant association between body mass index and seborrheic dermatitis. A p-value of 0.05 or higher signifies the absence of a statistically significant association between body mass index and seborrheic dermatitis. The methodology encompasses a description of the research approach, study subjects, execution of the research procedure, utilization of materials and instruments, data collecting, and analytical techniques.[2]

3. Result

A study examining the correlation between body mass index and the prevalence of seborrheic dermatitis in an adult population was performed at Cengkareng General Hospital, West Jakarta, from March to June 2024.

Table 1. Respondent characteristic distribution

Characteristic	Frequency (n=126)	Percentage
Age		
Early adulthood (26-35 years old)	76	60.3
Late adult (36-45 years old)	50	39.7
Gender		
Male	66	52.4
Female	60	47.6

Table 2. Subject's body mass index data

Body Mass Index	Frequency (n=126)	Percentage
Underweight	5	4.0
Normal	32	25.4
Overweight	5	4.0
At risk	26	20.6
Obesity I	49	38.9
Obesity II	9	7.1

Table 3. Seborrheic dermatitis data

Characteristic	Frequency (n=126)	Percentage
Seborrheic Dermatitis		
Yes	83	65.9
No	43	34.1

The study comprised a sample size of 126, including data from patients diagnosed with and without seborrheic dermatitis, collected between January 2021 and January 2024.

Table 1 displays data regarding the distribution of respondent characteristics for seborrheic dermatitis in relation to age and gender. There are two age categories: early adulthood, with 76 respondents, and late adulthood, consisting of 50 respondents. The gender distribution indicates 66 male responses and 60 female respondents. The predominant age group is early adulthood, comprising 76 respondents, while the most prevalent gender is male, with 66 respondents.

Table 2 displays categorical data categorizing respondents according to Body Mass Index (BMI). There are six BMI categories: underweight (BMI < 18.5) with 5 respondents, normal (BMI 18.5 - 22.9) with 32 respondents, overweight (BMI > 23) with 5 respondents, at risk (BMI 23-24.9) with 26 respondents, obesity I (BMI 25-29.9) with 49 respondents, and obesity II (BMI > 30) with 9 respondents. The predominant category is obesity I, with a frequency of 49 responses.

Table 3 displays information regarding seborrheic dermatitis among 126 participants. The data is categorical, with two categories: Yes and No. The "yes" group denotes respondents with seborrheic dermatitis, whereas the "no" category signifies respondents without seborrheic dermatitis. Table 10 indicates a minimum frequency of 43 respondents for the "No" group and a maximum frequency of 83 respondents for the "Yes" category. The predominant category

Table 4. Relationship between age and sex index and seborrheic dermatitis

Variable	Seborrheic Dermatitis		p Score
	Yes n (%)	No n (%)	
Age			
Early Adulthood	49 (64.5%)	27 (35.5%)	
Late Adult	34 (68.0%)	16 (32.0%)	0.683*
Gender			
Male	44 (66.7%)	22 (33.3%)	0.844*
Female	39 (65.0%)	21 (35.0%)	

**Chi-square test*

Table 5. Relationship between body mass index and seborrheic dermatitis

Variable	Seborrheic Dermatitis		p Score
	Yes n (%)	No N (%)	
BMI			
Non-overweight	22 (48.9%)	23 (51.1%)	0.003
Overweight	61 (75.3%)	20 (24.7%)	

* Chi-square test

in this table is "Yes," with a frequency of 83 responses.

The test results in Table 4 indicate that the frequency distribution of sample characteristics of seborrheic dermatitis is more prevalent in early adulthood (49 respondents) than in late adulthood (34 respondents). Statistical research indicated no significant correlation between age and seborrheic dermatitis in the adult population. p = 0.683. Table 4 indicates that the frequency distribution of seborrheic dermatitis characteristics comprises 44 male patients and 39 female subjects. Statistical analysis indicated no correlation between gender and seborrheic dermatitis in the adult population (p = 0.844).

In the initial research plan, Body Mass Index (BMI) was categorized into six classifications according to WHO standards: underweight, normal, overweight, at risk, obesity I, and obesity II. However, subsequent statistical analysis failed to satisfy the chi-square criterion, prompting the amalgamation of categories. The non-overweight group integrated underweight and normal, while the overweight group consolidated overweight, at risk, obesity I, and obesity II. Table 5. The correlation between body mass index and seborrheic dermatitis.

Table 5 presents the correlation between Body Mass Index (BMI) and the occurrence of seborrheic dermatitis at Cengkareng Hospital. Statistical research indicated a strong correlation between BMI and seborrheic dermatitis in the adult population (p = 0.003).

4. Discussion

Research conducted at Cengkareng Regional General Hospital indicates that the prevalence of seborrheic dermatitis

predominantly occurs in early adulthood, specifically among individuals aged 26 to 35 years, with 76 respondents reporting this condition. The findings align with the research conducted by Tarroe et al., which indicates that the incidence of seborrheic dermatitis peaks between the ages of 18 and 40 years.[11] The heightened activity of sebaceous glands, which peaks during puberty and progressively escalates over subsequent decades, significantly contributes to the elevated prevalence of seborrheic dermatitis among individuals aged 18 to 40.[7] This study's findings contrast with those of Nabillah's 2018 research, which identified the majority of respondents in late adulthood (36-45 years) among a sample of 50 individuals. The risk of seborrheic dermatitis escalates significantly with advancing age. Sanders et al. elucidated that this phenomenon arises from various physiological alterations, including a reduction in lipids within the stratum corneum and the thinning of both the epidermis and dermis, rendering the skin more vulnerable to irritation in advanced age.[12]

The majority of data, totaling 66 respondents, were collected from men based on gender frequency. This aligns with studies by Silvia et al., which indicated that among 72 respondents, the predominant gender was male, with 45 participants, attributed to higher levels of androgen hormones in men, leading to increased sebum production. Excessive sebum production might lead to the accelerated proliferation of Malassezia and trigger dandruff symptoms.[9] In contrast to the study of Sugiarto et al., which primarily involved female participants, comprising 71 responses.[10]

The research findings on Body Mass Index (BMI) indicated that the largest prevalence was observed in the obesity I group, with 49 respondents exhibiting a high BMI. Obesity individuals possess elevated fat levels, resulting in increased free fatty acid concentrations and heightened sebum hydrolysis by endothelial lipoprotein lipase, thereby elevating sebum levels.[6] These findings align with the research conducted by Silva et al., which identified 30 obesity respondents.[9] Furthermore, the notion posited by Clark et al. asserts that the elevation of sebum can be metabolized by Malassezia fungi on the skin, resulting in the production of free fatty acids that may compromise the skin barrier.[13]

Malassezia flourishes in lipid-rich environments, so the availability of free fatty acids facilitates fungal proliferation. Inflammation induces hyperproliferation of the stratum corneum and results in inadequately differentiated corneocytes, hence altering the barrier and functionality of the stratum corneum. In contrast to the findings of Sugiarto et al., which indicated that the majority of respondents possessed a normal body mass index, specifically 65 respondents.[10] This study identified that 83 subjects experienced seborrheic dermatitis, a dermatological condition characterized by pink patches and plaques on the scalp with indistinct borders and oily scales.[14] The findings align with the study by Sugiarto et al., which identified 61 respondents with seborrheic dermatitis.[10] Conversely, Silvia et al. reported a balanced incidence rate of 50% for both those affected and unaffected by seborrheic dermatitis.[9]

The bivariate study of age and the incidence of seborrheic dermatitis, utilizing the chi-square statistical test, yielded a result of $p = 0.683$, indicating a value greater than 0.05. This suggests that age does not have a significant correlation with the incidence of seborrheic dermatitis. This finding is not corroborated by other studies indicating that the association between the two variables is nonexistent. Tarroe et al.[11] demonstrated that seborrheic dermatitis predominantly

manifests between the ages of 18 and 40 years. Sebaceous gland activity increases during adolescence, significantly contributing to the elevated prevalence of seborrheic dermatitis in this demographic, and continues to escalate in subsequent decades.

Nonetheless, these findings diverge from other studies that reported a p value of 0.008 ($p < 0.05$), indicating a significant correlation between age and the prevalence of seborrheic dermatitis.[8] This is corroborated by the theory posited by Sanders et al., which asserts that the incidence of seborrheic dermatitis escalates with age due to various physiopathological alterations. One of them will reduce the lipid content in the stratum corneum and diminish the thickness of the epidermis and dermis.[12] This may lead to increased sensitivity to external stimuli in the elderly. Malak et al. assert that diminished endurance can render older individuals susceptible to different ailments, including seborrheic dermatitis.[15]

This study revealed no significant correlation between gender and the prevalence of seborrheic dermatitis in the adult population ($p = 0.844$). The findings align with the study by Sugiarto et al., which reported no significant association between gender and the incidence of seborrheic dermatitis (p-value > 0.05). Conversely, this contradicts the research by Silvia et al., which indicated a significant relationship between gender and the incidence of seborrheic dermatitis, with a p-value of 0.008 ($p < 0.05$). This suggests that there are inherent differences between male and female skin, observable in the quantity of hair follicles, sebaceous glands, sweat glands, and hormonal influences.[8] Male skin possesses predominant hormones, specifically androgens, which can result in increased perspiration and hair growth. In men, the activity of sebaceous glands, which influences sebum excretion, is heightened due to the effects of androgen hormones. Androgen hormones induce an enlargement of sebaceous glands, enhance sebum synthesis, and promote keratinocyte proliferation within the sebaceous gland duct and acroinfundibulum. The sebaceous glands will continuously produce sebum and secrete it to the skin surface via the hair follicle pores. Sebaceous glands release lipids via holocrine secretion. Sebum secretion is regulated by hormones.[5]

Statistical study indicated a significant correlation between Body Mass Index (BMI) and the prevalence of seborrheic dermatitis, with a p-value of 0.04, which is less than 0.05. A higher body mass index correlates with an increased incidence of seborrheic dermatitis. This aligns with research by Silvia et al., which indicates that an elevated body mass index correlates with an increased incidence of seborrheic dermatitis.[9] Statistical analysis yielded a p-value of 0.001, indicating significance ($p < 0.05$), with an r-value of 0.282, demonstrating a significant relationship between body mass index and the occurrence of seborrheic dermatitis. Individuals with elevated BMI or obesity are at a greater risk for dermatitis due to hyperandrogenism, the primary catalyst for sebum production. Elevated sebum levels can be readily decomposed by Malassezia spp fungus on the skin, leading to the production of free fatty acids that compromise the skin barrier, thus causing hyperproliferation and renewed sebum production.[9]

Lausarina et al. indicated that obesity patients exhibit elevated levels of free fatty acids. The elevation of free fatty acids resulting from excessive fat accumulation also suppresses lipogenesis, so hindering the clearance of serum triacylglycerol and leading to elevated blood triglyceride levels (hypertriglyceridemia). Individuals with seborrheic dermatitis exhibit elevated triglyceride and cholesterol levels on the skin

surface.[4] Conversely, the study conducted by Sugiarto et al. reported a p-value of 0.427, indicating no significant correlation between body mass index and the occurrence of seborrheic dermatitis.[10]

5. Conclusion

Our research finds that overweight is associated with seborrheic dermatitis in the adult population, with a p-value of 0.003.

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