Risk Factors of Acne Vulgaris among Mosul University Students from Iraq

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Abstract

Background	Acne vulgaris is a common skin disease, which is a significant health problem among adolescents and young adults. It affects 85-100% of people at some point in their lives, and it usually begins at puberty. Acne can persist into the 30s and beyond.
Objective	To evaluate the risk factors for development of acne vulgaris among Mosul University students in Mosul- Iraq.
Methods	A case-control study conducted to 300 persons (150 cases and 150 controls) aged 18-35 years selected randomly among Mosul University students who attended university primary health care that located inside Mosul University, Iraq, during the sixth month period from august 2019 to January 2020.
Results	Of the acne vulgaris cases (150 cases) that included in the study, 45 % are males and 55% are females, those with age group 18-23 years has 1.8 risk for developing of acne, always stress has 2.7 risk, female cases with irregular cycle have 58 times risk. 53% of female & 46% of male have acne on their face and male patients have 35 risk for acne on their shoulder, oily skin has 3 times risk, two and more members in family with acne have 4 risk followed by 3 times risk of one family member with acne, student's mobile use has about 2 times risk for developing of acne.
Conclusion	There were several significant factors associated with acne formation in the study, which play a role in acne formation including age, psychological status, menstrual cycle irregularity, site of appearance of acne, nature of the skin, family history, using student's mobile.
Keywords	Acne vulgaris, risk factors, university students
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List of abbreviations: BMI = Body mass index, DHEA = Dehydroepiandrosterone, GAGS = Global acne grading system, PCOS = Poly cystic ovary syndrome

Introduction

Acne vulgaris is an inflammatory disorder of the pilosebaceous unit, which runs a chronic course and can lead considerable physical and psychological problems if diagnosed or treated properly. Acne vulgaris is triggered by *Cutibacterium acnes* in adolescence, under the influence of normal circulating dehydroepiandrosterone (DHEA). It is a very common skin disorder, which can present with inflammatory and non-inflammatory lesions chiefly on the face but can also occur on the upper arms, trunk, and back [1-3]. Several exacerbating factors have been suggested including diet, menstruation, sweating, personal stress, ultraviolet radiation, application of pomades and occupation [4], use of medications like lithium, steroids, and anticonvulsants, exposure to excess sunlight, use of occlusive wear like shoulder pads, headbands backpacks, and underwire brassieres, endocrine disorders like polycystic

ovary syndrome and even pregnancy have also reported [5]. The association between diet and acne can no longer be dismissed. Compelling evidence shows that high glycemic load diets may exacerbate acne (also, low glycemic load diet that resulted in the improvement of acne lesions) [6,7]. Food with a high glycemic index is rapidly absorbed, increases serum glucose levels and stimulates increased glucose-dependent insulin signaling [8]. Acne vulgaris affects 85% of adolescents, often starts in preadolescence, and persists into adulthood [9]. Acne lesions may vary in number during the natural course of the disease and multiple measurements have been developed, which is based on clinical examination and photographic documentation, to measure the clinical severity. The grading of acne based on the type of lesions, affected surface area and their severity that can help in deciding which therapies are needed in each individual. However, no grading system has been accepted universally. The Global Acne Grading System (GAGS) is a quantitative scoring system to assess acne severity. It was first developed by Doshi and colleagues in 1997 [10]. The total severity score is derived from summation of six regional sub scores. Each is derived by multiplying the factors: 2 for forehead, 2 for each cheek, 1 for nose, 1 for chin, 3 for both chest and back by the most heavily weighted lesion within each region. The regional factors were derived from consideration of surface area and distribution and density of pilosebaceous units, according to this score acne was graded as mild, moderate, severe and very severe, as showing in the following table 1 [11,12].

Table 1. The Global Acne Grading System (GAGS) [10]

Location	Factor X Grade (0-4) = Local score	Global score
Forehead	2	0 = None
Right cheek	2	1-18 = Mild
Left cheek	2	19-30 = Moderate
Nose	1	31-38 = Severe
Chin	1	> 39 = Very severe
Chest & upper back	3	

Grade 0: No lesions; 1 ≥ One comedone; 2 ≥ One papule; 3 ≥ One pustule; 4 ≥ One nodule

Topical therapy is the first-line choice for mild to moderate acne and important adjuvant treatment for moderate to severe acne that is being treated systemically [13].

This study aimed to assess the risk factors that might play essential role in the occurrence of acne vulgaris in university students in Mosul, Iraq.

Methods
Settings and study design
This case-control study assessed factors associated with the development of acne, which selected by systematic randomization as every other one of university students that visit the University Primary Health Care that located inside Mosul University aged from 18-35 years (both under graduate and postgraduate university students). It is categorized as a case or control by clinical examination and included in the study during the sixth month period (from August 2019 till January 2020), 150 cases and 150 controls were included in the study.

Ethical consideration
All patients provided a verbal consent before participating in the study. The protocol was reviewed and approved by the Ethics Committee at the participating center.

Case and control definition

Cases: morning and evening under graduate and postgraduate university students aged (18-35) years (including both males and females) were diagnosed with acne vulgaris of any grade (ranging from mild to severe), as assessed by clinical examination during the visit.

Controls: morning and evening under graduate and post graduate university students aged (18-35) years (including males and females) that attend University Primary Health Care for conditions other than acne and who were not diagnosed with acne during the visit.

Retrieving data

The main source of data was obtained directly from the cases and controls by the investigator through direct interview with the patients, from their case sheets of each case or control and filling the questionnaire form, which was prepared to record all relevant information related to cases and controls in the study sample.

Procedure

A structured questionnaire was administered during their visits and was developed to collect general sociodemographic information, personal habits, smoking, anthropometric measurements, menstrual pattern and relation of acne with menstrual cycle, living with family, washing face per day, washing body per week, season do acne appear, location of acne, skin type, family history of acne vulgaris, and a food frequency questionnaire. Also, we assess if there is any friction or pressure on the skin by person's mobile or helmets [14-21]. After preparing it, it was reviewed by other dermatological doctor and it is used in English and Arabic).

Analysis of data

Data were collected based on the frequencies of occurrence and statically analyzed with a Pearson's Chi-square test using (SYSTAT 12) statistical software to assign significant differences between the groups where the significance level was set at P<0.05. The effects of identified factors were presented as odd ratio, p-value, with 95% confidence interval.

Results

Table 2 shows that of 150 acne cases, 45% are males and 55% are females with p-value 0.106 with no statistically association with acne between cases and controls, 53.3% of cases between age group (18-23) with p-value <0.05 with significant association, 52.4% of acne cases are single with no statistical association, 49.2 of acne patients living with family, 64.2% of acne cases have always stress with statistically strongly significant association with acne with 2.7 risk, the frequency of washing face or body has no statistically association with acne, of acne female patients menstrual cycle irregularity has 58 times risk with statistical strongly association with acne, 100% of acne female cases have acne before or during menstruation.

Table 3 reveals that of acne patients 46.6% of male and 53% of female have acne on their face and having acne on shoulders have statistically association with acne with 35 risk between male and female, 43.2% of male and 56.8% of female have acne in summer season but have no statistically association with acne.

Table 4 shows 47.5% of cases have normal body mass index has no statistical association with acne, oily skin has 3 times risk for acne with statistically strongly significant association with acne, dry skin has protective factor, face complexion has no statistical association with acne , two and more members in family with acne have 4 risk for acne followed by 3 times risk of one family member with acne with statistical association of acne, cigarette smoking has no statistically association with acne.

Table 5 reveals that dietary intake have no statistically significant association with acne.

Table 6 demonstrates that person's mobile use has about 2 times risk for developing of acne with statistically association with acne.

Table 2. Sociodemographic, psychological, self-hygiene, menstrual regularity factors associated with acne formation (n=300)

Characteristics		Case		Control		X₂	P-Value	Odd ratio	95% of C.I.
		n	%	n	%				
Sex	Male	70	45.46	84	54.54	2.615	0.106	0.688	0.436-1.083
	Female	80	54.79	66	45.21				
Age	18-23	119	53.6	103	46.3	7.456	0.024	1.752	1.037-2.960
	24-30	29	43.9	37	56			0.732	0.422-1.268
	31-35	2	16.6	10	83.3			0.189	0.041-0.879
Marital status	Single	128	52.4	116	47.5	3.162	0.075	1.705	0.943-3.083
	Married	22	39.2	34	60.7				
Living with family	Yes	136	49.2	140	50.7	0.725	0.395	0.694	0.298-1.616
	No	14	58.3	10	41.6				
Stress	Always	81	64.2	45	35.7	22.443	0.000	2.739	1.704-4.402
	Absence	22	30.1	51	69.8			0.334	0.190-0.587
	Occasional	47	46.5	54	53.4			0.811	0.502-1.311
Washing face/day	1-2	37	53.6	32	46.3	0.958	0.619	1.207	0.704-2.070
	3-5	99	48.2	106	51.7			0.806	0.495-1.312
	>5	14	56	11	44			1.301	0.570-2.966
Washing body/ day	1-2	19	47.5	21	52.5	0.910	0.635	0.891	0.458-1.735
	3-5	101	48.7	106	51.2			0.856	0.524-1.396
	>5	30	56.6	23	43.3			1.380	0.759-2.510
Menstrual irregularity (Female)	Yes	38	97.4	1	2.6	39.063	0.000	58.810	7.777-444.72
	No	42	39.2	65	60.7				
Acne in relation to menstruation (Female)	Yes	13	100	0	0	11.773	0.001	1.985	1.677-2.350
	No	67	50.3	66	49.6				

Table 3. Comparison of cases between males and females regarding location of acne and season do acne appear (n=150)

Characteristics		Acne positive				P-Value	Odd ratio	95% of C.I.
		Male		Female				
		n	%	n	%			
Location of acne Case only	Face	70	46.67	80	53.33	0.380	1.313	0.715-2.411
	Shoulders	22	38.5	35	61.4	0.000	35.139	4.636-266.4
	Others	2	66.6	1	33.3	0.448	2.473	0.221-27.7
Season do acne appear	Summer	54	43.2	71	56.8	0.630	0.862	0.472-1.574
	Winter	11	61.0	7	38.8	0.135	2.110	0.802-5.534
	Autumn	14	42.4	19	57.6	0.797	0.905	0.428-1.915
	Spring	5	38.4	8	61.6	0.653	0.767	0.254-2.327

Table 4. Acne rate regarding body mass index, skin type, family history of acne vulgaris, cigarette smoking (n=300)

Characteristics		Case		Control		Odd ratio	P-Value	95% of C.I.
		n	%	n	%			
BMI	Under weight	11	50	11	50	1	1.000	0.429-2.334
	Normal	95	47.5	105	52.5	0.740	0.221	0.458-1.197
	Over weight	30	58.8	21	41	1.536	0.167	0.838-2.812
	Obese class I	12	52	11	47.8	1.099	0.828	0.478-2.525
	Obese class II	1	50	1	50	1	1.000	0.103-9.665
	Obese class III	1	50	1	50	1	1.000	0.103-9.665
Skin type	Dry	12	24	38	76	0.256	0.000	0.129-0.509
	Oily	99	64.2	55	35.7	3.353	0.000	2.090-5.379
	Mixed	39	40.6	57	59.3	0.573	0.026	0.351-0.936
Face complexion	Fair	1	33.3	2	66.6	0.497	0.562	0.064-3.841
	Moderate	144	49.6	146	50.3	0.658	0.520	0.195-2.220
	Dark	5	71.4	2	28.5	2.552	0.251	0.560-11.57
Family history of acne vagaries	Nil	70	37.4	117	62.5	0.247	0.000	0.150-0.407
	1 Family member	55	67.9	26	32	2.761	0.000	1.618-4.711
	2 More member	25	78	7	21.8	4.086	0.001	1.744-9.547
Cigarette smoking	Never	113	50.2	112	49.7	1.036	0.894	0.616-1.743
	Sometimes	18	54.5	15	45.5	1.227	0.580	0.600-2.508
	Daily	19	45.2	23	54.8	0.801	0.506	0.419-1.530

Table 5. Comparison of dietary intake frequency between cases and control (n=300)

Diet		Case		Control		Chi	P-Value	Odd ratio	95% of C.I.
		n	%	n	%				
Chocolate	Often	108	50.7	105	49.2	0.146	0.703	1.102	0.670-1.811
	Seldom	42	48.2	45	51.7				
Sweets	Often	108	50.4	106	49.5	0.065	0.798	1.067	0.648-1.757
	Seldom	42	48.8	44	51				
Potato ships	Often	106	53	93	46.7	2.523	0.112	1.477	0.913-2.387
	Seldom	44	43.5	57	56.4				
Ice-cream	Often	106	51.7	99	48.2	0.755	0.385	1.241	0.763-2.017
	Seldom	44	46.3	51	53.6				
Carbonated drink	Often	111	52.8	99	47	2.286	0.131	1.466	0.893-2.406
	Seldom	39	43	51	56.6				
Milk	Often	79	45.6	94	54.3	3.072	0.080	0.663	0.419-1.050
	Seldom	71	55.9	56	44				

Table 6. Comparison of acne between case and control based on Friction or pressure on skin of the face (n=300)

Friction or Pressure on the skin by		Case		Control		Chi	P-Value	Odd ratio	95% of C.I.
		n	%	N	%				
Mobile	Yes	48	61.5	30	38.4	5.613*	0.018	1.882	1.114-3.179
	No	102	45.9	120	54				
Helmits	Yes	9	50	9	50	0.000	1.000	1	0.397-2.521
	No	141	50	141	50				

Discussion

From this study, it has been revealed that of acne cases 45% are male and approximately 55% are female with no statistically association with acne between cases and controls, this result is similar to the study done by Yassin and Mohammed in 2020 in Baghdad, Iraq [22]. As with men, female acne is the result of too much oil being produced by the skin which is the result in clogged pores [5]. Age group has statistically association with acne with age group 18-23 years with approximately 2 times risk, as this nature is considered a normal aspect of the maturation process, this result is similar to the result study in Bangladesh 2019 by Ettel [23].

Marital status has no statistical association with acne, this result is similar study done in India 2017 by Qidwai et al. [18]. Living with family has no statistical association with acne as in the study done in Syria in 2014 by Al-kubaisy et al. [16].

Having always stress has 3 times risk for acne, we confirmed the association between acne prevalence and degree of stress in which we found that students who always were subjected to continuous stress demonstrated higher rate of acne, most probably, this relation could be attributed to the increased production of cortisol during emotional stress which in turn increased the sebum production [15], this result is similar to study in Damascus, Syria 2014 by Al-kubaisy. [16].

There is no statistically significant association with washing face or body per day as a risk factor for acne, this result is similar to study done in south India 2015 by Durai and Nair [17]. Irregular cycle for female cases has a 58 times risk with statistically significant association with acne, this result is similar to the study done in Syria in 2014 by Al-kubaisy et al. [16], which is stated that hyperandrogenicity during the menstrual cycle especially if its irregular may have contributed to the acne formation.

Face is the commonest site of acne followed by shoulders which has statistical association with acne this result is similar to the study done in 2015 in India by Durai and Nair [17], as oil glands are all over the body, but those are the places where there are the most. In both males and females, acne mostly appear during summer as a study done in India 2017 by Qidwai et al. as in summer there increase in sweating and sebum production [18].

Majority of acne cases had normal body mass index, the association between body mass index and acne is not significant although there were proportion who were underweight, normal, overweight or obese in almost all the grades of acne, this is similar to study done in Nepal 2018 by Neupan et al. [19].

Skin type has statistical association with acne with oily skin has 3 times risk for acne as sebum overproduction is the result of excessive androgen hormones or a heightened sebaceous gland sensitivity to normal levels of androgen hormones, this result is similar to study done in Louisiana 2019 by Oge' et al. [24].

Medium face complexion has 49.6% of the cases as oily skin and medium complexion are more likely to be predisposed to skin damage than light and dark complexion, dry skin is the next leading skin condition prone to acne, this result is similar to the study in north central India in 2017 by Qidwai et al. [18].

Family history of acne vulgaris has statistically significant association with acne with 4 times risk for 2 and more family member with acne and 2 times risk for one family member with acne. It is further supported by a large-scale twin genetic modeling study; which was conducted in the United Kingdom. It was evident that 81% of acne variances were due to genetic factors; while unshared environmental factors made up the remaining 19%, this study is similar to the study done in 2012 in journal American academy by Di Landro et al. [25].

Cigarette smoking has no statistically significant association with acne, like the study done in Malaysian 2018 by Suppiah et al. [26].

Dietary intake has no statistical association with acne, a concise systematic review by Magin et al. [27] of seven studies, including one randomized controlled trial, concluded that there was no clear, positive evidence that any dietary components increase acne risk as in the study done in India in 2017 by Qidwai et al. [18].

Friction or pressure on the skin by person's mobile has approximately 2 times risk for acne like study done in America 2019 by Torjesen [28] as acne mechanica is defined as being any acneiform eruption in areas of friction, pressure, stretching, rubbing, pinching or occlusion of the skin in any individual, regardless of pre-existing acne. It presents as inflammatory papules and pustules that can progress to nodules and cysts.

In conclusions, acne is a health and psychological problem among university students which is highly related to age of youth. There were several significant factors associated with acne formation in the study which were age, stress, menstrual cycle irregularity, location of acne, skin type, family history of acne vulgaris and person's mobile use.

The recommendations of the current study is to minimize and decrease the prevalence and the aggravating factors of acne vulgaris as much as possible among the medical students of Mosul University Students in Mosul, Iraq to get more beneficial quality of the life and promotions of the psychological future as we can prevent its complications on the skin.

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