

*Research Article***Aggravating Factors of Acne Vulgaris among Adolescents of Secondary Schools in New Minia City, Egypt.****Yosra M. Hamza***, MBBCh; **Sadek R, MD****; **Mahfouz E, MD**** and **Abdel-Rahman A, MD*****

* Family medicine Center, Minia Health Administration, Minia, Egypt.

** Department of Public Health and Preventive Medicine, Minia University, Minia, Egypt.

***Department of Dermatology, Andrology and STDs, Minia University, Minia, Egypt.

Introduction

Acne vulgaris (AV) is a chronic inflammatory disease of the pilosebaceous unit, characterized by the formation of comedones, erythematous papules, and pustules. Less frequently it is presented by nodules, deep pustules, or pseudocysts and, in some cases, is accompanied by scarring. (Simpson and Cunliffe, 2004)

AV is the most common dermatological condition encountered in adolescents, as almost every one worldwide has acne to some extent during puberty. It has a prevalence of almost 85% in people aged 12-24 years. (Krowchuck, 2000)

The impact of diet on acne vulgaris is still a very controversial matter, but it can't be neglected. If a patient notes a positive relation between a particular dietary factor and acne severity, he should be instructed to exclude it from diet or decrease its consumption. (Kucharska et al., 2016).

In 2005, Adebamowo et al., conducted a cohort, retrospective study on about 50 thousands women. They were asked to recall their high school diet using a validated food frequency questionnaire. The authors found that there was a positive relation between acne and the reported quantity of consumed milk, particularly skimmed milk.

Chocolate is always believed to be a considerable factor that may contribute to aggravation of acne, but there is a very limited amount of evidence supporting its negative impact on the skin. On the other hand, dermatologists often observe that patients have new pimples a few days after ingestion of products containing chocolate (Costa et al., 2010).

Acne is one of the most frequently reported skin conditions connected to menstrual cycle. Period-related hormonal breakouts are very common in the peri-menstrual phase (Hermanns-Le et al., 2013; Geller et al., 2014).

Stress is reported to trigger or worsen acne by different mechanisms, however many studies have demonstrated the relationship between stress and acne breakouts. In one study, it was concluded that stress positively correlates with acne severity and that therapeutic approaches can be manipulated according to stress levels and behavioral intervention could be a choice in some cases (Zari et al., 2017).

Patients and methods

The current study was a cross sectional study conducted on secondary schools' students in New Minia City, Minia governorate, Egypt, in the period between March and April 2019. Eight schools were screened during the study and all students attending the school on the days of the visits, were included in the study.

The nature of the study was explained to the students and after obtaining the required consent all students were subjected to provisional dermatologic examination. Only those with acne lesions were subjected to: full history taking, thorough clinical examination of acne lesions and digital photography.

Every patient with acne was examined for distribution of acne, type of acne lesions and the degree of severity using the Global Acne Grading System (GAGS) (Doshi et al., 1997).

Statistical analysis:

Analysis of data was done by personal computer using SPSS (Statistical Program for Social Science) for windows, version 24.

Results

Table 1: Aggravating factors of acne among secondary schools' students, in New Minia city, Minia Governorate, in the period between March and April 2019.

		N=479(%)
Hormonal treatment	<i>No</i>	477(99.6%)
	<i>Yes</i>	2(0.4%)
Corticosteroids therapy	<i>None</i>	456(95.2%)
	<i>Topical</i>	22(4.6%)
	<i>Systemic</i>	1(0.2%)
cosmetics	<i>No</i>	406(84.8%)
	<i>Yes</i>	73(15.2%)
Hair gel	<i>No</i>	434(90.6%)
	<i>Yes</i>	45(9.4%)
Hot weather	<i>No</i>	254(53%)
	<i>Yes</i>	225(47%)
Dairy products	<i>No</i>	453(94.6%)
	<i>Yes</i>	26(5.4%)
Chocolates	<i>No</i>	431(90%)
	<i>Yes</i>	48(10%)
Spicy food	<i>No</i>	398(83.1%)
	<i>Yes</i>	81(16.9%)
Stress	<i>No</i>	382(79.7%)
	<i>Yes</i>	97(20.3%)
Skin friction or Pressure	<i>No</i>	296(61.8%)
	<i>Yes</i>	183(38.2%)

This study was carried out on 1034 secondary school students; 563 (54.4%) males and 471(45.6%) females. Their age ranged from 14 to 19 years old, with a mean \pm SD of 16.3 ± 1 . The study investigated the effect of certain factors on acne vulgaris and it was found that exposure to hot weather causes flaring up the acne in 47% of students. Other factors that cause increasing of acne were: skin friction in 38.2%, exposure to stress in 20.3%, eating spicy food in 16.9%, using cosmetics in 15.2%, ingestion of chocolates in 10%, using hair gel in 9.4%, ingestion of dairy products in 5.4%, and using topical corticosteroid in 4.6% (Table 1)

Table 2: Relation between sex and aggravating factors of acne among secondary schools' students, in New Minia city, Minia governorate, in the period between March and April 2019.

		Sex		X ²	P value
		Male N=239	Female N=240		
Hormonal treatment	No	239 (100%)	238 (99.2%)	2	0.499
	Yes	0 (0%)	2 (0.8%)		
Corticosteroids therapy	None	239 (100%)	217 (90.4%)	24.06	<0.001*
	Topical	0 (0%)	22 (9.2%)		
	Systemic	0 (0%)	1 (0.4%)		
Make up use	No	239 (100%)	167 (69.6%)	85.77	<0.001*
	Yes	0 (0%)	73 (30.4%)		
Hair gel	No	200 (83.7%)	234 (97.5%)	26.86	<0.001*
	Yes	39 (16.3%)	6 (2.5%)		
Hot weather	No	134 (56.1%)	120 (50%)	1.77	0.183
	Yes	105 (43.9%)	120 (50%)		
Dairy products	No	226 (94.6%)	227 (94.6%)	0	0.991
	Yes	13 (5.4%)	13 (5.4%)		
Chocolates	No	226 (94.6%)	205 (85.4%)	11.1	0.001*
	Yes	13 (5.4%)	35 (14.6%)		
Spicy food	No	197 (82.4%)	201 (83.8%)	0.15	0.699
	Yes	42 (17.6%)	39 (16.3%)		
Stress	No	205 (85.8%)	177 (73.8%)	10.72	0.001*
	Yes	34 (14.2%)	63 (26.3%)		
Skin friction or Pressure	No	152 (63.6%)	144 (60%)	0.66	0.418
	Yes	87 (36.4%)	96 (40%)		

* = statistically significant difference

There was no significant difference between males and females in the history of certain aggravating factors as hormonal treatment (P value=0.499), exposure to hot weather (P value=0.183), ingestion of dairy products (P value=0.991) and spicy food (P value=0.699) and skin friction (P value= 0.418). On the other hand, comparing both genders with the use of corticosteroids revealed that there was a significant difference in corticosteroid therapy particularly with the topical form (P value<0.001). The percentage of females

affected by topical steroid therapy was 9.2%, while it was 0% in males. Moreover, the use of make-up products affected acne in 30.4% of females versus 0% in males (P value<0.001) while using the hair gel affected 16.3% of males versus 2.5% of females (P value<0.001). Females reported flaring of their acne lesions with ingestion of chocolates (14.6%) versus 5.4% in males (P value=0.001). Stress was blamed to aggravate acne in 26.3% of females and 14.2% in males (P value=0.001). (Table 2)

Table 3: Relation between acne severity and aggravating factors for acne among secondary schools' students, in New Minia city, Minia governorate, in the period between March and April 2019.

		Acne severity				X ²	P value
		Mild	Moderate	Severe	Very severe		
		N=355	N=97	N=20	N=7		
Hormonal treatment	No	355(100%)	95(97.9%)	20(100%)	7(100%)	8.12	0.088
	Yes	0(0%)	2(2.1%)	0(0%)	0(0%)		
Corticosteroids therapy	None	342(96.3%)	88(90.7%)	19(95%)	7(100%)	10.84	0.152
	Topical	13(3.7%)	8(8.2%)	1(5%)	0(0%)		
	Systemic	0(0%)	1(1%)	0(0%)	0(0%)		
Cosmetics	No	307(86.5%)	76(78.4%)	16(80%)	7(100%)	4.97	0.152
	Yes	48(13.5%)	21(21.6%)	4(20%)	0(0%)		
Hair gel	No	324(91.3%)	87(89.7%)	18(90%)	5(71.4%)	3.5	0.278
	Yes	31(8.7%)	10(10.3%)	2(10%)	2(28.6%)		
Hot weather	No	206(58%)	42(43.3%)	5(25%)	1(14.3%)	17.55	<0.001*
	Yes	149(42%)	55(56.7%)	15(75%)	6(85.7%)		
Dairy products	No	341(96.1%)	89(91.8%)	16(80%)	7(100%)	9.32	0.021*
	Yes	14(3.9%)	8(8.2%)	4(20%)	0(0%)		
Chocolates	No	323(91%)	87(89.7%)	14(70%)	7(100%)	7.48	0.046*
	Yes	32(9%)	10(10.3%)	6(30%)	0(0%)		
Spicy food	No	310(87.3%)	71(73.2%)	12(60%)	5(71.4%)	18.51	<0.001*
	Yes	45(12.7%)	26(26.8%)	8(40%)	2(28.6%)		
Stress	No	301(84.8%)	70(72.2%)	8(40%)	3(42.9%)	29.68	<0.001*
	Yes	54(15.2%)	27(27.8%)	12(60%)	4(57.1%)		
Skin friction or Pressure	No	249(70.1%)	39(40.2%)	3(15%)	5(71.4%)	47.54	<0.001*
	Yes	106(29.9%)	58(59.8%)	17(85%)	2(28.6%)		

Regarding the affection of the degree of severity of acne and the history of exposure to aggravating factors, the study found that there were significant differences between acne severity and exposure to hot weather, eating spicy food, stress, friction of the skin with a P value<0.001, the ingestion of dairy products (P value=0.021) and ingestion of chocolates (P value=0.046).

The hot weather affects most of the students (85.7%) with very severe degrees of acne. This affection was less reported in those with mild degree of acne severity (42%).

Students with severe and very severe forms of acne were found to be affected by stress with percentages of 60% and 57.1% respectively, while those with mild and moderate forms of acne were less affected with stress (15.2% and 27.8% respectively).

The effect of skin friction on acne was reported in 85% of students with severe form of acne, and 29.9% of those with mild acne.

Ingestion of dairy products affects acne in 20% of students with severe acne and 3.9% and 8.2% of those with mild and moderate degrees respectively. Students with very severe degree of acne were not affected by dairy products' ingestion.

Ingestion of chocolates aggravates acne in 30% of students with severe acne while 9% and 10.3% of those with mild and moderate degrees reported the same effect. None of the students with very severe degree is affected by reported any change with chocolates ingestion.

The study found that ingestion of spicy food affects the acne in students with severe and very severe forms in 40% and 28.6% respectively. Those with mild and moderate degrees of acne reported the aggravating effect of spicy food in 12.7% and 26.8% respectively.

There are no significant differences of the effect of the other factors as hormonal treatment, steroid therapy, using makeup and hair gel with the degree of acne severity. (Table 3)

Table 4: Relation between acne severity and menstrual history among females of secondary schools, in New Minia city, Minia governorate, in the period between March and April 2019.

		Acne severity			X ²	P value
		Mild	Moderate	Severe		
		N=355	N=97	N=20		
Menstrual cycle regularity	<i>Regular</i>	173(96.1%)	49(92.5%)	7(100%)	1.47	0.482
	<i>Irregular</i>	7(3.9%)	4(7.5%)	0(0%)		
menses relation with acne	<i>Reduced</i>	0(0%)	0(0%)	0(0%)	1.47	0.574
	<i>Not affected</i>	60(33.3%)	15(28.3%)	1(14.3%)		
	<i>Increased</i>	120(66.7%)	38(71.7%)	6(85.7%)		

In female students, there was no significant difference between the degree of acne severity with the regularity of menstrual cycle or with the effect of menstrual period on acne. (Table 4).

Discussion

Regarding the effect of the diet on acne, our study found that 26 (5.4%) of patients reported aggravation of their acne lesions after intake of dairy products whereas 48 patients (10%) reported this effect after consuming chocolates. George and Sridharan, 2018, demonstrated that two patients (1.8%) reported aggravation after intake of dairy products whereas 8 patients (7.3%) had that aggravation after consuming nuts and chocolates.

Khunger and Kumar, 2012 observed that 40 patients out of 176 (22%) using some form of cosmetics had aggravation due to the cosmetic use. In our study, 73 patients (15.2%) reported aggravation of lesion after using some form of cosmetics.

In this study, 22 patients (4.6%) noticed aggravation of lesions after applying topical steroids. Khunger and Kumar, 2012 observed that there was no significant relation with drug usage in their patients, except the use of topical steroids which caused aggravation in all the patients applying it (11.8%). In George and Sridharan, 2018 study, 3 patients (2.7%) noticed aggravation of lesions after applying topical steroids.

Stress is frequently implicated in the aggravation of acne while acne itself induces stress (Raj et al, 2009). In our study, 97 patients (20.3%) reported exacerbation during periods of emotional stress. In the study of Khunger and Kumar, 2012 25.7% of patients reported stress

as an aggravating factor, however Goulden et al.,1997 reported much higher affection in their patients (71%). Moreover, in George and Sridharan's study, 36 patients (32.7%) reported exacerbation during periods of emotional stress. In our study we found a positive correlation between acne and self-reported stress ($p < 0.001$) which was in agreement with the study of Tasoula et al., 2012. Also a study by Chiu et al., 2003, revealed that changes in acne severity were highly correlated with increasing stress, suggesting that emotional stress from external sources may have a significant influence on acne.

An Indian study by Sardana *et al.*, 2002, showed that majority of patients with acne vulgaris worsened during summer. In our study, 225 patients (40%) reported aggravation following hot weather exposure while in George and Sridharan's study, the majority of the patients (55.5%) reported no seasonal variation of acne, 42.7% of patients had exacerbation in summer and 1.8% in winter. In another study carried out by Khunger and Kumar, 2012 they reported that summer season as an aggravating factor in 36.7% of their patients.

Regarding menstrual history in females, it was found that 164 females (68.3%) in our study experienced premenstrual flare of acne. This was in accordance with the study of George and Sridharan, 2018 where they reported that out of the total 89 females in their study, 78.7% reported premenstrual flare of acne. This is also

in agreement with the study conducted by Goulden and his colleagues, 1997 in which premenstrual flare was reported in 84.8% of patients. On the other hand Khunger and Kumar, 2012 observed premenstrual flare in only 11.7% of their patients.

Conclusion:

This study confirmed the aggravating effect of hot weather, stress, skin friction, ingestion of chocolates, spicy food and dairy products on acne vulgaris.

Recommendations:

Adolescents with acne vulgaris should avoid factors that worsen their skin condition.

Further studies are recommended to confirm the effect of certain factors on acne.

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