



Dermatology Life Quality Index (DLQI) Score in Acne Vulgaris after *Epigallocatechin-3-Gallate* (EGCG) 3% as an Adjuvant of Tretinoin 0,025% Cream

Farah Meriana Fajrin¹, Irmadita Citrashanty¹ , Muhammad Yulianto Listiawan¹,
Rahmadewi¹, Budi Utomo, Dwi Murtiastutik¹ , Cita Rosita Sigit Prakoeswa¹ 

¹Department of Dermatology and Venereology, Faculty of Medicine, Universitas Airlangga/Dr. Soetomo General Academic Hospital, Surabaya - Indonesia

²Department of Public Health and Preventive Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya - Indonesia

ABSTRACT

Background: Acne vulgaris (AV) often occurs at the age of puberty, most people with AV feel ashamed of their appearance. It has been believed that green tea contains high level antioxidant, such as *Epigallocatechin-3-gallate* (EGCG). **Purpose:** This study is to compare quality of life from the patient of acne vulgaris before and after using 3% *Epigallocatechin-3-Gallate* (EGCG) cream as adjuvant therapy of 0,025% tretinoin cream with 0,025% tretinoin cream alone in the treatment of AV. **Methods:** This study is a quasi-experimental study with a pre-test and post-test design, and a control group design aiming to know the difference in quality of life of 46 samples after administration of EGCG cream combined with tretinoin cream compared to the group that was given tretinoin cream alone in patients with AV for 12 weeks, and then evaluate patients satisfaction and change in quality of life after treatment using the Dermatology Life Quality Index (DLQI). **Result:** Statistical analysis found that there was a significant difference (p-value <0.05) in the quality-of-life value of research subjects in the treatment group when compared between the initial arrival to week 12 with a p-value of 0.000. Distribution of DLQI values in research subjects who were given 3% EGCG cream therapy as adjuvant therapy with 0.025% tretinoin cream. **Conclusion:** Both groups showed an improvement in the DLQI value with the interpretation of the DLQI value at week 12 being both 100%, but the treatment groups DLQI decline faster than the control groups.

Keywords: acne vulgaris, EGCG, tretinoin, DLQI, human and health.

Correspondence: Muhammad Yulianto Listiawan, Department of Dermatology and Venereology Faculty of Medicine, Universitas Airlangga / Dr. Soetomo General Academic Teaching Hospital, Surabaya, Jl. Mayjen Prof. Dr. Moestopo No. 6-8 Surabaya 60131, Indonesia. Phone +6289642715814. E-mail: yuliantowawan@yahoo.com.

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BACKGROUND

Acne vulgaris (AV) is a disease that often occurs at the age of puberty and is also common in the community. AV can be the first sign of puberty and can occur one year before the first menstruation in girls. The highest age who often experiences this disease is the age range of 14-19 years.¹⁻³ In a study that was conducted by Collier CN et al. in the UK in 2007 stated that AV was found in 42.5% of men and 50.9% of women in their twenties. AV is a chronic inflammatory disease, so some people who suffer from it often feel ashamed of their appearance. It can cause socialization disorders, anger, depression, and low self-confidence,

especially in groups of people who have low socioeconomic status due to long-term treatment.^{4,5} The Dermatology Life Quality Index (DLQI) questionnaire is a tool to measure how skin problems affect quality of life. According to the WHO, a person's quality of life can be measured in 6 aspects, namely physical health, psychological health, freedom of activity, social relations, environment, and spirituality. The factors that affect the quality of life are gender, age, education level, occupation, relationships with other people, and reference standards that are used to compare the quality of life with other people.^{6,7}

Tretinoin is the mainstay therapy in AV eradication because of its high effectiveness, but it comes with a few side effects if the dose is increased. In the past years, AV treatment using EGCG has been increasing, but not much research has been done to test the effectiveness of EGCG, or any research using EGCG with mainstay therapy like tretinoin. Green tea is believed to have high levels of antioxidants, one of which is Epigallocatechin-3-gallate (EGCG). EGCG is the main polyphenol in green tea extract and has anti-carcinogenic, anti-inflammatory, and anti-proliferative properties. In the skin, EGCG has been studied to have potential as an antioxidant, immunopotent, and anticarcinogenic to chemicals and ultraviolet radiation.⁸⁻¹⁰

METHODS

This study is a quasi-experimental study with a pre-test and post-test design and a control group design with the aim of knowing the difference in therapeutic results after administration of EGCG cream with tretinoin cream in 46 patients with AV for 12 weeks at the outpatient clinic Medical Cosmetology Dr. Soetomo General Academic Hospital Surabaya. A paired comparison formula was used to count the total sample. The inclusion criteria all new patients that come to the outpatient clinic in the age range of 15–35 years old with a chief complaint of acne vulgaris that has never been treated before, or if the patient has been treated before, they have already stopped the treatment for at least 1 month. We measure the severity score using Lehman; all patients were mild AV; all the patients should be able to communicate well for the

evaluation; all patients willing to be evaluated and monitored; interviewed; and also sign the inform consent form and informed for consent to be in this research. The exclusion criteria are that the patients is allergic to any of the creams that were given, pregnant, or suffers from Systemic Lupus Erythematosus (SLE)/ Cutaneous Lupus Erythematosus (CLE). The samples were divided into two groups; the first group of 23 patients were treated with tretinoin 0.25% cream (control groups), and the second group of 23 patients were treated with EGCG 3% cream in the morning and tretinoin 0.25% in the night (treatment group). All the samples on both groups were told to fill out the DLQI test.^{11,12}

RESULT

Demographic data and clinical characteristics of research subjects are presented in the form of descriptive statistics, namely frequency and percent for nominal and ordinal data types, average \pm standard deviation for normal and median distributed numerical data and a range of values for non-normally distributed numerical data. In this study, there were 34 female patients (73.9%) and 12 male patients (26.1%). The femal-to-male ratio was 2.83:1. The subjects of this study were AV patients aged 15 to 35 years, so the age grouping in this study was based on WHO criteria, namely early adolescence (12-16 years), late adolescence (age 18 -25 years) and early adulthood (26-35 years). The mean age of the patients was 23 ± 4.95 years. The youngest patient was 16 years old, and the oldest was 35 years old. The highest age group is in the late teens (17-25 years) which is 30 people (65.2%).

Table 1. Age and gender characteristic of the study

Category	Groups	Frequency (%)			Total (%)	<i>p-value</i>
		Tretinoin 0,025% (n=23)	EGCG 3% Tretinoin 0,025% (n=23)	+		
Gender	Man	(21,7)	(30,4)		12 (26,1)	0.502
	Woman	18 (78,3)	16 (69,6)		34 (73,9)	
Age	Early teen (12 – 16 tahun)	1 (33,3)	(66,7)		(6,5)	0.069
	Late teen (17 – 25 tahun)	10 (33,3)	20 (66,7)		30 (65,2)	
	Early adult (26 – 35 tahun)	9 (69,2)	4 (30,8)		13 (28,3)	

*EGCG: *Epigallocatechin-3-Gallate*

At the beginning of arrival, the interpretation of the highest DLQI values in the control group was that it had a major effect on the quality of life, while at week 12 after administration of 0.025% tretinoin cream therapy, the interpretation of the highest DLQI values had a small effect on the quality of life. Statistical analysis was carried out to assess the improvement in quality of life, and it was found that the quality of life of the subjects in the control group compared between the early arrival and the 12th week with a p value of 0.000, which means that there was a significant difference (p value <0.05).

Table 2. Quality of life assessment from first visit, 4th week, 8th week, until 12th week after given tretinoin 0,025% cream

DLQI Interpretation (score)	Total (%) (n=23)			
	First visit	4 th week	8 th week	12 th week
No impact (0-1)	0 (0)	0 (0)	0 (0)	0 (0)
Small impact (2-5)	0 (0)	0 (0)	8 (34,7)	23 (100)
Moderate impact (6-10)	7 (30,4)	13 (56,6)	15 (65,3)	0 (0)
Big impact (11-20)	16 (69,6)	10 (43,4)	0 (0)	0 (0)
Very big impact (21-30)	0 (0)	0 (0)	0 (0)	0 (0)

*DLQI: Dermatology Life Quality Index

At the beginning of arrival, the interpretation of the highest DLQI value in the treatment group was that it had a major effect on quality of life, while at week 12 after administration of 3% EGCG cream as an adjuvant therapy of 0.025% tretinoin cream, the interpretation of the highest DLQI value was that it had a small impact on quality of life. Statistical analysis was carried out to assess the improvement in quality of life, and it was found that there was a significant difference (p value <0.05) in the quality of life of research subjects in the treatment group when compared between the initial arrival and week 12, with a p value of 0.000. Distribution of DLQI values in research subjects who were given 3% EGCG cream therapy as adjuvant therapy with 0.025% tretinoin cream.

Table 3. Quality of life assessment from first visit 4th week, 8th week, until 12th week after given EGCG cream 3% as an adjuvant of tretinoin cream 0,025%.

DLQI Interpretation (score)	Total (%) (n=23)			
	First visit	4 th week	8 th week	12 th week
No impact (0-1)	0 (0)	0 (0)	0 (0)	0 (0)
Small impact (2-5)	0 (0)	0 (0)	5 (21,7)	23 (100)
Moderate impact (6-10)	4 (17,3)	19 (82,4)	18 (78,3)	0 (0)
Big impact (11-20)	19 (82,4)	4 (17,3)	0 (0)	0 (0)
Very big impact (21-30)	0 (0)	0 (0)	0 (0)	0 (0)

*DLQI: Dermatology Life Quality Index
*EGCG: Epigallocatechin-3-gallate

DISCUSSION

Acne vulgaris (AV) is one of the most common skin diseases in adolescents, which causes a decrease in patient confidence. Low self-confidence can affect the quality of life of AV patients.¹³ In this study, quality of life assessment was carried out on study subjects at the time of first admission and when control patients at 4, 8 and 12 weeks after administration of 3% EGCG cream therapy as adjuvant 0.025% tretinoin cream therapy in mild AV patients. At the beginning of the study, 82,4% of the patients feels that AV has a big impact in their life, so the result of interpretation of the DLQI value in the treatment group was that it had a major effect on the quality of life, while at weeks 4 there was an improvement in the quality of life with a significant difference 82,4% change to moderate impact from 17,3% it means that the therapy that was given gave a lot of change that improve the AV. At the 8th week of the treatment DLQI that show AV has a big impact to the patient change to 0%, because all the patient has improved their quality of life that was parallel with the improvement of their AV lesion. At week 12, all study subjects had a DLQI interpretation that had little effect on quality of life this has a similar result from the study that was conducted by Chernyshov et al that the DLQI result getting better when the lesion improves.^{14,15}

However, there is a study conducted by Shen et al (2021) which examined the effect of tea consumption on anthropometric parameters, metabolic index and hormone levels of women with polycystic

ovary syndrome. In this meta-analysis, although there is insufficient evidence that tea has a beneficial effect on female reproductive hormones, some findings provide evidence for further exploration.¹⁶⁻¹⁸ Data in an RCT study showed that DLQI values were significantly reduced in the spearmint tea group after the intervention. Thus, it can be seen that tea has a potential effect in lowering androgen levels in patients with PCOS.^{12,19} It is known that the increase in dihydrotestosterone (DHT), also participates in the activity of the bacteria *P. acnes*.^{18,20} DHT is influenced by androgen stimuli such as increased testosterone, this together with increased activity of *P. acne* will increase the differentiation and proliferation of sebocyte cells (SEB-1) so that the sebum formed will also increase, this has an effect on *P. acne*, namely facilitating *P. acne* to colonize and facilitate inflammation in the local area. The hyperkeratotic process causes obstruction of the follicular ostium and ends up becoming microcomedo, if *C. acnes* binds to TLR2 it will cause inflammation.^{16,21,22}

The analysis was carried out by comparing the number of research subjects included in the DLQI assessment category with no effect (score 0-1), small effect (score 2-5), moderate effect (score 6-10), large effect (score 11-20) and the effect was very large (score 21-30) between the two groups. The results of the comparative analysis of the number of research subjects in the DLQI assessment category found that there were no significant differences between the control group and the treatment group.²³ From the result of this research the patient has a good improvement using EGCG it decrease the pustule faster than the groups that only use tretinoin. In this study if we evaluate the patients satisfactory and the improvement in quality of life both groups gave an improvement in the DLQI value with the interpretation of the DLQI value at week 12 being both 100% changed to a small effect that means the AV is no longer disturbing the activity of the patient, the patient confident is higher, and AV no longer a shameful burden in the patient's life. This is consistent with the results of a recent study which stated that treatment to reduce the number and size of acne vulgaris lesions could improve their quality of life by Matsuoka et al. showed that the use of skin care and cosmetics for female patients with acne can affect the patient's quality of life effectively.^{24,25} The study about EGCG as and adjuvant and compared with tretinoin was never conducted before, so the researcher has minimal literature in this study.

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