Psychosocial impact of acne and postinflammatory hyperpigmentation*

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Abstract: Background: Acne is one of the most common skin diseases. It has significant effect on self-image and negative impact on quality of life. Postinflammatory hyperpigmentation is an acquired hypermelanosis that occurs after a skin injury or cutaneous inflammation. It is common sequelae in acne patients.
Objectives: This study aimed to investigate the psychosocial impact of acne and postinflammatory hyperpigmentation among patients treated in a dermatology outpatient clinic at the University of Miami Hospital.
Methods: The study had the participation of 50 patients with acne and postinflammatory hyperpigmentation. All participants volunteered to complete an anonymous questionnaire containing socio-demographical information, questions about patient's attitudes toward postinflammatory hyperpigmentation caused by acne, the Cardiff Acne Disability Index and the Dermatology Life Quality Index.
Results: Postinflammatory hyperpigmentation was more predominant in the face. Makeup was frequently used to conceal the imperfections and the majority of patients felt embarrassed due to their condition. Interestingly, the majority of our patients did not have their quality of life impacted for acne and postinflammatory hyperpigmentation.
Study limitations: A limitation of the study was the relatively small sample size. For this reason, the findings of the study should not be generalized to the broader community.
Conclusion: The current medical literature has many studies analyzing the psychological impact of acne. This study is the first study in the literature that analyzed the psychosocial impact of acne and postinflammatory hyperpigmentation caused by acne.
Keywords: Acne vulgaris; Safety; Treatment outcome

INTRODUCTION

Acne is one of the most common skin diseases, affecting around 80% of world population.[1] It is a chronic inflammatory disorder of the skin that affects mostly teenagers leading to psychical and emotional scars.[2] Adult female acne is also another topic of discussion since its prevalence is increasing in the past years.[3] This condition affects mostly women and is more inflammatory than the adolescent acne.[4] Acne has significant effect on self-image and negative impact on quality of life. The occurrence of anxiety and depression is common in these patients. The psychological effects of this disease are similar to asthma and epilepsy.[5] Postinflammatory hyperpigmentation is an acquired hypermelanosis that occurs after a skin lesion or cutaneous inflammation. It is common sequelae in acne patients and is also called "acne hyperpigmented macule". This condition can affect all skin types, but are more common in skin-of-color patients.[6,7] Studies performed in US found this condition in 65.3% of blacks, 52.7% of Hispanics, and 47.4% of Asians.[8] The psychosocial impact of this disorder was never studied before. This study analyzes the psychosocial impact of acne and postinflammatory hyperpigmentation in a group of fifty patients treated at the University of Miami Hospital and Clinics.

METHODS

Fifty patients with acne and postinflammatory hyperpigmentation caused by acne who attended a Dermatology outpatient clinic at the University of Miami Hospital (from December 2012 to July 2013) volunteered to completed an anonymous questionnaire. The questionnaire contained four parts:

i) Sociodemographic characteristics of participants in the survey;

ii) Attitudes toward post inflammatory hyperpigmentation caused by acne (Chart 1);

iii) The Cardiff Acne Disability Index (CADI); [9]

iv) Dermatology Life Quality Index (DLQI).[10]

The sociodemographic questionnaire collected data on the demographic characteristics of the patients: gender, ethnicity, education, and age.

The Part II of the survey consisted on questions formulated by the researchers regarding the patient's attitudes toward postinflammatory hyperpigmentation caused by acne.

The Cardiff Acne Disability Index (CADI) is a short 5-item questionnaire (Question 17 to Question 21 in this survey) derived from the longer Acne Disability Index (Motley and Finlay, 1989).

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Chart 1: Questions about patient's attitudes toward postinflammatory hyperpigmentation

What bothers you more?

- ❍ The acne lesions (papules, pustules)
- ❍ The spots and/or stains caused by acne
- ❍ Not applicable (my skin condition does not bother me at all)

I have spots/stains in my: (check all that applies for you)

- ❍ Face
- ❍ Back
- ❍ Chest
- ❍ Other- Please specify: _____

Do you use make up to cover your spots/stains?

- ❍ Yes, everyday.
- ❍ Sometimes
- ❍ No, never

For the following 7 statements, participants were asked to select one categorical answer: Strongly Disagree, Disagree, Neutral/ Indifferent, Agree, and Strongly Agree

My spots and/or stains make me feel embarrassed:

I would like to receive psychological support to deal with my spots/stains:

Because of my spots and/or stains I have/had problems in my sexual life:

I believe that spots/ stains are permanent:

The use of sunscreen prevents the occurrence of spots/stains:

I style my hair in a different manner to cover my acne spots/ stains:

I tried to use over- the-counter skin bleaching products to improve my spots/stains:

The Cardiff Acne Disability Index is designed for use in teenagers and young adults with acne. The CADI score is calculated by summing the score of each question resulting in a possible maximum of 15 and a minimum of 0. Higher scores indicate more severely affected quality of life. Quality of life according to the CADI scores were categorized into two groups: low scores (<8) and high scores (8+).

The Dermatology Life Quality Index (DLQI) questionnaire is designed for use in adults, i.e. patients over the age of 16. It is self-explanatory and can be simply handed to the patient who is asked to fill it without the need for detailed explanation. The DLQI is calculated by summing the score of each question resulting in a maximum of 30 and a minimum of 0. The higher the score, the more quality of life is impaired. The DLQI can also be expressed as a percentage of the maximum possible score of 30.

Fisher's exact test of independence was performed in this study. The null hypothesis was that the relative proportions of patients' response to the question were independent of the demographics variable.

To support reasoning of the statistical hypothesis testing and therefore the rejection or the acceptance of a hypothesis, any p-value ≤ 0.05 (which implies a p-value less than alpha set as α = 0.05 cut off) shows "statistical significance".

Data analysis

The program used to perform statistical analysis was IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.

In this article, Fisher's exact test was used to determine the significance of the association (contingency) between two nominal variables. A data set used in this test is often called an "R×C table," where R is the number of rows and C is the number of columns. This test is valid for all sample sizes, although in practice it is used with relatively small samples.

In Fisher's exact test, the null hypothesis is that the relative proportions of one variable are independent of the other variable. The null hypothesis is rejected if p-value is less than some threshold (e.g. 0.05).

RESULTS

Socio-demographical characteristics of participants in the survey

The patient group (50) consisted of 38 women (76%) and 12 men (24%). The youngest participant was 18 years old, whereas the oldest one was 44 years. Mean age (SD) was 26.02 (6.996). The majority of the group had at least a college degree (74%) and 26% had been to graduate school. The analysis of the ethnicity of the group showed that the sample was composed by 44% (22) of Hispanic whites, 32% (16) whites, 10% (5) Asian pacific islanders, 4% (2) multi-racial, 2% (1) Hispanic black and 2% (1) considered the ethnicity as "other".

Attitudes toward postinflammatory hyperpigmentation caused by acne

Among the 40 participants (since 10 did not answer this question), 29 (58%) of them thought the acne lesions (papules, pustules) bothers them more, 11 (22%) of them thought the spots and/or stains caused by acne bothers them more. Regarding the location of spots or stains, 21 (42%) had spots or stains on the face, followed by 7 (14%) with spots or stains in the face and back, 6 (12%) in the face back and chest and 4 (8%) on the face and chest. Other less frequent locations and percentages are presented in table 1. Regarding the use of make up to cover spots and stains, 46% uses everyday, 24% uses occasionally and 28% never uses make up. It is interesting to note that 88% of women (30 of 34) use some kind of makeup to cover the spots, either sporadic or routinely, while 82% of men (9 of 11) never wear makeup to cover the spots. This demonstrates, with significance level P-value <0.001, that gender influences the use of makeup, and women tend to use makeup in these cases more often than men. The majority of the group (54%) feels embarrassed with the spots/stains. The response to this question does not have statistically significant dependence on the gender (Fisher's test statistics4.087, P-value = 0.383).

When asked if they would like to receive psychological support, 42% strongly disagreed and 24% disagreed. Regarding the problems in sexual life due the existence of spots/stains only 2 % strongly agree, 10% agree, 18% marked neutral/indifferent, and the majority disagrees or strongly disagrees (32% and 38%, respective-

ly). The same percentage 32% disagrees and agrees that the spots are permanent. Among the participants 36% and 14% respectively agrees and strongly agrees that the use of sunscreen prevents the occurrence of spots and stains, the same percentage 22% are neutral/ indifferent and disagrees and only 6% disagrees. The majority of participants do not style the hair different to cover the spots or stains. When asked regarding the use of over the counter skin bleaching products to improve the spots/stains, the majority answered that they don't have this habit.

The Cardiff Acne Disability Index (CADI)

The Cardiff Acne Disability Index for this group of patients had a measure that range from 0 to 14. The median and mode were 4, suggesting that for most of the patients the quality of life was not severely impaired. The mean relation score was 5.02 (Table 2).

Quality of life according to the CADI scores were categorized into two groups: low scores (<8) and high scores (8+). Most (78%) of the patients' quality of life was not severely affected by acne, while for 22% of them the quality of life was severely affected (Table 3).

Dermatology Life Quality Index (DLQI)

The Dermatology Life Quality Index (DLQI) had measure ranges from 0 to 27. The median was 4, suggesting that for half of the patients there was no effect or small effect on patient's life. The mean relation score is 5.98 (Table 2).

Dermatology Life Quality Index (DLQI) categorized showed that for 12% of patient's, there was no effect at all on their life, for 50% of patient's, there was small effect on their life, for 18% of patient's, there was moderate effect on their life, for 18% of patient's, there was very large effect on their life, and for 2% of patient's, there was extremely large effect on their life (Table 4).

The Fisher's Exact Test was performed to check the significant association between the two categorized scales and not surprisingly, CADI (categorized) has statistically significant dependence on the DLQI (categorized) at a level of significance of 0.05 (Fisher's test statistics26.865, P-value<0.001), which demonstrated good correlation between these two scales.

Table 1: Location of the spots/stains

	Frequency	Percent
Face	21	42.0
Face and Back	7	14.0
Face back and chest	6	12.0
Face back chest and everywhere	1	2.0
Face back chest and shoulders	1	2.0
Face back and arms/shoulders	1	2.0
Face Back and Buh	1	2.0
Face and chest	4	8.0
Face chest and thighs/buttocks	1	2.0
Face and Hip	1	2.0
Face and Jawline	1	2.0
Back	3	6.0
Back and chest	1	2.0
Missing	1	2.0
Total	**50**	**100.0**

Source: IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.

Table 2: The Cardiff Acne Disability Index and Dermatology Life Quality Index results

	Sample Size	Mean	Median	Std. Deviation	Minimum	Maximum
CADI	50	5.02	4.00	3.347	0	14
DLQI	50	5.98	4.00	5.612	0	27

Source: IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.

DISCUSSION

More than 75% of the patients that participated of this study were women. This result is similar to other studies that found a prevalence of acne in female patients.[11,12] Acne is not more common in women but they are more aware about their appearance than men, and they seek for medical care more frequently.

Acne and postinflammatory hyperpigmentation were more prevalent in Hispanic white and white patients. These findings are

Table 3: The Cardiff Acne Disability Index categorized

CADI (categorized)		Frequency	Percent	Valid Percent
Not severely affected quality of life	affected	39	78.0	78.0
Severely affected quality of life	affected	11	22.0	22.0
Total		**50**	**100.0**	**100.0**

Source: IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.

Table 4: Dermatology Life Quality Index Categorized results

Categorized DLQI	Frequency	Percent	Valid Percent	Cumulative Percent
no effect at all on patient's life	6	12.0	12.0	12.0
small effect on patient's life	25	50.0	50.0	62.0
moderate effect on patient's life	9	18.0	18.0	80.0
very large effect on patient's life	9	18.0	18.0	98.0
extremely large effect on patient's life	1	2.0	2.0	100.0
Total	**50**	**100.0**	**100.0**	

Source: IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.

different from the ones published in the British Journal of Dermatology showing a prevalence of acne in African American and Hispanic patients. [13] Black individuals are more prone to postinflammatory hyperpigmentation.[14] In our study there was just a small percentage of patients with black skin type seeking for medical treatment for acne and postinflammatory hyperpigmentation.

Most patients feel embarrassed with the spots and stains. There are no other studies analyzing embarrassment in patients with postinflammatory hyperpigmentation. However, patients with other skin condition that causes hyperpigmentation, such as melasma, commonly experience embarrassment. [15,16]

Use of make up to cover the spots and stains was frequent among female patients. Cosmetic camouflage has been widely described in literature as a good method to improve patient's quality of life, especially those with pigmentary disorders, such as postinflammatory hyperpigmentation. [17-20]

Thirty-six percent of patients were styling the hair in a different manner to cover the spots and stains. This is a strategy that some people find to cope with acne and postinflammatory hyperpigmentation. Tanghetti *et al.* found that 19.2% of female patients style their hair differently to hide the acne lesions. [21]

Only 40% of patients agreed and strongly agreed that the use of sunscreen prevent spots and stains caused by acne and 28% of the patients used over-the-counter bleaching creams to treat their postinflammatory hyperpigmentation. There are many over-the-counter products used to treat dermatological conditions. [22] In some countries, products containing hydroquinone are available over the counter and they can have adverse events if not used correctly and followed by a physician.

Psychological help was considered unnecessary by the majority of patients. But 10% would like to receive psychological help to deal with their condition. This finding only emphasizes the idea that dermatologists should have a basic training to screen the patients that would need an extra psychological follow up. Many patients would refuse psychological help due the stigma that therapy carries. In the past fifteen years, mental health professionals have initiated a number of national and international efforts against the stigma of psychological treatment and any type of mental diseases.[23] Dermatologists should encourage emotionally affected patients to seek help from a mental health specialist. [24]

Poor quality of life in acne patients has been well documented in the literature. Studies have described levels of social and emotional problems in acne patients comparable to patients with severe chronic disabling diseases, such as epilepsy, arthritis, and psoriasis. [25,26] Interestingly, the majority of our patients did not have their quality of life impacted for acne and postinflammatory hyperpigmentation. The CADI index also showed that for the majority of patients (78%) the quality of life was not severely affected by acne, while for 22% of them, the quality of life was severely affected. The cross-validation of the CLDQI and CADI demonstrated a good correlation. A limitation of the study was the relatively small sample size. For this reason, the findings of the study should not be generalized to the broader community.

CONCLUSION

The psychosocial of impact postinflammatory hyperpigmentation following acne lesions was never properly studied before. Although the majority of patients present lesions on the face and experience embarrassment, the quality of life was not severely impacted and they would not like to receive any psychological support to deal with their condition.

This study was only an initial step in describing the quality of life and psychological impact of these two conditions combined. Future research on psychological impact of acne and postinflammatory hyperpigmentation should focus on characterizing and understanding the group of patients that are experiencing more psychological impact and that need further help from the dermatologist. ❑

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