ORIGINAL ARTICLE

Prevalence and psychosocial impact of acne vulgaris among high school and university students in Sarawak, Malaysia

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ABSTRACT

Background: Acne vulgaris is a common skin condition that affects adolescents and young adults. Its psychosocial impact can be significant. The primary objective of this study was to determine the prevalence of acne vulgaris and its psychosocial impact among high school and university students in Kuching, Sarawak. In addition, the clinical characteristics of acne and its potential predisposing factors were assessed.

Methods: This cross-sectional study was conducted among high school and university students in Kuching, Sarawak. A team of dermatology-trained doctors examined a representative sample of high school and university students aged 16 to 25 years to identify acne vulgaris. The Dermatology Life Quality Index (DLQI) was used to assess the psychosocial impact of acne on affected individuals. The Global Acne Grading System (GAGS) was used to determine the severity of acne. Demographic data and clinical characteristics of acne were recorded.

Results: A total of 582 students aged 16 to 25 years were recruited. The overall prevalence of acne vulgaris was 75.8% (n=441). The prevalence of acne was highest (85.5%) in the age group of 16-18 years. There was a significantly higher tendency for male students to have moderate to severe acne (p=0.010). A significantly higher proportion of female students had impaired quality of life (p<0.001) compared to male students. In comparison to male students, the mean DLQI scores were significantly higher in female students in the domains of 'Work and school' and 'Personal relationship' (p<0.05). There were 41 students who had a very large impact on the quality of life with a DLQI score of 11-20 and 34 (82.9%) of them had mild acne. There was a significantly higher proportion of students who had frequent insomnia in the group of students with acne compared to those without acne (11.6% vs. 4.3%, p=0.011). There was no significant association of acne vulgaris with dietary intakes, such as chocolates, sweets, potato chips, yoghurt, milk, fried chicken, ice cream, nuts and carbonated drinks (p>0.05). Of the 441 students with acne, 247 (56%) had not sought any medical attention.

Conclusion: Acne vulgaris impacts the quality of life similarly to psoriasis, atopic eczema, and chronic urticaria. In mild acne cases, the quality of life may be significantly affected. Therefore, acne education is required in high schools and colleges to ensure that students understand their disease and are aware of available treatments.

INTRODUCTION

Acne vulgaris is common and occurs most frequently in adolescents and young adults. It is characterised by recurrent papules, pustules and nodules on the face, neck and upper trunk. The severity of skin involvement varies from mild involvement to disfiguring, which can negatively impact mood, self-esteem and quality of life. The estimates of acne prevalence vary from 35% to over 90% of adolescents, as reported by Stathakis et al.[1] Collier et al conducted a survey of 1013 participants in Alabama aged 20 years and older, in which 73.3% (n=744) reported ever having acne.[2] Wolkenstein et al., conducted a cross-sectional population-based online survey of 10,521 participants in seven European countries and reported an acne prevalence of 57.8%.[3] Hanisah et al., conducted a study of 409 secondary school students in Muar and reported an acne prevalence of 67.5%.[4] The prevalence of acne among 361 medical students at the Universiti Kebangsaan Malaysia was 68.1%, as reported by Muthupalaniappen et al.[5]

Acne vulgaris can result in significant psychological morbidity. Low self-esteem, anxiety, embarrassment or even depression related to the skin condition or disfiguring scars can have a substantial impact on the social life of the affected individuals.[6]

Sarawak is a state in East Malaysia, with a population of 2.4 million people, comprising 40 ethnic groups. Iban (36%), Chinese (21.7%), Malay (22.3%) and Bidayuh (8%) make up the majority of the population. To date, there is no local study or data on the prevalence of acne in Sarawak.

In this study, our primary objective was to assess the prevalence of acne and its psychosocial impact among high school and university students in Kuching, Sarawak. Secondary objectives included the assessment of the clinical characteristics of acne and its possible predisposing factors.

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MATERIALS AND METHODS

This cross-sectional study was conducted in two secondary schools and two universities in Kuching. The study period was from November 2020 to November 2021. Ethical approval was obtained from the Malaysian Research and Ethics Committee (MREC). Inclusion criteria were students aged 16 to 25 years. The selection of two schools and two universities were based on cluster sampling. The study has two types of clusters which are schools and universities from Kuching. The two schools were selected randomly out of 40 schools and the two universities were selected randomly out of 16 universities/colleges in Kuching. The study sample was selected by a stratified cluster sampling method based on their academic years. Students were selected randomly using simple random sampling for each academic year. The selected students and their parents received an informed consent letter outlining the research. Students were excluded from the study if they or their parents refused consent or if they were absent during the day of the data collection.

The calculation of sample size was performed using the Epi Info Statistical Calculator. The minimum sample size calculated was 334, with an expected frequency of 68%[4,5] and a confidence level of 95%. Data were processed using Microsoft Excel and SPSS statistics software version 17. Numerical variables were described using mean ± standard deviation (SD). Nominal variables were described using frequencies and percentages. The correlation of two nominal variables was analysed using the chi-square test. Statistical significance was taken at a p-value <0.05.

A representative sample of high school and university students aged 16 to 25 years was examined by a team of dermatology-trained doctors to identify acne vulgaris. The diagnosed cases of acne were evaluated using the Dermatology Life Quality Index (DLQI). The students were also assessed clinically for disease severity by the principal investigator or coinvestigators. The severity of acne was graded using the Global Acne Grading System (GAGS).[7] In addition, information on demographic variables, such as gender, age, weight, height and type of acne lesions, and possible predisposing factors were recorded. Students were asked to recall diet history on the intake of milk, carbonated drinks, chocolate, sweets, potato chips, ice cream, fried chicken, yoghurt and nuts in the previous four weeks. The frequency of food intake was defined as 'seldom' (none to once a week) versus 'often' (twice or more per week). The frequency of drinks was defined as 'seldom' (none to 1 glass daily) versus 'often' (2 glasses daily or more). The concept of a diet questionnaire was adopted from Halvorsen et al.,'s study.[8] In addition, students were asked to recall their sleep history in terms of insomnia, duration, and timing of sleep for the past month. Frequent insomnia was defined as two times or more per week.

In 1997, Doshi et al., devised the GAGS.[9] This system divides the face, chest and back into six regions (forehead, each cheek, nose, chin, chest and back) and assigns a factor to each area (1: chin/nose, 2: cheek/forehead, and 3: chest/upper back) on the basis of surface area, distribution and density of pilosebaceous units. Each region is graded with a severity scale of 0 to 4 (0: no lesion, 1: comedones, 2: papule, 3: pustule, and 4: nodule), with the most severe lesion determining the local score. The local score for each region is the product of the severity score multiplied by the area factor. The global score is the sum of all the six local scores, with a minimum score of 0 and a maximum score of 44. The global scores of 1-18, 19-30, 31-38 and >39 are considered mild, moderate, severe and very severe, respectively.

DLQI is a validated questionnaire developed by Finlay et al., in 1994.[10] It contains ten questions that measure symptoms and feelings (questions 1 and 2), daily activities (questions 3 and 4), leisure (questions 5 and 6), work/school (question 7), personal relationships (questions 8 and 9) and treatment (question 10). Each question has four alternative responses: 'not at all', 'a little', 'a lot' or 'very much', with corresponding scores of 0, 1, 2 and 3, respectively. The answer 'not relevant' is scored as '0'. The DLQI score is calculated by summing the scores of each question (0-3), resulting in a maximum of 30 and a minimum of 0. A score of 0-1 signifies no effect on the quality of life, 2–5 signifies small effect on the quality of life, 6-10 signifies moderate effect on the quality of life, 11-20 signifies very large effect on the quality of life and 21-30 signifies extremely large effect on the quality of life.

RESULTS

A total of 582 students aged 16 to 25 years participated in this study. The mean age of the study population was 20.2 years (SD 2.7). There were 199 (34.2%) male and 383 (65.8%) female participants included in this study, giving a male:female ratio of 1:1.9. The demographic and clinical characteristics of the subjects are outlined in Table I. The overall prevalence of acne vulgaris was 75.8% (n=441). Of the 441 students with acne, 151 (34.2%) were males and 290 (65.8%) were females; 51.7% were Chinese, 18.4% Malays, 11% Iban, 7.9% Bidayuh, 4.1% Melanau, 0.9% Indians and 8.2% others (Bajau, Bisaya, Bugis, Dusun, Kadazan, Kenyah, Lun Bawang, Murut, Penan and Runggus). The mean age for students with acne was 19.9 years (SD 2.7). The mean body mass index (BMI) of the study population was 22.5 kg/m^2 (SD 7.9) with the majority of the participants (59.3%) being in the normal BMI category. The mean BMI for students with acne was 22.6 kg/m2 (SD 8.8), whereas the mean BMI for non-acne students was 22.2 kg/m^2 (SD 4.5). There was a significantly higher proportion of students with acne in the age group of 16-18 years than those without acne (37.4% versus 19.9%, p-value 0.001, Table I). The prevalence of acne was highest in the age group of 16-18 years and decreased with increasing age (Table II). On the other hand, there was no significant association between the presence of acne and gender, ethnicity or BMI (p>0.05).

Of those 441 students who had acne, 409 (92.7%) were classified as having mild acne with a GAGS score of 1-18, 30 (6.8%) were classified as having moderate acne with a GAGS score of 19-30 and two (0.5%) were classified as having severe acne with a GAGS score of 31-38. Of the 165 students aged 16-18 years, 152 (92.1%) had mild acne, 13 (7.9%) had moderate acne, and none had severe acne. Of the 180 students aged 19-22 years, 168 (93.3%) had mild acne, 10 (5.6%) had moderate acne and two (1.1%) had severe acne. Of the 96 students in the age group of 23-25 years, 89 (92.7%) had mild acne, 7 (7.3%) had moderate acne and none had severe acne. There was no significant association between the

Table I: Demography and clinical characteristics of study participants

Demography Characteristics		Acne n=441(75.8%)	No Acne n=141(24.2%)	Total	*p*-value
Gender, n (%)	Male	151 (34.2)	48 (34.0)	199 (34.2)	0.966[a]
	Female	290 (65.8)	93 (66.0)	383 (65.8)	
Ethnicity, n (%)	Malay	81 (18.4)	30 (21.3)	111 (19.1)	0.072[b]
	Chinese	228 (51.7)	53 (37.6)	281 (48.3)	
	Indian	4 (0.9)	3 (2.1)	7 (1.2)	
	Iban	47 (11.0)	17 (12.1)	64 (11.0)	
	Bidayuh	30 (7.9)	16 (11.3)	46 (7.9)	
	Melanau	18 (4.1)	7 (5.0)	25 (4.3)	
	Others	33 (8.2)	15 (10.6)	48 (8.2)	
Age (years), mean (SD)		19.9 (2.7)	20.8 (2.6)	20.2 (2.7)	\
Age Group, n (%)	16 to 18	165 (37.4)	28 (19.9)	193 (33.2)	0.001[a]
	19 to 22	180 (40.8)	71 (50.4)	251 (43.1)	
	23 to 25	96 (21.8)	42 (29.8)	138 (23.7)	
BMI, n (%)	Underweight	85 (19.3)	27(19.1)	112 (19.2)	0.914[a]
	Normal	262(59.4)	83 (58.9)	345 (59.3)	
	Overweight	70 (15.9)	25 (17.7)	95 (16.3)	
	Obese	24 (5.4)	6 (4.3)	30 (5.2)	
Acne Severity n (%)	Mild (GAGS 1–18)	409 (92.7)	–	–	
	Moderate (GAGS 19–30)	30 (6.8)	–	–	
	Severe (GAGS 31–38)	2 (0.5)	–	–	
	Very Severe (GAGS >38)	0 (0.0)			
Mean DLQI score (SD)	Mild Acne	4.0 (4.0)	–	–	
	Moderate Acne	7.1 (5.5)	–	–	
	Severe	15.5 (6.4)	–	–	

[a]Chi-square test.
[b]Fisher's exact test.

Table II: Prevalence of acne by age group

	16–18 years N=193	19–22 years N=251	23–25 years N=138	Total N=582
Number with acne	165	180	96	441
Prevalence	85.5%	71.7%	69.6%	75.8%

Table III: Acne impact on the quality of life and acne severity

Acne severity	Acne Impact on the Quality of Life				
	No DLQI 0–1	Small DLQI 2–5	Moderate DLQI 6–10	Very Large DLQI 11–20	Extremely Large DLQI 21–30
Mild, n (%) GAGS 1–18	147 (97.4%)	138 (93.9%)	90 (89.1%)	34 (82.9%)	0 (0.0%)
Moderate, n (%) GAGS 19–30	4 (2.6%)	9 (6.1%)	11 (10.9%)	5 (12.2%)	1 (100%)
Severe, n (%) GAGS 31–38	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (4.9%)	0 (0.0%)
Total	151 (100%)	147 (100%)	101 (100%)	41 (100%)	1 (100%)

Table IV: DLQI score with respect to gender and age group

DLQI Domains	Gender		*p*-value	Age Group			*p*-value
	Male Mean DLQI (SD)	Female Mean DLQI (SD)		16 –18	19–22	23–25	
Symptoms and feelings	2.4 (1.4)	2.4 (1.3)	0.803	2.1(1.2)	2.5 (1.4)	2.7 (1.2)	0.004
Daily activities	0.6 (1.0)	0.8 (1.0)	0.197	0.5 (0.9)	0.9 (1.1)	0.8 (1.1)	0.016
Leisure	0.8 (1.2)	0.9 (1.1)	0.396	0.6 (1.0)	1.0 (1.2)	1.0 (1.2)	0.002
Work and school	0.4 (0.7)	0.6 (0.9)	0.035	0.4 (0.8)	0.5 (0.8)	0.6 (0.9)	0.168
Personal relationship	0.3 (0.8)	0.5 (0.8)	0.049	0.3 (0.6)	0.5 (0.8)	0.5 (0.8)	0.010
Treatment	0.3 (0.7)	0.3 (0.7)	0.796	0.2 (0.6)	0.4 (0.8)	0.3 (0.6)	0.183

Table V: Diet, Sleep, and Acne

	Acne n (%)	No Acne n (%)	p-value
Milk			0.057
Seldom	219 (49.7)	83 (58.9)	
Often	222 (50.3)	58 (41.1)	
Carbonated drinks			0.352
Seldom	314 (71.2)	106 (75.2)	
Often	127 (28.8)	35 (24.8)	
Potato chips			0.169
Seldom	342 (77.6)	117 (83.0)	
Often	99 (22.4)	24 (17.0)	
Ice cream			0.291
Seldom	353(80.0)	107 (75.9)	
often	88(20.0)	34 (24.1)	
Chocolate			0.791
Seldom	364 (82.5)	115 (81.6)	
Often	77 (17.5)	26 (18.4)	
Sweets			0.932
Seldom	277 (62.8)	88 (62.4)	
Often	164 (37.2)	53 (37.6)	
Fried chicken			0.960
Seldom	221 (50.1)	71 (50.4)	
often	220 (49.9)	70 (49.6)	
Yogurt			0.601
Seldom	380 (86.2)	119 (84.4)	
Often	61 (13.8)	22 (15.6)	
Nuts			0.110
Seldom	381 (86.4)	114 (80.9)	
Often	60 (13.6)	27 (19.1)	
Sleep quality			0.884
Sleep less than 6 hours	197 (44.7)	62 (44.0)	
Sleep more than 6–8 hours	244 (55.3)	79 (56.0)	
Slept after 12 midnight			0.002
Yes	203 (46.0)	44 (31.2)	
No	238 (54.0)	97 (68.8)	
Frequent insomnia			0.011
Yes	51 (11.6)	6 (4.3)	
No	390 (88.4)	135 (95.7)	

age group and the severity of acne (p>0.05). Based on the local score of GAGS for each region, the most affected areas were the right and left cheeks with mean local scores of 2.5 (SD 1.7) and 2.4 (SD 1.8), respectively, followed by the forehead 2.0 (SD 1.6), chest/upper back 1.3 (SD 2.4), chin 0.7 (SD 0.9) and nose 0.4 (SD 0.7). Of the 409 students with mild acne, 133 (32.5%) were males and 276 (67.5%) were females. Of the 30 students with moderate acne, 16 (53.3%) were males and 14 (46.7%) were females. Of the two students with severe acne, all (100%) were males. There was a significantly higher tendency for male students to have moderate to severe acne (p=0.010).

In our study, the mean DLQI score for the students with acne overall was 4.3 (SD 4.3). The mean DLQI score was 4.0 (SD 4.0) for those with mild acne, 7.1 (SD 5.5) for those with moderate acne and 15.5 (SD 6.4) for those with severe acne. The correlation coefficient between GAGS and DLQI is significant at 0.322 with a p<0.001. Correlation analysis was conducted using Spearman's correlation test.

Of the 441 students with acne, 290 (65.8%) students had various impairments on the quality of life and 151 (34.2%) students had no impact on the quality of life. A DLQI score of 0-1 was defined as having no impact on the quality of life. The impact of acne on the quality of life was found to be small in 147 (33.3%) students with a DLQI score of 2-5, moderate (DLQI 6-10) in 101 (22.9%) students, very large (DLQI 11-20) in 41 (9.3%) students and extremely large (DLQI 21-30) in one (0.2%) student. The relationship between acne impact on the quality of life and acne severity is outlined in Table III. There was a significant association between the impact on the quality of life and acne severity (p<0.001). Increasing acne severity had a tendency to have a higher impact on the quality of life.

The mean DLQI score was 3.48 (SD 4.4) for male students, and it was 4.7 (SD 4.2) for female students. Of the male students with acne, no impact on the quality of life was found in 70 (46.4%) students, a small impact on the quality of life in 49 (32.5%) students, a moderate impact on the quality of life in 20 (13.2%) students, a very large impact on the quality of life in 11 (7.3%) students and an extremely large impact on the quality of life in 1 (0.7%) student. Of the female students with acne, there was no impact on the quality of life in 81 (27.9%) students, a small impact on the quality of life in 98 (33.8%) students, a moderate impact on the quality of life in 81 (27.9%) students and a very large impact on the quality of life in 30 (10.3%) students. A significantly higher proportion of female students had an impaired quality of life (p<0.001) compared to male students.

The most affected DLQI domain was 'Symptoms and feelings' with a mean DLQI score of 2.4 (SD 1.3), and the least affected DLQI domain was 'Treatment' with a mean DLQI score of 0.3 (SD 0.7). The mean DLQI scores of the domains of 'Daily activities', 'Leisure', 'Work and school' and 'Personal relationship' were 0.7 (SD 1.0), 0.9 (SD 1.2), 0.5 (SD 0.8) and 0.4 (SD 0.8), respectively. In comparison to male students, the mean DLQI scores were significantly higher in female students in the domains of 'Work and school' and 'Personal relationship' ($p<0.05$). However, there was no significant difference between male and female students in the DLQI domains of 'Symptoms and feelings', 'Daily Activities', 'Leisure' and 'Treatment' ($p>0.05$, Table IV). The mean DLQI scores for the age groups of 16-18 years, 19-22 years and 23-25 years were 3.0 (SD 3.5), 5.0 (SD 4.5) and 5.0 (SD 4.6), respectively. The mean DLQI scores were significantly lower in the age group of 16-18 years in the domains of 'Symptoms and feelings,' 'Daily activities,' 'Leisure' and 'Personal relationship' compared to the other age groups, as shown in Table IV ($p<0.05$). On the other hand, there was no significant difference among the age groups in the DLQI domains of 'Work and school' and 'Treatment' ($p>0.05$, Table IV).

There was no significant association of acne vulgaris with dietary intakes, such as chocolates, sweets, potato chips, yoghurt, milk, fried chicken, ice cream, nuts and carbonated drinks ($p>0.05$, Table V). There was a significantly higher proportion of students who had frequent insomnia in the group of students with acne compared to those without acne (11.6% vs. 4.3%, $p=0.011$, Table IV). A significantly high proportion of students who slept after midnight was also noted in the group of students with acne (46% vs. 31.2%, $p=0.002$, Table V). However, no association was found between acne severity, insomnia, duration and timing of sleep ($p>0.05$).

Of the 441 students with acne, 247 (56%) had not sought any medical attention, 165 (37.4%) self-purchased over-the-counter treatment from the pharmacy, 15 (3.4%) received spa treatment from beauticians and 14 (3.2%) received treatment from medical practitioners. Of the 409 students with mild acne, 229 (56%) had not sought any medical attention, 155 (37.9%) self-purchased over-the-counter treatment from the pharmacy, 12 (2.9%) received spa treatment from beauticians and 13 (3.2%) received treatment from medical practitioners. Of the 30 students with moderate acne, 16 (53.3%) had not sought any medical attention, 10 (33.3%) self-purchased over-the-counter treatment from the pharmacy, 3 (10%) received spa treatment from beauticians and 1 (3.3%) received treatment from medical practitioners. Of the two students with severe acne, none had sought any medical attention.

DISCUSSION

Acne vulgaris is a prevalent skin disorder that mostly affects teenagers and young adults. This study confirms that acne is a common skin problem in adolescents and young adults in Kuching, involving 441 students with an overall prevalence of 75.8%. Alajlan et al., reported an acne prevalence of 55.5% among medical students in King Saud University of Saudi Arabia.[11] The prevalence of acne was 34.7% among secondary schools in Egypt, as reported by Tayel et al.[12] In Korea, an acne prevalence of 71.2% was reported among high school students.[13] Comparisons of prevalence rates between studies are complicated by the fact that different studies employ a variety of different methods for grading acne and conducting studies. There are currently around 25 acne grading systems in use. However, there is no gold standard or standardised method that is routinely utilised in clinical practice.[14] For instance, in the study conducted by Muthupalaniappen et al., the definition of acne was a clinical diagnosis by the investigators and the Comprehensive Acne Severity Scale was used to characterise acne severity.[5] On the other hand, in the study done by Alajlan et al., the definition of acne was self-reported acne by the students.[11] Tayel et al., reported both the prevalence of self-reported acne and clinically proven acne in their study (34.7% and 24.4%, respectively), with the GAGS and the Cardiff Acne Disability Index being used to assess the acne severity.[12]

In our study, the prevalence of acne was highest (85.5%) in the age group of 16-18 years and decreased with increasing age. This finding was consistent with the study done by Wolkenstein et al.,[3] which showed the highest acne prevalence of 65.8% for the age group of 15-17 years and decreased with increasing age. Although acne can remain into adulthood, its prevalence tends to peak in adolescence and then decline.[3] The inverse relationship between age and acne in the current study was consistent with this pattern. The results of studies examining the association between acne vulgaris and weight have been mixed, leaving the relationship between these two conditions unclear. Obesity is usually related to peripheral hyperandrogenism, which can result in increased sebum production and the development of severe acne. Tsai et al reported that a higher BMI is a substantial risk factor for the development of acne in school children.[15] In contrast, Snast et al., reported that there was an inverse association between obesity and acne.[16] As the BMI increased, the chance of acne reduced significantly. In our current study, there was no significant association of acne with BMI.

Acne vulgaris has been shown to have a significant emotional impact on individuals. Embarrassment and low self-esteem associated with the appearance of the skin or the presence of a disfiguring acne scar can significantly influence the academic and social life of those who are affected.[17] Acne has been predicted to have psychological consequences comparable to those of other chronic conditions, such as asthma, epilepsy, diabetes or arthritis.[18] In this study, a significant proportion of 290 (65.8%) students with acne had an impaired quality of life. A very large impact on quality of life with a DLQI score of 11-20 was seen in 41 (9.3%) students. On the other hand, an extremely large impact with a DLQI score of 21-30 was seen in one (0.2%) student. In our study, the mean DLQI score for all the acne students was 4.3 (SD 4.3). This was comparable to a study done by Đurović et al.,19 which showed a mean Children's Dermatology Life Quality Index score of 4.3 (SD 5.1) among all acne students, whereas a mean DLQI score of 4.1 (SD 4.5) was reported in Yap's study.[20] The most affected DLQI domain was 'Symptoms

and feelings' with a mean DLQI score of 2.4 (SD 1.3). In comparison with male students, the mean DLQI scores were significantly higher in female students in the domains of 'Work and school' and 'Personal relationship' ($p<0.05$). Furthermore, there was a significantly higher proportion of female students who had an impaired quality of life ($p<0.001$). Female students had a higher total mean DLQI score of 4.7 (SD 4.2), despite the fact that male students had a higher tendency to have moderate to severe acne in our study ($p=0.010$). Males are more likely to suffer from severe acne than females. According to a previous study by Koku Aksu et al, there was a strong correlation between having severe acne and being male.[21]

In our study, females experienced a greater impact on the quality of life than males. The difference in study findings between male and female students suggested that females may experience a more significant psychosocial impact from acne than males, more likely due to females' higher level of cosmetic concern, higher perception of appearance and greater reliance on social relationships.[22] According to Do et al, females were more likely than males to have psychosocial disturbances in terms of self-perceived stress, social connections, peer relationships and self-esteem.[23] Wisuthsarewong et al., reported that females displayed a substantially larger loss of self-confidence and anxiety about physical appearance than males.[24] In addition, several studies have revealed that girls are more vulnerable to the negative psychological impacts of acne than boys.[25,26] However, Hanisah et al., reported that there was no significant difference in acne impact on the quality of life between genders among secondary school students in Muar.[4] This study demonstrated a weak to moderate positive correlation between the scores of DLQI and GAGS (p-value $p<0.001$). This result was consistent with the study done by Tatliparmak et al., which also demonstrated a positive correlation between the scores of GAGS and DLQI.[27] Safizadeh et al., reported that there was a weak to moderate positive correlation between the scores of GAGS and DLQI.[28] However, there was no correlation between the scores of GAGS and DLQI in a study done by Alsulaimani et al.[29] This implies that the severity of acne does not always correlate with the severity of psychosocial impact. Even mild acne can have a substantial emotional impact on patients. In this study, there were 41 students who had a very large impact on the quality of life and 34 (82.9%) of them had mild acne (Table III). This demonstrates the significance of the dermatologist's role in customising medical treatment to each patient's unique requirements in terms of quality of life. The mean DLQI score of 15.5 (SD 6.4) for severe acne is equivalent to those of debilitating dermatological conditions, such as atopic eczema, chronic urticaria, occupational contact dermatitis and psoriasis.[30,31,40] The impact of acne on the quality of life must be considered when treating acne. In our study, the mean DLQI scores were significantly lower in the age group of 16-18, especially in the domains of 'Symptoms and feelings', 'Daily activities', 'Leisure' and 'Personal relationship', in comparison with the other age groups. Students above the age of 18 felt that acne had a greater impact on their life than those below the age of 18. This finding was consistent with that of Wisuthsarewong's.[24]

The role of dietary variables in acne manifestation has been highly disputed. Studies that investigated the effect of various dairy products (including ice cream, yoghurt, cheese and various types of milk) on the appearance of acne yielded disparate results. The majority of research studies indicated that taking cheese, yoghurt, nuts, ice cream, fast food and carbonated drinks had no effect on acne risk. On the other hand, the effect of milk and chocolate/sugar consumption on acne risk was unclear, with contradictory results among trials.[32–35] Sleep deprivation may result in an increase in proinflammatory cytokines, which are often out of balance in acne. Sleep is also critical for poststress and postinflammatory healing. As a result, sleep deprivation could exacerbate skin conditions.[36] It was shown by a research team in France that there was a significant positive relationship between acne and fatigue upon awakening (poor sleep quality). In addition, it was discovered that stressed individuals experienced more fatigue upon waking and were more prone to develop acne.[37,38] Despite the fact that acne causes significant psychological morbidity, many adolescents believe that acne is a skin problem caused by poor cleanliness.[39] Embarrassment, stigma and misunderstandings regarding acne are the most common reasons that discourage adolescents from seeking help. The majority of our students with acne (56%) did not seek any medical attention. This may imply that there was a lack of awareness of acne and its possible treatment to reduce its psychosocial impact.

LIMITATION

The cross-sectional design of this study is its major limitation. The cross-sectional design of the study means that although associations can be identified, causality cannot be demonstrated. A prospective study would be preferable to show a direct causal link between acne, quality of life, and its risk factors. Students who refused to participate or were absent might have been more susceptible teenagers or young adults who were most embarrassed by their skin.

CONCLUSION

Acne vulgaris has a similar effect on the quality of life as psoriasis, atopic eczema and chronic urticaria. There was a weak to moderate correlation between the scores of GAGS and DLQI. A significant impact on the quality of life may be seen in mild-acne cases. Thus, all patients with acne vulgaris must have their quality of life addressed. Acne should be viewed by health care practitioners as a psychologically debilitating condition that requires optimal management. Acne education is necessary in our high schools or universities to ensure that students understand their disease and are aware of potential treatments. The lack of awareness of good treatment options in the management of acne needs to be emphasized. Those with a significant impact on the quality of life due to acne should be made aware of the care available with both primary care practitioners and dermatologists in ensuring successful wholesome management of acne.

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CONFLICT OF INTEREST
There is no conflict of interest.

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Ethical approval for this study was obtained from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia.

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