Original Article

Association of Dairy Foods in Acne Vulgaris

Sathi FR[1], Bhuiyan I[2], Hossain MS[3], Hossain MM[4], Alahi MN[5], Islam S[6]

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ABSTRACT:

Background: *Acne vulgaris is one of the most commonly found skin problems affecting teenagers and adolescents. Dietary foods particularly dairy products consist of milk or any of its food made from milk are frequently regarded by patients and clinicians as a cause or aggravator of acne. As there are very limited studies found on this regard, this study was aimed to find the association of dairy foods in acne vulgaris.*

Methods: *This wasa cross-sectional analytical study and was carried out in the Dermatology and Venereology department of Shaheed Suhrawardy Medical College Hospital. Total 260 patients were selected by appropriate inclusion criteria equally into two groups: Group A (diagnosed with acne vulgaris, n=130) and group B (patients not having acne vulgaris, n=130). A thorough history of every patient and face to face interview was taken by a predesigned questionnaire after getting the written informed consent of the patient. Data were collected in predetermined data collection form. Result were subjected to standard statistical evaluation and were analyzed by SPSS-24.*

Results: *According to the age group, majority of the acne patients were between 10-20 years (75.4% in group A and 63.8% in group B, p<0.05), though mean age in both groups were statistically similar (18.53±5.78 and 17.29±4.59 years, respectively). Also, female respondents were predominant in both groups (80.8% and 72.3%). The risk was increased in those with a family history of acne in siblings (OR2.449, p=0.021;95% CI,1.145-5.238) and the risk was reduced in subjects doing physical exercise. Papules (35.4%) and comedones (27.7%) were most common lesion and mostly found in forehead (74.6%) and left (68.5%) and right (63.1%) cheeks. According to global acne severity grading, majority had mild form of acne (83.1%) and use of cosmetics (43.8% vs. 30%), topical steroid (34.6% vs. 16.9%), taking fastfood (24.6% vs. 14.6%) and less water intake (36.9% vs. 18.5%) also significantly higher among acne patients. Multivariate regression analysis showed, dairy products such as whole milk (OR 1.984, p=0.022), chocolate (2.490, p=0.004), chips (OR 3.207, p<0.001), Pizza (OR 2.388, p=0.021) and red meat (OR 3.055, p=0.009) were significant risk for developing acne vulgaris. Also, whole milk (3.050, p=0.01), chocolate (3.817, p=0.004) and pizza (3.822, p=0.005) were independent risk factors for moderate to severe acne.*

Conclusion: *This study found an association between high dairy product consumption and acne in adolescents, indicating that dairy consumption may be a contributing factor for developing acne vulgaris.*

Key Words:
Retinoid, Pilosebaceous, Propionibacterium, Hyperinsulinemia, Glycemic Indexe

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1. Dr. Farzana Rahman Shathi, Assistant registrar, Department of Skin & VD, Shaheed Suhrawardy Medical College
2. Dr. Ishrat Bhuiyan, Associate professor, Department of Skin & VD, Shaheed Suhrawardy Medical College
3. Dr. Md. Shahadat Hossain, Professor, Department of Skin & VD, Ex. Shaheed Suhrawardy Medical College
4. Dr. Md. Motiul Hossain, Assistant professor, Department of Skin & VD, Shaheed Suhrawardy Medical College
5. Dr. Mohammad Niamat Alahi, Assistant professor, Department of Skin & VD, Shaheed Suhrawardy Medical College
6. Dr. Shiropa Islam, Assistant professor, Department of Skin & VD, Shaheed Suhrawardy Medical College

Correspondence: Dr.Ishrat Bhuiyan, Associate Professor, Department of Skin & VD, Shaheed Suhrawardy Medical College Hospital, Dhaka.
Email: ishratskin@yahoo.com; Mobile: 01711822551

Introduction

Acne vulgaris is a common chronic inflammatory disease of the pilosebaceous unit which is characterized by the formation of non-inflammatory open and closed comedones & inflammatory papules, pustules, nodules and cysts.[1] It is the eighth most prevalent disease worldwide and estimated almost 9.4% of the global population are affected by acne vulgaris.[2] Previous studies enquiring into the potential link between diet and acne vulgaris have shown controversial results.[5] There have been an increasing number of investigations about the role of diet as one of the underlying causes of acne vulgaris and the effects of ingesting certain dairy products, carbohydrates, glycemic index (GI) and high glycemic load (GL) diet in exacerbating acne vulgaris. It has been hypothesized that what is eaten may affect the skin.[6]

The influence of environmental factors, such as diet, in the pathogenesis of acne is still being clarified. Again, the precise mechanisms of acne are not known but there are major pathophysiologic factors including excessive sebum production, follicular hyper keratinization and proliferation of Propionibacterium acnes with direct or indirect inflammation.[7]

Diet is considering as one of the main factors involving in acne generation and numerous studies were conducted to evaluate the effect of some types of food like chocolate, milk and fatty diet.[11] Specially milk was a determinant for acne in many types of research that identified an association between all types of milk such as skimmed milk and high-fat milk with acne development and suggested that hormones and bioactive molecules present in milk might be linked to this association.[12,13] It is proposed that high glycemic indexes lead to hyperinsulinemia and a resulting cascade of endocrine consequences, including increased androgens, increased IGF-1, and altered retinoid signaling pathways, that mediate acne. The severity of acne is correlated with facial sebum secretion and it has been hypothesized that foods high in fat or carbohydrates may exacerbate acne by production of more comedogenic sebum.[14]

Based on previous studies, it hypothesized that high glycemic load diet, milk and dairy products intake, high body mass index (BMI) as well as increase body fat percentage may be the risk factors of acne vulgaris. Knowledge on how diet and acne vulgaris is related, enables the identification and management of the condition and community education in preventing and improving the acne condition, besides the primary systemic and topical treatment. In Bangladesh, little studies are found regarding this matter. Therefore, this study was designed to determine the relationship between dairy food products and acne vulgaris.

Rationale of the study

Acne leads to a reduced quality of life comparable to chronic conditions and as such associated with social and psychological problems. Diet is considering as one of the main factors involving in acne generation and numerous studies were conducted to evaluate the effect of some types of food like chocolate, milk and fatty diet. The research supporting an association between milk product and acne show some of the more consisting and convincing results but it is still inconclusive. Unfortunately, very few studies have focused the issues among the people in Bangladesh. On this regard,the main focus of this study was to find out the association of dairy foods in acne vulgaris.

Research Question: Is there any association of dairy food with acne vulgaris?

Objectives

General Objective:

To determine the association of dairy foods in acne vulgaris.

Specific Objectives:

• To find out the socio-demographic characteristics of the participants.

• To evaluate the dietary habit of the participants.

• To examine which types of dairy food products mostly involved with acne vulgaris of the participants.

Materials and Methods

Study Design: Cross sectional analytical study.

Place of Study: Department of Dermatology & Venereology, Shaheed Suhrawardy Medical College Hospital.

Study Period:1 year.

Study population: All patients visiting the indoor and outdoor facilities of Dermatology & Venereology department in ShSMCH.

Group A: Patients diagnosed with acne vulgaris

Group B: Patients without acne vulgaris

Sampling Method: Purposive sampling.

Sample size: For this study, sample size calculation was done by following statistical formula. n = P(1-P)Z2/(error)2

For this study, 130 patients diagnosed with acne vulgaris were in group A and 130 patient with no acne vulgaris were included in group B. Total 260 patients were considered as sample for this study.

Inclusion criteria

Group A:

• Patients aged >10 years

• Both gender

• Diagnosed cases of acne vulgaris

• Willing to participate

Group B:

• Patients aged >10 years

• Both gender

• Patients came for skin problem other than acne vulgaris

• Willing to participate

Exclusion criteria

• Subjects previously diagnosed with eating disorder

• Patients with diabetes mellitus and coronary artery diseases

• Women previously diagnosed with polycystic ovarian syndrome and on hormonal therapy

• Other foods such as Oily food, sugar & other aggravating factors like drugs – Oral corticosteroids, Anti tubercular drugs & other drugs causing acneiform eruption.

Study variable

a. Main outcome variables:

• Socio-demographic characteristics.

• Association of dairy food product with acne vulgaris.

b. Confounding variable:

Not Applicable

Acne vulgaris grading: 36 Graded by using a simple grading system as follows:

• Grade 1 - comedones, occasional papules

• Grade 2 - papules, comedones, few pustules

• Grade 3 - predominant pustules, nodules, abscess

• Grade 4 - mainly cysts, abscess, widespread scarring

Global Acne Severity Scale (GEA Scale):37

0	Clear. No lesions	Residual pigmentation and erythema may be seen
1	Almost clear or no lesions	A few scattered open or closed comedones and very few papules
2	Mild	Easily recognizable: less than half of the face is involved. A few open or closed comedones and a few papules & pustules
3	Moderate	More than half of the face is involved. Many papules and pustules, open or closed comedones
4	Severe	Entire face is involved, covered with many papules and pustules, open or closed comedones and a few nodules or cysts
5	Very Severe	Highly inflammatory acne covering the face with presence of numerous nodules and cysts

Study procedure

Data were collected by following procedure:

1. Before commencement of the study, formal ethical approval was taken from the ethical review committee (ERC) of ShSMCH.

2. All patients with skin problem who visited the indoor and outdoor facilities of Dermatology & Venereology department in ShSMCH during the study period were approached for this study. About 130 diagnosed cases with acne vulgaris (group A) and 130 patients having skin problem rather than acne vulgaris (group B) were included in this study. Written informed consent were obtained from the patients and/or guardian. One dermatologist evaluated the severity of acne using the Global Acne Severity Scale.

3. Face to face interview was conducted by using a semi-structured questionnaire containing socio-demographic parameters and relevant information.

4. Demographical data (age, sex, education, occupation, etc.) and siblings' history of acne was collected. The food consumption habits were recorded using a food frequency questionnaire. Investigated food included, whole milk

(milk whose fat content is unaltered), low fat milk (milk whose fat content is reduced), cream of milk, ice-cream, cheese, chocolate, cake, fresh fruit, fresh vegetable, meat, chicken and egg.

5. Weight and height were measured with light clothes and without shoes using a standardized method. Body mass index was computed as weight (Kg)/height (m^2).

6. History of physical exercise and history of being on diet of the participant were collected and recorded in the data collection sheet. Physical exercise was categorized as regular and occasional. Diet was evaluated if participant is on diet for a year.

7. Data collection was carried out by the investigator himself by using separated a case record form.

8. Data analysis were done by SPSS 24 windows 10 version

9. Association of dairy food products with acne vulgaris was assessed. A p-value less than 0.05 was considered as significant.

Informed consent: Written informed consent was taken from every patient

Ethical issues

The researcher was concerned about the ethical issues related to the study. In this study the following criteria were followed to ensure maintaining the ethical values.

A. Formal ethical clearance was taken from the ethical review committee of the Shaheed Suhrawardy Medical College Hospital for conducting the study.

B. Confidentiality of the person and the information was maintained, observed and unauthorized persons didn't have any access to the data.

C. Informed written consent was taken from the subject.

D. The content of the consent requirements was as such:

i. Explanation of the nature & purpose of the study.

ii. Explanation of the procedure of study.

iii. Explanation that they have the right to refuse, accept & withdraw to participate in the study.

E. The participants didn't gain financial benefit from this study.

Data Processing and Analysis:

After collection of all the required data, these were checked, verified for consistency and tabulated using the SPSS/PC 24 software. Also, univariate and multivariate logistic regression were done to find out the independent risk factors. A p-value of <0.05 was considered significant.

Results

This cross-sectional analytical study was conducted in the Department of Dermatology & Venereology, Shaheed Suhrawardy Medical College Hospital, Dhaka. After careful history taking, examination and appropriate investigations fulfilling inclusion and exclusion criteria, 130 patients with Acne vulgaris were included in group A and other 130 patients visiting the indoor and outdoor facilities who did not had Acne Vulgaris, were included as group B in this study. The main aim of the study was to evaluate the association of dairy food products with acne vulgaris of the participants.

Table-1: Socio-demographic status of respondents (n=260)

Variables	Group A n=130 (%)	Group B n=130 (%)	P value
Age group			0.033*
10-20	98(75.4)	83(63.8)	
21-30	25(19.2)	43(33.1)	
>30	7(5.4)	4(3.1)	
Mean age (SD)	18.53±5.78	18.76±5.09	0.724**
Gender			0.107*
Male	48(36.9)	36(27.7)	
Female	82(63.1)	94(72.3)	
Residence			0.264*
Rural	63(48.5)	72(55.4)	
Urban	67(51.5)	58(44.6)	
Marital status			0.150*
Unmarried	93(71.5)	103(79.2)	
Married	37(28.5)	27(20.8)	

Table-2: Family economic condition and occupational status of respondents (n=260)

Variables	Group A n=130 (%)	Group B n=130 (%)	P value*
Family economical condition			0.177
<10000 tk	21(16.2)	24(18.5)	
10000-20000 tk	39(30)	52(40)	
20000-40000 tk	47(36.2)	32(24.6)	
>40000 tk	23(17.7)	22(16.9)	
Occupational status			0.144
Govt employee	7(5.4)	4(3.1)	
Non-govt employee	15(11.5)	6(4.6)	
Housewife	17(13.1)	17(13.1)	
Student	91(70)	103(79.2)	

Table-3: Factors related to Acne Vulgaris among respondents (n=260)

Variables	Group A n=130 n(%)	Group B n=130 n(%)	P value
Mean duration of sleep (hours)	5.68±1.12	6.45±0.79	**<0.001****
Physical exercise			**0.006***
No exercise	95(73.1)	72(55.4)	
Regular	24(18.5)	32(24.6)	
Occasional	11(8.5)	26(20)	
On diet plan			0.512*
Yes	10(7.7)	13(10)	
No	120(92.3)	117(90)	
Sibling history of acne			**0.001***
Yes	31(23.8)	11(8.5)	
No	99(76.2)	119(91.5)	

*Chi-square test and ** student t-test;Group A= with Acne, Group B= without Acne

Figure-1: Distribution of clinical lesions of Acne Vulgaris (n=130)

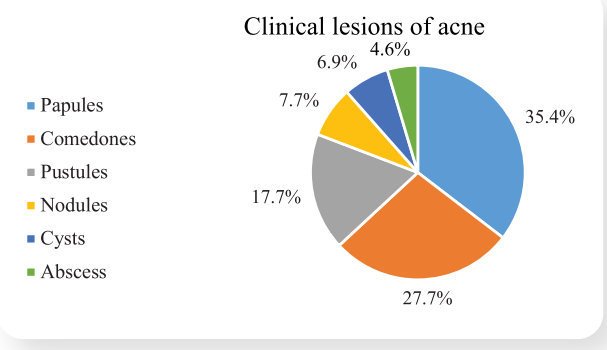

Figure-2: Distribution of clinical stages of Acne Vulgaris (n=130)

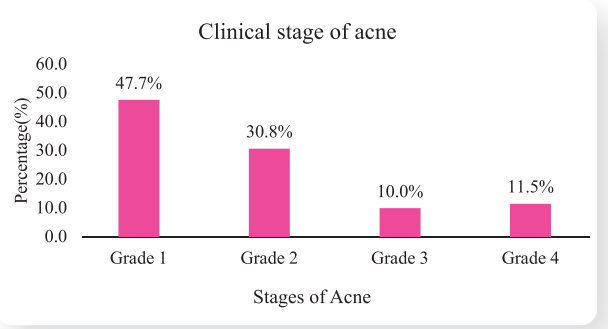

Table-4: Distribution of site and duration of the Acne Vulgaris (n=130)

	Frequency (n)	Percentage (%)
Site of Acne		
Left cheek	89	68.5
Right cheek	82	63.1
Forehead	97	74.6
Chest and upper back	27	20.8
Nose	10	7.7
Duration of Acne (days)	13.25±7.69	

Table-5: Distribution of Factors aggravating Acne Vulgaris (n=260)

Variables	Group A n=130 n(%)	Group B n=130 n(%)	P value*
Use of cosmetics	57(43.8)	39(30)	**0.021**
Topical steroid	45(34.6)	22(16.9)	**0.001**
Intake of steroid	11(8.5)	8(6.2)	0.475
Premenstrual flare up	21(16.2)	13(10)	0.141
Taking fast food	32(24.6)	19(14.6)	**0.042**
Smoking habit	9(6.9)	8(6.2)	0.802
Taking less water	48(36.9)	24(18.5)	**0.001**

Figure-3: Distribution of Acne Vulgaris Severity by GEA score (n=130)

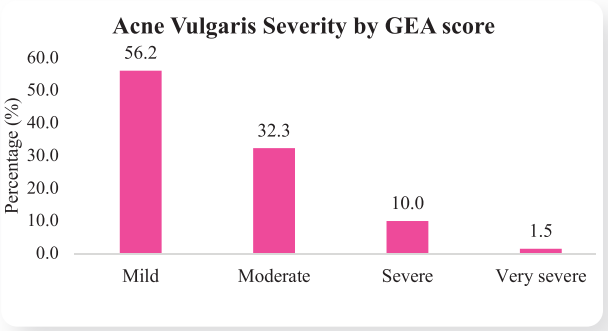

Table-6: Association of food intake frequency with acne vulgaris (n=260)

Variables		Group A n=130 (%)	Group B n=130(%)	P value*
Whole milk	< 3 days	56(43.1)	86(66.2)	**<0.001**
	≥3 days	74(56.9)	44(33.8)	
Low fat milk	< 3 days	73(56.2)	89(68.5)	**0.041**
	≥3 days	57(43.8)	41(31.5)	
Cream milk	< 3 days	88(67.7)	106(81.5)	**0.010**
	≥3 days	42(32.3)	24(18.5)	
Ice cream	< 3 days	83(63.8)	103(79.2)	**0.006**
	≥3 days	47(36.2)	27(20.8)	
Yogurt	< 3 days	59(45.4)	66(50.8)	0.385
	≥3 days	71(54.6)	64(49.2)	
Egg	< 3 days	71(54.6)	90(69.2)	**0.015**
	≥3 days	59(45.4)	40(30.8)	
Cake	< 3 days	48(36.9)	76(58.5)	**0.001**
	≥3 days	82(63.1)	54(41.5)	
Chocolate	< 3 days	44(33.8)	66(50.8)	**0.006**
	≥3 days	86(66.2)	64(49.2)	
Chips	< 3 days	38(29.2)	67(51.5)	**<0.001**
	≥3 days	92(70.8)	63(48.5)	
Pizza	< 3 days	92(70.8)	110(84.6)	**0.007**
	≥3 days	38(29.2)	20(15.4)	
Fresh Veg	< 3 days	73(56.2)	54(41.5)	**0.018**
	≥3 days	57(43.8)	76(58.5)	
Cooked veg	< 3 days	29(22.3)	27(20.8)	0.763
	≥3 days	101(77.7)	103(79.2)	
Dry fruit	< 3 days	104(80)	116(89.2)	**0.039**
	≥3 days	26(20)	14(10.8)	
Chicken	< 3 days	45(34.6)	59(45.4)	0.076
	≥3 days	85(65.4)	71(54.6)	
Red meat	< 3 days	99(76.2)	115(88.5)	**0.009**
	≥3 days	31(23.8)	15(11.5)	

Table-7: Results of the logistics regression analysis of the variables associated with acne (n=260)

Variables		OR	P value	95%CI
Age (year)	10-20	1.734	**0.044**	1.015-2.964
	>20	Ref		
Gender	Male	Ref		
	Female	0.654	0.112	0.387-1.105
Physical exercise	No exercise	2.187	**0.003**	1.301-3.676
	Regular/occasional	Ref		
Siblings with acne	Yes	3.388	**0.001**	1.620-7.084
	No	Ref		
Whole milk	< 3 days	Ref		
	≥3 days	2.583	**<0.001**	1.563-4.269
Low fat milk	< 3 days	Ref		
	≥3 days	1.695	**0.041**	1.021-2.814
Cream milk	< 3 days	Ref		
	≥3 days	2.108	**0.011**	1.185-3.749
Ice cream	< 3 days	Ref		
	≥3 days	2.160	**0.006**	1.241-3.761
Egg	< 3 days	Ref		
	≥3 days	1.870	**0.016**	1.125-3.107
Chocolate	< 3 days	Ref		
	≥3 days	2.016	**0.006**	1.222-3.324
Chips	< 3 days	Ref		
	≥3 days	2.575	**<0.001**	1.545-4.292
Pizza	< 3 days	Ref		
	≥3 days	2.272	**0.008**	1.237-4.173
Red meat	< 3 days	Ref		
	≥3 days	2.401	**0.011**	1.225-4.703

Table-8: Results of the multivariate logistics regression analysis of the variables associated with acne (n=260)

Variables		OR	P value	95%CI
Age (year)	10-20	1.653	0.130	0.863-3.166
	>20	Ref		
Physical exercise	No exercise	1.345	0.354	0.719-2.516
	Regular/occasional	Ref		
Siblings with acne	Yes	2.985	0.018	1.208-7.373
	No	Ref		
Whole milk	< 3 days	Ref		
	≥3 days	1.984	**0.022**	1.106-3.557
Low fat milk	< 3 days	Ref		
	≥3 days	1.465	0.277	0.789-2.722
Cream milk	< 3 days	Ref		
	≥3 days	1.870	0.071	0.948-3.690
Ice cream	< 3 days	Ref		
	≥3 days	1.809	0.084	0.924-3.540
Egg	< 3 days	Ref		
	≥3 days	1.713	0.081	0.937-3.131
Chocolate	< 3 days	Ref		
	≥3 days	2.490	**0.004**	1.707-4.623
Chips	< 3 days	Ref		
	≥3 days	3.207	**<0.001**	1.707-6.023
Pizza	< 3 days	Ref		
	≥3 days	2.388	**0.021**	1.138-5.011
Red meat	< 3 days	Ref		
	≥3 days	3.055	**0.009**	1.326-7.040

Table-9: Results of the Multivariate logistics regression analysis of the variables associated with moderate to severe acne (n=260)

Variables		OR	P value	95%CI
Age (year)	10-20	2.221	0.132	0.786-6.279
	>20	Ref		
Gender	Male	1.286	0.563	0.548-3.017
	Female	Ref		
Siblings with acne	Yes	2.169	0.150	0.755-6.232
	No	Ref		
Whole milk	< 3 days	Ref		
	≥3 days	3.050	**0.010**	1.298-9.525
Chocolate	< 3 days	Ref		
	≥3 days	3.817	**0.004**	1.529-9.525
Chips	< 3 days	Ref		
	≥3 days	0.266	0.366	0.266-1.629
Pizza	< 3 days	Ref		
	≥3 days	3.822	**0.005**	1.486-9.827
Red meat	< 3 days	Ref		
	≥3 days	2.539	0.061	0.956-6.742

Discussion

Acne vulgaris is a multifactorial dermatosis which occurs most often during puberty.[25] Both high glycemic load and dairy-rich foods increase the levels of insulin-like growth factors (IGF)-1 and can reduce insulin sensitivity.[29] This may lead to androgen-mediated increases in sebum production and in turn attributes to the manifestation of acne vulgaris, as excess sebum is one of the vital mechanisms in the pathophysiology of acne vulgaris.[29] On this regard, the main aim of the study was to evaluate the association of dairy food products with acne vulgaris of the participants. In this study, 130 patients with Acne vulgaris were included as group A and other 130 patients visiting the indoor and outdoor facilities who did not had Acne Vulgaris, were included as group B.

According to this study, respondents between 10-20 years old were more found among acne group of respondents (75.4%) compared to non-acne respondents (63.8%, $p<0.05$). Yet, mean age were quite similar in both groups (18.53±5.78 and 17.29±4.59 years, respectively) as respondents were selected as per inclusion and exclusion criteria. This findings were coincided with the mean ages of the participants in the case and control groups were 21.58±4.69 and 21.74±5.19 years, respectively in Bajelan et al.33 The Also, female respondents were predominant (80.8% and 72.3%) and mostly were unmarried (71.5% and 79.2%) in this study. However, in the study conducted in Malaysia, there were more male patients (n=34; 59.6%) compared to female patients (n=23, 40.4%).[15] This finding differ from our study, probably due to androgenic effect of acne and environmental difference from this study place. Yet, in this study, majority of the respondents resided from urban area among Acne vulgaris respondents, more respondents of non-Acne vulgaris respondents resided from rural area (55.4%).

Regarding family economical condition, Acne vulgaris respondents mostly were from upper middle class (36.2%), while, most of the non-Acne vulgaris respondentswere from lower middle class (40%). However, most of the respondents were student in both groups (70% and 79.2% respectively), similar to previous study.[33]

Personal history regarding duration of sleep, physical exercise and siblings having acne were also assessed in this study. Where, it was found that, the mean duration of sleep was significantly lower among respondents having acne compared to non-Acne vulgaris respondents. Also, physical exercise and sibling with history of acne had significant relation with respondents. It showed that, among respondents having acne, mostly did not had any exercise (73.1%) compared to non-Acne vulgaris respondents. Although, majority of the respondents in groups had no siblings with history of acne, about 18.5% respondents having acne vulgaris had siblings with acne, while only 8.5% respondents in non-Acne vulgaris respondents had that. This was also found in another study, as the majority of patients (n=43, 75.4%) had at least one immediate family members with a history of acne vulgaris; which was more than the controls.[15]

Among 130 respondents who had Acne Valgaris, majority of them had papules (35.4%) and comedones (27.7%) in this study. Also, pustules (17.7%), nodules (7.7%), cysts (6.9%) and abscess (4.6%) were to be found. About more than half respondents had Acne Vulgaris over face (53.1%), while, 30% had over forehead, 9.2% had over chest and 7.7% had over back. However, the mean duration of Acne diagnosis was 13.25±7.69 days. Cheek (85%) was the predominant site of involvement of acne according to previous study.[16]

Clinical stages of Acne Vulgaris presented, most of the respondents had grade 1 Acne (47.7%), other were followed by grade 2 (30.8%), grade 3 (10%) and grade 4 (11.5%). Global Evaluation of Acne score were also

assessed among acne group of respondents and most of the respondents had mild acne (56.2%). Also, about 32.3% respondents moderate acne, 10% had severe acne and 1.5% had very severe acne. Similar study showed acne severity was mild in 50%, moderate in 34%, severe in 14% and very severe in 2%.[17]

As aggravating factors, use of cosmetics, use of topical steroid, taking fast food and taking less water was found significantly more among respondents having Acne vulgaris than non-Acne vulgaris respondents. About 56.9% respondents among respondents having Acne vulgaris had consumed whole milk more than 3days a week, while, in nonAcne vulgaris respondents, it was only 33.8% ($p<0.001$). Also, low fat milk (43.8% vs. 31.5%), cream milk (32.3% vs. 18.5%), Ice cream (36.2% vs. 20.8%) and egg (45.4% vs. 30.8%) were mostly consumed by respondents having Acne vulgaris compared to non-Acne vulgaris respondents.Again, is was found that, respondents having Acne vulgaris had consumed chocolate (66.2%), chips (70.8%), Pizza (32.3%), dry fruits (20%) and red meat (22.3%) more comparative to non-Acne vulgaris respondents ($p<0.05$). However, there was no significant relation was found with yogurt, cooked vegetables and chicken consumption in between two groups.

According to logistic regression analysis, age between 10-20 years respondents had 1.734 time higher risk of Acne Vulgaris [p=0.004; 95%CI(1.015-2.964)]. This findings was similar to another study as they found the risk of acne increased with increasing age; OR (odds ratio) =1.39; 95 % CI (confidence interval: 1.14–1.68) (p=0.001).38 Also, Aalemi, Anwar and Chen showed, the consumption of whole milk (OR =2.36, 95% CI, 1.39–4.01) and low fat milk (OR 1.95 CI, 1.10–3.45) 3 days or more per week was associated with moderate to severe acne, and the risk was increased in those with a family history of acne in siblings (OR =4.13, 95% CI, 2.55–6.69).39 Nevertheless, this study findings were also presented that having no physical exercise had 2.187 and siblings with acne had 2.449 time higher risk for developing acne. Again, according to multivariate analysis in this study, consumption of whole milk more than 3 days had 1.984 times ($p<0.001$) and chocolate had 2.490 times higher risk for developing acne. The association might be explained by the presence of milk derived amino acids which promote insulin secretion and induce hepatic insulin like growth factor-1 (IGF-1) synthesis, which is considered as a key factor for acne pathogenesis. However, fast food like chips (OR 3.207, $p<0.001$), Pizza (OR 2.388, p=0.021) and red meat (OR 3.055, p=0.09) were found as significant risk for developing acne vulgaris in this study. These findings were agreed with another study, it showed, fatty and sugary dietary pattern such as milk, milk chocolate, sugary beverage etc. (aOR, 1.13; 95% CI, 1.05-1.18; $P < .001$) more likely to have acne vulgaris.34Also, these dietary habit had significant relation with severity of acne vulgaris. Whole milk (OR 3.050, p=0.010), chocolate (OR3.817,p=0.004) and pizza (OR3.822, p=0.005) also found as an independent risk factor for developing moderate to severe acne among respondents. Increased butter and chocolate consumption were linked to more severe forms of acne ($p = 0.049$ and $p = 0.005$ respectively).17The results of our study appear to support the hypothesis that the Western diet (rich in animal products and fatty and sugary foods) is associated with the presence of acne.

Conclusion

In conclusion, this study found that the associations between acne vulgaris and the dietary intake of chocolates and milk support the hypothesis that dietary factors may influence the development of acne vulgaris.Adolescent and female are most commonly affected by acne vulgaris. Besides, this study showed that the development of acne vulgaris is influenced by a family history of acne vulgaris and having regular exercise can limit the formation of acne. Severity of Acne also assessed by GRE score and most of them had mild form of acne throughout this study. However, whole milk, chocolate and fast food like pizza were risk factors for developing moderate to severe acne among respondents.

Limitations of the study

- The lack of detailed information regarding specific types of chocolate and milk consumed and there caloric values could not be measured.
- Also, recall bias among our respondents was possible.
- Long term follow up was beyond the scope of the study

Recommendations

1. Patient should be consulted on healthy diet to reduce the development of acne.
2. A multifaceted assessment which includes dietary patterns should help clinicians with acne vulgaris management.

References

1. Saizuddin M, Hasan MS, Sen SK, Alfazzaman M, Rahman MM, Rahman MM, et al. A Study on Factors In fluencing Acne among the Medical Students of Bangladesh. Med Today. 2017;29(2):30–2.
2. Tan JK, Bhate K. A global perspective on the epidemiology of acne. Vol. 172, British Journal of Dermatology. 2015;172(1):3–12.
3. Zaenglein AL, Pathy AL, Schlosser BJ, Alikhan A, Baldwin HE, Berson DS, et al. Guidelines of care for the management of acne vulgaris. J Am Acad Dermatol. 2016;74(5):945-973.
4. Khondker L, Wahab M, Khan M. Pattern of Acne Vulgaris in Women, Attending a Tertiary Care Hospital. Med Today. 2012;23(2):76–9.
5. Jabbar A, Al Subaihawi K, Mohammed T, Taher J. Milk consumption among patients with acne vulgaris. EurAsian J Biosci Eurasia J Biosci. 2020;14(10):3935–8.
6. Ismail NH, Manaf ZA, Azizan NZ. High glycemic load diet, milk and ice cream consumption are related to acne vulgaris in Malaysian young adults: a case control study. BMC Dermatol. 2012;12(13):1–8.
7. Tahir CM. T. Pathogenesis of acne vulgaris: Simplified. J Pakistan Assoc Dermatologists. 2010;20(2):93–7.
8. Jeremy AH, Holland DB, Roberts SG, Thomson KF, Cunliffe WJ. Inflammatory events are involved in acne lesion initiation. J Invest Dermatol. 2003;121(1):20–7.
9. Sultana T. Evaluation of Severity in Patients of Acne Vulgaris by Global Acne Grading System in Bangladesh. Clin Pathol Res J. 2017;1(1):1-6.
10. Gonãalves G, Amado JM, Matos ME, Massa A. The prevalence of acne among a group of Portuguese medical students. J Eur Acad Dermatology Venereol. 2012;26(4):514–7.
11. Juhl CR, Bergholdt HK, Miller IM, Jemec GB, Kanters JK, Ellervik C. Dairy intake and acne vulgaris: A systematic review and meta-analysis of 78,529 children, adolescents, and young adults. Nutrients. 2018;10(8):1–13.
12. LaRosa CL, Quach KA, Koons K, Kunselman AR, Zhu J, Thiboutot DM, et al. Consumption of dairy in teenagers with and without acne. J Am Acad Dermatol. 2016;75(2):318–22.
13. Ulvestad M, Bjertness E, Dalgard F, Halvorsen JA. Acne and dairy products in adolescence: results from a Norwegian longitudinal study. J Eur Acad Dermatology Venereol. 2017;31(3):530–5.
14. Davidovici BB, Wolf R. The role of diet in acne: facts and controversies. Clin Dermatol. 2010;28(1):12–6.
15. Suppiah TS, Sundram TK, Tan ES, Lee CK, Bustami NA, Tan CK. Acne vulgaris and its association with dietary intake: A Malaysian perspective. Asia Pac J Clin Nutr. 2018;27(5):1141–5.
16. Shah N, Shukla R, Chaudhari P, Patil S, Patil A, Nadkarni N, et al. Prevalence of acne vulgaris and its clinico-epidemiological pattern in adult patients: Results of a prospective, observational study. J Cosmet Dermatol. 2021;20(11):3672–8.
17. Mahmood A. The Influence of dietary components on acne; a case-control survey. Res Sq. 2022;1–13.
18. Shetty VH, Swathi D. Correlation of acne with dairy products - Fact or a Misconception. Indian J Clin Exp Dermatology. 2017;3(2):43–7.
19. Aslam M, Younas M. Association Between Dietary Practices and Acne in Young Adults; A Review. J Dermatology Res Rev Reports. 2020;1(4):1–8.
20. Saeed Alanazi M, Mohamed Hammad S, Elwan Mohamed A. Prevalence and psychological impact of Acne vulgaris among female secondary school students in Arar city, Saudi Arabia, in 2018. Electron Physician. 2018;10(8):7224–9.
21. Sattar A, Sumsuzzoha SM, Zaman S, Das AK. The Pattern of Skin Diseases in Patients Attending OPD of Dermatology and Venereology in a Tertiary Care Hospital in Bangladesh Annals of International Medical and Dental Research. Ann Int Med Dent Res. 2022;8(5):270–7.
22. Lynn D, Umari T, Dellavalle R, Dunnick C. The epidemiology of acne vulgaris in late adolescence. Adolesc Health Med Ther. 2016;7(1):13–25.
23. Makrantonaki E, Ganceviciene R, Zouboulis C. An update on the role of the sebaceous gland in the pathogenesis of acne. Dermatoendocrinol. 2011;3(1):41–9.
24. Iftikhar U, Choudhry N. Serum levels of androgens in acne & their role in acne severity. Pakistan J Med Sci. 2019;35(1):146–50.
25. Kucharska A, Szmurło A, Sinska B. Significance of diet in treated and untreated acne vulgaris. Postep Dermatologii i Alergol. 2016;33(2):81–6.
26. Ramli R, Malik AS, Hani AFM, Jamil A. Acne analysis, grading and computational assessment methods: An overview. Ski Res Technol. 2012;18(1):1–14.
27. Ramli R, Malik AS, Hani AF, Yap FB. Identification of acne lesions, scars and normal skin for acne vulgaris cases. 2011 Natl Postgrad Conf - Energy Sustain Explor Innov Minds, NPC 2011. 2011; 1-4.
28. Doshi A, Zaheer A, Stiller MJ. A comparison of current acne grading systems and proposai of a novel system. Ordinary Partial Differ Equ Routines C, C++, Fortran, Java, Maple, MATLAB. 2003;36(6):416–8.
29. Suda KM. Associations Among Acne Vulgaris and Western Diet. Physician Assist Sch Proj Posters. 2018;25(5):1–35.
30. Adebamowo CA, Spiegelman D, Berkey CS, Danby FW, Rockett HH, Colditz GA, et al. Milk consumption and acne in adolescent girls. Dermatol Online J. 2006;12(4):1–10.
31. Adebamowo CA, Spiegelman D, Berkey CS, Danby FW, Rockett HH, Colditz GA, et al. Milk consumption and acne in teenaged boys. Physiol Behav. 2008;58(5):787–93.
32. Kakroo SN, Jamal A, Beg MA. Evaluate an Association Between Diet and Acne Vulgaris: A Cross Sectional Study. Int Arch Biomed Clin Res. 2021;7(2):1–4.
33. Bajelan A, Ghaebi M, Javadi M, Barikani A, Beheshti A, Bargahi M, et al. The Association Between the Incidence of Acne Vulgaris and Lifestyle Factors Including Dietary Habits, Physical Activity, and Bathing Frequency. J Ski Stem Cell. 2021;7(3):6–11.
34. Penso L, Touvier M, Deschasaux M, Szabo De Edelenyi F, Hercberg S, Ezzedine K, et al. Association between Adult Acne and Dietary Behaviors: Findings from the NutriNet-Santé Prospective Cohort Study. JAMA Dermatology. 2020;156(8):854–62.
35. Aghasi M, Golzarand M, Shab-Bidar S, Aminianfar A, Omidian M, Taheri F. Dairy intake and acne development: A meta-analysis of observational studies. Clin Nutr. 2019;38(3):1067–75.
36. Adityan B, Kumari R, Thappa DM. Scoring systems in acne vulgaris. Indian J Dermatol Venereol Leprol. 2009;75(3):323–6.
37. Dreno B, Poli F, Pawin H, Beylot C, Faure M, Chivot M, et al. Development and evaluation of a Global Acne Severity scale (GEA scale) suitable for France and Europe. J Eur Acad Dermatology Venereol. 2011;25(1):43–8.
38. Alghamdi H, Alhemel AM, Bukhari IA. Effect of milk and dairy products consumption on acne risk and severity in young adult patients with Acne vulgaris attending the dermatology clinics at King Fahd Hospital of the University in Alkhobar, Saudi Arabia. Sci Med Sci. 2017;0(4 (12)):4–8.
39. Aalemi AK, Anwar I, Chen H. Dairy consumption and acne: A case control study in kabul, afghanistan. Clin Cosmet Investig Dermatol. 2019;12(7):481–7.