

Prevalence and Risk Factors of Acne Vulgaris in Adolescents in Belbis City, Sharkia Governorate, Egypt: A Cross-Sectional Study

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Abstract

Background: Acne vulgaris is the most common skin condition affecting adolescents across the globe. It is a chronic inflammatory disease of pilosebaceous follicles, characterized by the presence of comedones, papules, pustules, nodules, cysts and scars. Development of acne has been associated with many factors as genetic component, emotional stress, diet and hormonal activity such as menstrual cycles and puberty. **Objectives:** To estimate the prevalence of acne in adolescents at preparatory and secondary school students in Belbeis city and to identify the risk factors that may have an impact on acne. **Methods:** A cross sectional study was conducted on 370 adolescents aged 10-19 years in Belbeis city. A sociodemographic and risk factors questionnaires of acne was applied on students of two preparatory schools and one secondary school. **Results:** Among the study subjects; 21.6% reported having acne. Acne is more significant in females than males and in students in preparatory schools than students in secondary schools with p value= 0.04, 0.01 respectively. There is high significant difference between female students who have acne and female students who do not have acne regarding occurrence of menarche and increasing acne few days before menses, there is weak significant difference regarding consuming large amounts of high fat milk products in diet. The occurrence of acne is one and half time higher in students with positive history of acne in their families. **Conclusion:** Twenty percent of adolescence students had acne, with girls affected at higher rates than boys.

Keywords: Students, Dermatology, Predisposing factors.

Introduction: Acne vulgaris is a chronic inflammatory long term skin disease caused by blockage of hair follicles with dead skin cells and oil from the skin.⁽¹⁾ It affects nearly 85% of adolescents, it usually begins at puberty and recovers at the age of twenty.⁽²⁾ Although researches have proved in the last two decades that it is common in the adult people, acne has typically been an adolescent disease.⁽³⁾

Risk factors that may cause acne are: 1. Genetics: is confirmed by genetic studies that explain the very high rate of incidence of acne among first-degree relatives and twins.⁽⁴⁾ As acne does not have a classic hereditary form, the predisposition to it results from the effect of multiple genes. Multiple gene candidates have been suggested including certain variations in Tumour Necrosis Factor- α (TNF- α) and Interleukin-1 α (IL-1 α).⁽⁵⁾ 2. Hormones: during puberty and menstrual cycle, an increase in sex hormones known as androgens during puberty leads to growth of the skin follicle glands and production of excessive oily sebum.

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The androgens testosterone, dihydrotestosterone (DHT) and dehydroepiandrosterone (DHEA) are hormones which are associated with acne; increased rates of growth hormone (GH) and insulin-like growth factor 1 (IGF-1) can contribute to the formation of bad acne.⁽⁶⁾ 3. Emotional stress: some studies have been made indicating that stress leads to acne or even worsens it.⁽⁷⁾ Other studies have proved that high severity of acne occurs due to increased stress rates as in premenstrual syndrome because of hormonal changes.⁽⁸⁾ 4. Menstruation: The clinical route of acne often waxes and wanes during menstrual period in females.⁽⁹⁾ 5. Diet: There is no clear association between diet and acne, as any definitive relationship between them has not been proved by high quality confirmation.⁽¹⁰⁾

According to weak observational evidence dairy milk ingestion is positively related to an increased frequency and severity of acne.⁽¹¹⁾ Also whey protein and hormones such as bovine IGF-1 and precursors of DHT are the components of milk which activate the act of insulin and IGF-1 and increase the production of sebum, androgen hormones and activate the formation of comedones.⁽¹²⁾ There is no evidence that confirms the effects from other types of food, such as salt and chocolate.^(10, 13) Acne vulgaris is extremely prevalent regardless of socioeconomic status, sex or nationality due to androgen production during puberty. Providing data that explain the epidemiology, pathogenesis, risk factors, and comorbidities related to acne vulgaris helps to improve the prevalence of this condition leading to important changes in the trend of the disease.

Methods: The current study is a descriptive cross sectional study made at preparatory and secondary schools in Belbeis city on adolescents (young people between the ages of 10-19 years).⁽¹⁴⁾ The sample was calculated by using computer software open Epi-info. The calculated prevalence of acne vulgaris was 54.2%,⁽¹⁵⁾ and the total number of students at preparatory and secondary schools were 12000 according to the educational administration in Belbeis city, the power of the test is 80% at 95% cl.

The sample size was calculated to be 370 students. The sample selection was carried out by multistage sampling collected from both preparatory and secondary schools. The number of preparatory schools was 16 and those of secondary schools was 9. So, the ratio between both was nearly 2:1. According to this ratio we selected 2 preparatory schools: (Aalsaida Aisha for girls and Samy Fathy for boys) and 1 secondary school (The new secondary school for girls) by

simple random sample. The data collection tools were 1-Socio-demographic factors questionnaire and 2-Risk factors questionnaire including family history of acne, hormonal factor as the hair of chin and moustache in male students and menarche in female students, emotional stress, diet, Self-care and steroid treatment for long periods. The study was carried out through a period of six months from October 2017 to March 2018.

Data Management: The SPSS program was used for data entry and analysis. The collected data was presented in the form of percentages for sociodemographic variables. Factors associated with acne were analyzed using the chi-square test. The results were considered statistically significant when the significant probability is ≤ 0.05 .

Ethical considerations: Administrative Design and Ethical Consideration: Official permission was obtained for enforcement of the study. Approval was obtained from Institutional Review Board (IRB), faculty of medicine at Zagazig University.

Results:The study shows that the prevalence of acne is 21.6% among studied students (Table1), acne is more prevalent in female 57% than in males 25% with a significant difference and in students in preparatory schools 55% than students in secondary schools 45 % with p value=0.04, 0.01 respectively (Table 2). There is high significant difference between students who have acne and those who do not have acne as regarding history of acne presence in parents, brothers and sisters with a p- value = 0.001 (Table 3), there is high significant difference between female students who have acne and female students who do not have acne as regarding presence of menarche and increasing acne few days before menses (Table 4).

And there is weak significant difference between students who have acne and those who do not have acne as regarding consuming large amounts of high fat milk products, fruits and vegetables in their diet (Table 5). This study shows that occurrence of acne is one and half time higher in students with positive history of acne in their parents, brothers and sisters. Also occurrence of acne is three times higher in female students having menarche with one and half time higher increase occurrence of acne few days before menses (Table 6).

Discussion:The present study was conducted to estimate the prevalence, risk factors of acne patients in adolescence at preparatory and secondary school students in Belbeis city. The

prevalence of acne in the studied group was 21.6%. This rate was much lower than previously reported prevalence in Ismailia city, Egypt (54.2%).⁽¹⁵⁾ Several studies conducted in Saudi Arabia found that more than half of its school and university students suffered from acne and this estimate was up to 64.5% among the general population.⁽¹⁶⁾ Results of Wei et al was (51.3%) in adolescence in north east China after performing a case-control study among 5696 undergraduates.⁽¹⁷⁾

The prevalence rate reported among 1277 schoolchildren aged 7–19 years through a cross-sectional study was 55.4% in Lithuania.⁽¹⁸⁾ It was 96% in a cross-sectional study including 452 adolescents aged between 10 and 17 from elementary and high schools in Brazil.⁽¹⁹⁾ Also 51.2% in Greece through a cross-sectional study performed on adolescents (aged 11-19).⁽²⁰⁾ And 62.2% among 145 medical students in Portugal.⁽²¹⁾ And 55.9% in Karachi, Pakistan where a cross-sectional study was conducted on 630 medical students (aged 16-29 years).⁽²²⁾ Acne prevalence in Iran was 93.3%, 94.4% for boys, and 92 % for girls through a cross-sectional study which was performed on high school pupils.⁽²³⁾

In Turkey it was 60.7% where a cross-sectional study was conducted on 2300 participants aged 13–18 years.⁽²⁴⁾ In Nigeria among students (aged 11-19) was 90.7% where a cross-sectional study was made in a secondary school.⁽²⁵⁾ Acne prevalence (65.6%) was observed in patients who were between the ages of 13 and 24 years in Durban, the second most populous urban area in South Africa.⁽²⁶⁾ On the other hand, acne prevalence in our study was much more than that reported approximately (8.9%) in rural Cameroon (aged 10-19).⁽²⁷⁾ And more than that reported (11.2%) in rural Kenya (aged 10-19).⁽²⁸⁾

In our study, acne was more significant in females (75%) than males (25%) with p value= 0.04 and this may be attributed to a greater number of females, genetic and hormonal factors effects. Such observation was similarly reported in another study in Ismailia city, Egypt, where acne prevalence was more in females (56%) than males (44%).⁽¹⁵⁾ On the other hand, this came in contrast to a Chinese community-based study which was conducted on adolescents and adults and demonstrated a higher incidence of acne in males (10.4%) than in females (6.1%) in the period from the late teens to 20y.⁽²⁹⁾

The current study showed that there is high significant difference between students who have acne and those who do not have acne as regarding history of acne presence in parents, brothers and sisters with p value=0.001. The occurrence of acne was one and half time higher in students with positive history of acne in their parents (OR=1.23), brothers and sisters (OR =1.56). Our study is compatible with another cross-sectional study that was conducted on adolescents in north east China showing that undergraduate students can develop acne by 78% heritability in first-degree relatives.⁽¹⁷⁾

Another cross-sectional study was performed on the final year female medical students in Jeddah, Saudi Arabia have also shown that cases with moderate to severe acne were strongly associated with first-degree relatives' acne history.^(30, 31) The results of the present study showed that there was a high significant difference between female students who have acne and female students who do not have acne as regarding presence of menarche and increasing acne few days before menses. Also, occurrence of acne was three times higher in female students who have menarche (OR =3.20) and one and half time higher in females whose acne increases few days before menses (OR =1.40) in our study.

A similar finding was also reported by Al Mashat et al who have mentioned that 88.2% of their studied female students observed an increase in their acne few days before menses through a cross-sectional study made in Jeddah, Saudi Arabia.⁽¹⁶⁾ In the current work, there was weak significant difference between students who have acne and those who do not have acne as regarding consuming large amounts of high fat milk products, fruits and vegetables in their diet and no significant difference between them as regarding consuming large amounts of chocolate and other nutrients mentioned in the study.

A significant association between dairy intake and acne was also demonstrated in a case-control study in Malaysian young adults which is similar to our study.⁽³²⁾ A study of almost 50 thousands women which is compatible with our study found that acne was positively associated with a reported quantity of milk ingested, particularly skim milk and also showed a positive correlation between acne and consumption of breakfast instant products and cottage cheese.⁽³³⁾ A cross-sectional study was conducted on 2300 participants aged 13-18 years in Turkey and revealed that fatty foods were associated with increased risk of acne.⁽²⁴⁾

Another study proved significant changes in severity of acne occurred among the studied population after a single ingestion of chocolate. This allowed the authors to hypothesize that chocolate can exacerbate acne lesions which is in contrast to our study. ⁽³⁴⁾ A cross-sectional study was made on 2300 participants aged 13-18 years in Turkey and revealed that frequent sugar intake (OR = 1.30), frequent eating sausages, burgers (OR=1.24), frequent eating pastries, cakes (OR = 1.20) were associated with increased risk for acne which is different from our study. ⁽²⁴⁾

Conclusion: The prevalence of acne in the studied group was 21.6 %, acne was more prevalent among females than males, significantly higher with family history of acne and higher with starting menstruation and consuming high fat milk products.

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Table (1): Prevalence of Acne

Variable	No (370)	Percent (%)
Prevalence of acne		
▪ Case	80	21.6
▪ Normal	290	78.4

Table (2): The relationship between presence of acne and sociodemographic characteristics

Variable	Presence of Acne=80 No (%)	Absence of acne=290 No (%)	Total No=370	χ^2	P value
Age (year):					
▪ 11 - <14	25 (31.2)	104 (35.8)	129	0.87	0.64
▪ 14-<17	55 (68.8)	185 (63.8)	240		
▪ 17-19	0 (0.00)	1 (0.34)	1		
Sex:					
▪ Male	20(25.0)	103(35.5)	123	3.13	0.04*
▪ Female	60(75.0)	187(64.5)	247		
School type					
▪ Preparatory	44(55.0)	202(69.7)	246	6.04	0.01*
▪ secondary	36(45.0)	88(30.3)	124		
Address:					
▪ Urban	59 (73.8)	223 (76.9)	282	0.34	0.33
▪ Rural	21(26.3)	67(23.1)	88		
Economic state					
▪ low	9(11.3)	57(19.7)	66	3.44	0.18
▪ Enough	51(63.8)	176(60.7)	227		
▪ Enough and more	20(25.0)	57(19.7)	77		

NB:* significant result

Table (3): The relationship between presence of acne and family history of acne

Variable	Presence of Acne =80 No (%)	Absence of acne =290 No (%)	Total N =370	χ^2	P value
Parents acne					
▪ No	46(61.3)	229(79.0)	275	16.58	0.001*
▪ Father	12(15.0)	17(5.9)	29		
▪ Mother	15(18.8)	26(9.0)	41		
▪ Both	7(8.8)	18(6.2)	25		
Brothers and sisters Acne					
▪ No	55(68.8)	243(83.8)	298	11.99	0.001*
▪ Brother	7(8.8)	20(6.9)	27		
▪ Sister	12(15.0)	21(7.2)	33		
▪ Both	6(7.5)	6(2.1)	12		
Other Family members					
▪ No	70(87.5)	264(91.0)	334	0.89	0.23
▪ Yes	10(12.5)	26(9.0)	36		

NB:* significant result

Table (4): The relationship between presence of acne and hormonal changes

Variable	Presence of Acne=20 No (%)	Absence of Acne =103 No (%)	Total N =123	χ^2	P value
Presence of Mustache and chin hair male (No=123)					
▪ Yes	14(70.0)	62(60.2)	76	0.68	0.41
▪ No	6(30.0)	41(39.8)	47		
Variable	Presence of Acne =60 No (%)	Absence of Acne =187 No (%)	Total N =247	χ^2	P value
Menarche female (No=247)					
▪ Yes	50(83.3)	114(80.3)	164	10.18	0.001*
▪ No	10(16.7)	73(19.7)	83		
Female who Had menarche No=164	Presence of Acne =50 No (%)	Absence of Acne =114 No (%)	Total N =164	χ^2	P value
Menses regularity					
▪ Yes	38(76.0)	81(71.0)	119	0.14	0.71
▪ No	12(24.0)	33(29.0)	45		
Drugs to regulate menses					
▪ Yes	2(4.0)	4(3.5)	6	1.03	0.31
▪ No	48(96.0)	110(96.5)	158		
Increase acne 2-6 days before menses					
▪ Yes	30(60.0)	6(5.3)	36	60.78	<0.001*
▪ No	20(40.0)	108 (94.7)	128		

NB:* significant result

Table(5): Diet habits that may be a risk factor for occurrence of acne in all students of the studied group

Variable	Presence of Acne=80 No (%)	Absence of acne=290 No (%)	Total No=370	χ^2	P value
Excess chocolate eating					
▪ Yes	32(40.0)	131(45.2)	163	0.68	0.24
▪ No	48(60.0)	159(54.8)	207		
Excess spicy food eating					
▪ Yes	38(47.5)	135(46.6)	173	0.02	0.49
▪ No	42(52.5)	155(53.4)	197		
Excess junk food eating					
▪ Yes	58(72.5)	209(72.1)	267	0.01	0.53
▪ No	22(27.5)	81(27.9)	103		
Eating large amounts of Fruit and vegetables					
▪ Yes	47(58.8)	207(71.4)	254	4.65	0.02*
▪ No	33(41.3)	83(28.6)	116		
Eating large amounts of Meat					
▪ Yes	46(57.5)	147(50.7)	193	1.17	0.17
▪ No	34(42.5)	143(49.3)	177		
High fat milk products intake					
▪ Yes	39(48.8)	100(34.5)	139	5.44	0.02*
▪ No	41(51.3)	190(65.5)	231		
Water intake(glass/day)					
▪ <1 glass	5(6.3)	16(5.5)		7.97	0.09
▪ 1-4	21(26.3)	83(28.6)			
▪ 5-8	26(32.5)	82(28.3)			
▪ 9-12	6(7.5)	55(19.0)			
▪ >12	22(27.5)	54(18.6)			

NB:* significant result

Table (6): logistic regression to predict risk factors of acne vulgaris

Variable	B	Sig	OR
▪ Sex	0.52	0.08	1.65
▪ Parents acne	0.27	0.03*	1.32
▪ Sisters and brother acne	0.38	0.01*	1.56
▪ Menarche	1.16	0.002*	3.20
▪ Increase acne before menses	0.34	0.01*	1.40
▪ Excess fruit and vegetables	0.42	0.20	1.52
▪ Excess milk intake	0.08	0.83	1.08

. NB:* significant result

المخلص العربي

معدل انتشار وعوامل الخطوره المؤديه لمرض حب الشباب عند المراهقين في مدينة بلبس- محافظة الشرقية-مصر: دراسة مستعرضه

ريهام عبدالرحمن حسن - أحمد عبدالجواد نوفل- نورا نبيل حسين

الخلفية: حب الشباب هو من أكثر الأمراض الجلدية شيوعا التي تؤثر على المراهقين في جميع أنحاء العالم. هو مرض التهابي مزمن في الجريبات الدهنية للشعر ، تتميز بوجود حبوب ، بثور ، عقيدات ، حويصلات وندبات. وقد ارتبط تطور حب الشباب بالعديد من العوامل مثل التكوين الجيني ، والضغط النفسي ، والنظام الغذائي والنشاط الهرموني مثل الدورة الشهرية والبلوغ.

الأهداف: تقدير مدى انتشار حب الشباب لدى المراهقين لدى طلاب المدارس الإعدادية والثانوية بمدينة بلبس وتحديد عوامل الخطر التي قد يكون لها تأثير على حب الشباب. **المنهجية وطرق البحث:** أجريت دراسة مقطعية مستعرضة على ٣٧٠ مراهق تتراوح أعمارهم بين ١٠-١٩ سنة في مدينة بلبس. تم تطبيق استبيانات حاله الاجتماعية والديموغرافية والعوامل المؤديه لحدوث حب الشباب على طلاب من مدرستين إعدادية ومدرسة ثانوية واحدة. **النتائج:** من بين الطلاب موضوع الدراسة ؛ ٢١,٦٪ نسبة وجود حب الشباب. وجد حب الشباب أكثر انتشارا في الإناث من الذكور وطلاب المدارس الإعدادية عن الطلاب في المدارس الثانوية. هناك فرق ذو دلالة احصائية بين الطالبات اللواتي لديهن حب الشباب والطالبات اللواتي لا يعانين من حب الشباب فيما يتعلق بحدوث الحيض وزيادة حب الشباب بضعة أيام قبل الحيض ، وهناك اختلاف ضعيف فيما يتعلق بتناول كميات كبيرة من منتجات الألبان عالية الدسم في النظام الغذائي. كما تبين ان حدوث حب الشباب أعلى بمره ونصف في الطلاب الذين لديهم تاريخ إيجابي من حب الشباب في أسرهم. **الخلاصة:** كان ٥١٪ من الطلاب في سن المراهقة مصابين بحب الشباب ، و الفتيات تتأثر بمعدلات أعلى من الاولاد.