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HORMONAL PROFILE AND THEIR ASSOCIATION WITH ACNE PRESENTATION IN ADULT FEMALE

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Hormonal profiles, Acne vulgaris, Polycystic ovary syndrome (PCOS), Menstrual cycle, Testosterone, Estrogen, Acne severity.

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Abstract

Background: *Acne vulgaris is one of the most common skin conditions affecting adult females, with hormonal fluctuations playing a crucial role in its development. Hormonal imbalances, particularly those involving androgens, estrogen, and progesterone, are believed to influence the severity and frequency of acne. Adult females often experience this due to factors such as menstrual cycles, pregnancy, and conditions like polycystic ovary syndrome (PCOS). These impact on acne pathogenesis which remains an area of active research.*

Objective(s): *The primary objective of this study is to investigate the relationship between hormonal profiles and acne presentation in adult females.*

Methodology: *The study was designed a cross-sectional design featuring adult females aged 18-40, exhibiting both mild and severe acne manifestations. The sample size was kept 40 participants. Blood tests will be used to check hormone levels in the body. The Global Acne Grading System (GAGS) will be used to measure the severity of acne by looking at the number and type of lesions. We will use statistical methods like correlation and regression models to find out how hormone levels and acne severity are related.*

Results: *A significant correlation between elevated androgen levels and acne severity in adult females was observed. Furthermore, variations in estrogen and progesterone levels may show a connection to acne flare-ups, particularly during specific phases of the menstrual cycle or in individuals with hormonal disorders such as PCOS.*

Conclusion(s): *It was concluded that hormonal imbalances influence acne in adult females, and this study lead to develop potential pathways for better management and treatment strategies. Understanding these correlations may lead to more personalized approaches in treating acne, particularly in those with hormone-related acne.*

INTRODUCTION

Acne vulgaris is a common chronic skin condition that affects a large proportion of the global population, particularly adult females. Although it is commonly associated with adolescence, its persistence into adulthood has become an

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increasing concern. Studies show that approximately 40% to 55% of women in their 20s and 30s experience adult acne, often presenting as deep, inflammatory and cystic lesions mainly on the lower face, jawline, and chin. Unlike adolescent acne, adult female acne is more persistent and is strongly linked with hormonal imbalance, genetics, diet, and lifestyle factors. (1)

Hormones, especially androgens such as testosterone, play a major role in acne development by stimulating sebaceous glands, leading to excess sebum production, clogged pores, and inflammation. Fluctuations in estrogen and progesterone during menstruation, pregnancy, and conditions like polycystic ovary syndrome (PCOS) are strongly associated with acne flare-ups. Many studies report that acne severity increases during the luteal phase of the menstrual cycle due to higher progesterone levels, while it often improves during the follicular phase when estrogen predominates. (2)

PCOS is one of the most significant endocrine disorders linked with severe and persistent acne due to hyperandrogenism. In addition, genetic predisposition may increase sensitivity to hormonal changes, making some women more prone to severe acne than others. Hormonal treatments, including oral contraceptives and anti-androgens such as spironolactone, have shown effectiveness in reducing acne severity by regulating androgen activity and sebum production, although response varies among individuals. (3)

Given the high incidence of adult acne in women, which can have a substantial negative influence on mental health, self-esteem, and general quality of life, this research is especially pertinent. Acne has psychological effects in addition to physical ones, frequently resulting in social disengagement, anxiety, and despair. Furthermore, not everyone responds well to the conventional acne medications, such as topical retinoids and oral contraceptives, underscoring the need for more specialized treatments based on hormonal profiles. (4)

By identifying hormonal factors that influence acne presentation, the findings could assist healthcare professionals in diagnosing and treating adult female acne more effectively. Furthermore, the results of this study could have broader applications in the fields of women's health, endocrinology, and dermatology, potentially informing public health policies aimed at addressing skin conditions in adult populations. (5)

Adult acne, which may be both physically and psychologically upsetting, affects between 40% and 55% of women in their 20s and 30s, according to studies. Adult acne, which is characterized by deeper, cystic lesions mostly around the jawline, chin, and lower face, frequently presents differently from its teenage cousin. Adult acne is typically persistent, with recurrent outbreaks that can have a substantial influence on a woman's self-esteem, quality of life, and psychological well-being, in contrast to adolescent acne, which is frequently transient. (6)

Acne flare-ups are frequently caused by hormonal changes associated with the menstrual cycle. Because progesterone and androgens activate sebaceous glands, women may have more acne lesions during the premenstrual phase. Similarly, persistent, severe acne has been strongly associated with disorders like PCOS, which is characterized by high androgen levels. Even while the connection between hormones and acne is becoming more widely recognized, research particularly examining the hormonal profiles that influence the severity of acne in adult females is still lacking. (7)

Despite growing awareness, there is still limited research focusing specifically on detailed hormonal profiles and their direct relationship with acne severity in adult females. Most available studies focus on adolescents, creating a gap in understanding adult female acne. Therefore, this study aims to investigate the correlation between hormonal profiles and acne manifestation in adult females, with the goal of supporting more personalized and effective treatment strategies based on hormonal variations.

Methodology:

The study was designed as cross-sectional, survey-based analytical study with non-probability sampling technique, done in clinical settings. The

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sample size was 40 female participants, with inclusion criteria of females 15 years and above with presence of papulopustular or nodulocystic acne and new-onset acne or persistence/aggravation of acne after adolescence. The exclusion criteria include Pregnant or lactating women, patients using systemic corticosteroids, hormonal contraceptives, anti-androgens, or anabolic steroids, Patients with comedonal acne only and patients with known endocrine disorders already under treatment.

RESULTS

In this study, a total of 40 adult female patients were included, and their age distribution was assessed to determine the age group in which acne was more frequently observed. Age-related information was obtained from the patient proforma and categorized into three age groups for analysis. The results showed that 16 (40%) participants belonged to the 21–25 years age group, 14 (35%) to the 26–30 years group, and 10 (25%) to the 31–35 years group, indicating that acne was more commonly observed among younger adult females in the study sample. The details are presented in the following table.

Table 1: Age distribution of participants.

Age group (years)	Frequency	Percentage
21-25	16	40.0%
26-30	14	35.0%
31-35	10	25.0%
Total	**40**	**100%**

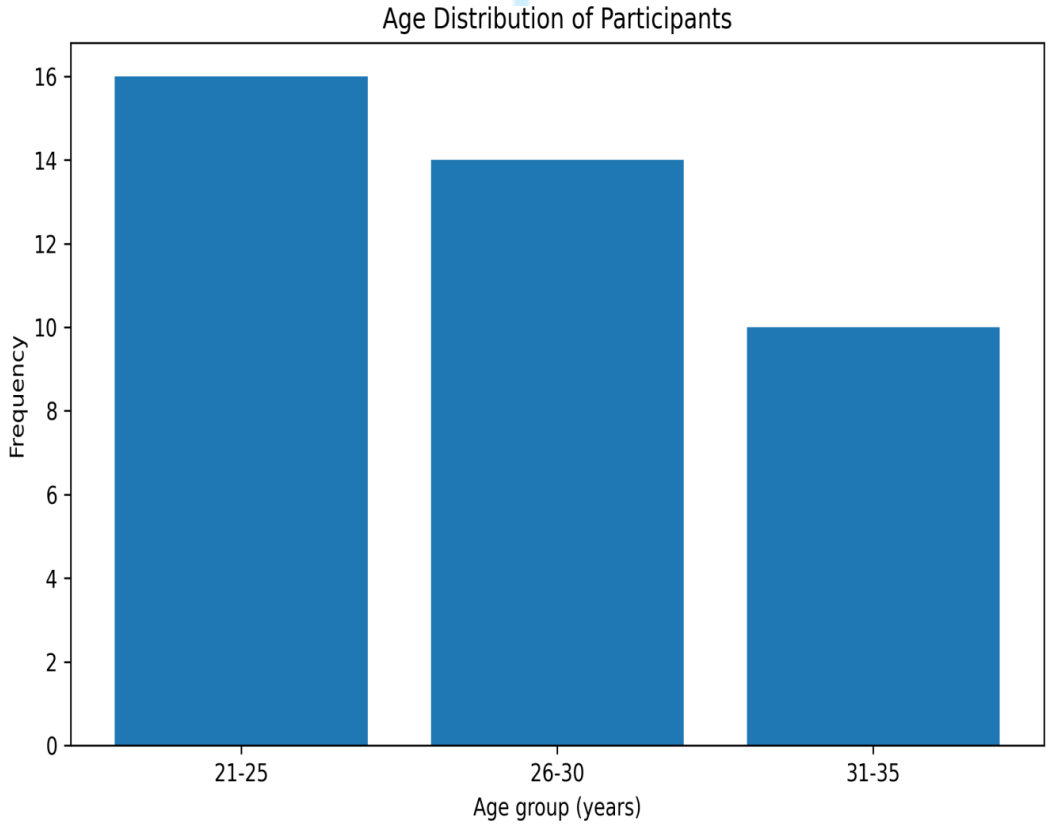

Table 2: Marital Status of Participants

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The marital status of all 40 participants was recorded to describe the demographic characteristics of the study sample. This information was collected directly from the responses provided in the patient proforma. The findings revealed that 24 (60%) participants were single, while 16 (40%) were married, showing that unmarried adult females constituted the larger proportion of the study population. The details are presented below.

Martial status	Frequency	percentage
Single	24	60.0%
Married	16	40.0%
Total	40	100%

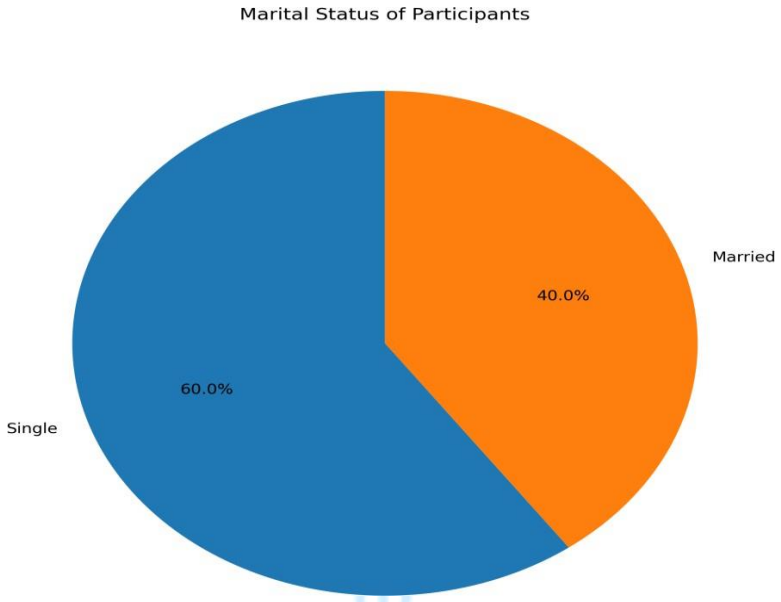

Figure 2 Martial status of participants

Table 3: Occupation of participants

The occupational status of the 40 adult female patients was assessed to understand the social and functional background of the study sample. This information was obtained from the patient questionnaire and categorized into student, employed, homemaker, and other groups. The results demonstrated that 16 (40%) participants were students, 14 (35%) were employed, 8 (20%) were homemakers, and 2 (5%) belonged to the other category. These findings indicate that students and employed females formed the major proportion of the study population. The details are shown in the following table.

Occupation	Frequency	Percentage
Student	16	40.0%
Employed	14	35.0%
Home maker	8	20.0%
Other	2	5.0%
Total	40	100%

Table 4: Acne severity among participants

Acne severity was the main outcome variable of this study; therefore, it was assessed in all 40 participants to identify the proportion of mild, moderate, and severe acne cases. Severity information was categorized according to the

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available responses in the study proforma. The results showed that 13 (32.5%) participants had mild acne, 20 (50%) had moderate acne, and 7 (17.5%) had severe acne, indicating that moderate acne was the most common clinical presentation among adult females included in this study. The details are given below.

Acne severity	Frequency	Percentage
Mild	13	32.5%
Moderate	20	50.0%
Severe	7	17.5%
Total	**40**	**100%**

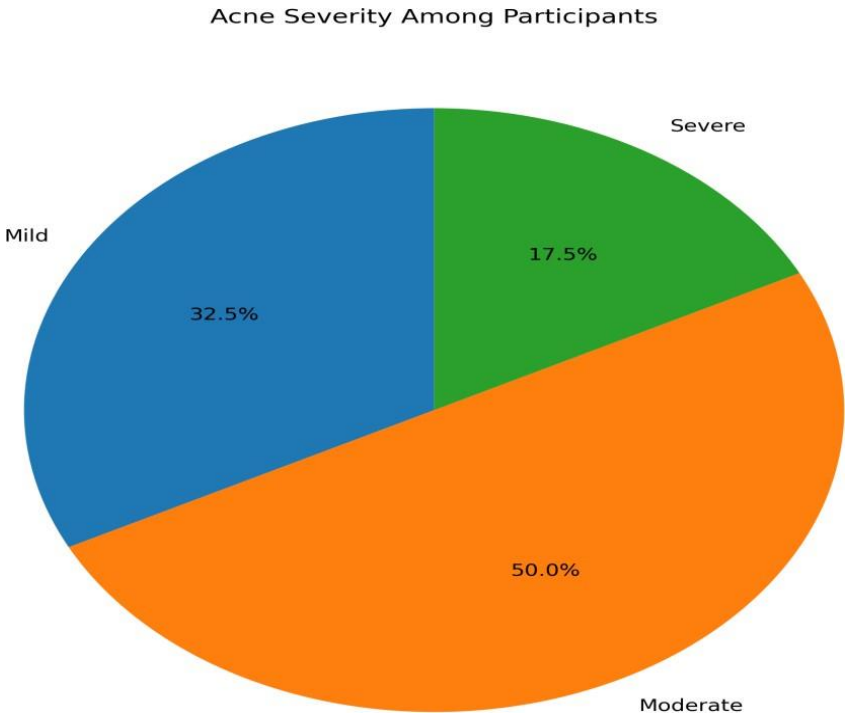

Figure 5.5 Acne Severity among participants

Table 5: Premenstrual worsening of acne among participants

Premenstrual worsening of acne was assessed among all 40 adult female patients because hormonal fluctuation before menstruation is considered an important factor in acne exacerbation. This information was collected through self-reported responses on the questionnaire. The findings revealed that 24 (60%) participants reported that their acne worsened before menstruation, whereas 16 (40%) did not report premenstrual aggravation. This pattern supports the possible role of cyclical hormonal changes in acne presentation. The results are presented in the following table.

Acne worsens before mensturaration	Frequency	Percentage

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yes	24	60.0%
No	16	40.0%
Total	40	100%

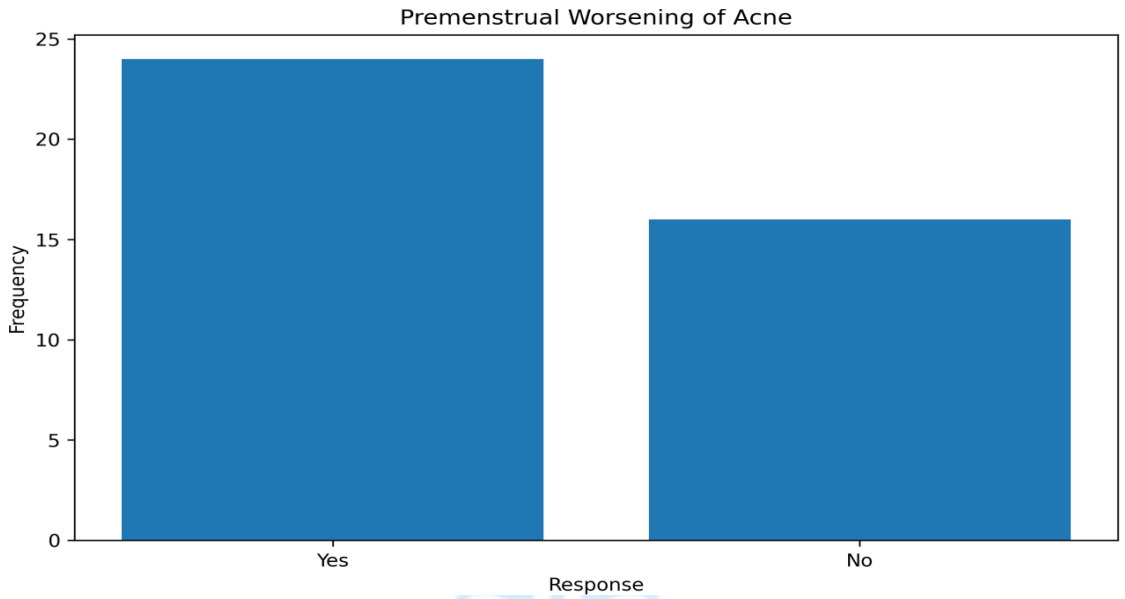

FIGURE 5 Premenstural Worsening of Acne Among Participants

Table 6: Menstrual cycle regularity among participants

Menstrual cycle regularity was assessed in all 40 study participants to evaluate an important indirect indicator of hormonal imbalance. This information was obtained from patient responses recorded in the proforma. The results showed that 25 (62.5%) participants had regular menstrual cycles, while 15 (37.5%) had irregular cycles, indicating that a considerable proportion of the study population experienced menstrual irregularity. The detailed distribution is shown below.

Menstural cycle regularity	Frequency	Percentage
Regular	25	62.5%
Irregular	15	37.5%
Total	**40**	**100%**

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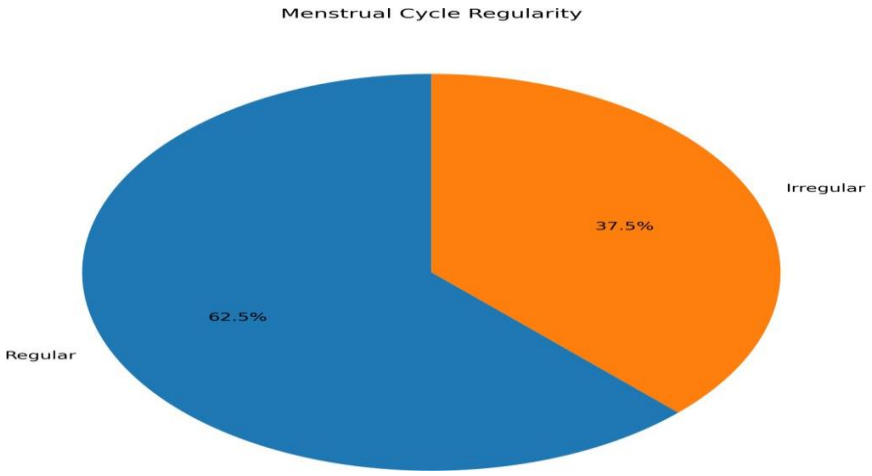

Figure 6: Menstrual cycle regularity among participants

Table 7: Excessive Hair growth among participant

Excessive hair growth was evaluated in the 40 adult female patients because it may reflect underlying hyperandrogenism and thus support the hormonal basis of acne. The data were obtained from patient-reported responses in the questionnaire. The analysis showed that 16 (40%) participants reported excessive hair growth, whereas 24 (60%) did not. This finding suggests that androgen-related clinical manifestations were present in a notable proportion of the participants. The results are shown below.

Excessive hair growth	Frequency	Percentage
Yes	16	40.0%
No	24	60.0%
Total	**40**	**100%**

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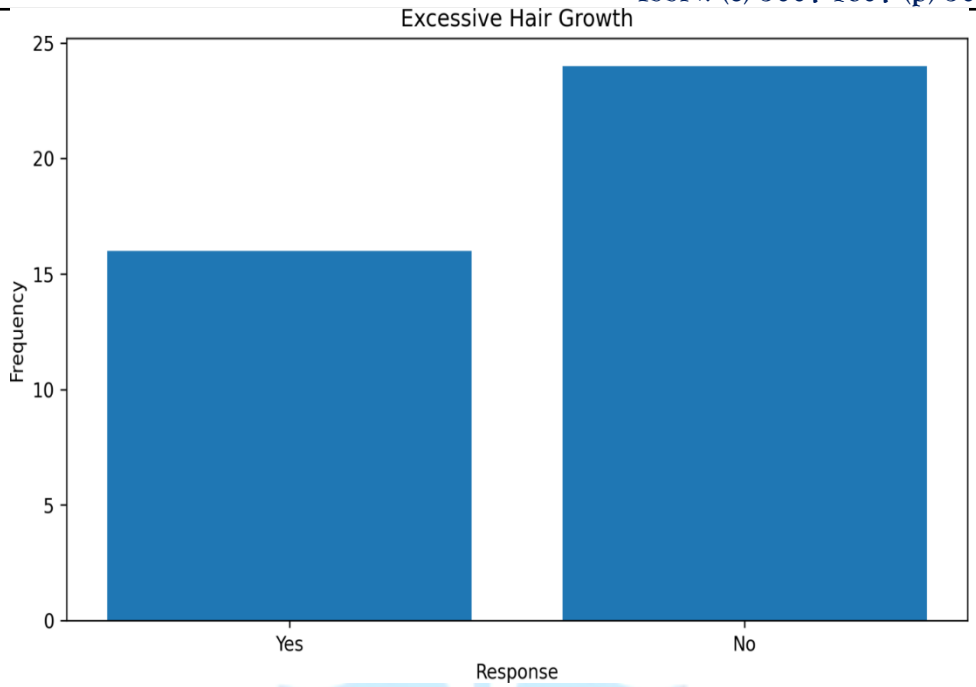

Figure 7 Excessive hair growth among participant

Table 8: Hair Fall among participants

Hair fall was assessed in all 40 participants because it can be associated with hormonal disturbance as well as stress, both of which are relevant to the clinical presentation of acne. This information was collected through patient responses in the questionnaire. The results demonstrated that 28 (70%) participants reported hair fall, while 12 (30%) did not. This indicates that hair fall was a common associated complaint in the study population. The details are presented in the following table

Hair Fall	Frequency	Percentage
Yes	28	70.0%
No	12	30.0%
Total	**40**	**100%**

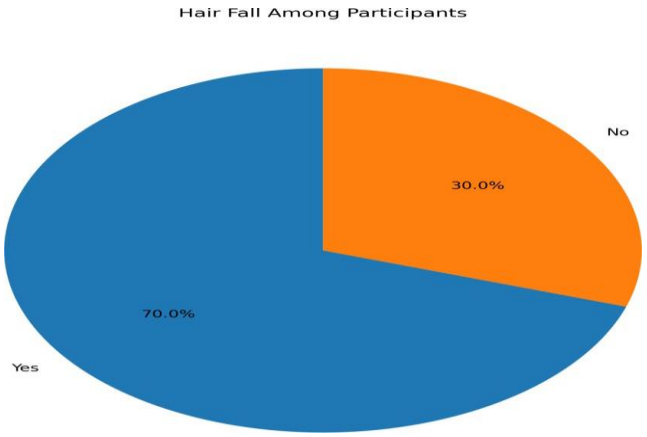

Figure 8 Hair Fall among participants

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Table 9: Stress related acne flare ups

Stress related acne flare ups were assessed among all 40 participants because stress is widely regarded as an aggravating factor in acne. The data were collected through self reported responses in the study questionnaire. The analysis showed that 32 (80%) participants experienced acne flare-ups during stress, whereas 8 (20%) did not report such worsening. These findings indicate that stress was one of the most frequently reported aggravating factors in the present study. The details are provided below.

Stress related flare ups	Frequency	Percentage
Yes	32	80.0%
No	8	20.0%
Total	**40**	**100%**

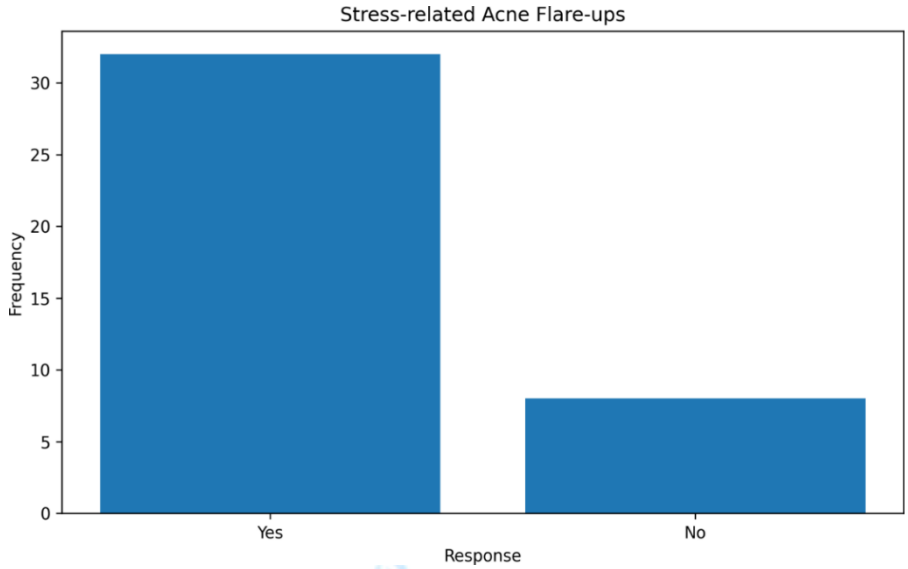

Figure 9 Stress related acne flare ups among participants

Table 10: Sleep duration among participants

Stress related acne flare ups were assessed among all 40 participants because stress is widely regarded as an aggravating factor in acne. The data were collected through self reported responses in the study questionnaire. The analysis showed that 32 (80%) participants experienced acne flare-ups during stress, whereas 8 (20%) did not report such worsening. These findings indicate that stress was one of the most frequently reported aggravating factors in the present study. The details are provided below.

Sleep duration	Frequency	Percentage
<6 hours	16	40.0%
6-8 hours	20	50.0%
>8 hours	4	10.0%
Total	**40**	**100%**

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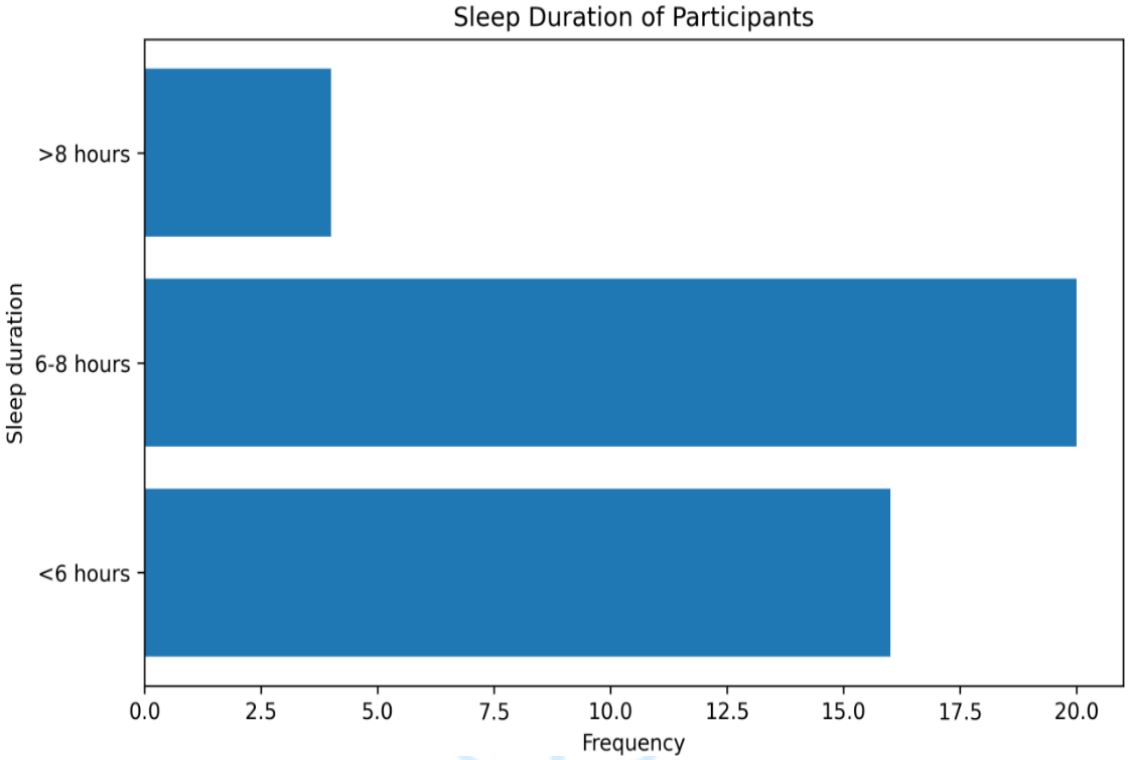

Figure 10 Sleep duration among participants consultation with dermatologist or Aesthetician

Table 11: Hormonal testing among participants

Hormonal testing was assessed among all 40 adult female patients to determine how many participants had undergone investigation for a possible hormonal basis of acne. This information was self-reported in the questionnaire. The results indicated that 24 (60%) participants had undergone hormonal testing, whereas 16 (40%) had never been tested. These findings suggest that a moderate proportion of the sample had been evaluated for hormonal abnormalities. The results are presented in the following table.

Hormonal testing done	Frequency	Percentage
Yes	24	60.0%
No	16	40.0%
Total	**40**	**100%**

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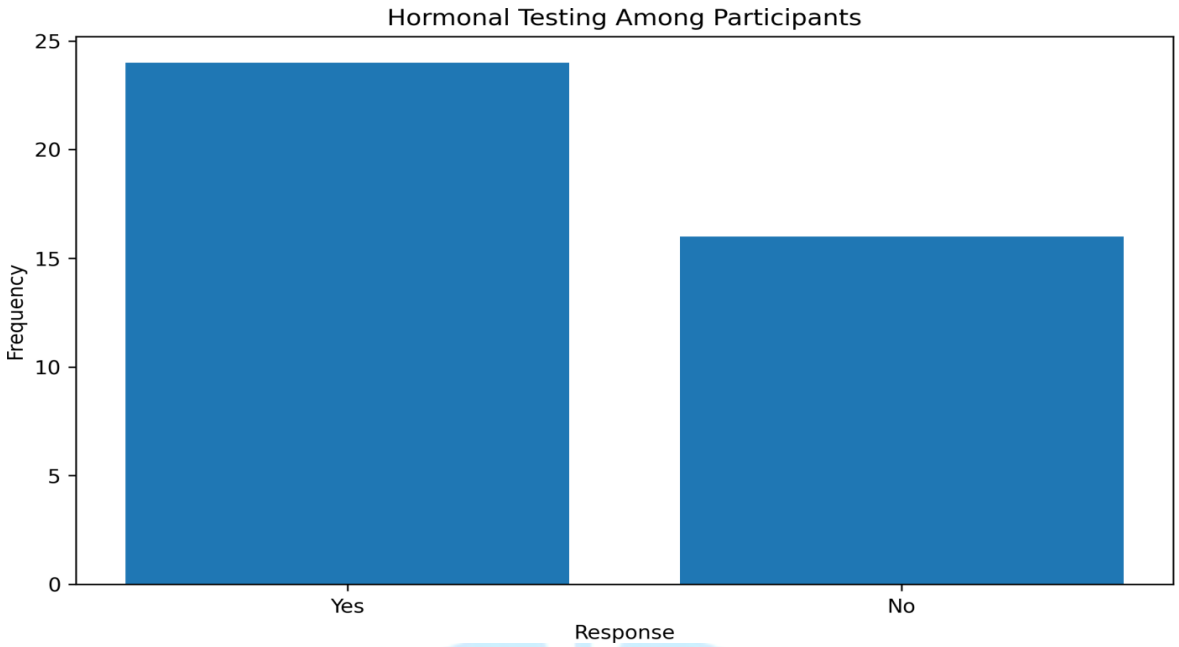

Figure 11 Hormonal testing among participants awareness regarding hormonal causes of acne

Table 12: Association between acne severity and premenstural worsening

To assess whether acne severity was associated with premenstrual worsening, data from all 40 adult female patients were cross-tabulated by acne severity category and premenstrual aggravation status. Acne severity was grouped as mild, moderate, and severe, while premenstrual worsening was recorded as yes or no. The findings showed that premenstrual worsening was present in 5 out of 13 mild cases, 14 out of 20 moderate cases, and 5 out of 7 severe cases. The Pearson Chi-square test was applied, and the result was p = 0.155, indicating that although premenstrual worsening appeared more frequent in moderate and severe acne, the association was not statistically significant. The detailed cross-tabulation is presented below.

Acne severity	Yes	No	Total
Mild	5	8	13
Moderate	14	6	20
Severe	5	2	7
Total	**24**	**16**	**40**

Test applied: pearson chi- square =3.727,df =2, p =0.155

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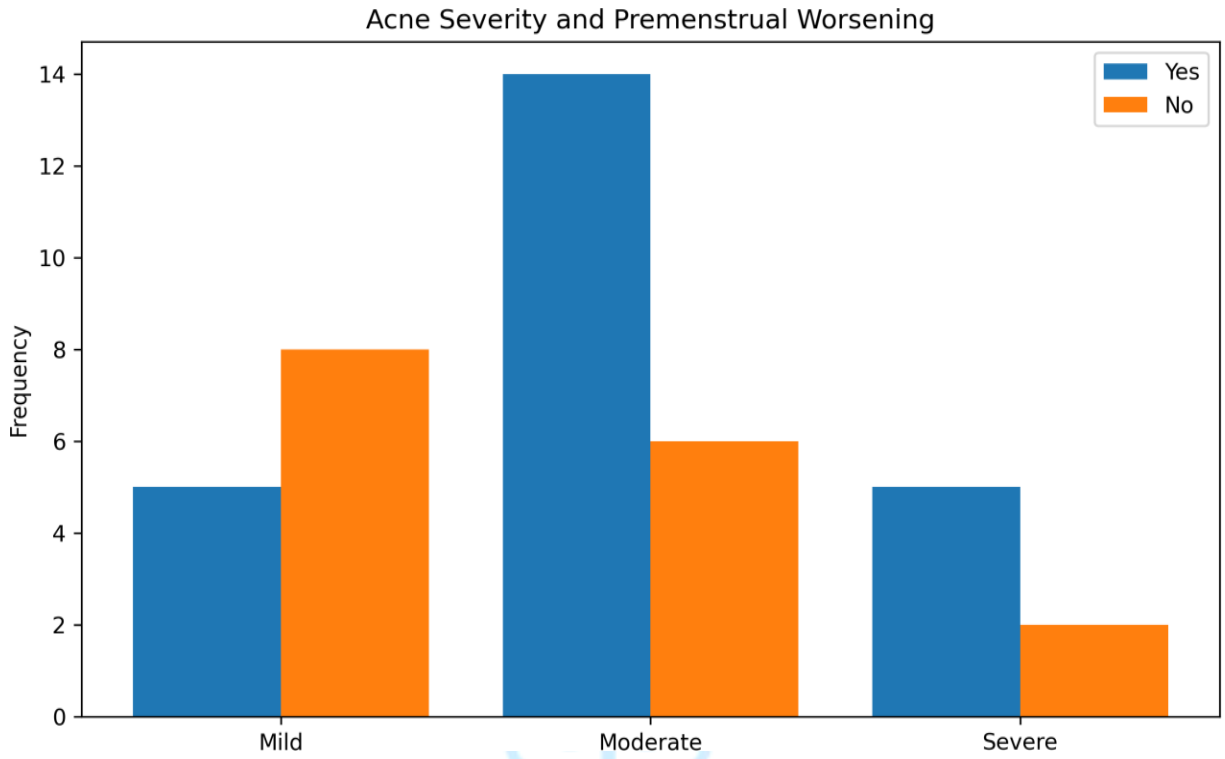

Table 13: Association between acne severity and sleep duration

The association between acne severity and sleep duration was examined among all 40 adult female patients to assess whether altered sleep patterns were linked with higher acne severity. Sleep duration was categorized into less than 6 hours, 6–8 hours, and more than 8 hours, and then compared across mild, moderate, and severe acne groups. The findings showed that among mild cases the distribution was 4, 7, and 2, among moderate cases 9, 10, and 1, and among severe cases 3, 3, and 1 respectively. The Pearson Chi-square test yielded a p-value of 0.821, indicating that sleep duration had no statistically significant association with acne severity in this study. The detailed comparison is shown below.

Acne severity	<6hrs	6-8hrs	8hrs	Total
Mild	4	7	2	13
Moderate	9	10	1	20
severe	3	3	1	7
Total	**16**	**20**	**4**	**40**

Test applied :Pearson Chi-square =1.532,df =4,p =0.

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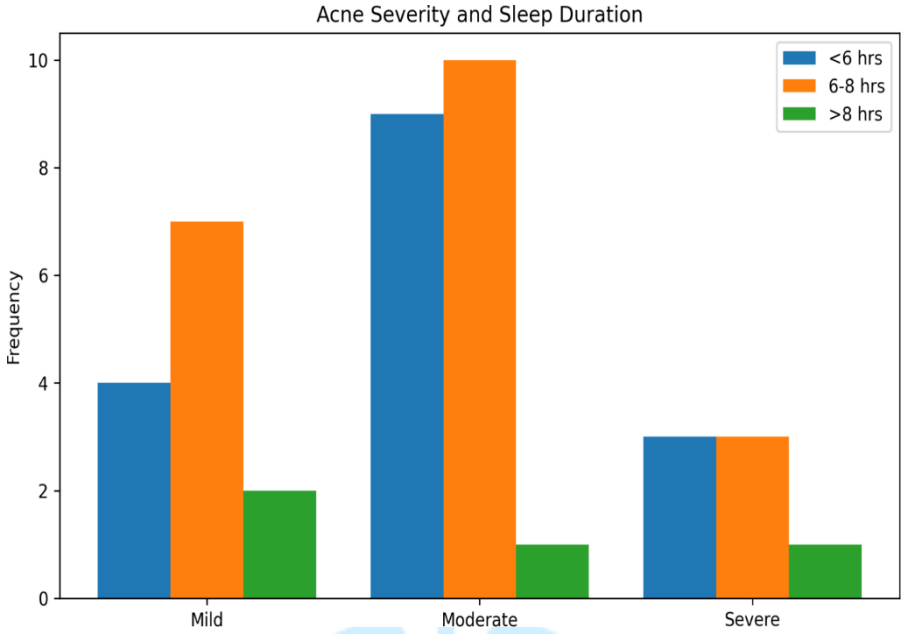

DISCUSSION

The present study evaluated 40 adult female patients with acne and found that the largest proportion fell in the younger adult age range, with moderate acne emerging as the most frequent clinical category. This overall pattern is broadly in line with earlier work on adult female acne. Chanya chailert et al., in a study of 208 women aged 25 years or above, reported a mean age of 31.8 ± 7.1 years and similarly concluded that persistent acne with moderate severity was common. In contrast, the large international study by Dréno et al. reported that 47.3% of adult women were rated as mild or clear/almost clear at the study visit, although many of those women p already receiving treatment, which may partly explain why the present study showed a relatively greater concentration of moderate disease. (9)

One of the most important findings of the present study was the high frequency of premenstrual aggravation. Premenstrual worsening was reported by 60% of participants, which is very close to the classic work of Lucky et al., who quantitatively documented that 63% of adult women experienced a 25% premenstrual increase in inflammatory acne lesions. The present finding is also comparable to the 58.9% rate summarized in later reviews of adult female acne, although it is somewhat lower than the 72.6% reported by Chanya chailert et al. in Thai adult women. This similarity supports the view that cyclical hormonal fluctuation remains one of the most consistent clinical features of adult female acne across different settings. (10)

Menstrual irregularity was found in 37.5% of the women in the present study. This is remarkably close to the findings of Timpatanapong and Rojanasakul, who reported abnormal menstruation in 20 of 51 women with acne, corresponding to 39.2%. Cibula et al. also reported irregular cycles in 43 of 90 adult women, or 48%, which is somewhat higher than the proportion observed in the present study. Taken together, these comparisons suggest that menstrual disturbance is repeatedly encountered in women with acne, even though the exact proportion varies across studies because of differences in age range, referral pattern, and diagnostic criteria. (11)(12)

The present study also showed that 40% of participants reported excessive hair growth, suggesting a clinically relevant burden of hyperandrogenic features. This proportion is higher than the 21% hirsutism rate documented by Cibula et al. and substantially higher than the 5.7% reported by Khunger and Kumar in their

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clinico-epidemiological study of adult acne. A likely explanation is that the present study relied on patient-reported proforma data, whereas several previous studies used stricter clinical criteria for hirsutism. Even so, the direction of the finding is consistent with the broader endocrine literature, which continues to regard acne, hirsutism, and menstrual disturbance as linked manifestations of androgen excess in at least a subset of adult women.

Hair fall was another prominent associated complaint in the present study, being reported by 70% of participants. Direct comparison with previous adult acne studies should be made cautiously, because many earlier papers reported clinically defined alopecia rather than self-reported hair fall. For example, Khunger and Kumar reported alopecia in only 1.8% of adult acne patients, and in their discussion they noted that Goulden et al. had reported alopecia in 7.2% of women with adult acne. The markedly higher proportion in the present study may therefore reflect the broader wording of ―hair fall,‖ local reporting patterns, or increased subjective concern about shedding rather than frank androgenetic alopecia. (14)

Stress-related flare-ups were reported by 80% of the women in the present study, making stress one of the most frequently identified aggravating factors. This proportion is noticeably higher than the 53.8% reported by Chanyachailert et al. and the 52.8% psychological stress rate reported by Khunger and Kumar. Nevertheless, the direction of the finding is strongly supported by the wider acne literature. In the prospective Stanford study by Chiu et al., worsening stress correlated significantly with worsening acne severity, with a correlation coefficient of 0.61 and $P < .01$, while mean acne severity was significantly higher during examination periods. The present findings therefore fit well with the view that stress is a clinically important trigger, even if its measurable impact on severity varies from one sample to another. (15)

With respect to sleep, the present study found that a large proportion of participants slept less than the recommended duration, but no statistically significant association was demonstrated between sleep duration and acne severity. Thus, although poor sleep may plausibly aggravate acne through stress and neuroendocrine pathways, the current evidence, including the present study, suggests that the sleep-acne relationship is less consistent than the stress-acne relationship. (16)

A key analytical finding of the present study was that none of the selected variables showed a statistically significant association with acne severity when tested by the Fisher-Freeman-Halton Exact Test. This result actually agrees with several earlier investigations. Meena et al., in 60 adult female acne patients, found no association between acne severity and the biochemical or hormonal parameters they evaluated. Likewise, Cibula et al. found no positive correlation between acne severity and clinical or laboratory markers of androgenicity, despite irregular cycles in 48%, hirsutism in 21%, elevated androgens in 81%, and polycystic ovaries in 50% of their participants. A Pakistani study by Kiayani and Rehman also reported no statistically significant relationship between acne severity and serum testosterone ($P = 0.776$) or SHBG ($P = 0.711$) in 531 females with acne. These comparisons support the possibility that symptom burden and hormonal disturbance may coexist without demonstrating a simple linear relationship with severity grades in every dataset. (17)

Overall, the present study is in substantial agreement with the broader literature in showing that adult female acne is closely accompanied by premenstrual exacerbation, menstrual irregularity, stress, and other features suggestive of hormonal influence. It also aligns with several studies that failed to find a direct severity-hormone correlation, while differing from others that demonstrated significant endocrine associations. Taken together, the comparison suggests that adult female acne is best understood as a heterogeneous condition: .

LIMITATION

- The sample size was relatively small, which may have limited the statistical power of the study and reduced the ability to detect significant associations between acne severity and the selected hormonal and lifestyle related factors.

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- The study was conducted on participants from a limited setting, which may affect the generalizability of the findings to the wider population of adult females.
- The study focused mainly on clinical and questionnaire-based indicators and did not include detailed biochemical hormonal profiling for all participants, which may have provided a clearer understanding of the endocrine basis of acne.

Recommendations:

- Based on the findings of the present study, adult females presenting with persistent, recurrent, or treatment-resistant acne should undergo a comprehensive clinical evaluation that includes menstrual history, premenstrual flare pattern, excessive hair growth, hair fall, stress level, and sleep pattern.
- Hormonal assessment should be considered in selected patients, particularly those showing features suggestive of endocrine imbalance such as irregular menstrual cycles, hirsutism, or other clinical signs of hyperandrogenism.
- Healthcare professionals should adopt a multidisciplinary approach for the management of adult female acne by involving dermatologists, gynecologists, endocrinologists, and aestheticians whenever necessary.
- In addition, counseling regarding lifestyle modification should be made a routine part of acne management.
- Public awareness should also be increased so that women can better understand the possible hormonal and lifestyle-related contributors to acne.
- Acne in adult females should not be considered only a cosmetic problem, but rather a condition that may reflect underlying hormonal or systemic disturbances.
- It is further recommended that clinical protocols be developed to identify patients who require hormonal screening or referral for further endocrine evaluation.

CONCLUSION

The study concludes that acne in adult females appears to be influenced by a combination of hormonal and lifestyle-related factors. Clinical features suggestive of hormonal involvement, such as menstrual irregularity, premenstrual exacerbation, and other associated symptoms, were commonly observed among the participants. Lifestyle factors, particularly stress and altered sleep patterns, also appeared to play an important role in aggravating the condition. These findings support the view that adult female acne should not be considered only a cosmetic concern, but rather a condition with possible underlying endocrine and behavioral influences. Although the statistical analysis did not demonstrate significant associations between acne severity and the selected variables, the descriptive trends indicate a meaningful clinical relationship. Therefore, hormonal assessment may still be valuable in selected patients, especially those presenting with persistent or recurrent acne. The study emphasizes the importance of a comprehensive evaluation of adult female acne to improve understanding and management. Further research with larger samples is recommended to clarify these relationships more conclusively

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Cases

Figure 1.1

Figure 1.1: An adult female presented with moderate hormonal acne characterized by inflammatory lesions and residual pigmentation on the cheeks. The condition showed a recurrent pattern, particularly around the menstrual cycle. A structured acne management plan was initiated and continued for 12 weeks. Noticeable clinical improvement was achieved with a reduction in active lesions and pigmentation, without any adverse reactions.

Figure 1.2

Figure 1.2: An adult female presented with inflammatory acne lesions localized on the forehead. A targeted treatment plan was followed for several weeks under clinical supervision. Follow-up assessment showed a marked decrease in active acne and skin redness. No significant adverse effects were observed during the treatment period.

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Figure 1.3

Figure 1.2: A female patient presented with inflammatory acne lesions on the forehead and cheeks. A personalized treatment regimen was administered under clinical observation for several weeks. Follow-up examination revealed a reduction in active lesions and skin inflammation. No significant adverse effects were reported during the treatment.

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