Original Article

Acne Vulgaris: Prevalence, Predictors, and Factors Influencing Quality of Life of Female Medical Students at King Abdulaziz University, Jeddah

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Abstract

Context: Acne vulgaris is the most frequent skin condition that reduces patients' quality of life (QOL). **Aims:** The aim of the study is to determine the prevalence, clinical manifestations, predictors, and factors that influence QOL of female medical students with acne at King Abdulaziz University Hospital (KAUH), Jeddah. **Settings and Design:** A cross-sectional design was conducted at KAUH, Jeddah. **Subjects and Methods:** Four-hundred participants were selected through a stratified random sampling technique during the educational year 2016/2017. Data collection included the "Acne-Specific Quality of Life Questionnaire (Acne-QOL)" and "Hospital Anxiety and Depression Scale (HADS)." Clinical examination was conducted by a female clinician, with grading of acne by the global acne grading system. **Statistical Analysis Used:** Descriptive and inferential statistics were done. Logistic regression analysis was conducted. **Results:** The prevalence of acne among medical students was 58.8%. Combined type of acne was the most common clinical presentation. Predictors of acne were stress ($P < 0.001$), menstrual flaring ($P < 0.001$), and family history of the condition ($P < 0.01$). Females with severe acne had the lowest score (worse QOL) of all QOL domains compared to others ($P < 0.05$). Most of QOL domains were lower among students with psychological problems, anxiety, and depression ($P < 0.5$). **Conclusions:** Acne is prevalent among female medical students. Stress, menstrual flaring, and family history were the predictors. Acne-QOL was influenced by the severity of acne, psychological problems, anxiety, and depression. Screening of acne, with holistic management approach (by dermatologists and psychologists), is recommended.

Keywords: Acne vulgaris, clinical presentation, medical students, prevalence, quality of life

Introduction

Acne vulgaris is an epidemic of chronic, multifactorial inflammatory skin disorder.[1,2] It is the most frequent skin lesion which affects >80% of world's population during some periods of their life[3] and 85% of adolescents in the developed countries.[1] Acne affects 9.4% of the world's population, making it the most prevalent worldwide disease.[4]

There are various factors that contribute to the appearance and severity of acne.[5] Furthermore, acne has an impact on personal body image and can affect the quality of life (QOL).[6,7]

The impact of acne on QOL[2] and the factors which influence QOL of patients with acne is not well characterized in the Gulf countries. Our study was done to determine the prevalence, clinical manifestations, and the predictors of acne vulgaris among female medical students and to identify the factors that influence QOL of participants who had acne at King Abdulaziz University (KAU), Jeddah, Saudi Arabia.

Subjects and Methods

A cross-sectional study was conducted at KAU during the educational year 2016/2017. The study enrolled female medical students who completed the freshman year (2nd–6th year) and

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accepted to participate. A stratified random sample method was used and based on their educational grade.

The sample size was determined by formula of calculation of sample size from the cross-sectional studies.[8] Where "n" is the minimal sample, "z" is a constant (1.96), and "p" was assumed to be 55.5% according to a recent study from Riyadh.[9] Hence, the minimal estimated sample to accomplish a precision of 0.05% at 95% confidence interval (CI) was 380 students, which was exceeded during field work to reach 400 participants, for the stratification purpose.

A data collection form was completed and included:

a. A validated, anonymous, confidential, self-administered questionnaire:
   The face and content validity of the questionnaire was done by panel of experts.[10] The internal consistency reliability of the questionnaire was examined and found to be 0.83 by Cronbach's alpha test.[10] The questionnaire inquired about personal and sociodemographic information. The presence of chronic diseases and psychological problems was determined. Nutritional habits were assessed (intake of milk, chocolate, fruit, and vegetables). The questionnaire asked also about the previous diagnosis of acne by physician(s), and the treatment was taken (if any)
b. Acne-Specific Quality of Life Questionnaire (Acne-QOL): a valid and reliable standardized English version of the questionnaire was used. Acne-QOL consists of 19 questions which categorized into 4 domains. The total score of each of the self-perception, role-emotional, and acne symptoms QOL domains ranged from 0 to 30. While the score of the role-social domain ranged from 0 to 24. The total Acne-QOL score ranged from 0 to 114[11]
c. Hospital anxiety and depression scale: It was used for assessing the presence of anxiety or depression. It consists of 14 items (7 questions to assess anxiety and 7 for depression)[12]
d. Physical examination: physical examination was performed by a female dermatology resident to determine diagnosis and grading of acne. If acne was present, the type(s) was identified, and the severity of acne was graded using the global acne grading system (GAGS).[13]

Statistical analysis

Data were analyzed using SPSS version 21 (IBM SPSS Statistics 20, IBM Corporation, Armonk, NY, USA, 2014). Scoring of the continuous variable of Acne-QOL and each domain was calculated.[11] Classification of anxiety and depression was done based on HADS (three categories). Anxiety and depression were then classified into two categories: having morbid condition (abnormal) or not having (normal and borderline).[12]

Descriptive statistics was performed. Inferential statistics was done with calculation of Chi-squared, odds ratio (OR), and 95% CI. Student's *t*-test and one-way analysis of variance with the least statistical difference were calculated. Pearson's correlation was done to determine associations between different Acne-QOL domains. Multiple linear regression was done to determine acne predictors. $P < 0.05$ was considered statistically significant.

Results

The mean age of the participants was 21.3 ± 1.4 years. Only 155 students (38.8%) were previously diagnosed as having acne by physicians and 134 of them (86.8%) received medical treatment of whom 48.4% received oral treatment; 10.7%, 32.7%, and 5.7% received topical, both oral and topical drugs, or other drugs, respectively. One-third of those who received treatment took over-the-counter drugs.

The prevalence of acne among the participants was 58.8%. Based on the GAGS, 68.1%, 26.0%, and 5.9% of the participants had mild, moderate, and severe degrees, respectively. Mixed types of acne affected the majority (55.3%) of the participants. The most common separate types of acne were whiteheads (15.3%), blackheads (12.6%), papules (6%), cysts (4.2%), and nodules (3.7%). Acne was more common among younger (61.5%) compared to older students (54.8%) but without statistical significant difference ($P > 0.05$) [Table 1]. The rate of acne was higher among students who had family history acne (69.1%) compared to those without such history (43.9%), with a highly statistical significant difference ($\chi^2 = 25.28$, $P < 0.001$). In addition, menstruation and flaring of acne were associated ($P < 0.001$). Females with regular menstrual period had a slightly lower prevalence of acne compared to those with irregular menstruation ($P > 0.05$).

Students who suffered from stress were about 6.5 times more liable to have acne compared to other students (OR = 6.53; 95% CI: 4.08–10.47) [Table 2]. Overweight and obese females had a higher acne prevalence (66.7%) compared to others (56.4%), but the difference was not statistically significant ($P > 0.05$). Students with systemic disease(s) had also a higher prevalence of acne compared to other. However, there is no statistical significant difference ($P > 0.05$). Poor social life was associated with a higher prevalence of acne ($P < 0.05$). Acne was not associated with anxiety and depression ($P > 0.05$). Acne was not associated also with eating chocolate or with eating other foods such as milk or fat.

Regression analysis [Table 3] reveals that stress was the strongest acne predictor (adjusted OR [aOR] = 4.89; 95% CI: 2.98–8.01), followed by menstrual flaring (aOR = 2.42; 95% CI: 1.50–3.89) and family history of acne (aOR = 2.18; 95% CI: 1.38–3.45).

Students with acne reported the highest mean score on the domain of self-perception, followed by role-emotional and finally the acne symptoms. The corresponding means (standard deviation) of the three domains were 22.18 (8.0), 21.77 (7.8), and 21.38 (5.0), respectively.

Age or academic grade of the students who had acne was not related to QOL domains [Table 4]. Similarly, the duration

Table 1: Relationship between acne vulgaris and each of personal, habitual, and familial characteristics of female medical students at King Abdulaziz University

Variable	Acne, *n* (%)		χ^2 (*P*)	OR (CI)
	Yes	No		
Age				
≤21	144 (61.5)	90 (38.5)	1.81 (0.17)	1.32 (0.88-1.97)
>21	91 (54.8)	75 (45.2)		
Academic year				
Basic years	112 (58.3)	80 (41.7)	0.026 (0.78)	0.97 (0.65-1.44)
Clinical years	123 (59.1)	85 (40.9)		
Marital status				
Single	227 (59.0)	158 (41.0)	0.19 (0.66)	1.26 (0.44-3.54)
Ever married	8 (53.3)	7 (46.7)		
Place of residence				
With family	207 (58.0)	146 (42.0)	0.80 (0.33)	0.74 (0.38-1.43)
Dorms	28 (65.1)	15 (34.9)		
Family atmosphere				
Harmonic	202 (59.9)	135 (40.1)	0.25 (0.66)	1.16 (0.65-2.06)
Conflict	31 (56.4)	24 (43.6)		
Menstrual pattern				
Regular	187 (58.4)	133 (41.6)	0.45 (0.52)	0.84 (0.49-1.40)
Irregular	47 (62.7)	28 (37.3)		
Flare-up around menstruation				
Yes	181 (68.3)	84 (31.7)	29.56 (0.0001)	3.23 (2.10-4.97)
No	54 (40.0)	81 (60.0)		
Family history of acne				
Yes	163 (69.1)	73 (30.9)	25.28 (0.000)	2.85 (1.88-4.31)
No	72 (43.9)	92 (56.1)		
Body mass index				
Overweight	62 (66.7)	31 (33.3)	3.13 (0.07)	1.55 (0.95-2.52)
Obese normal	173 (56.4)	134 (43.6)		
Smoker				
Yes	4 (40)	6 (60)	1.59 (0.33)	0.45 (1.24-1.61)
No	231 (59.8)	155 (40.2)		
Chronic disease				
Yes	24 (72.7)	9 (27.3)	2.89 (0.08)	1.97 (0.89-4.16)
No	211 (57.5)	156 (42.5)		
Chocolate				
Do not eat (zero)	20 (64.5)	11 (35.4)	0.46 (0.23)	1.30 (0.60-2.79)
All other frequencies	215 (58.3)	154 (41.7)		

OR: Odds ratio, CI: Confidence interval

of acne did not affect the QOL. Students with easy scarring of their acne had lower scores of QOL domains compared to others. Statistically significant associations were found between easy acne scarring and each of the role-emotional and acne symptoms QOL domains. The impact of acne on different QOL domains was proportional to its severity. Medical students who had mild acne had the highest mean scores in all four QOL domains (better QOL), whereas those with severe acne had worse QOL. This relation was strongest in the role-emotional domain ($F = 10.22$ and $P < 0.001$). The Acne-QOL scores were lower among students with poor social life compared to the others ($P < 0.05$). The role-social domain was the most commonly affected domain by having poor social life, followed by acne symptoms. Anxiety and depression affected most of the QOL domains of the participants who had acne. Highly statistical significant associations were found between presence of morbid depression and each of self-perception, role-social, and role-emotional QOL domains ($P < 0.001$). On the other hand, role-social domain was the most affected QOL domain by the presence of morbid anxiety among females who had acne.

Discussion

The prevalence of acne among female medical students in the present study was 58.8%, which is within the range from previous two Saudi studies[9,14] and with a study done in seven European countries.[15] However, our rate is lower than the prevalence reported from Portugal,[16] Malaysia,[6] and Southern India.[17] This discrepancy may be attributed to differences

Table 2: Relationship between acne vulgaris and each of social and psychological characteristics of female medical students at King Abdulaziz University

Variable	Acne, *n* (%)		χ^2 (*P*)	OR (CI)
	Yes	No		
Poor social life				
Yes	43 (70.5)	18 (29.5)	4.09 (0.04)	1.83 (1.01-3.30)
No	192 (56.6)	147 (43.4)		
High self-esteem				
Yes	128 (56.9)	97 (43.1)	0.74 (0.39)	0.84 (0.56-1.25)
No	107 (61.1)	68 (38.9)		
Psychological problems				
Yes	60 (65.9)	31 (34.1)	2.50 (0.11)	1.48 (0.90-2.41)
No	175 (56.6)	134 (43.4)		
Anxiety				
Morbid	44 (64.7)	24 (35.3)	1.19 (0.27)	1.35 (0.78-2.32)
Normal	191 (57.5)	141 (42.5)		
Depression				
Morbid	30 (68.2)	14 (31.8)	1.81 (0.17)	1.57 (0.81-3.08)
Normal	205 (57.6)	151 (42.4)		
Stress				
Yes	200 (72.2)	77 (27.8)	67.27 (0.0001)	6.534.08-10.47
No	35 (28.5)	88 (71.5)		
Poor body image				
Yes	97 (62.6)	58 (37.4)	1.53 (0.21)	1.30 (0.85-196)
No	138 (56.3)	107 (43.7)		
Insomnia				
Yes	60 (67.4)	29 (32.6)	3.55 (0.06)	1.61 (0.98-2.64)
No	175 (56.3)	136 (43.7)		

OR: Odds ratio, CI: Confidence interval

Table 3: Logistic regression analysis of predictors of acne among female medical students at King Abdulaziz University

Variable	*B*	*P*	aOR	95% CI
Stress	1.587	0.000	4.89	2.98-8.01
Menstrual flaring	0.882	0.000	2.42	1.50-3.89
Family history of acne	0.779	0.001	2.18	1.38-3.45
Constant		−5.735		

CI: Confidence interval, aOR: Adjusted odds ratio

between study populations, samples, time of studies, or due to conduction of physical examination in the current study. The present study revealed that only 38.8% of the females with acne were previously diagnosed by physician(s), which agrees with the results from Riyadh.[9] The most common separate types of acne in our study were white and black heads, which agrees with results from Southern India.[17] Furthermore, about two-thirds of our cases had mild acne, which coincides with a Greece's study.[18]

The current study illustrates significant association between presence of acne and family history of it, which agrees with previous studies.[15,19] 14,18-21Such findings may support the genetic role in acne pathogenesis.[19] Furthermore, 68.3% of the students with acne reported the presence of acne flaring during menstruation, which coincides with results from New York.[20] This finding may be due to the influence of hormonal regulation.[21] The current study revealed that stress was the strongest predictor of acne, which is in line with results from a multicenter case–control study.[22] Because of stress, additional physiological mechanisms may be activated in the body including the immune, endocrine, and nervous systems. The neuroendocrine mechanism is suggested to play a big role in acne.[23,24] Furthermore, experimental studies demonstrated that stressors affect both cutaneous and adaptive immunities.[23]

The current study reported the absence of an association between acne and consumption of chocolate. However, another study indicated that there is a correlation between chocolate consumption and increased acne exacerbation.[25]

Acne affects students' QOL and its impact on the four different domains was proportional to the severity of acne. This finding coincides with the results of Greece,[18] Brazil,[26] and Oman.[2] Another study from Korea found that severe acne leads to emotional and social impairments.[27] On the other hand, Gupta *et al*.,[3] Turkey, reported the absence of such association. This difference may be because Gupta's study did not use a standardized QOL questionnaire.

Results from the present study reported the absence of significant association between age of students with acne

Table 4: Factors affected the quality of life of female medical students with acne at King Abdulaziz University

Variables	QOL domain, mean±SD				
	Self-perception	Role-emotional	Role-social	Acne symptoms	Total
Age					
≤21	22.94±7.46	22.65±7.86	20.40±5.47	21.83±5.9	85.02±24.36
>21	21.89±8.81	21.79±7.76	20.59±5.45	21.26±5.78	83.26±24.9
Student's *t*-test, (*P*)	0.82, 0.41	0.68, 0.49	0.21, 0.84	0.598, 0.55	0.52, 0.66
Academic year					
Basic years	22.16±8.19	21.99±8.1	20.51±5.71	21.33±6.51	83.86±26.26
Clinical years	22.20±7.87	22.1±7.60	20.55±5.28	20.45±5.31	8366±23.81
Student's *t*-test, (*P*)	0.03, 0.9	0.07, 0.94	0.05, 0.96	0.13, 0.89	0.55, 0.95
Place of residence					
With family	22.40±7.75	22.11±7.66	20.65±5.36	21.26±5.62	83.70±24.29
Dormitory	20.48±9.73	21.38±8.81	19.67±6.16	22.62±7.14	84.14±29.17
Student's *t*-test, (*P*)	1.04, 0.29	0.41, 0.68	0.78, 0.44	1.02, 0.31	0.078, 0.95
Acne duration					
<5 years	21.93±7.77	21.65±7.53	20.73±5.33	21.54±5.70	83.06±24.25
>5 years	21.91±8.35	22.24±8.34	20.37±5.84	20.46±5.92	82.71±25.18
Student's *t*-test, (*P*)	0.02, 0.98	0.32, 0.75	0.39, 0.69	1.15, 0.25	0.8, 0.92
Scar easily					
Yes	21.48±8.36	21.03±7.98	20.48±5.46	20.56±5.89	81.23±25.39
No	23.51±7.17	23.88±7.16	20.75±5.42	22.81±5.41	88.33±23.30
Student's *t*-test, (*P*)	1.7, 0.09	2.41, 0.02	0.33, 0.74	2.62, 0.01	1.93, 0.06
Severity of acne					
Mild a	23.04±7.6	23.37±7.0	21.38±4.5	22.46±5.2	82.30±22.4
Moderate b	20.29±8.0	19.98±8.2	19.00±6.6	19.18±6.1	76.06±26.8
Sever c	18.00±9.1	14.54±8.5	17.54±7.5	17.77±7.0	67.85±28.0
ANOVA *F*-test, (*P*)	3.09, (0.02)	10.22, (0.00)	5.41, (0.00)	8.69, (0.00)	6.60, (0.00)
LSD	a statistically different from b and c	b statistically different from c and a statistically differs from b and c	a statistically different from b and c	a statistically different from b and c	a statistically different from b and c
Obesity					
Yes	22.68±6.63	21.68±6.85	21.64±3.09	22.08±5.84	88.08±17.14
No	22.25±8.02	22.22±7.6	20.47±5.5	21.43±5.60	83.82±24.85
Student's *t*-test, (*P*)	0.26, 0.78	0.33, 0.74	1.03, 0.30	0.45, 0.59	0.82, 0.40
Psychological illness					
Yes	19.59±10.14	19.60±9.37	17.96±7.29	20.10±6.80	74.92±31.91
No	23.11±6.96	22.87±7.06	21.50±4.29	21.85±5.40	86.86±2.23
Student's *t*-test, (*P*)	2.70, 0.000	2.51, 0.01	4.07, 0.00	1.82, 0.07	2.98, 0.00
Morbid anxiety					
Yes	19.16±9.70	19.14±9.07	17.89±7.24	19.70±6.82	72.89±31.11
No	22.95±7.41	22.71±7.37	21.23±4.71	21.81±5.50	86.44±22.46
Student's *t*-test, (*P*)	2.62, 0.01	2.47, 0.01	3.44, 0.000	1.99, 0.05	3.07, 0.000
Morbid depression					
Yes	16.68±11.60	17.05±10.62	15.55±8.12	18.86±8.28	68.14±36.02
No	22.23±7.17	22.71±7.14	21.24±4.62	21.73±5.37	85.78±22.47
Student's *t*-test, (*P*)	3.54, 0.00	3.27, 0.000	4.88, 0.00	2.19, 0.03	3.21, 0.000
Poor social life					
Yes	19.86±10.31	19.85±9.50	18.00±7.82	19.60±7.20	75.17±32.16
No	22.74±7.30	22.53±7.31	21.16±4.56	21.7±5.40	58.73±22.53
Student's *t*-test, (*P*)	1.97, 0.05	1.82, 0.07	3.19, 0.00	2.03, 0.04	2.33, 0.02
High self-esteem					
Yes	23.03±7.43	22.62±7.09	21.18±5.20	21.89±5.70	85.85±23.15
No	21.19±8.58	21.32±8,61	19.81±5.65	20/76±5.93	81.15±26.63
Student's *t*-test, (*P*)	1.59, 0.11	1.13, 0.26	1.73, 0.09	1.33, 0.19	1.32, 0.19

LSD: Least statistical difference, ANOVA: Analysis of variance, SD: Standard deviation, QOL: Quality of life

and their QOL, which agrees with results from two Turkish studies.[3,28] Furthermore, we found that Acne-QOL domains were positively associated with anxiety, depression, and psychological problems, which agree also with the Turkish study.[28]

Conclusion

Acne vulgaris prevailed among female medical students from KAU. Most of the cases had a mild form, and the white/black heads were the most common separate types. The predictors of acne were stress, menstrual flaring, and presence of family history. QOL was influenced by the severity of acne, anxiety, depression, and psychological problems. Screening programs and management of acne are recommended. Holistic and interdisciplinary approaches, involving both dermatologists and psychologists, are needed for caring of acne cases.

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Conflicts of interest

There are no conflicts of interest.

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