

The Role of Diet in Acne Vulgaris and Its Complications: Clinical Study in Sulaimani Teaching Center of Dermatology

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Abstract

Background : Acne Vulgaris is chronic inflammatory disease of pilosebaceous units characterized by comedones, papules, pustules, nodules, cysts, abscesses, and later on sometimes as widespread scarring. The aim of this study was to determine the relationship between dietary variables and acne vulgaris in addition to describe acne complications.

Method: A cross sectional study carried out in Al-Sulimanya teaching center of dermatology for period from 1st of February to end of June, 2014 on sample of 110 acne vulgaris patients. The researcher reviewed one week recall nutritional history of each patient and asking about the effect of some dietary items on acne. The effect was defined as increased the acne nodules and/or severity.

Results : Mean age of acne patients was 19±5 years and age group 15-19 years was the predominant (47.3%). Females were more than males with predominance of housewives and urban residents. Two thirds of studied patients had moderate acne and more than half of them had acne duration ≥ 2 years. Lipid and menstrual cycle (among females) were perceived by the patients as effective on acne vulgaris. There was significant association of effective lipid and milk with severe acne vulgaris ($p < 0.001$). Patients with severe acne were significantly complicated than other types of acne ($p = 0.001$). Consumption lipids, red meat and white meat by acne patients was associated significantly with complicated acne vulgaris ($p < 0.05$).

Conclusions : Lipids as perceived by acne patients may have a significant aggravating effect on severity and complications of acne. Diet had an effect on acne complications. Behavioral modification of adolescents especially regarding dietary habits and enforcement on fiber-rich diet omega3 fatty acids should be encouraged.

Keywords: Acne, diet, complication, severity, association, Iraq

Introduction

Acne Vulgaris is the most common skin disorder and, prevalence of moderate to severe acne vulgaris being about 11%. Nearly 90% of teenagers have acne, and half of them continue to experience symptoms as

adults⁽¹⁾. By age 40 years, 1% of men and 5% of women still have lesions. Acne presents several significant challenges, including complex etiology, concerns about antibiotics resistance. The effects of acne may contribute to significant psychological distress, depression and even increased risk of suicide⁽²⁾.

Although dietary factors have long been considered unimportant, insulin resistance (IR) and dietary carbohydrates have recently been implicated in the etiology of acne. High insulin concentrations in the fasting and/or postprandial state may exacerbate acne by increasing the proliferation of basal keratinocytes.

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Insulin also stimulates the synthesis of androgens leading to high sebum production, a recognized correlate of acne severity. IR could also increase inflammatory responses within and adjacent to the comedo⁽³⁾.

The risk factors for acne vulgaris that reported in many literatures were oils, family history, hormonal effect, facials (facial massage), cooking, cosmetics, friction and pressure, repeated irritation, sweat, menstruation, pregnancy and acne, stress, sunlight, smoking, drug-induced acne⁽⁴⁾.

Historically, milk was found to be positively associated with acne flares⁽⁵⁾. This is because, in prostaglandins production, competition between trans and essential fatty acids may lead to inflammation. A cross sectional study reported that foods such as chocolate, milk, roasted peanuts or cola have no influence on acne vulgaris conditions⁽⁶⁾.

There have been an increasing number of studies investigating the role of diet as one of the underlying causes of acne vulgaris.⁽⁷⁾ However, the findings of these studies are inconsistent. Hyper-glycemic food-induced hyperinsulinaemia is proposed to lead endocrine responses that aggravate acne and a high glycemic load diet has been shown to affect acne in epidemiologic studies and in randomized, controlled trials⁽⁸⁾.

Dairy foods could also aggravate acne vulgaris and may influence comedo-genesis because they contain androgens, 5 α -reduced steroids (e.g. dihydrotestosterone), and other non-steroidal growth factors that affect the pilosebaceous unit⁽⁹⁾.

Many studies have investigated the influence of omega-3 fatty acid and γ -linolenic acid on various diseases. Omega-3 fatty acid has anti-inflammatory and anti-cancer properties, but few well-controlled studies have been conducted on the influence of these fatty acids on acne. Typically, Western food contains a higher ratio of omega-6 to omega-3 fatty acids than non-Westernized food 32. A case controlled study conducted in Baghdad on forty-five male patients with acne vulgaris revealed a significant association between serum levels of each of Zn and Mg with the severity of acne⁽¹⁰⁾.

Methods

A cross sectional study carried out in Al-Sulimanya

teaching center of dermatology for period from 1st of February to end of June, 2014.

The target population was all Acne vulgaris patients attended the consultancy clinic of Al-Sulimanya teaching center of dermatology.

Inclusion and Exclusion criteria

Patients who fulfilled the following criteria were considered eligible for participation: 1) Acne vulgaris patients regardless of age and gender. 2) Agreed to participate. While other excluded who conformed to the following criteria: 1) A recent treatment with acne. 2) Endocrine disturbances like diabetes. 3) Use of medications affecting glucose metabolism (as corticosteroids). 4) Mental health disorders. 5) Previous gastrointestinal surgery. 6) Malabsorption disorders. 7) Systemic Lupus Erythematosus. 8) Heart diseases.

Sampling

A convenient sample of 110 acne vulgaris patients were enrolled in this study, all the patients who met the criteria and filled ethical considerations were taken for the sample.

Data collection

The collection of data was done through direct interview in consultancy clinic of Dermatology center with each patient and filling a prepared closed-ended questionnaire. The researcher reviewed one week recall nutritional history of each patient and asking about the effect of some dietary items on acne. The effect was defined as increased the acne nodules and/or severity. Informed consent was obtained from each patient. The questionnaire included the followings:

- Demographic information: age, gender, occupation, residence and marital status.
- Clinical: Types, complications and duration of acne.
- Dietary items effect: Like sweets, spicy food, fruits, lipids, milk, dairy product, red meat, white meat, chocolate and smoking. The effect of each item was described by the patient as increasing the acne nodules and/or severity.

Statistical Analysis

All patients' data entered using Statistical Package for Social Sciences (SPSS) version 17 was used. Descriptive statistics presented as (mean \pm standard deviation) and frequencies as percentages. Chi-square used for categorical variables and Fishers exact test was used when more than 20% of expected variable was less than 5. In all statistical analysis, level of significance (p value) set at ≤ 0.05 .

Results

A total 110 acne vulgaris patients were enrolled in this study with mean age 19 ± 5 years. Age group 15-19 years as the predominant (47.3%). Male gender was represented by 40.9% of acne patients. About two thirds of acne patient were student (67.3%), housewives, self-employed and public servants represented 13.6%, 10% and 9.1% of acne patients, respectively. More than half (62.7%) of acne patients lived in urban area. Most of

acne patients (84.5%) were unmarried and 15.5% of them were married. Moderate acne was present among 67 (60.9%), mild and severe acne were represented by 22.7% and 16.4% of the patients, respectively. Mean duration of acne among studied patients was 2.4 ± 2.1 years with median 2 years, 58.2% of acne patients were with acne duration ≥ 2 years and 41.8% of the were with acne duration < 2 years.

Age groups of acne patients were not associated significantly with acne complications ($p=0.4$). Gender of acne patients was not associated significantly with acne complications ($p=0.7$), table 1. Public servants among studied acne patients were associated significantly with presence of acne complications ($p=0.04$). Residence of acne patients was not associated significantly with acne complications ($p=0.6$). Marital status of acne patients was not associated significantly with acne complications ($p=0.3$).

Table 1: Association of patients' demographic characteristics according to presence of complications.

Variable	Complicated		Not complicated		χ^2	P
	No.	%	No.	%		
Age (years)						
<15	6	37.5	10	62.5	2.9	0.4
15-19	23	44.2	29	55.8		
20-24	16	61.5	10	38.5		
≥ 25	8	50.0	8	50.0		
Gender						
Male	21	46.7	24	53.3	0.07	0.7
Female	32	49.2	33	50.8		
Occupation						
Student	35	47.3	39	52.7	8.2	0.04
Housewife	8	53.3	7	46.7		
Public servant	8	80.0	2	20.0		
Self-employed	2	18.2	9	81.8		
Residence						
urban	32	46.4	37	53.6	0.2	0.6
rural	21	51.2	20	48.8		
Marital status						
single	43	46.2	50	53.8	0.9	0.3
married	10	58.8	7	41.2		
Menstrual cycle	0.05	0.8			0.05	0.8
No effect	15	50.0	15	50.0		
Effective	29	52.7	26	47.3		

Diet & Severity of Acne vulgaris:

Studying the effectiveness of dietary items regarding severity of acne vulgaris among studied patients revealed significant association of effective lipid and milk with severe acne vulgaris ($p < 0.001$). There was significant association between no effect of sweets (as perceived by patients) with moderate acne vulgaris ($p < 0.001$). No significant association was observed between each of spicy food, fruits, dairy products, red meat, white meat and smoking with severity of acne vulgaris ($p > 0.05$), table 2.

Table 2: Distribution of dietary effect according to severity of acne.

Variable	Mild		Moderate		Severe		χ^2	P
	No.	%	No.	%	No.	%		
Sweets								
Effective	9	22.0	18	43.9	14	34.1	15.7	<0.001
No effect	16	23.2	49	71.0	4	5.8		
Spicy food								
Effective	2	18.2	9	81.8	0	-	2.9	0.2
No effect	23	23.2	58	58.6	18	18.2		
Fruits								
Effective	2	33.3	2	33.3	2	33.3	2.2	0.3
No effect	23	22.1	65	62.5	16	15.4		
Lipids								
Effective	0	-	18	21.0	67	79.0	47.0	<0.001
No effect	7	28.0	15	60.0	3	12.0		
Milk								
Effective	0	-	0	-	3	100.0	15.7*	<0.001
No effect	25	23.4	67	62.6	15	14.0		
Dairy products								
Effective	0	-	3	60.0	2	40.0	2.8*	0.2
No effect	25	23.8	64	61.0	16	15.2		
Red meat								
Effective	0	-	3	100.0	0	-	1.9	0.3
No effect	25	23.4	64	59.8	18	16.8		
White meat								
Effective	0	-	4	100.0	0	-	2.6*	0.2
No effect	25	23.6	63	59.4	18	17.0		
Chocolate								
Effective	6	46.2	5	38.5	2	15.4	4.7	0.09
No effect	19	19.6	62	63.9	16	16.5		

Diet & Complications of Acne vulgaris:

The acne complications were present among 53 (48.2%) patients and 57 (51.8%) acne patients were without complications. The common complication type was scar (42.5%), followed by hyper-pigmentation (38.5%), treatment complications (12%) and psychological complications (7%), table 3.

Table 3: Distribution of dietary items effect according to acne complications.

Variable	Complicated		Not complicated		χ^2	P	
	No.	%	No.	%			
Sweets						0.08	0.7
Effective	19	46.3	22	53.7			
No effect	34	49.3	35	50.7			
Spicy food						0.03	0.8
Effective	5	45.5	6	54.5			
No effect	48	48.5	51	51.5			
Fruits						9.8	<0.001
Effective	4	9.0	40	91.0			
No effect	25	38.0	41	62.0			
Lipids						8.8	0.002
Effective	66	78.0	19	22.0			
No effect	14	56.0	11	44.0			
Milk						0.03*	0.01
Effective	1	11.0	8	89.0			
No effect	53	52.0	48	48.0			
Dairy products						0.2	0.5
Effective	3	60.0	2	40.0			
No effect	50	47.6	55	52.4			
Red meat						3.3	0.06
Effective	3	100.0	0	-			
No effect	50	46.7	57	53.3			
White meat						4.6	0.03
Effective	4	100.0	0	-			
No effect	49	46.2	57	53.8			
Chocolate						0.1	0.6
Effective	7	53.8	6	46.2			
No effect	46	47.4	51	52.6			
Smoking						-	-
No effect	53	48.2	57	51.8			
Effective	-	-	-	-			

Discussion

There has been a re-evaluation of nutritional influences related to endocrine factors involved in promoting the development of acne⁽¹¹⁾.

Mean age of studied acne patients was 19±5 years. This finding is matching with fact

Our findings are inconsistent with many studies including an epidemiological Iraqi study that showed that acne vulgaris in general was more common in males than females. This inconsistency might be attributed to high interest and adherence to acne treatment among females than males⁽¹²⁾.

Approximately, two thirds (60.9%) of patients in the present study had moderate acne vulgaris. This finding is close to results of Tayel DI, et al study in Egypt⁽¹²⁾ but contradicting results of Shen Y, et al study in China⁽¹³⁾ that reported highest prevalence of mild acne (68.9%). This inconsistency might be attributed to difference in genetic-based, diet and lifestyle factors between communities.

Our finding of sweet effect on acne is inconsistent to results of Reynolds RC, et al study in Australia⁽¹⁴⁾ which concluded that high glycemic diet of acne patients was responsible for increased severity of acne.

Regarding spicy food, our finding is consistent with German study⁽¹⁵⁾ of no association between spicy food and severity of acne.

The effect of fruits in this study is consistent with study in USA⁽¹⁶⁾ and Egypt⁽¹⁷⁾ that reported a protective effect of fruits from acne vulgaris as the fruits is low glycemic diet. Regarding milk, dairy products and meat, finding of this study is similar to results of Kim J, et al study in South Korea⁽¹⁸⁾ in which the acne showed a significant improvement in patients treated with lactoferrin. This finding is inconsistent with what reported by Danby FW in USA on aggravating effect of milk and meat on acne⁽¹⁹⁾

Many studies as our study failed to find association between chocolate and acne vulgaris.⁽²⁰⁾ The present study revealed aggravating effect of lipids on acne vulgaris. This finding is consistent with results of Saudi Arabia⁽²¹⁾ and USA⁽²²⁾.

Studying relation between dietary effect and severity of acne vulgaris revealed significant association of effect of lipid and milk with severe acne vulgaris ($p < 0.001$). This significant association of effect of lipid and milk was similar to results dy in USA⁽⁸⁾ and Germany⁽²³⁾ that reported the association of lipid and milk with severe acne.

The majority of complications reported in less than half of our patients were scarring and hyper-pigmentations. This finding is consistent with results in Hong Kong⁽²⁴⁾.

No significant difference was observed in age, gender marital status and residence regarding complicated acne in this study that is inconsistent with results from Hong Kong⁽²⁴⁾ and in USA⁽²⁵⁾. The trend of increased scarring reported with age is consistent with the direct relationship between the degree of scarring and disease duration.

Conclusion

lipids as perceived by acne patients may have a significant aggravating effect on severity of acne. Fruits, spicy food, meat, dairy products, chocolate and menstruation as perceived by acne patients may have no aggravating effect on severity of acne. Although milk is associated significantly with severe acne, it may have a protective effect with fruits for acne complications. Lipid and meat may influence acne complications.

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