Acne and regular menstrual cycles: a study of 100 Libyan females

Abstract:

Background: Acne and menstrual cycles are highly prevalent among young females. The hormones and their fluctuations play an important part in the menstrual cycle and its regularity, as well as acne pathogenesis.

Aims: To look into the relationship between acne and the menstrual cycle and determine whether perimenstrual acne flares occur even with a regular menstrual cycle.

Methods: This was an observational cross-sectional study that took place between August 2021 and April 2022. It included 100 Libyan females who had visited outpatient dermatological clinics at the National Cancer Institute (Misurata, Libya) with clinically diagnosed acne and had normal menstrual cycles.

Results: A total of 100 Libyan females with clinically diagnosed acne and regular menstrual cycles were studied. The females in this study ranged in age from 17 to 26 years, with a mean of (20 ±1 years). 20% of females experienced perimenstrual acne flares, and 12% of them reported worsening symptoms in the week preceding their menstruation. Most females reported a perimestrual acne flare that was diagnosed as moderate acne. All females (20%) with a perimenstrual acne flare have an onset of acne that was accompanied by or shortly before the first menstrual cycle (menarche).

Conclusion: A perimenstrual acne flare may occur, even in women who have regular menstrual cycles.Females who develop acne during or shortly before menarche are more prone to perimenstrual acne flares.

Keywords: Acne, Menstrual cycle, Severity grades, Libyan female

Introduction:

Acne is a pilosebaceous unit disorder with symptoms ranging from mild comedonal acne to severe systemic disease (1,2). Acne has an undeniable psychosocial impact, and those who suffer from it are more likely to experience self-

consciousness, social isolation, anxiety disorders, depression, and even suicidal ideation (2). Insights into the pathogenesis of acne have greatly aided in the further definition of acne subtypes and the development of effective treatment regimens (2,3,4).

Acne accounts for 0.3% of the total and 16% of the global dermatologic disease burden (1). Acne affects approximately 85% of young people between the ages of 12 and 24 and is thus a physiologic occurrence in this group (1, 5).

The acne is caused by the interaction of several factors, the majority of which are influenced by hormonal regulation (6,7). Androgens, such as dihydrotestosterone (DHT) and dehydroepiandrosterone sulfate (DHEA-S), stimulate androgenic receptors found in pilosebaceous units and the outer root sheath of hair follicles(7,8). This causes sebum and keratin to accumulate in follicles, resulting in open and closed comedones and providing a growth medium for Propionibacterium acnes (7). Independent of their effect on the sebaceous gland, androgens can induce follicular hyperkeratosis, a key factor in the pathogenesis of acne (8).

On the other hand, the menstrual cycle and its regularity are controlled by a series of changes in hormone levels; for example, elevated levels of androgens lead to ovulatory disturbances, and women with premenstrual syndrome show a high prevalence of acne flares (9).

Premenstrual syndrome is a collection of physical and emotional symptoms that occur prior to menstruation and include irritability, nervousness, insomnia, headache, breast tenderness, abdominal bloating, and dysmenorrhea (9, 10).

Since the menstrual cycle and acne are both regulated by hormones, it is strongly indicated that women who already have acne are more likely to have an acne flare-up during their period (11).

Regardless of menstrual regularity, the vast majority of previous studies have described a premenstrual acne flare among women of childbearing age during their menstrual cycle (12, 13).

We, therefore, conducted this study on young women in Libya to look at the link between acne and a regular menstrual cycle. Providing epidemiological evidence of the association between acne and the normal menstrual cycle may open up new avenues for clinical gynecological and dermatological evaluations and therapy.

Materials and methods:

This was an observational cross-sectional study that took place between August 2021 and April 2022. It included 100 Libyan females who had visited outpatient dermatological clinics at the National Cancer Institute (Misurata, Libya) with clinically diagnosed acne, and had normal menstrual cycles.

The patients in this study were subjected to a full dermatological and gynecological history, and a complete clinical dermatological examination was performed on all patients in order to establish the clinical diagnosis and determine the severity of the disease.

We adopted the classification scheme for primary acne vulgaris developed in 1990 by the American Academy of Dermatology to assess the severity of acne (14).

In this grading scale delineates three levels of acne: mild, moderate, and severe. Mild acne is characterized by the presence of a few to several papules and pustules but no nodules.

Patients with moderate acne have numerous papules and pustules, as well as a few to several nodules. With severe acne, patients have numerous or extensive papules and pustules, as well as many nodules.

Females were considered to have regular menstrual cycles if the averages of these cycles were between 22 and 41 days (15, 16).

Exclusion criteria:

1. Pregnant females.
2. Lactating females.
3. Females on oral contraceptive pills or hormone therapy.
4. Females who are on topical or systemic medication.
5. Patients with a history of chronic diseases.

Statistical analysis:

Microsoft Excel 2010 was used to tabulate the data. Descriptive statistical analysis was done using a scientific calculator.

Results:

Over a period of nine months, a total of 100 Libyan females with clinically diagnosed acne and regular menstrual cycles were studied.

The age of the females in this study was ranging from 17 to 26 years. with the mean age (20 ±1 years). More than half were age group 20-23 years (55%) followed by (25%) in the age group 16-19 years and (20%) were in the age group 24-27 years.

Acne was distributed according to body site as follows: forehead (42%), checks (40%), and the upper back (10%). There was no significant difference in the distribution of acne in those with ah premenstrual acne flare.

Among acne females, 20% experienced perimenstrual acne flare and 12% of females reported worsening symptoms in the week preceding their menstruation [table 1].

In this study, the severity of acne in females was graded as mild (54%), moderate (41%), and severe (5%). Most females reported perimestrual acne flare was diagnosed as moderate acne [figure 1].

In this study, 62% of the females with acne had menarche older than 12 years, and 38% had menarche younger than 12 years, and the onset of acne ranged from 11 to 21 years [table 2].

According to the relationship between the first appearance of acne and the first menstrual period, the study sample was divided into two groups. The first group (group A) said that the appearance of acne was accompanied by or shortly before the first menstrual period, while the second group (group B) confirmed that the acne appeared after the first menstrual period. The first group included all females (20%) with perimenstrual acne flare [figure 2].

Discussion:

Both acne and the menstrual cycle are affected by hormones (11), which is why we conducted this study on 100 Libyan girls who suffer from acne and have a regular menstrual cycle.

This study provided epidemiological evidence for the concepts that acne is associated with the menstrual cycle and that a premenstrual acne flare is a common condition among acne females (12, 13). In this study, 20% of females experienced perimenstrual acne flares, and 12% of them reported worsening symptoms in the week preceding their menstruation.

In a US Geller et al. hospital-based study on 105 females with acne, it was detected that 65% of women had perimenstrual acne flares, 56% one week before menses (17). In 2001, Stolla et al. interviewed 400 women with acne from the US and revealed that 44% of women had a premenstrual acne flare (11). In two studies conducted in France in 2001 and 2017, the perimenstrual acne flare rate was 78% and 80%, respectively (18, 19). Moreover, in Egypt, Arafa et al. reported in 2020 that perimenstrual acne flares were seen in 56.7% of females with acne, mostly (58.5%) of them one week before menstrual cycle (20).

Previous studies' high percentages compared to the results of this study may be due to the fact that this study only included females with a regular menstrual cycle, whereas previous studies' results were based on the relationship between menstrual cycle and acne regardless of whether the menstrual cycle was regular or irregular.
On the other hand, this study is in agreement with previous studies in that most perimenstrual acne flares occur in the week preceding the menstrual cycle (17, 20).

In our study, the perimenstrual acne flare was observed in 52% of the women suffering from moderate acne, 25% of the women suffering from severe acne, and only 10% of the women suffering from mild acne. This relationship between acne severity and perimenstrual acne flares is most likely due to acne exacerbation with each menstrual cycle (6, 9), whereas women whose acne appeared are of the mild type due to not being affected by the subsequent menstrual cycle every month.

In our study, we noticed that the all cases 20% of perimenstrual acne flare was reported in female who have onset of acne with or shortly before the menarche (first

menstrual period), whereas no cases were recorded in females whose acne appeared after the first menstrual period.

The explanation for this may be due to the fact that the pathogenesis of acne is multifactorial (4, 7), and the onset of the acne coincides with the first menstrual cycle, which gives evidence that the role of hormones is the main factor of pathogenesis in some cases, while in other cases where the onset of the acne was after the first menstrual cycle, the role of hormones in acne pathogenesis is less than other factors.

Conclusion:

A perimenstrual acne flare may occur, albeit to a lesser extent, even in women who have regular menstrual cycles. It can happen before, during, or after the menstrual cycle, but it usually happens a week before.

Females with perimenstrual acne experience worsening acne with each menstrual cycle.

Females who develop acne during or shortly before menarche are more prone to perimenstrual acne flares than females who develop acne after menarche.

Statements of Declarations:

Ethical Consideration:

The study was approved by the national cancer institute in Misurata, Libya. Every patient signed an informed written consent for acceptance of participation in the study.

References:

1- Karimkhani C, Dellavalle RP, Coffeng LE, Flohr C, Hay RJ, Langan SM, Nsoesie EO, Ferrari AJ, Erskine HE, Silverberg JI, Vos T. Global skin disease morbidity and mortality: an update from the global burden of disease study 2013. JAMA dermatology. 2017 May 1;153(5):406-12.

2- Halvorsen JA, Stern RS, Dalgard F, Thoresen M, Bjertness E, Lien L. Suicidal ideation, mental health problems, and social impairment are increased in adolescents with acne: a population-based study. Journal of Investigative Dermatology. 2011 Feb 1;131(2):363-70.

3- Ramrakha S, Fergusson DM, Horwood LJ, Dalgard F, Ambler A, Kokaua J, Milne BJ, Poulton R. Cumulative mental health consequences of acne: 23-year follow-up in a general population birth cohort study. The British journal of dermatology. 2016 Nov;175(5):1079.

4- Hazarika N. Acne vulgaris: new evidence in pathogenesis and future modalities of treatment. Journal of dermatological treatment. 2021 Apr 3;32(3):277-85.

5- Collier CN, Harper JC, Cantrell WC, Wang W, Foster KW, Elewski BE. The prevalence of acne in adults 20 years and older. Journal of the American Academy of Dermatology. 2008 Jan 1;58(1):56-9.

6- Thiboutot D. Acne: hormonal concepts and therapy. Clinics in dermatology. 2004 Sep 1;22(5):419-28.

7- Rao A, Douglas SC, Hall JM. Endocrine disrupting chemicals, hormone receptors, and acne vulgaris: a connecting hypothesis. Cells. 2021 Jun 9;10(6):1439.

8- Cong TX, Hao D, Wen X, Li XH, He G, Jiang X. From pathogenesis of acne vulgaris to anti-acne agents. Archives of dermatological research. 2019 Jul;311(5):337-49.

9- Gleicher N, Weghofer A, Barad DH. The role of androgens in follicle maturation and ovulation induction: friend or foe of infertility treatment?. Reproductive Biology and Endocrinology. 2011 Dec;9(1):1-2.

10- Dickerson LM, Mazyck PJ, Hunter MH. Premenstrual syndrome. American family physician. 2003 Apr 15;67(8):1743-52.

11- Stolla S, Shalita AR, Webster GF, Kaplan R, Danesh S, Penstein A. The effect of the menstrual cycle on acne. Journal of the American Academy of Dermatology. 2001 Dec 1;45(6):957-60.
12- Wang YY, Li SW, Luo S, Qin L, Zeng X, Li L, Li XH. How to evaluate acne in reproductive-age women: an epidemiological study in Chinese communities. BioMed research international. 2019 Feb 3;2019.
13- Arafa A, Mostafa A, Khamis Y. The association of acne and menstrual symptoms among young women (18–25 years) in Egypt: a population-based cross-sectional study. International Journal of Adolescent Medicine and Health. 2021 Dec 1;33(6):463-8.
14- Pochi PE, Shalita AR, Strauss JS, Webster SB, Cunliffe WJ, Katz HI, Kligman AM, Leyden JJ, Lookingbill DP, Plewig G. Report of the consensus conference on acne classification. Washington, DC, March 24 and 25, 1990. Journal of the American Academy of Dermatology. 1991 Mar;24(3):495-500.
15- Creinin MD, Keverline S, Meyn LA. How regular is regular? An analysis of menstrual cycle regularity. Contraception. 2004 Oct 1;70(4):289-92.
16- Mihm M, Gangooly S, Muttukrishna S. The normal menstrual cycle in women. Animal reproduction science. 2011 Apr 1;124(3-4):229-36.
17- Geller L, Rosen J, Frankel A, Goldenberg G. Perimenstrual flare of adult acne. The Journal of clinical and Aesthetic dermatology. 2014 Aug;7(8):30.
18- Poli F, Dreno B, Verschoore M. An epidemiological study of acne in female adults: results of a survey conducted in France. Journal of the European Academy of Dermatology and Venereology. 2001 Nov;15(6):541-5.
19- Saint-Jean M, Khammari A, Seite S, Moyal D, Dreno B. Characteristics of premenstrual acne flare-up and benefits of a dermocosmetic treatment: a double-blind randomised trial. European Journal of Dermatology. 2017 Mar;27(2):144-9.
20- Arafa A, Mostafa A, Khamis Y. The association of acne and menstrual symptoms among young women (18–25 years) in Egypt: a population-based cross-sectional study. International Journal of Adolescent Medicine and Health. 2021 Dec 1;33(6):463-8.

Table 1: The distribution of premenstrual acne flares according to menstrual cycle duration.

Menstrual cycle duration	premenstrual acne flares % (n=100)
One Week preceding menses	12%
During menses	6%
One Week After menses	2%
Total	20%

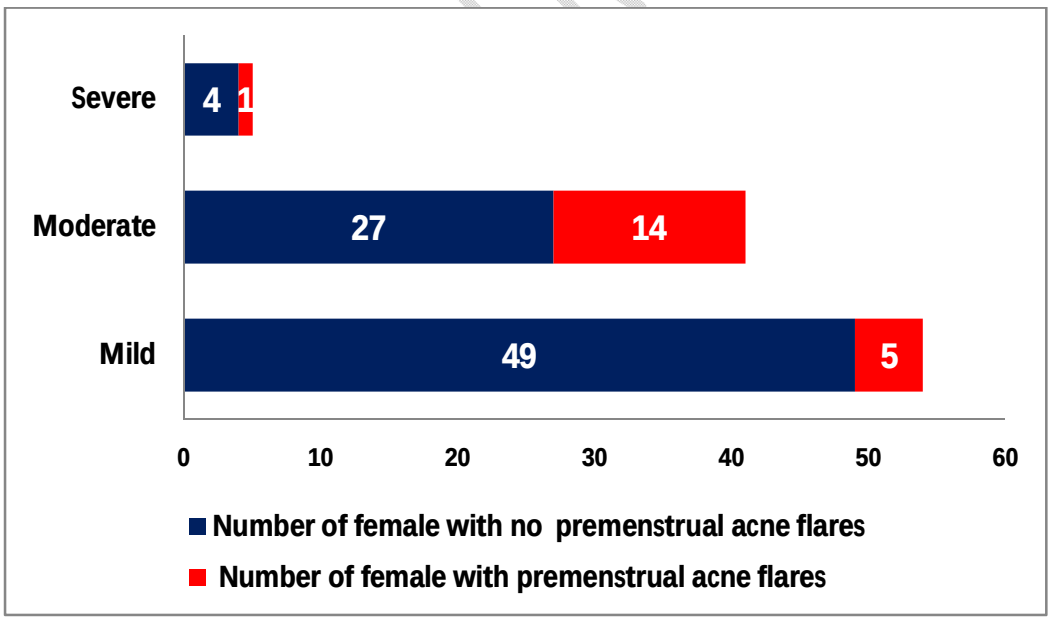

Figure 1: The relation between perimestrual acne flare and the severity of acne.

Table 2: The age of acne onset across the severity of acne.

Age of acne onset	(%) Total n=100	The severity of acne		
		Mild	Moderate	Severe
11-14 years	(38%) n=38	21	16	1
14-17 years	(49%) n=49	17	28	4
18-21 years	(13%) n=13	3	9	1

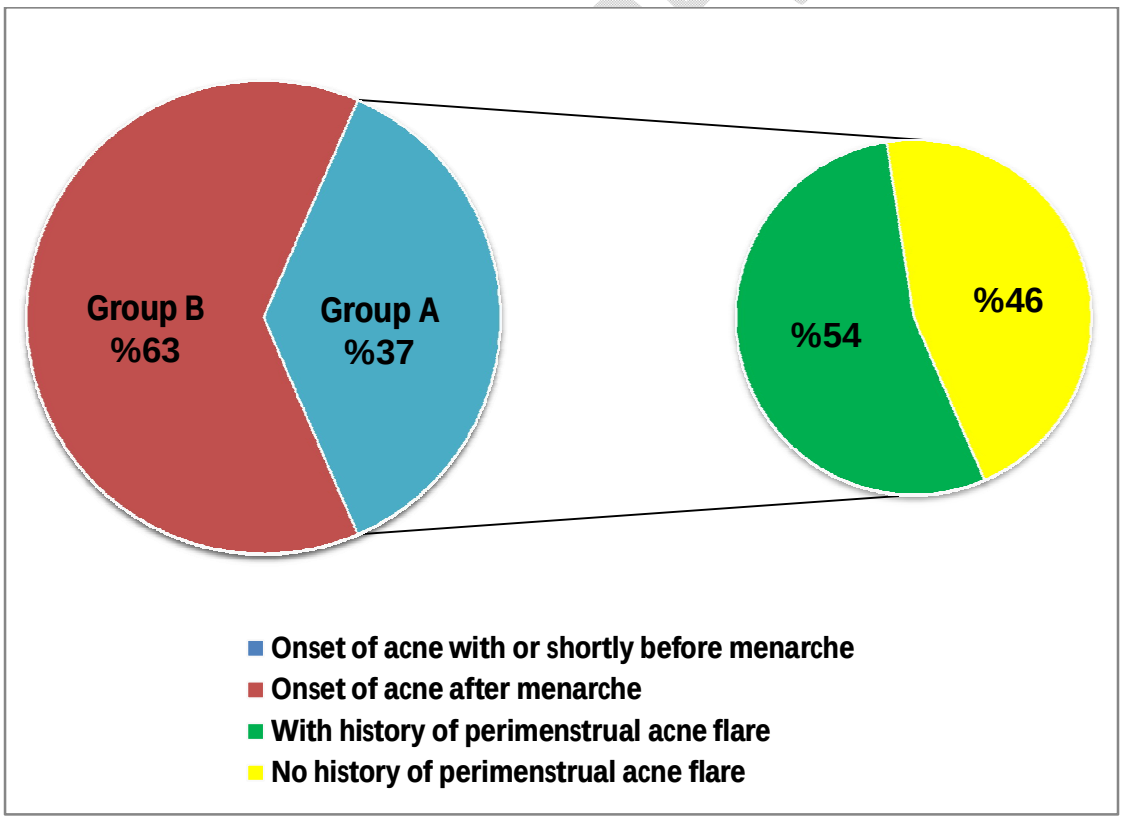

Figure 2: Perimenstrual acne flare according to the relationship between the onset of acne and menarche.

Table 3 : Distribution of respondent's age group

Age group	Frequency	Percent	Mean
16-19	25	25%	20 ±1
20-23	55	55%	
24-27	20	20%	

Table 4: Distribution of acne lesions according to body sites

site	Frequency	Percent
Forehead	42	42%
Cheek	40	40%
Jaw	17	17%
Chin	19	19%
Back	10	10%
Chest	9	9%
Arm	7	7%