

THE EFFECT OF BODY MASS INDEX, AND VITAMIN D LEVEL ON ACNE IN FEMALE PATIENTS IN MISRATA CITY

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ABSTRACT

Acne is a chronic inflammatory disease that affects the pilosebaceous unit, it is considered as one of the most common skin diseases worldwide, especially among adolescent population. The pathogenesis of acne is largely multifactorial and is still not fully understood. In contrast to our knowledge of the genetic and hormonal role in the pathogenesis of acne, there is uncertainty regarding other factors, including diet, body mass index and vitamin D. Studies of the role of these factors in the pathogenesis of acne have shown conflicting and inconclusive results. This study aimed to know the effect of body mass index, and vitamin D level on acne vulgaris, and their association with acne severity through a representative sample of female acne patients in Misrata city. A prospective study, a total of 129 acne vulgaris female patients and 47 matched healthy subjects as controls have been enrolled in this study. To collect data a self-made questionnaire was designed. The collected data was statistically analyzed using Statistical Package for the Social Sciences (SPSS) version 28. According to this study, vitamin D level influences the presence of acne (p-value= 0.001) however it does not affect its severity (p-value= 0.348). No correlation was found between acne and the body mass index (p-value was 0.701). This study found that a deficient vitamin D level affect acne vulgaris in female patients, and may play a potential role in pathogenesis of acne vulgaris but no correlation between acne and the body mass index.

Key words: Acne Vulgaris, Body Mass Index, Vitamin D Level.

INTRODUCTION

Acne vulgaris is a chronic inflammatory disease, considered as one of the most common dermatologic conditions globally [1]. About 75–95% of all adolescents suffer from acne to some degree [2]. After teenage years, acne remains more common in women than men, occurring in approximately one-half of women in their 20s, one-third in their 30s, and one-quarter in their 40s [3]. It's characterized by non-

inflammatory lesions (white and black comedones), and inflammatory lesions (papules, pustules, nodules, and/or cyst) which can cause negative reflects on patients psychologically and cosmetically by scarring and pigmentations [4].

Our understanding of the pathogenesis of acne vulgaris is still evolving, although progress has been made. abnormalities in several processes (sebum production and sebocyte differentiation, proliferation and inflammation) can contribute to the

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development of acne. It is known that multiple factors impact acne pathophysiology, including genetic, hormonal, inflammatory, and environmental influences [5].

Acne is thought to be a disease of wealthy nations, where an abundance of food, particularly processed food, is readily available [6]. Contrary to our knowledge of the genetic nature of acne and the role of hormones in causing acne, there is uncertainty about the role of environmental factors, including diet [7,8].

Also factors such as vitamin D, obesity and autoinflammation is evolving. The impact of body mass index (BMI) on acne has received limited attention and remains uncertain. The relationship between diet and acne is highly controversial. Several studies during the last decade have led dermatologists to reflect on a potential link between diet and acne.

According to Choi and Bissonnette, the modern lifestyle, which includes diet, stress, urban noise, socioeconomic pressure, light stimuli and variations in sleep patterns, is a potential risk factor for acne [9,10]. Studies about the role of vitamin D in the pathogenesis of acne vulgaris have shown conflicting and nonconclusive results [11], for instance a higher prevalence of vitamin D deficiency was found in acne patients compared with controls, also vitamin D supplementation has been shown to produce improvements in acne inflammation, the same researchers found no significant association between increased BMI and acne vulgaris [12].

Meanwhile positive correlations have been found between low BMI and

reduced risk for acne, and equally, rising BMI and increased risk [13,14].

OBJECTIVE OF THE STUDY

This study aimed to evaluate the effect of body mass index, and vitamin D level on female acne patients in Misrata city.

MATERIALS AND METHODS

This study was designed prospectively as a case-control study comparing two female groups living in the city of Misrata at similar age, but with one group suffering from acne vulgaris with different levels of severity, whereas the other group do not have acne (control group). All respondents were randomly selected; Each was asked to fill a questionnaire formulated by researchers in order to evaluate the effect of possible related variables on acne. The questionnaires were filled out over a period of approximately four months (April to July 2021), the data were collected and then statistically analyzed and interpreted as well as the writing of thesis. A total of 129 acne vulgaris female patients and 47 matched healthy subject as controls have been enrolled in this study. The researchers used a self-made questionnaire to collect data. The questionnaire was formulated mainly to evaluate the effect of body mass index and vitamin D level on female acne and its severity.

As the majority of data were collected from acne vulgaris female patients attending selected clinics, a request for permission to conduct the study was submitted to allow researchers collecting data in all authority. The questionnaire comprised of two parts: Part I covered the respondent's profile (age, social level, and occupation)

Table (1): Classification of BM

BMI (Kg/m ²)	Nutritional level
<18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
≥ 30	Obese

Part II covered the needed measurements:

- Weight (Kg) and Length [m] for calculation of BMI (Kg/m²)
- Severity of acne
- Vitamin D level

Body mass index [BMI]:-

Calculated BMI was classified according to WHO as shown in table 1. Severity of acne was classified as mild, moderate or severe and in accordance with the lesions that predominate in a given patient: comedonal , papulo pustular, nodular, nodulocystic or conglobate acne [15] as shown in table (2).

Vitamin D level:-

Vitamin D level was classified according to US Endocrine society classification [16] that are shown in table 3.

Table (2): Classification of clinical forms of acne vulgaris

Clinical type according to acne severity	Comedones	Papules and or pustules	Nodules	Nodules, Cysts, sinus tracs
Mild; Comedonal acne and papulopustular acne	Comedones are the main lesions < 20	Small and few in number < 10	None	None
Moderate; Papulopustular acne and nodular acne	10-40	10-40	0-10	None
Severe; Nodulocystic acne and conglobate acne	40-100 and fused	> 40	> 10	Many

Table (3): Vitamin D level in relation to 25 [OH] D levels

Vitamin D level	25 [OH] D level
Deficiency	<20 ng/mL
Insufficiency	21–29 ng/mL
Sufficiency	>30 ng/mL

Statistical analysis: -

The data gathered were classified, tabulated and analyzed using

descriptive statistics. The statistical tools used were tally, frequency, percentage, and p value. SPSS software, virgin 28 was used to determine p-value which is needed to confirm the significance of the results and to investigate the correlation between variables. $P > 0.05$ is the probability that the null hypothesis is true. A statistically significant test result ($P \leq 0.05$) means that the test hypothesis is false or should be

rejected. A P value greater than 0.05 means that no effect was observed. Statistical tables and graphs were likewise displayed to clearly represent the results of the study.

RESULTS AND DISCUSSION

1. Age

Table (4.1) shows the percentage distribution of acne patients respondents according to age. Only 2 (1.55%) of the respondents aged 10-14 years, 39 (30.23%) aged 15-19 years, 61 (47.29%) aged 20-24 years, and 27 (20.93%) aged 25 years.

Table (4.1): distribution of acne patients according to age

Age	10-14	15-19	20-24	≥25
%	1.55	30.23	47.29	20.93

2. Measured data

2.1. Body mass index [BMI]

As displayed in table 4.2.1 BMI was normal (N) for more than half of acne respondents (55.81%), followed by overweight (OW) (30.23%), obese (O) and underweight were (UW) (10.85%) and (3.10%) respectively.

Table 4.2.1: Distribution of acne patients respondents according to BMI

BMI	U.W	N	O.W	O
%	3.10	55.81	30.23	10.85

2.2. Severity of acne

Table 4.2.2. shows the percentage distribution of acne patients respondents according to the severity of acne (39.53%) have mild (Mi) acne, (34.88%) have moderate (Mo) acne, and (25.58%) have severe (S) acne.

Table 4.2.2: Distribution of acne patients respondents according to severity of acne

Severity	Mi	Mo	S
Percent	39.53	34.88	25.58

2.3. Vitamin D level

As displayed in table 4.2.3 vitamin D was deficient (D) in the majority of acne respondents (66.67%), insufficiency (I) was recorded in (29.46%), and only (3.88%) of acne respondents were in sufficient (S) vitamin D level.

Table: 4.2.3: Distribution of acne patients respondents according to vitamin D level

Vitamin D	D	I	S
%	66.67	29.46	3.88

3. The correlation between studied factors and presence of acne

To verify the correlation between studied factors and presence of acne a comparing between acne group and no acne group (control) must be conducted.

3.1. The correlation between Body mass index and acne

To investigate the correlation between body mass index and acne the Chi-square test was applied on body mass index in both the acne group and the no acne group (control). The p-value found to be 0.701 indicating no correlation between body mass index and acne or in other words body mass index does not affect the presence of acne according to this study. As shown in table 5.3.1. frequency distribution of acne respondents and no acne respondents (control) according to body mass index was similar indicating that BMI does not play a significant role in acne etiology in this study.

Table 5.3.1: Distribution of acne patients and control according to the body mass index

BMI	UW	N	OW	O
Acne	4	72	39	14
No acne	3	24	16	4

3.2. The correlation between vitamin D level and acne

To verify the relationship between vitamin D level and acne, Chi-square test was applied to vitamin D level in both acne group and no acne group (control group). A significance or p-value of 0.001 was found to indicate that vitamin D level influences the presence of acne. As shown in table 5.3.2 frequent distribution of acne respondents and no acne respondents (control) according to vitamin D level shows elevated vitamin D deficiency level in acne group compared to no acne group (control) indicating that vitamin D level may play an important role in acne triggers in this study.

4.The correlation between studied factors and severity of acne

To verify the correlation between studied factors and severity of acne, acne patients grouped into three groups according to severity of acne: mild, moderate, and severe. a comparing between studied factors in the three acne groups were conducted. The Chi-square test was applied.

Table 5.3.2: Distribution of acne and no acne according to vitamin D level

Vit D status	D	I	S
Acne	86	38	5
No acne	17	27	3

4.1. The correlation between vitamin D level and severity of acne

To find out the relationship between vitamin D level and severity of acne, the Chi-square test was applied to vitamin D level in three acne groups: mild, moderate, and severe. A significance or p-value was equal to 0.348 indicates that vitamin D level does not influence the severity of acne although its effect on the presence of acne.

4.2. The correlation between body mass index and severity of acne

To find out the relationship between body mass index and severity of acne, the Chi-square test was applied to body mass index in three acne groups: mild, moderate, and severe. A significance or p-value was equal to 0.123 indicates that BMI does not influence the severity of acne.

CONCLUSION

Acne vulgaris is an inflammatory skin disorder with not as yet fully understood pathogenesis. In this study, we assessed female acne vulgaris patients for some possible pathogenic factors such as BMI, and vitamin D level.

One hundred twenty-nine patients were given a diagnosis of acne vulgaris during the study period. Compared with controls, we found significant associations between vitamin D deficiency (<20 ng/mL) and diagnosis of acne vulgaris, although the majority of both the acne group and controls had serum vitamin D level under 30 ng/ML which reflect high prevalence of deficiency and insufficiency of vitamin D in the study sample.

No significant association was found between BMI and acne.

This study concluded that vitamin D may play a potential role in pathogenesis of acne vulgaris. Further studies are needed to confirm these potential relations.

RECOMMENDATION

According to the findings of this study we would recommend the following: For acne patient, to ensure vitamin D efficiency level by living healthy life, sun exposure and out-door sporting and taking supplements and requirements according to doctor's assessment and advice.

To the Dermatologist: Consider vitamin D level as a factor affecting

acne vulgaris. Besides traditional acne vulgaris medications. Moreover, serum 25(OH)D3 test should be conducted to ensure vitamin D efficiency level and supplements of vitamin D may be useful to prescribe.

limitation of the study

The study was conducted during a critical period of time due to the spread of the Corona virus pandemic with all the consequent restrictions on all sectors.

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