Research Article

Knowledge, Beliefs, and Psychosocial Effect of Acne Vulgaris among Saudi Acne Patients

Magdy A. Darwish1 and Ahmed A. Al-Rubaya2

1 Department of Family and Community Medicine, College of Medicine, University of Dammam, P.O. Box 2114, Dammam 31451, Saudi Arabia
2 Postgraduate Center of Family and Community Medicine, Directorate of Health Affairs, Ministry of Health, Eastern Province, Saudi Arabia

Correspondence should be addressed to Magdy A. Darwish; magdar9123@yahoo.com

Received 6 August 2013; Accepted 9 October 2013

Academic Editors: T. J. Ryan and A. Zalewska

Copyright © 2013 M. A. Darwish and A. A. Al-Rubaya. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Objective. This study was conducted to assess the knowledge, beliefs, and psychosocial effect of acne vulgaris among acne patients attending referral dermatology clinic in Al-Khobar city. Material and Methods. A cross-sectional study was conducted on all Saudi acne patients (males and females) attending referral dermatology clinic in Al-Khobar Governmental Hospital. The data were collected by using a structured self-administered questionnaire. Results. Like other studies conducted before, we found that 58.33% of our sample have poor knowledge about factors that affect acne vulgaris with a significant correlation with both age and gender ($P = 0.012$ and $P = 0.031$, resp.). There was significant association of reporting affected social activities with age and educational level ($P = 0.023$ and $P = 0.013$, resp.). Variation between both genders regarding reporting feeling stressed due to acne was significant ($P = 0.001$). The majority of our sample sought medical advice after one year. The most commonly used treatment for acne vulgaris before seeking medical help was peeling products. The majority of our patients thought that acne needs not treatment by physicians. Doctors’ treatment is considered guaranteed and safe by the vast majority of our patients. Conclusion. This study showed that knowledge about acne is still insufficient among acne patients.

1. Introduction

Acne vulgaris is an extremely common disorder. Prevalence of acne varies among different populations in different studies from 50% [1, 2] to 80% [3–5]. There is general recognition that there are many factors in the etiology of acne vulgaris [6]. Causes could be attributed to both genetic and environmental factors. There is familial predisposition of severe forms of acne that support a genetic component. Acne usually occurs around puberty but it may start late in the thirties and forties (in adulthood) [5, 7, 8]. It takes several years before spontaneous remission [5]. Prognosis of the disease is usually good but, as a chronic disease, relapses even during treatment could occur. It can remit spontaneously [9].

Few studies are interested in exploring knowledge and experiences of acne patients towards acne [10]. In a study that was conducted by Brajac et al. (2004) they found that “Acne was considered as a trivial and transitory condition by 52% of the acne patients and 44% of the family physicians” [11]. Students had misconceptions regarding the causes of acne [2]. Not only the knowledge about acne causes that is lacked, but also natural course and therapy were very low, and it has been found among patients of all ages, physicians, and nurses as well [12]. Individuals have various beliefs and perceptions about what causes acne vulgaris and how it could be managed [3–5, 13]. Despite the high prevalence of acne, there is too much wrong beliefs and deficiencies in the knowledge about it [14]. Some patients think it is a normal phase in the development into adulthood. Others believe that it resolves spontaneously once the affected person gets in early adulthood.

Treatment of acne is usually postponed that patients may wait more than one year before seeking medical advice [15]. Acne is a disorder in which adherence has a major impact on
treatment outcome [15]. Improvement of current knowledge and understanding of the different presentations of acne allow for individualization, tailoring treatment, and improved outcomes for acne patients [16].

Psychological and social consequences of acne vulgaris are considerable although it is not causing severe morbidity or physical disability [2, 17–20]. Acne often leads to significant psychological and physical morbidity [21, 22]. More than a cosmetic nuisance, acne can produce anxiety, depression, and other psychological problems that affect patients' lives in ways comparable to life-threatening or disabling diseases [23]. Given the fact that acne causes psychological suffering, acne can affect social, vocational, and academic performance of teenagers [24]. Severe acne may lead to scarring and disfigurement, aggravating the already present psychosocial aspects of this condition [25]. Suicidal ideation was found to be around 6-7% in acne patients [3, 26, 27]. Some studies have shown that there are gender differences in the effect of psychological trauma on acne patients [28, 29]. Psychological comorbidities in acne are probably greater than generally assumed. Therefore, emotional problems due to acne should be taken seriously and included in the treatment plan [23].

This cross-sectional study was conducted to assess knowledge, beliefs, and psychosocial effects of acne among acne vulgaris patients attending dermatology referral clinics, Al-Khobar Governmental Hospital, Al-Khobar, Saudi Arabia.

2. Material and Methods

A cross-sectional study was conducted to assess knowledge, beliefs, and psychosocial effects of acne among acne vulgaris patients attending Al-Khobar Governmental Hospital, Dermatology Referral Clinics, Eastern Province, Saudi Arabia. All acne patients (males and females) attending Al-Khobar Governmental Referral Dermatology Clinic during the period from November 2012 to the end of December 2012 were involved. Data were collected using structured, self-administered questionnaire which was designed after reviewing the recent literature and similar questionnaires and based on the objectives of the study putting in consideration sociocultural backgrounds. The questionnaire was divided into two parts. The first part includes sociodemographic data like age, gender, and marital status. The second part includes questions to assess: (1) knowledge and beliefs about causes and aggravating factors, (2) knowledge and beliefs about treatment, and (3) the perceived psychological effects of acne. Questionnaire was validated and modified in the light of pilot study. The questionnaire was reviewed by 2 faculty, one of whom has Saudi Arabian slang; revised questionnaires were compared and necessary modifications were made before finally approved by the reviewers. The questionnaire was then reviewed by researchers again, one of whom has Saudi Arabian slang before and after pilot study with minor linguistic modifications of some confusing words. The participants were approached in their clinics (male and female dermatology clinics). The questionnaires were distributed and explained to them after obtaining their verbal consent. Questionnaires were collected after being completed. A pilot study was conducted on 38 patients—different from the target group—to check the understanding and clarity of the questionnaire. Based on the results, some linguistic modifications of questions were made to avoid confusion about questions and make easier understanding and interpretation by participants. The data were entered and analyzed in a personal computer using statistical package for social sciences (SPSS) software version 16. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and mean and standard deviation (SD) for quantitative variables. Chi-square test was used as appropriate to determine association. The level of statistical significance was set to be less than 0.05. The study was approved by the Ethical Committee of Postgraduate Saudi Board Program, Eastern Province. Verbal consent was obtained from the participants after explaining the objectives of the study to them. All questionnaires were anonymous, and collected data were kept confidential and not used except for the study purpose.

3. Results

In this study, 200 questionnaires were distributed, 180 acne patient completed the questionnaire, and 20 patients were excluded (18 patients of them did not complete the questionnaire and 2 were non-Saudi). Males accounted for 40% of the sample and females were 60%.

Table 1 illustrates sociodemographic characteristics of study population while Table 2 showed assessment of knowledge and believes about causes and aggravating factors among acne patients/study populations. Factors affecting total knowledge score about causes and aggravating factors of acne among study sample are illustrated in Table 3 while Table 4 shows perceived stress due to acne in study population according to their gender. Self-reported social effects of acne among study group are summarized in Table 5.

4. Discussion

4.1. Knowledge, Beliefs, and Misconceptions about Causes and Aggravating Factors. Thirty-two percent of our patients believed that acne is inherited or having genetic factors. These results were better than other studies; for example, in Poli et al. study, 25.2% perceived acne to be inherited from parents [30] while it was 18% of Tallab study sample [8]. Food items in general were considered as causes and/or aggravating factors of acne. Fatty food, chocolate, potato chips and spicy food were considered a cause of acne in 53.9%, 79.4%, 53.9%, and 29.4% of the sample, respectively. In Poli et al. study fatty food, chocolate, and snacks were thought to exacerbate acne by 62% and 45% of their sample, respectively [30]. In Al-Hoqail study 79% of acne patients sample believed that acne is related to diet [7].

Tension was believed to be related to acne by 65.6% of our patients. Almost the same result was found in Tallab study (65% of his sample) [8]. In Al-Hoqail study and Amado et al. study 80% and 71% of acne patients, respectively, believed that acne is related to stress [7, 31]. Cosmetic products were
Table 1: Sociodemographic characteristics of study population.

| Variable                | Frequency (total sample number = 180) | No. | %    |
|-------------------------|---------------------------------------|-----|------|
| Age                     |                                       |     |      |
| ≤ 14 years old males    |                                       | 4   | 2.2% |
| ≤ 14 years old females  |                                       | 15  | 8.4% |
| 14–21 years old males   |                                       | 52  | 28.9%|
| 14–21 years old females |                                       | 60  | 33.3%|
| > 21 years old males    |                                       | 24  | 13.3%|
| > 21 years old females  |                                       | 25  | 13.9%|
| Gender                  |                                       |     |      |
| Males                   |                                       | 72  | 40%  |
| Females                 |                                       | 108 | 60%  |
| Marital status          |                                       |     |      |
| Single                  |                                       | 150 | 83.3%|
| Married                 |                                       | 28  | 15.5%|
| Divorced                |                                       | 1   | 0.6% |
| Widow (er)              |                                       | 1   | 0.6% |
| Education               |                                       |     |      |
| Illiterate              |                                       | 5   | 2.8% |
| Primary school          |                                       | 2   | 1.1% |
| Intermediate school     |                                       | 29  | 16.1%|
| Secondary school        |                                       | 95  | 52.8%|
| Bachelor or more        |                                       | 49  | 27.2%|
| Occupation              |                                       |     |      |
| Student                 |                                       | 101 | 56.1%|
| Governmental job        |                                       | 15  | 8.3% |
| Nongovernmental         |                                       | 20  | 11.1%|
| Housewife               |                                       | 16  | 8.9% |
| Jobless                 |                                       | 28  | 15.6%|
| Income                  |                                       |     |      |
| < 5000 Saudi Riyals     |                                       | 54  | 30%  |
| 5000–10000 Saudi Riyals |                                       | 82  | 45.6%|
| > 10000 Saudi Riyals    |                                       | 44  | 24.4%|

believed to aggravate acne according to 53.3% of our sample which is similar to Poli et al. study in which 58% of the respondents believed that cosmetics are aggravating acne [30]. Fifty-four percent of our sample believed that menses aggravate acne, which is similar to Poli study results (55% thought that menses affect acne adversely) [30] and comparable to Stoll et al. study (44% of their sample experienced premenstrual flares of their acne) [32]. Self -ygiene was believed by about two-thirds (67.8%) of our patients to be related to acne in contrast with Poli et al. study where 40% of responders believed that not washing is an acne aggravating factor [30].

Regarding general knowledge score, 41.7% of our study population showed good knowledge in contrast to study of Brajac et al. (2004), where only 11% have the overall score of correct answers [11]. There was significant correlation between total knowledge score and both age (where increasing age was associated with increasing total knowledge score \( P = 0.012 \)) and gender (where total knowledge score of females was better than males \( P = 0.031 \)).

These study results showed that poor knowledge, false beliefs, and many misconceptions are prevalent among Saudi acne patients in a way comparable to previous studies in other populations which include acne patients and/or normal populations of different cultures. This may reflect deficient acne patient education during their follow-up in their dermatology clinics.

4.2. Psychosocial Effects. Perceived stress was self-reported by 98 patients, that is, 54.4% of total sample. There was statistically significant correlation of self-reported being stressed due to acne with gender, (40.3% and 63.9% of males and females, resp. \( P = 0.001 \)). This is expected since females are more health conscious and sensitive regarding their skin and their health seeking behavior to reflect this consciousness.

The effect of acne on school performance was reported by 13.3% compared to only 6.4% of Do et al. study sample [24]. This is in contrast to Al-Hoqail study results, where 39% of his sample reported affected school performance due to acne [7]. Work performance was thought to be affected by 10.6% of our sample that is contrary to Al-Hoqail study in which 39% of his sample felt an affected work achievement [7], while spouse relationship, marriage willingness, and affected friendship relations were thought to be affected by 21.1%, 30.6%, and 17.2% % of our sample, respectively. These results were different from Al-Hoqail study results where it was 46%, 56%, 46%, respectively [7]. Differences from Al-Hoqail study may reflect difference in study populations which consisted in Al-Hoqail study of high school and college students in the central region of Saudi Arabia.

4.3. Treatment Seeking Behavior. Regarding seeking medical advice, twenty-two percent, 16.7%, 23.9%, and 37.8% of total sample visited their doctors within 3 months, 3–6 months, and 6–12 months and after 1 year from symptoms appearance, respectively. Similar results were found in Poli et al. study (2011), twenty-two percent, 14.2%, 12.4%, and 49.6% of their sample, but their sample consisted of acne patients and others who never had acne [30], in contrast to Al Robaee study (2005) in which, majority of his sample (40.3%) sought medical advice in the first three months [1]. Different result was found in Tallab study (2004), where the vast majority of his sample (76.2%) started more than one year [8], which is consistent with Tan et al. study (2001) in which 74% of patients waited more than 1 year before seeking medical attention for acne [15]. This variability in treatment seeking behavior may be related to underlying deficiencies in knowledge and believes about acne both among general population and among acne patients. Whether acne needs to be treated once noticed or discovered, 75% of our sample agreed on that. In our study 60% (109 patients) agreed that acne does need to be treated by physicians, which is consistent with Poli et al. study, where 70.9% subjects in their study believed that acne should be treated by physicians [30]. Forty-seven percent
Table 2: Knowledge about causes and aggravating factors among acne patients.

| Factors                              | Yes | %   | No  | %   | Do not know | %   |
|--------------------------------------|-----|-----|-----|-----|-------------|-----|
| Inheritance (genetics)               | 57  | 31.7| 81  | 45  | 42          | 23.3|
| Consuming fatty food*                | 97  | 53.9| 53  | 29.4| 30          | 16.7|
| Consuming chocolate*                 | 143 | 79.4| 27  | 15  | 10          | 5.6 |
| Consuming spicy food*                | 53  | 29.4| 83  | 46.1| 44          | 24.4|
| Consuming potato chips*              | 97  | 53.9| 52  | 28.9| 31          | 17.2|
| Obesity*                             | 61  | 33.9| 67  | 37  | 52          | 28.9|
| Poor hygiene*                        | 122 | 67.8| 37  | 20.6| 21          | 11.7|
| Tension                              | 118 | 65.6| 32  | 17.8| 30          | 16.7|
| Using cosmetics                      | 96  | 53.3| 33  | 18.3| 51          | 28.3|
| Menses                               | 98  | 54.4| 23  | 12.8| 59          | 32.8|
| Exposure to sun*                     | 63  | 35  | 62  | 34.4| 55          | 30.6|
| Contagious*                          | 56  | 31.1| 68  | 37.8| 56          | 31.1|

*Indicate wrong answer.

Table 3: Factors affecting total knowledge score about causes and aggravating factors of acne among study sample.

| Knowledge versus age | Poor | %   | Good | %   | Total | %   | P value |
|----------------------|------|-----|------|-----|-------|-----|---------|
| Childhood            | 14   | 73.7| 5    | 26.3| 19    | 100.0|         |
| Teenagers            | 69   | 61.6| 43   | 38.4| 112   | 100.0| P = 0.012 |
| Adulthood            | 22   | 44.9| 27   | 55.1| 49    | 100.0|         |
| Total                | 105  | 58.3| 75   | 41.7| 180   | 100.0|         |

| Knowledge versus gender | Poor | %   | Good | %   | Total | %   | P value |
|-------------------------|------|-----|------|-----|-------|-----|---------|
| Males                   | 49   | 68.1| 23   | 31.9| 72    | 100.0|         |
| Females                 | 56   | 51.9| 48.1 | 48.1| 108   | 100.0| P = 0.031 |
| Total                   | 105  | 58.3| 75   | 41.7| 180   | 100.0|         |

| Knowledge versus marital status | Poor | %   | Good | %   | Total | %   | P value |
|---------------------------------|------|-----|------|-----|-------|-----|---------|
| Single                          | 90   | 60  | 60   | 40  | 150   | 100.0|         |
| Married                         | 13   | 46.4| 15   | 53.6| 15    | 100.0|         |
| Divorced                        | 1    | 100 | 0    | 0   | 1     | 100.0| P = 0.357 |
| Widow (er)                      | 1    | 100 | 0    | 0   | 1     | 100.0|         |
| Total                           | 105  | 100 | 75   | 41.7| 180   | 100.0|         |

| Knowledge versus education      | Poor | %   | Good | %   | Total | %   | P value |
|---------------------------------|------|-----|------|-----|-------|-----|---------|
| Illiterate                      | 4    | 80  | 1    | 20  | 5     | 100.0|         |
| Primary school                  | 2    | 100 | 0    | 0   | 2     | 100.0|         |
| Intermediate                    | 20   | 69  | 9    | 31  | 29    | 100.0| P = 0.297 |
| Secondary                       | 54   | 56.8| 41   | 43.2| 95    | 100.0|         |
| Bachelor and more               | 25   | 51  | 24   | 49  | 49    | 100.0|         |
| Total                           | 105  | 58.3| 75   | 41  | 180   | 100.0|         |

| Knowledge versus income         | Poor | %   | Good | %   | Total | %   | P value |
|---------------------------------|------|-----|------|-----|-------|-----|---------|
| <5000 RS                        | 33   | 61.1| 21   | 38.9| 54    | 100.0|         |
| 5000–10000 RS                    | 51   | 62.2| 31   | 37.8| 82    | 100.0| P = 0.258 |
| >10000 RS count                 | 21   | 47.7| 23   | 52.3| 44    | 100.0|         |

of our study believed that treating acne by doctors requires Long-term follow-up which is compared to only 26% in Al-Robaeestudy [1]. The majority of patients (87.2%) in our study believed that the outcome of the treatment by physicians is guaranteed, and 90.6% considered it safe.

5. Conclusion and Recommendations

These study results showed that poor knowledge, false beliefs, and many misconceptions are prevalent among Saudi acne patients in a way comparable to the previous studies in other
populations and cultures. This in spite of the fact that our study population consisted only of acne patients followed up in dermatology clinics. Seeking medical advice behavior and expectation from treatment modalities among acne patients in this study are also similar to other studies and appear to reflect the poor knowledge and misconceptions about the disease. More effort for health education in general and selective patient education in particular is needed to improve patients’ knowledge about acne and its modalities of treatment and to encourage early medical consultation behavior and improve patient adherence to treatment. Considering psychological effect, it appears to be high as it has been proved in other cultures and needs always to be considered and addressed early in the course of patient management.

Conflict of Interests

The authors declare that they have no conflict of interests.

References

[1] A. A. Al Robaeec, “Prevalence, knowledge, beliefs and psychosocial impact of acne in University students in central Saudi Arabia,” Saudi Medical Journal, vol. 26, no. 12, pp. 1958–1961, 2005.

[2] A. Pearl, B. Arroll, J. Lello, and N. M. Birchall, “The impact of acne: a study of adolescents’ attitudes, perception and knowledge,” New Zealand Medical Journal, vol. 113, no. 1070, pp. 269–271, 1998.

[3] T. C. Chu, “Acne and other facial eruptions,” Medicine, vol. 25, pp. 30–33, 1997.

[4] E. Healy and N. Simpson, “Acne vulgaris,” British Medical Journal, vol. 308, no. 6932, pp. 831–833, 1994.

[5] W. J. Culiffe and D. J. Gould, “Prevalence of facial acne vulgaris in late adolescence and in adults,” British Medical Journal, vol. 1, no. 6171, pp. 1109–1110, 1979.

[6] B. Rzany and C. Kahl, “Epidemiology of acne vulgaris,” Journal der Deutschen Dermatologischen Gesellschaft, vol. 4, no. 1, pp. 8–9, 2006.

[7] I. A. Al-Hoqail, “Knowledge, beliefs and perception of youth toward acne vulgaris,” Saudi Medical Journal, vol. 24, no. 7, pp. 765–768, 2003.

[8] T. M. Tallab, “Beliefs, perceptions and psychological impact of acne vulgaris among patients in the Assir region of Saudi Arabia,” West African Journal of Medicine, vol. 23, no. 1, pp. 85–87, 2004.

[9] S. J. McPhee, M. A. Papadakis, and M. W. Rabow, Current Medical Diagnosis and Treatment, McGraw-Hill, New York, NY, USA, 50th edition, 2011.

[10] R. N. Smith, A. Braue, G. A. Varigos, and N. J. Mann, “The effect of a low glycemic load diet on acne vulgaris and the fatty acid composition of skin surface triglycerides,” Journal of Dermatological Science, vol. 50, no. 1, pp. 41–52, 2008.

[11] I. Brajac, L. Bilić-Zulle, M. Tkalcic, K. Lončarek, and F. Gruber, “Acne vulgaris: myths and misconceptions among patients and family physicians,” Patient Education and Counseling, vol. 54, no. 1, pp. 21–25, 2004.

[12] B. B. Davidovici and R. Wolf, “The role of diet in acne: facts and controversies,” Clinics in Dermatology, vol. 28, no. 1, pp. 12–16, 2010.

[13] D. H. Suh, J. W. Shin, S. U. Min et al., “Treatment-seeking behaviors and related epidemiological features in Korean acne patients,” Journal of Korean Medical Science, vol. 23, no. 6, pp. 969–974, 2008.

[14] G. Uslu, N. Şendur, M. Uslu, E. Şavk, G. Karaman, and M. Eskin, “Acne: prevalence, perceptions and effects on psychological health among adolescents in Aydin, Turkey,” Journal of the European Academy of Dermatology and Venereology, vol. 22, no. 4, pp. 462–469, 2008.

[15] J. K. L. Tan, K. Vasey, and K. Y. Fung, “Beliefs and perceptions of patients with acne,” Journal of the American Academy of Dermatology, vol. 44, no. 3, pp. 439–445, 2001.

[16] A. Haider and J. C. Shaw, “Treatment of acne vulgaris,” Journal of the American Medical Association, vol. 292, no. 6, pp. 726–735, 2004.

[17] V. Stathakis, M. Kilkenney, and R. Marks, “Descriptive epidemiology of acne vulgaris in the community,” Australasian Journal of Dermatology, vol. 38, no. 3, pp. 115–123, 1997.

[18] A. Smithard, C. Glazebrook, and H. C. Williams, “Acne prevalence, knowledge about acne and psychological morbidity in mid-adolescence: a community-based study,” British Journal of Dermatology, vol. 145, no. 2, pp. 274–279, 2001.

[19] Y. Kubota, Y. Shirahige, K. Nakai, J. Katsura, T. Moriue, and K. Yoneda, “Community-based epidemiological study of psychosocial effects of acne in Japanese adolescents,” Journal of Dermatology, vol. 37, no. 7, pp. 617–622, 2010.

[20] D. C. Liao, “Management of acne,” Journal of Family Practice, vol. 52, no. 1, pp. 43–51, 2003.

[21] V. Bataille, H. Snieder, A. J. MacGregor, P. Sasieni, and T. D. Spector, “The influence of genetics and environmental factors in the pathogenesis of acne: a twin study of acne in women,” Journal of Investigative Dermatology, vol. 119, no. 6, pp. 1317–1322, 2002.

[22] S. Aktan, E. Özmen, and B. Şanlı, “Anxiety, depression, and nature of acne vulgaris in adolescents,” International Journal of Dermatology, vol. 39, no. 5, pp. 354–357, 2000.

[23] V. Niemeier, J. Kupfer, and U. Gieler, “Acne vulgaris—psychosomatic aspects,” Journal of the German Society of Dermatology, vol. 4, no. 12, pp. 1027–1036, 2006.

[24] J. E. Do, S.-M. Cho, S.-I. In, K.-Y. Lim, S. Lee, and E.-S. Lee, “Psychosocial aspects of acne vulgaris: a community-based study with Korean adolescents,” Annals of Dermatology, vol. 21, no. 2, pp. 125–129, 2009.
[25] D. S. Berson, D. K. Chalker, J. C. Harper, J. J. Leyden, A. R. Shalite, and G. F. Webster, "Current concepts in the treatment of acne: report from a clinical roundtable," Cutis, vol. 72, supplement 1, pp. 5–13, 2003.

[26] M. A. Gupta and A. K. Gupta, "Depression and suicidal ideation in dermatology patients with acne, alopecia areata, atopic dermatitis and psoriasis," British Journal of Dermatology, vol. 139, no. 5, pp. 846–850, 1998.

[27] A. Picardi, E. Mazzotti, and P. Pasquini, "Prevalence and correlates of suicidal ideation among patients with skin disease," Journal of the American Academy of Dermatology, vol. 54, no. 3, pp. 420–426, 2006.

[28] S. C. Kellett and D. J. Gawkrodger, "The psychological and emotional impact of acne and the effect of treatment with isotretinoin," British Journal of Dermatology, vol. 140, no. 2, pp. 273–282, 1999.

[29] D. P. Krowchuk, T. Stancin, R. Keskinen, R. Walker, J. Bass, and T. M. Anglin, "The psychosocial effects of acne on adolescents," Pediatric Dermatology, vol. 8, no. 4, pp. 332–338, 1991.

[30] F. Poli, N. Auffret, C. Beylot et al., "Acne as seen by adolescents: results of questionnaire study in 852 French individuals," Acta Dermato-Venereologica, vol. 91, no. 5, pp. 531–536, 2011.

[31] J. M. Amado, M. E. Matos, A. M. Abreu et al., "The prevalence of acne in the north of Portugal," Journal of the European Academy of Dermatology and Venereology, vol. 20, no. 10, pp. 1287–1295, 2006.

[32] S. Stoll, A. R. Shalita, G. F. Webster, R. Kaplan, S. Danesh, and A. Penstein, "The effect of the menstrual cycle on acne," Journal of the American Academy of Dermatology, vol. 45, no. 6, pp. 957–960, 2001.