

## Original Research Article

# Quality of life of adolescents with facial acne vulgaris before and after treatment in Ibadan, Nigeria

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**Received:** 23 November 2018

**Revised:** 27 December 2018

**Accepted:** 28 December 2018

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### ABSTRACT

**Background:** Adolescent facial acne vulgaris impairs their quality of life (QOL). This impairment of QOL in has been documented to improve with treatment. In Nigerian adolescents who have facial acne vulgaris, it is not known if QOL improves with treatment. The aim was to assess QOL improvement with in adolescents who have facial acne vulgaris. To identify the socio-demographic, CADI QOL items and clinical characteristics related to this QOL improvement.

**Methods:** This was a cross-sectional comparative study. One hundred and nine adolescents aged 15-20 years clinically examined for facial acne vulgaris. Quality of life before and after 6 weeks of treatment with 10% benzoyl peroxide was assessed using the Cardiff acne disability index. Data was analyzed using SPSS 16. The differences in quality of life scores were tested using non-parametric tests. Level of significance of all tests was  $p < 0.05$ .

**Results:** Post-treatment, the median CADI score improved to 2 from a pre-interventional score of 4,  $p < 0.001$ . Improvement was observed in all the components of the CADI especially with the question, "how bad do you think your acne is now" with a percentage reduction from 81.4% to 54.6% and this improvement was in more males with improvement from 92% to 65%. Also, post-treatment, moderate to severe clinical severity of acne improved from 49.1% to 10.3%,  $p < 0.001$ .

**Conclusions:** Treatment of adolescent facial acne leads to improvement of QOL especially in the perception of facial skin appearance and the severity of acne.

**Keywords:** Adolescent, QOL, Acne vulgaris, Nigeria, Treatment

### INTRODUCTION

Acne vulgaris is common in adolescents with documented evidence of impairment of quality of life.<sup>1,2</sup> Various modalities of treatment of acne vulgaris, topical and systemic have been well documented.<sup>3</sup> The topical agents include benzoyl peroxide.<sup>3-5</sup>

A few studies on the influence of treatment of acne vulgaris on QOL have also been documented.<sup>6,7-10</sup> These

studies show improvement in QOL with treatment and it is postulated that QOL improvement can enhance treatment adherence. Most of these studies however, were conducted on adults and not on adolescents.

In Nigeria so far, there is paucity of data on QOL in adolescent acne.<sup>11,12</sup> Also, there is no data on the influence of treatment on QOL in the adolescents in our locality.

This study was therefore, carried out to fill this gap in the knowledge of the QOL of adolescents with facial acne vulgaris before and after treatment.

The aim of this study was to compare QOL before and after treatment in adolescent facial acne vulgaris. Also, to determine the socio-demographic, CADI QOL items and clinical characteristics related to this QOL improvement.

## METHODS

This was a comparative study carried out in four co-educational secondary schools in Ibadan North Local Government Area (LGA) of Oyo State, two private and two public schools. A total of one hundred and nine students attending the four schools aged 15-20 years were studied.

Permission to carry out the study was sought and obtained from the Ministry of Education of Oyo State. Permission was also obtained from the various school heads. Study was explained to the subjects and their parents via a letter and an informed consent was obtained from the parents. Ethical approval was given by the research and ethics committee of the University College Hospital Ibadan before the study was undertaken.

A comparative study was carried out over a 6 weeks period (February to March 2011), in which 109 students who had facial acne and had parental consent were given topical 10% benzoyl peroxide (BPO) to apply on the face morning and evening after washing their face. They were also notified of the possible side effects of BPO (dry skin, peppery sensation, bleaching of hair and clothes). Benzoyl peroxide (10%) was chosen for this study because of its availability, efficacy, ease of use, and cost. They were also told that, they were free to withdraw from the study at any point in time and to stop the treatment if any of them found the side effects unbearable.

### *Inclusion criteria*

Inclusion criteria were adolescents aged 15-20 years; adolescents who were willing to make use of the treatment; adolescents who had parental consent.

### *Exclusion criteria*

Exclusion criteria were adolescents who did not have acne; adolescents who were already having treatment for acne; adolescents who did not have parental consent.

The quality of life of the adolescents was assessed at baseline and six weeks after the topical acne treatment using the Cardiff acne disability index (CADI).

The CADI, a well validated questionnaire is a disease specific instrument for acne, derived from the acne disability index (ADI) developed in 1989 by Motley and Finlay and it is designed for use in teenagers and young

adults with acne.<sup>7,8,13</sup> The CADI is made up of five questions with four responses. The five questions relate to feeling of aggression, frustration, interference with social life, avoidance of public changing facilities and appearance of the skin (all over the last month) and an indication of how bad the acne is now. Scores range from 0-3 per question with total scores of 0-15. High scores infer poor QOL and low scores little or no impairment of QOL.<sup>14</sup> Walker et al stratified the CADI as follows; CADI scores of <4 is interpreted as mild, scores of 5-9 as moderate and scores of 10-15 as severe impairment of QOL.<sup>14</sup>

Permission was obtained from Finlay, Basra and Lewis-Jones, the developers of the questionnaires to make use of the CADI.

Clinical evaluation was done, lesions were counted on the face at baseline and at 6 weeks. The type of lesion; open or closed comedones, pustules and severity of acne vulgaris were noted. In this study, acne severity was graded using the combined acne severity scale (CASS) which was developed in 2007 by Tan et al.<sup>15</sup>

Data was analysed using SPSS version 16.<sup>16</sup> Univariate descriptive statistics such as means, medians, frequencies and proportions are presented. Associations between categorical variables were tested using the chi-square test while differences in means of groups were tested using the t-test and analysis of variance. Associations between quantitative variables were tested using Spearman's correlation coefficient due to non-normal distribution.

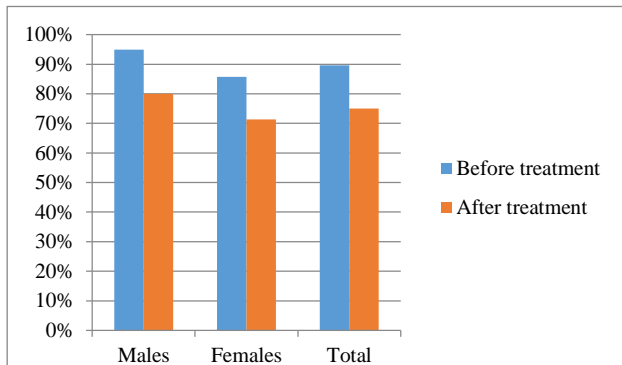
The differences in quality of life scores were tested using non-parametric tests because the variables were not normally distributed. When the two groups were compared (pre and post treatment), the Mann Whitney U test was used while Kruskal Wallis test was used for more than two categories. Logistic regression analysis was used to identify predictors of acne and severity of acne, odds ratio and 95% confidence intervals were reported. The "Enter" variable selection method was used which enters all variables in a block in a single step. Level of significance of all tests was  $p < 0.05$ .

## RESULTS

One hundred and nine (109) adolescents were recruited into the study but only 96 completed it giving a completion ration of 88%. Study population was made up of 40 (41.6%) males and 56 (58.3%) females.

Before treatment, 89.6% of the adolescents had an impaired QOL and this decreased to 75% of adolescents' post- treatment. Pre-treatment, 34% of the students had moderate to severe QOL impairment. This percentage reduced to 19.6% after treatment, which was statistically significant. Also, pre-treatment, 66% of the students had mild QOL impairment which improved to 80.4% post-treatment. Figure 1 shows a gender based quality of life

score distribution before and after- treatment. Pre-treatment, 95% of males and 85.7% of females had impairment in their quality of life. This decreased to 80.0% for males and 71.4% for females after treatment.



**Figure 1: Histogram of impairment of QOL before and after treatment.**

**Table 1: Change in clinical severity of acne pre and post treatment.**

Variable	Male	Female	Total
<b>Pre-intervention severity</b>			
Mild	14 (35)	21 (37.5)	35 (36.5)
Moderate	22 (55)	34 (60.7)	56 (58.3)
Severe	4 (10)	1 (1.8)	5 (5.2)
<b>Post-intervention severity</b>			
Mild	28 (70.0)	37 (66.1)	65 (67.7)
Moderate	12 (30.0)	19 (33.9)	31 (32.3)
Severe	0 (0.0)	0 (0.0)	0 (0.0)

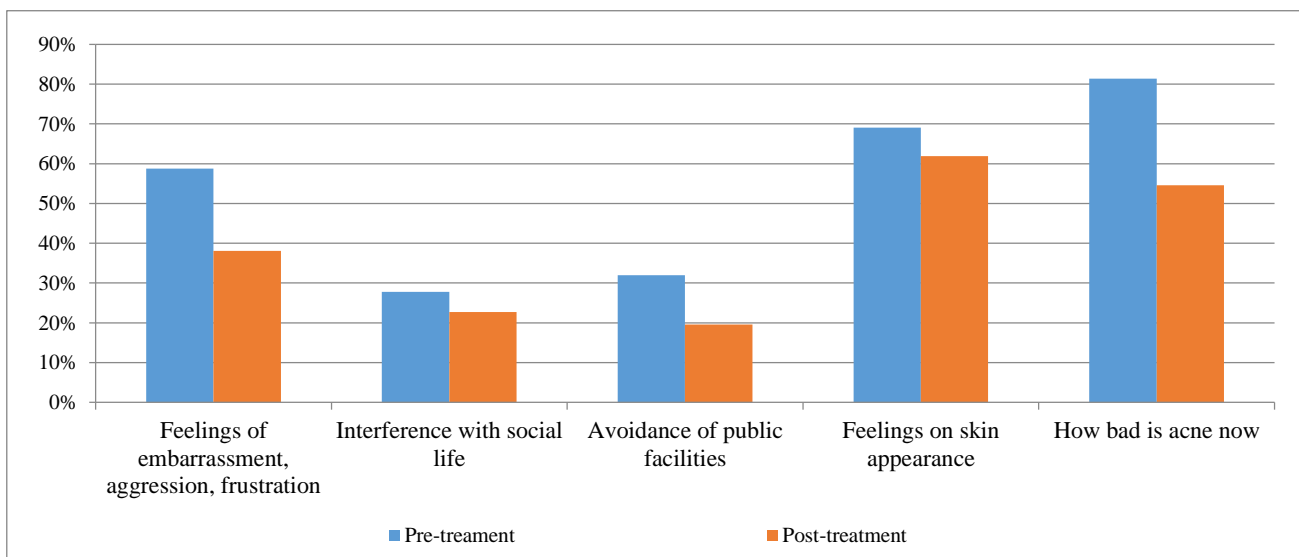
Change in the clinical severity pre- treatment and post-treatment is shown in Table 1. Overall, mild acne increased from 36.5% pre-treatment to 67.7% post-treatment. Among males, clinically mild acne increased from 35% pre-intervention to 70% post-treatment. Change among females was similar (Table 1).

Post treatment, there was a significant change in the severity of acne with  $p < 0.001$ . Moderate/severe acne decreased from 50.9% pre- treatment to 10.3% post-treatment and mild acne percentage increased from 49.1% pre- treatment to 89.7% post- treatment.

There was a change in the median quality of life, from 4.00 (4.00) pre- treatment to 2.00 (3.75) post- treatment. This change was significant at  $p < 0.001$ .

Post treatment, there was improvement on all items on the CADI scale especially on the item of “how bad acne is now” which decreased from 81.4% pre-intervention to 54.6% post-intervention which was significant (Figure 2).

Among males a decrease in impairment in all items of the Cardiff scale was observed. Feelings of aggression, frustration and embarrassment decreased from 75.6% pre-treatment to 48.8% post- treatment. Interference with social life decreased from 36.6% pre- treatment to 34.1% post- treatment. Avoidance of public facilities decreased from 31.7% to 22.0%. Impairment in skin appearance decreased from 78.0% pre-treatment to 56.1% post-treatment. Responses to feelings on how of bad acne is now decreased from 92.7% pre- treatment to 65.9% post-treatment.



**Figure 2: Histogram of pre-treatment and post-treatment response to the items on the CADI.**

For females, feelings of aggression, frustration, and embarrassment decreased from 46.4% pre-treatment to

30.4% post-treatment. A change from 21.4% pre- to 14.3% post-treatment was observed for interference with

social life. Avoidance of public facilities decreased from 32.1% before treatment to 17.9% after treatment. Feelings on how bad the skin appearance is increased from 62.5% pre-treatment to 66.1% post-treatment. On how bad the adolescents thought their acne was, percentage reduction was from 81.4% pre-treatment to 54.6% post-treatment. Rating of the severity of the acne lesion decreased from 73.2% pre-treatment to 46.4% post-treatment.

## DISCUSSION

This study is a community based study of QOL before and after treatment of adolescents who have facial acne vulgaris. To the knowledge of the authors, this is the first of such a study in Nigeria. Acne vulgaris is well documented to have negative effects on QOL.<sup>1,2,11,14,17</sup> Studies on QOL affectation by acne vulgaris in adolescents are few and there is no documented influence of treatment on this QOL in Nigeria.

One hundred and nine were recruited into this study. However, only 96 of the adolescents completed the study. This study population was considered adequate since other studies on QOL and treatment of acne by Kaymak et al and Kobayashi et al had a population of 78 and 79 respectively.<sup>18,6</sup>

Pre-treatment median CADI score was 4 and this reduced to 2 which was statistically significant following treatment showing an improvement in QOL. This study demonstrates a significant reduction in CADI following treatment for acne. This reduction in CADI shows that the facial lesions of acne vulgaris can influence an adolescent's QOL and that treatment leads to improvement in QOL. Although studies on QOL improvement in adolescent acne are few, the few studies done show as in this study, an improvement in QOL following treatment in adolescents despite using various QOL scales.<sup>6-10</sup> This shows that treatment of acne is important in adolescents despite most of them having mild acne.<sup>11,19</sup>

Post-treatment, there was a statistical improvement in QOL with a marked improvement in QOL in those, whose QOL was moderately to severely affected by presence of facial acne vulgaris. Also, there was a marked increase post-treatment in the number of students with mild QOL impairment. This study validates the need for treatment of adolescent acne vulgaris. There was no gender difference in the improvement in QOL following treatment, showing that gender has nothing to do with QOL improvement with treatment. Gollnick et al and Zarea et al following treatment of acne vulgaris also have demonstrated the need for treatment of acne vulgaris, as their study also led to QOL improvement.<sup>7,8</sup>

Post-treatment, improvement was observed in all the components of the CADI with the highest level of improvement being in the assessment of "how bad the

students thought their acne was now". Zarea et al and Gollnick et al in their studies also reported an improvement in all variables of the CADI following treatment of adolescent acne.<sup>7,8</sup> Improvement in level of embarrassment, "how bad the students thought their acne was now" and perception of appearance of skin was more in males. Perception of appearance of skin although more improved in males was overall not much. This slight improvement in skin appearance may have been due to the post-inflammatory pigmentation from acne despite a reduced lesion count. Gollnick et al also found an improvement in the perception skin appearance in their study which was quite marked unlike in this study where improvement in appearance was not marked.<sup>7</sup> The Gollnick study was in Caucasian adolescents whose skin does not show post-inflammatory hyperpigmentation as strikingly as in dark skinned adolescents. On the scale of interference with social life, there was a slight improvement with no marked gender difference in improvement. Avoidance of public facilities by adolescents had a moderate improvement with more improvement in females.

The improvement in components of CADI used in the assessment of QOL in this study, demonstrates the importance of assessment of QOL in adolescents, so their individual needs can be addressed. Also this study revealed gender related improvement in the specific items of the CADI. Males had more improvement on the items concerning embarrassment, perception of skin appearance and how bad acne is now. Females had more improvement on the item of avoidance of public facilities. The reason for this gender difference in improvement in specific items of QOL despite no significant difference in overall QOL affectation by facial acne is not known.

It is hypothesized that this difference in improvement may be due to the fact that, specific determinants of QOL differ between individuals and between the genders. From this study we can see that adolescents are concerned about how severe their acne is. Addressing this and other concerns will improve their QOL. Also, that, there is gender variation in specific QOL affectation and it's improvement with treatment.

There was a significant improvement in clinical severity of acne vulgaris and this correlated with consequent improvement in QOL. This improvement in lesion severity was irrespective of gender and demonstrated in the three classes of acne severity. This improvement in severity of acne demonstrates the importance of treatment of all grades of severity of acne including mild acne. Improvement in lesion severity following treatment with a consequent improvement in QOL as in this study, has been demonstrated in other studies.<sup>7-9,14</sup>

In conclusion, this study has shown that, treatment of facial acne leads to improvement of QOL with improvement in all components of QOL assessed especially on the component of how the adolescents

thought their acne was now irrespective of the severity of the acne. Also, treatment of acne leads to a reduction in severity of acne. Acne should be treated in adolescents irrespective of the severity of the acne.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the institutional ethics committee*

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**Cite this article as:** Anaba EL, Adebola OO. Quality of life of adolescents with facial acne vulgaris before and after treatment in Ibadan, Nigeria. *Int J Res Dermatol* 2019;5:155-9.