

A Cross-Sectional Study on the Impact of Acne Vulgaris on the Quality of Life among High School Students in Pasig City, Philippines

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Abstract

Background: Acne vulgaris affects approximately 85% of people between 12 to 24 years of age. Although neither debilitating nor life threatening, it has a significant impact on the social, psychological, and emotional functioning of affected individuals.

Objective: To determine the association of age, gender and acne severity to health-related quality of life (QOL) among Filipino high school students

Methods: A cross sectional study was conducted among students in two high schools, one public and one private. Six regions in the face and trunk were assessed with Global Acne Grading Scale (GAGS) for acne severity. A validated Filipino version of Cardiff Acne Disability Index (CADI) questionnaire was self-administered by students to measure QOL. Logistic regression analysis was performed to determine predictors for QOL impairment. All data were processed using STATA 12.0.

Results: The 216 participants were 14 years old on average, with the two sexes being almost equal in proportions. Median GAGS score was 8 (range, 0-36), while median CADI score was 3 (range, 0-13). Increased age (OR, 1.438; $P = .033$) and grade level (OR, 1.652; $P = .017$) were associated with a more severe acne and greater impairment of QOL.

Conclusions: Among the factors investigated, only age was found to correlate significantly with QOL impairment. GAGS score and gender were not significant predictors. QOL evaluations in the clinics are necessary to better manage acne vulgaris in adolescents.

Keywords: *acne vulgaris, quality of life, adolescence, Global Acne Grading Scale, Cardiff Acne Disability*

INTRODUCTION

Acne vulgaris is a common disorder of the pilosebaceous unit that affects approximately 85% of people between 12 and 24 years of age.¹ Lesions range from mild comedones to severe nodules or cysts, with possible associated scarring, and are found mainly on the face and upper trunk. Although not a life-threatening disease, it can impart significant impact upon an individual's social, psychological, and emotional functioning.²

Acne prevalence peaks during adolescence, a crucial stage in growth marked by accelerated, sometimes turbulent, physical, psychological, and social development. Add this to the "disfigurement" caused when located in exposed areas of the body, acne vulgaris has been related to feelings of embarrassment, reduced self-esteem, low self-assertiveness, poor self-image, and self-consciousness. The negative feelings are only exacerbated by taunting and perceptions of judgment or scrutiny.^{3,4} Some young patients may even be so adversely affected as to develop social inhibition and phobia. Moreover, depression and suicidal ideation were found to be significantly higher among individuals with acne than among those with other dermatological problems, such as alopecia areata and atopic dermatitis, something surpassed only in cases of severe psoriasis.⁵

With its considerable psychosocial impact, recent studies have focused on the assessment of quality of life (QOL) in patients with acne. Some used validated instruments, like general health-related QOL indexes and specific acne-related measures, and were able to demonstrate a significant negative effect of acne on QOL. This was noted to be comparable to when having asthma, epilepsy, or diabetes.⁶ Results, however, regarding the correlation of QOL to age, gender, race, and acne severity have been inconsistent.

In the Philippines, dermatologists, and even lay people, are aware of the psychosocial and emotional effects of acne vulgaris in the teenage population. Yet, this aspect of the disease is seldom noted or managed. There also exists a lack of quantitative

studies among Filipinos that measure the impact of the condition in this age group. As such, we aimed to assess the impact of acne vulgaris on QOL measures among Filipino high school students, with the goal of highlighting its psychosocial effects and, hopefully, improve its current state of management. At the same time, we provide a baseline study for future investigations focusing on acne-related QOL in adolescent students.

REVIEW OF RELATED LITERATURE

Acne tends to exert negative effect on the psychological well-being of individuals, as evidenced by several studies. Uhlenhake *et al.* noted that the prevalence of depression among these persons was three to four times that in the general population.⁷ Depressive symptoms was also shown to have a positive correlation with acne severity of secondary school students, with a higher frequency of suicidal thoughts and attempts when there was perception of a "problem acne."⁸ A study by Uslu and colleagues among high school students showed that there was a direct correlation between the subjective, and not the objective, severity of acne and symptoms of depression and anxiety.⁹ Symptoms of body dysmorphic disorder have been associated with acne patients, with the risk doubled with the requirement of isotretinoin therapy.¹⁰ The level of loneliness and anxiety among those affected was comparable to that seen in serious illnesses such as diabetes, cancer, epilepsy, and cystic fibrosis.¹¹ Effects were also noted to equal that of patients with asthma.⁶

Most of these non-dermatologic effects of acne have been attributed to its prevalence in adolescence, anatomical distribution of lesions, misconception regarding etiology, and peer pressure.⁵ Adolescence being a time of major changes in the physical, emotional, and social dimensions of a person, this stage is susceptible to issues concerning appearance, self-image, and self-esteem. Acne lesions are easily visible if they appear in areas not usually covered by clothing, such as the face, upper trunk, and upper arms. In a survey conducted by Tan *et al.*, people thought that acne develops from poor skin hygiene, which may cause feelings of shame and guilt among patients.¹²

Because of the increasing body of evidence relating acne vulgaris to psychosocial impairment, recent studies have focused on quantifying the impact of acne on quality of life of patients. According to the World Health Organization, QOL is an "individual's perception of their position in the context of culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns."¹³ Measuring the QOL allows the clinician to see the disease in the point of view of the patient. General health measures can be used to compare skin diseases like acne with other disease entities that are not necessarily dermatologic. Dermatology-specific measures, on the other hand, can be used to compare the QOL of patients with different skin diseases. Examples are the Dermatology Life Quality Index (DLQI) and Skindex. Acne-specific measures, to which the Cardiff Acne Disability Index (CADI) belongs, are designed specifically for acne.⁶

Knowledge of the QOL of patients suffering from acne allows a clinician to tailor his management for enhanced patient compliance.⁶ A greater effect on QOL has implications on self-esteem, body image, and relationships with others.¹⁴ The psychological, social, and emotional impact of acne on patients have been demonstrated with the use of different validated QOL instruments. The degree of impact of acne vulgaris varies among different countries, with India having a lower magnitude of impact as compared to others.

The correlation between acne severity and QOL has been studied, yielding varying results. Tasoula *et al.* noted that the impact of acne on the QOL of adolescents in Greece was proportional to its severity.¹⁴ Similarly, Pawin *et al.* observed a significant correlation of perceived severity of acne and relationships with friends, as well as with feelings of anger, sadness, anxiousness, and shame.¹¹ However, in an investigation of university students in Turkey, no correlation was found between acne severity and QOL.¹⁵ It was noted that acne, even of mild severity, can significantly affect psychological status.¹⁶ The disproportionality between QOL and acne severity may also be reflective of some disparity between the viewpoints of patients and clinicians.¹⁷

Variations have been reported on the impact of acne vulgaris on QOL in opposite sexes. In a study on adolescents, acne was seen to have more impact on the QOL of females.¹⁴ In contrast, Walker *et al.* showed no significant difference between QOL mean scores of the two sexes.¹⁸

As to age, studies have shown that older patients tend to be more affected by acne vulgaris than younger patients. In a study by Lasek *et al.*, it was noted that older patients with acne had a lower QOL compared to younger counterparts.¹⁹ The greater effect may be due to the prolonged duration of having acne, poor response to tried treatments, and social implications in the adult population, such as difficulty in getting a job.⁵

OBJECTIVES

General objective

To determine the impact of acne vulgaris to health-related quality of life among Filipino high school students

Specific objectives

1. To measure the acne severity of high school students by Global Acne Grading Scale (GAGS)
2. To assess quality of life of these students using Cardiff Acne Disability Index (CADI)
3. To describe how age and grade level, gender, and acne severity correlate with CADI scores

METHODS

This cross-sectional investigation took place in two co-educational schools situated in Pasig City, Philippines. One was public and another was private, and each had four year levels of high school. Permission to conduct the study was initially sought from the principal of each school, as well as the Schools Division Superintendent of Pasig City.

A standard data collection tool divided into three sections was utilized in data collection. The first part asked about the participant's gender, age, and year level. The second portion consisted of the Global Acne Grading Scale (GAGS). The third part was a validated Filipino version of the Cardiff Acne Disability Index (CADI). The first two portions were filled up by the primary investigator as the examination and interview proper progressed.

Acne severity

For GAGS assessment, six facial and truncal regions were examined and scored, namely: forehead, right cheek, left cheek, nose, chin, and chest and upper back. A subscore was computed for each region by multiplying the region-specific factor (2 for each of forehead, right cheek, and left cheek; 1 for each of nose and chin; and 3 for the chest and upper back) with the area's most severe lesion (1 for comedone, 2 for papule, 3 for pustule, and 4 for nodule). Local scores were added to obtain the global score. A total GAGS score of 1–18 is considered mild, 19–30 is moderate, 31–38 is severe, and > 38 is very severe.

Quality of life

The CADI is a validated five-item questionnaire designed for use in teenagers and young adults.²¹ The answer to every question corresponds to a score (3, 2, 1, 0 for answers a, b, c, and d, respectively). Individual item scores were summated to obtain the CADI score. Any item left unanswered was given a score of zero. If more than one item was left unanswered, the respondent of the questionnaire was dropped from the study. Indices may range from 0 to 15, with a higher score denoting greater QOL impairment. For this study, a score of 1–4 was considered mild impairment, 5–10 was moderate, and 11–15 was severe.

Statistical analysis

Continuous and categorical variables were presented using descriptive statistics: median (range),

mean $\pm$ SD, and count (%). All valid data was included in the analysis and no imputation was required. Ordinal regression analysis was utilized to analyze the association of age and year level, gender, and GAGS score to the quality of life, as assessed by the CADI score, among these students afflicted with acne vulgaris. Data encoding and analysis were performed using STATA 12.0.

Ethical considerations

The study was designed to be consistent with the ethical principles contained within the Declaration of Helsinki and the National Guidelines for Biomedical/Behavioral Research of the National Ethics Committee (NEC) of the Philippines. The Institutional Review Board (IRB) approved the protocol before commencement. No deviation from approved procedure was committed during the study. All participants were given clear and complete instructions about the study's design and goal before eliciting assent. Withdrawal from the study for any reason was allowed at any time. The investigators were available for any questions or clarifications raised. Study participants were not financially remunerated but rewarded with medical attention.

Confidentiality of subjects was maintained. Only the investigators or authorized representatives of regulatory agencies were allowed to have direct access to any of the information in the source documents.

Results

There were 216 high school participants recruited, composed of 53% female and with a group mean ($\pm$ SD) age of 14.5 ± 1.4 years (Table 1). Grades 8 and 10 were slightly less represented than grades 7 and 9. Of the participants, 98.5% had acne. GAGS median score was 8 (range: 0–36), while median CADI score was 3 (range: 0–13).

Table 1 Profile of 216 High School Students with Acne Vulgaris

Age (years)	14.5 ± 1.4
Female	114 (53)
Grade level	
7	56 (26)
8	47 (22)
9	64 (30)
10	49 (23)
Global Acne Grading Severity†	8 (0–36)
Cardiff Acne Disability Index‡	3 (0–13)

Values are given as follows: age as mean ± SD; gender and year levels as count (%); acne scoring instruments as median (range).

†Acne severity based on GAGS: 0, no acne; 1–18, mild; 19–30, moderate; 31–38, severe; > 38, very severe.

‡Quality of life impairment based on CADI: 1–4, mild; 5–10, moderate; 11–15, severe.

Percentages may not add up to 100 due to rounding.

GAGS subscores showed that, of the six facial and truncal regions, the forehead and both cheeks were the most commonly acne affected areas (Table 2).

Table 2 Global Acne Grading Severity Subscores of 216 High School Students with Acne Vulgaris

	Median (Range)
Forehead	2 (0–8)
Right cheek	2 (0–8)
Left cheek	2 (0–8)
Nose	1 (0–4)
Chin	0 (0–4)
Chest and upper back	0 (0–12)

Values are given as median (range).

QOL measurement by CADI revealed 50% of students to have experienced a little aggressiveness, frustration, or embarrassment due to acne (Table 3). Social life and relationships were personally assessed as not affected for 53% and occasionally for 43%. Almost three-fourths (71%) were not into avoiding public changing all the time. Neither depression nor miserable feelings were present in 30%, while more than half (52%) was usually occasionally concerned over their acne. By personal perception, acne was thought to be a minor problem in almost half (47%) and not a problem for about a third (32%) of the patient.

Table 3 Itemized Cardiff Acne Disability Index of High School Students with Acne Vulgaris (N = 216)

	Frequency (%)
Item 1. Nitong nakaraang buwan, ikaw ba ay naging agresibo, inis o napahiya dahil sa pagkakaroon ng pimples/tagyawat? (As a result of having acne, during the last month have you been aggressive, frustrated or embarrassed?)	
(a) Labis-labis (Very much indeed)	3 (1)
(b) Labis (A lot)	11 (5)
(c) Bahagya (A little)	109 (50)
(d) Hindi (Not at all)	93 (43)
Item 2. Sa iyong palagay, nakapigil ba ang pagkakaroon mo ng pimples/tagyawat sa pakikisalamuha mo sa iba, sa pag-attend mo sa mga okasyon/party, o sa pakikitungo mo sa ibang kasarian (opposite sex) sa nakaraang buwan? (Do you think that having acne during the last month interfered with your daily social life, social events or relationships of the opposite sex?)	
(a) Sobra-sobra, lahat ng ginagawa ko ay apektado (Severely, affecting all activities)	6 (3)
(b) Sobra, halos lahat ng ginagawa ko ay apektado (Moderately, in most activities)	3 (1)
(c) Minsan, sa ilang mga gawain lang (Occasionally, or in some activities)	93 (43)
(d) Hindi (Not at all)	114 (53)
Item 3. Sa nakaraang buwan, umiwas ka ba sa pagbibihis sa harap ng ibang kaibigan/kaklase o sa pagsuot ng swimsuit/backless dahil sa iyong pimples/tagyawat? (During the last month have you avoided public changing facilities or wearing swimsuit costumes because of your acne?)	
(a) Palagi (All of the time)	5 (2)
(b) Madalas (Most of the time)	12 (6)
(c) Paminsan-minsan (Occasionally)	45 (21)
(d) Hindi (Not at all)	154 (71)
Item 4. Paano mo mailalarawan ang iyong damdamin/feelings tungkol sa itsura ng balat mo nitong nakaraang buwan? (How would you describe your feelings about the appearance of your skin over the last month?)	
(a) Sobrang malungkot at miserable (Very depressed and miserable)	6 (3)
(b) Madalas na nababahala/nalulungkot (Usually concerned)	32 (15)
(c) Paminsan-minsan nababahala/nalulungkot (Occasionally concerned)	113 (52)
(d) Hindi nababahala/nalulungkot (Not bothered)	65 (30)
Item 5. Sa iyong palagay, gaano kalala ang iyong pimples/tagyawat sa ngayon? (Please indicate how bad you think your acne is now:)	
(a) Pinakamalalang problema (The worst it could possibly be)	11 (5)
(b) Isang malalang problema (A major problem)	35 (16)
(c) Isang magaang na problema (A minor problem)	101 (47)
(d) Hindi problema (Not a problem)	69 (32)

Values are given as count (%).

Medians of the total GAGS scores were all within the category of mild acne (Table 4). They were lowest in grade 7 and highest in grade 10. The ranges also increased when comparing a grade level against the one immediately below it (e.g., grade 8 vs. grade 7). The worst condition recorded in grade 7 was moderate acne (GAGS score of 25), while it was severe acne in grade 10 (GAGS score of 36). For the forehead, cheeks, and nose, median GAGS subscores across all grade levels were 2, 2, 2, and 1, respectively. Noticeable differences, however, were evident in the maximum values registered, which generally tended

to increase with greater seniority. The chin displayed more apparent differences in subscores, with recorded medians of 0 (range, 0–2) and 1 (range, 0–4) for grades 7 and 10, respectively. Overall GAGS subscore for the chest and upper back became nonzero only in the females of grade 10 (median, 3; range, 0–9).

Median CADI scores increased almost consistently with higher year levels. It was interpreted mild (median, 1; range, 0–7) for grade 7 and moderate (median, 5; range, 0–11) for grade 10.

Table 4 Acne Severity and Quality of Life Summarized by Year Level and Gender (N = 216)

	Grade 7		Grade 8		Grade 9		Grade 10	
	Male	Female	Male	Female	Male	Female	Male	Female
GAGS [†]	7 (0–25)	5 (0–21)	7.5 (0–22)	7 (0–19)	11 (0–30)	7 (0–22)	11 (2–30)	12 (2–36)
Forehead	2 (0–6)	2 (0–6)	2 (0–4)	2 (0–6)	2 (0–6)	2 (0–8)	2 (0–8)	2 (0–8)
Right cheek	2 (0–6)	2 (0–4)	2 (0–4)	2 (0–4)	2 (0–8)	2 (0–4)	2 (0–8)	2 (0–8)
Left cheek	2 (0–6)	0 (0–4)	2 (0–6)	2 (0–6)	2 (0–6)	2 (0–8)	2 (0–6)	2 (0–8)
Nose	1 (0–1)	1 (0–2)	1 (0–4)	1 (0–1)	1 (0–4)	1 (0–4)	1 (0–4)	1 (0–4)
Chin	0 (0–1)	0 (0–2)	0.5 (0–2)	0 (0–2)	1 (0–2)	0 (0–3)	1 (0–4)	1 (0–3)
Chest and upper back	0 (0–9)	0 (0–6)	0 (0–6)	0 (0–6)	0 (0–6)	0 (0–6)	0 (0–12)	3 (0–9)
CADI [‡]	1 (0–4)	1 (0–7)	2 (0–6)	4 (0–10)	4 (0–10)	3.5 (0–13)	5 (0–13)	5 (2–11)

Values are given as median (range).

[†]GAGS, Global Acne Grading Scale. Interpreted as: 0, no acne; 1–18, mild; 19–30, moderate; 31–38, severe; > 38, very severe.

[‡]CADI, Cardiff Acne Disability Index. Interpreted as: 1–4, mild; 5–10, moderate; 11–15, severe.

Multiple regression modeling was able to confirm the trends observed. The relative odds of having a worse CADI score was 1.438 if with greater age (95% CI, 1.030–2.007; *P* = .022) and 1.652 if with higher grade level (95% CI, 1.093–2.497; *P* = .017). The odds of greater QOL impairment was increased by 1.687 times in the female gender, but this did not achieve statistical significance (Table 5).

Table 5 Regression Model for Cardiff Acne Disability Index

	Odds Ratio	95% CI	P-value
Age	1.438	1.030–2.007	.033
Female	1.687	0.992–2.868	.053
Year level	1.652	1.093–2.497	.017
GAGS score interpretation			
Mild vs. No acne	1.056	0.274–4.077	.936
Moderate vs. No acne	0.920	0.196–4.302	.915
Severe vs. No acne	3.171	0.048–207.623	.589

Goodness of fit of the ordinal logistic regression model (*r*²) was 11.07%, with *P* < .0001.

CI, confidence interval. GAGS, Global Acne Grading Scale.

DISCUSSION

The CADI is composed of a set of questions pertaining to different QOL facets. This study showed that about 8 to 9 out of 10 students answered choice (c) or (d) for almost all items in CADI, so that, overall, the median CADI score obtained was 3. This corresponds to mild QOL impairment, comparable to findings obtained in similar studies from India and Malaysia.^{22,23}

CADI scores have been found to be significantly associated with age, with the older age group having a higher degree of QOL impairment as compared to the younger age group. This was found to be similar to the results obtained by Jones-Caballero *et al.* where Skindex-29, a QOL questionnaire, was used in 1,878 patients under the care of 252 clinicians in Spain.¹⁷ Such findings may be due to the noted increased severity of acne vulgaris in the older age group (Table 4), similar to findings in Malaysia.²³ In a study conducted by Ismail and Mohammed-Ali (2012) in Erbil City, they found that older patients, age group 21-25 years, had QOL impairments ranging from moderate to severe.²⁶ This age-related difference may be due to acne vulgaris being more prevalent during adolescence, leading to better social acceptance of their condition. It was also reported that negative feelings towards acne vulgaris accumulate from the self and the community as a person ages.²⁶

Reports have been made of increased psychological impairment with greater acne severity,^{6,14} but other studies found no correlation.^{14,15,24,25} Our results also indicated no association, although median GAGS and CADI scores increased with higher grade levels. It should be noted, however, that in this study, students across grade levels generally had only mild acne severity that may have positively affected their CADI scores (Table 1). The lack of correlation, however, shows that mild acne could have just as much an effect on adolescents' psychology as severe acne.¹⁶ Also, the goodness of the fit of the model only came up to 11.07%, indicating that there other factors, internal or external, likely at play in the QOL of acne patients.

In this study, QOL impairment was more associated with the female population, though the difference between genders was not statistically significant. This may be from women generally having

more concern over their appearances than men.²⁶ However, the lack of significant difference might also be reflecting how males are now becoming more aware of their skin condition.²³ The inverse phenomenon was highlighted in a study conducted in Egypt, wherein males were found to have more impairment in QOL than females.²⁷

One of the limitations of this study was that it examined the impact of acne vulgaris on the QOL of Filipino high school students at a single point in time. This limitation may be overcome in future studies by using a prospective study design. Also, increasing the scope of the study will be able to uncover more fully the dynamics involved between acne and QOL of teenagers.

CONCLUSION

Acne vulgaris was shown to impart a mild QOL impairment among Filipino high school students, with older students being significantly more affected than their younger counterparts. Gender marginally exceeded significant correlation with QOL, perhaps pointing to an increased awareness in males of their skin condition. GAGS score was likewise not a significant predictor for QOL impairment, indicating that mildly afflicted individuals may be affected as much as those with more severe conditions.

Our results demonstrate the importance of QOL evaluation in managing adolescent patients with acne; severity alone may not be enough to adequately assess the impact of acne on an adolescent. In addition, it is recommended that future studies on acne vulgaris, especially interventional ones, should include quality of life measures as part of the parameters.

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