

Influencing Factors and Microbial Agents Which Contribute to Acne among Students from Pathological Analysis Department/Kufa Technical Institute\Al- Najaf Government

Noor Ismeal Nasser¹, Ahmed Abdul Hasan Mohsin², Thuraya Aamer Habeeb², Maysoon Khudair Al-Hadrawi³
¹Department of Pathological Analysis, ²Department of Community Health, ³Department of Pathological Analysis, Kufa Technical Institute, Al-Furat Al-Awsat Technical University, 31001 Kufa, Al-Najaf, Iraq

ABSTRACT

Context: Acne is not a life-threatening disease, but it can cause permanent dermal scar, it may be a source of depletion of the financial resources of the individual as well as the psychological distress that can affect a person's future life.

Aims: determine the influencing factors, grading acne severity and identify the potential microbial cause.

Method and Material: the analytic descriptive study was performed using an interview-administered questionnaire and clinical examination for each participant. Global acne grading system was used for determining the acne severity. The sample was collected only from students who have a cane, the specimen have been processed to identify the species of microorganism.

Statistical analysis: The data were analyses by a statistical program SPSS (version 21).

Results: the prevalence of acne was (71.9%), it was more common among male compared to female (43% vs29%), there is a significant association ($p>0.05$) between acne and skin hygiene, family history, stress and menstrual cycle, while there is no association ($p<0.05$) between acne and hormonal imbalance, polycystic ovarian, sun protecting creams, cosmetic and moisture cream. sever and moderate form of acne was more common in female (2.3 %, 5% vs 0%, 3.6%), however the mild form more common in male (39.4% vs 22.2%). *Staphylococcus epidermidis* was the most bacterial isolate from specimens (28.3%).

Conclusions: acne results from overlapping more than one factor at the same time. The extent of the impact of these factors may differ from one person to another depending on regional variations in terms of the environment and lifestyle.

Keywords: *acne, gender, severity, diet, menstrual cycle.*

INTRODUCTION

First of all, let us introduce acne is a cutaneous condition encountered in the puberty period. It affects almost 85% of individuals 12-24 years of age ¹, it is a very common skin problem but it is not contagious. It is characterized by the formation of nodules, pustules, papules, comedowns, blackheads and whiteheads on the skin ². It may be appearing in more than one place in the body such as the face, chest and back. It occurs primarily because of the increase in the production of sebum, which is produced by the sebaceous glands. This substance plays an important role in moisturizing and protecting the skin from invasion by the most bacterial species ³. Several studies have shown that the appearance and severity of acne may be affected by several factors such as genetics, hormones, polycystic ovaries, menstrual cycle, emotional stress, diet, use sunscreen and the colonization of the skin by a species

Corresponding Author:

Noor Ismeal Nasser
Department of pathological analysis,
Kufa Technical Institute,
Al-Furat Al-Awsat Technical University, 31001
Kufa, Al-Najaf, Iraq.

Email: noornasser1984@gmail.com *Indian Journal of Public Health Research & Development, January 2019, Vol.10, No. 1* 485

of bacteria which have the ability to metabolize the sebum ^{4, 5}. The presence of one or more of these factors is affecting the appearance of acne in some young people compared to their peers, as well as it controls the degree of acne which ranges from mild infection that disappears automatically after a certain period to severe infection that may leave scars on the skin, if it is not treated properly . Adolescence is a period in which a person experiences many biological and psychological changes. Acne may make this period more difficult and lead to a variety of psychological impacts such as embarrassment, depression, anxiety, violence and lack of self-confidence, as mentioned in previous research ⁷.

MATERIAL AND METHOD

Study design: This is an analytical descriptive study designed to identify potential influencing factor that related to acne, grading acne severity and the microbial species that associated with acne formation.

Place of the study: This study was conducted in the district of Kufa- Najaf province in Iraq, on a sample of students from the first and the second stage of the Department of Pathological Analysis \ Kufa Medical Technical Institute.

Sample size and study period: The study was conducted from 5 to 29 of January. The total number of students was 350, Only 107 females and 115 males agreed to participate.

Data collection: The research team conducted an interview with all participants to complete the questionnaire form after getting a verbal consent of the department headmasters. The questionnaire contained several parts. The first part included information about the participants, such as age, sex, personal hygiene. Use sunscreen, use cosmetics or skin care creams, Family history, stress, as well as a number of additional questions for a female. The second part concerned with the clinical examination. The third part concerned with the laboratory examination of the sample.

Clinical classification of the acne: The clinical examination was performed by a doctor and a nurse with experience in the field of dermatology. According to criteria of global acne grading system (GAGS) ⁸.

Sample processing: The samples were collected only from the participants who suffer from acne. The specimens were transferred directly to the laboratory and cultured on blood agar, sabouraud dextrose agar with olive oil overlay, two replicates per sample for each type of media was performed then incubated at 37 ° C for 2 to 7 days with aerobic and anaerobic conditions, to verify any Bacterial or fungal growth. All the microbes were isolated subjected to further identification method⁹.

Statistical analysis: The data were analysed using a statistical program SPSS (version 21), the result optioned by Calculating the Chi square, frequency, present, P values less than 0.05 was considered significant.

RESULT

Among the 350 students, only 221 participated (106 females and 115 males) with a response rate of (63.1%). The percentage of acne among students was (71.9%), the results showed that gender, skin hygiene, family history and stress condition, statistically significant with acne as follows. The percentage of acne among male 95(43%) was higher compared with female 64(29%). Students who wash their skin 3-5 time 58(26.2%) and more than 5 times 9 (4.1%) in a day less Suffering from acne than those who clean their skin once a day 92(41.6%). The percent of participants who have acne and family history was high , regardless of whether they are inherited from the father 60 (27.1%), mother 50(22.6%) or both of them 26(11.8%), stress was thought to make acne appear and become worse in 134(60.6%) of students, while there was no significant value between presence of acne and the use of sunscreen, make-up and moisturizing creams ($\chi^2=0.532$, $p=0.466$; $\chi^2=3.803$, $p=0.051$; $\chi^2=3.995$, $p=0.046$), all these variables and values summarized in detail in Table (1).

Table 1: The socio-demographic factors that influence with acne formation

| Characteristic | Category | Have acne | | | | Total | | x | p |
|----------------|----------|-----------|------|----|------|-------|-----|--------|------|
| | | Yes | | No | | n | % | | |
| | | n. | % | n. | % | | | | |
| Gender | Male | 95 | 43 | 20 | 9 | 115 | 52 | 13.506 | .000 |
| | Female | 64 | 29 | 42 | 19 | 106 | 48 | | |
| | Total | 159 | 71.9 | 62 | 28.1 | 221 | 100 | | |

| | | | | | | | | | |
|-----------------------|--------------|-----|------|-----|------|-----|------|--------|-------|
| Skin hygiene | 1-2 | 92 | 41.6 | 9 | 4.1 | 101 | 45.7 | 52.168 | .000 |
| | 3-5 | 58 | 26.2 | 29 | 13.3 | 87 | 39.4 | | |
| | >5 | 9 | 4.1 | 24 | 10.9 | 33 | 14.9 | | |
| Sun protecting creams | Yes | 41 | 18.6 | 19 | 8.6 | 60 | 27.1 | 0.532 | 0.466 |
| | No | 118 | 53.9 | 43 | 19.5 | 161 | 72.9 | | |
| Cosmetic | Yes | 52 | 23.5 | 107 | 48.4 | 81 | 36.7 | 3.803 | .051 |
| | No | 29 | 13.1 | 33 | 14.9 | 140 | 63.3 | | |
| Moisture cream | Yes | 27 | 12.2 | 132 | 59.7 | 45 | 20.4 | 3.995 | .046 |
| | No | 18 | 8.1 | 44 | 19.9 | 176 | 79.6 | | |
| Family history | Father | 60 | 27.1 | 10 | 4.5 | 70 | 31.7 | 58.543 | .000 |
| | Mother | 50 | 22.6 | 9 | 4.1 | 59 | 26.7 | | |
| | Both of them | 26 | 11.8 | 2 | 0.9 | 28 | 12.7 | | |
| | None of them | 23 | 10.4 | 41 | 18.6 | 64 | 29 | | |
| Stress | Yes | 134 | 60.6 | 25 | 11.3 | 167 | 75.6 | 23.293 | .000 |
| | No | 33 | 14.9 | 29 | 13.1 | 54 | 24.4 | | |

The highest percentage of females agreed that the appearance of acne increases and becomes worse before the start of the menstrual cycle 77(72.6%) the results were statistically significant, While neither hormonal disorder nor polycystic ovaries had any significant value with acne according to our results that mentioned in Table (2).

Table 2: Factors related to female and its association with acne formation

| Variable | Menstrual cycle | | | | Hormonal imbalance | | | | Polycystic ovarian | | | | |
|-----------|-----------------|----|------|----|--------------------|----|------|----|--------------------|---|-----|----|------|
| | Yes | | No | | Yes | | No | | Yes | | no | | |
| | No | % | No | % | no | % | no | % | no | % | no | % | |
| Have acne | Yes | 55 | 51.9 | 9 | 8.5 | 8 | 7.5 | 56 | 52.8 | 7 | 6.6 | 57 | 53.8 |
| | No | 22 | 20.8 | 20 | 18.9 | 40 | 37.7 | 2 | 1.9 | 2 | 1.9 | 40 | 37.7 |
| Total | Total | 77 | 72.6 | 29 | 27.4 | 96 | 90.6 | 9 | 8.5 | 9 | 8.5 | 97 | 91.5 |
| X | 14.368 | | | | 1.7 | | | | 1.245 | | | | |
| P value | .000 | | | | 0.182 | | | | 0.265 | | | | |

The intensity of acne was determined by the global acne grading system (GAGS) and the results were as follows, 136 (61.5%) of participants had mild, 19 (8.6%) of them had moderate and only 5(2.3%) had severe cases, the severe and moderate form were more common among female(2.3%,5%) than male, As mentioned briefly in Table (3).

Table 3: Grading acne according to (GAGS), and its distributions with gender

| Gender | | Global score | | | | | X ² | P |
|--------|-----|--------------|------|----------|-------|-------|----------------|------|
| | | No Lesion | Mild | Moderate | Sever | Total | | |
| Male | No. | 20 | 87 | 8 | 0 | 115 | 22.992 | .000 |
| | % | 9 | 39.4 | 3.6 | 0.0 | 52 | | |
| Female | No. | 41 | 49 | 11 | 5 | 106 | | |
| | % | 18.6 | 22.2 | 5 | 2.3 | 48 | | |
| Total | No. | 61 | 136 | 19 | 5 | 221 | | |
| | % | 27.6 | 61.5 | 8.6 | 2.3 | 100 | | |

Out of 159 samples, only 103 gave positive results, included 44 samples containing mix species of microorganisms and 59 samples containing one species. The type and number of isolates were determined as follows, Propionibacterium acne 15(10.1%), Staphylococcus epidermidis 42(28.3%), Staphylococcus aureus 40(27%), Klebsiella SPP. 14(9.4%), Streptococcus

SPP. 24(16.2%), *Mallasia* SPP. 13(8.7%) As mentioned briefly in Table (4).

Table 4: The species of microbe that may be associated with acne formation

| Species | Mix isolates | | | | | | | | | | | | Total no of mix isolate | Total no of a single isolate | Single isolate | | Total no of each isolate |
|-----------------------------------|--------------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|--|-------------------------|------------------------------|----------------|-----------|--------------------------|
| | No. | % | | | | | | | | | | | | | No. | % | |
| <i>Propionibacterium acnes</i> | + | + | + | | | | | | | | | | | 3 | 2.9 | 15(10.1%) | |
| <i>Staphylococcus epidermidis</i> | + | | + | + | + | + | + | | | | | | | 16 | 15.5 | 42(28.3%) | |
| <i>S.aureus</i> | | + | + | + | | | | | + | + | | | | 15 | 14.5 | 40(27%) | |
| <i>Klebsiella</i> | | | | | + | | | | | | | | | 7 | 6.7 | 14(9.4%) | |
| <i>streptococcus</i> | | | | | | + | | | + | + | + | | | 10 | 9.7 | 24(16.2%) | |
| <i>Mallasia</i> | | | | | | | + | + | | | + | | | 8 | 7.7 | 13(8.7%) | |
| No. | 4 | 6 | 2 | 11 | 3 | 5 | 2 | 2 | 4 | 1 | 4 | | | | | | |
| % | 3.8 | 5.8 | 1.9 | 10.6 | 2.9 | 4.8 | 1.9 | 1.9 | 3.8 | 0.9 | 3.8 | | | | | | |
| <i>Total</i> | | | | | | | | | | | | | 44 | 59 | 103 | 148 | |

DISCUSSION

Acne is one of the health problems that prevalent among young people, and there are several studies that have dealt with this subject in different parts of the world. But this problem has never been highlighted in the city of Al- Najaf. Therefore, this study was conducted to determine the prevalence of acne in a sample of students and the response rate was less than a study in Syria (99.2%)¹⁰, the prevalence of acne was lower in Saudi Arabia (56.2%), Turkish (40.1%) and Syria (43.7%) than in our study^{10, 11, 12}, while the result in Singapore was higher (88%)¹³. There is a disparity in the results of studies from different regions of the world on the relationship between gender and acne. A study in Malaysia and turkey reported that acne is more common in males than females^{14, 15}, and this is consistent with our results, while other studies in Saudi Arabia and Iran showed that acne is more common in females than males^{12, 16}. These differences may be due to variation in the proportion of male and female participants. According to U.S. Food and drug administration, the poor hygiene has no interfere with acne¹⁰, which is contrary to our results where there is a significant relationship between acne and a good self-hygiene which consistent with results of a Syrian study¹⁰. The percentage of acne was higher in a student with a positive family history of acne, according to the study carried out in Cameroon¹⁷ and that corresponds to our results, but the proportion was lower in a study in Japan (56.8%)¹⁸. There are many researchers who have dealt with the relationship between stress and acne^{19, 15}. They reported that stress is one of the risk factors contributing to acne especially among students and this corresponds to our results. It may be due to the relationship between stress and cortisol, where their production increases with increased stress and leads to sebum secretion in larger amounts than the normal secretion rate. The menstrual cycle is regulated by different types of hormones, including progesterone, which its level increase during this period leading to increased production of sebum and close, swell the pores²⁰. All these events cause the appearance and exacerbation of acne in females in the pre-menstrual period, Therefore, there are many studies mentioned the existence of a significant relationship between the menstrual cycle and acne ($p=0.298$, $p=0.3$)^{21,22}, however, this is close to the results of our research($p=.000$). regarding the acne severity our results were contrary to previous studies in Malaysia and Iran where the severe and moderate cases common among males more than females ($P= 0.001$, $P=0.003$)^{16,23}.The Conflicts of results because the lack of uniform global system for determining severity. **488** *Indian Journal of Public Health Research & Development*, January 2019, Vol.10, No. 1

In our study, the most prevalent bacterial isolate was *Staphylococcus epidermidis* followed by *S. aureus* while in an Indian study reported that *S. aureus* was the most common isolate²⁴, furthermore another study showed that *Staphylococcus epidermidis* and *Propionibacterium acnes* were the frequent bacterial cause of acne²⁵. The acne may result from overlapping more than one type of microbes act together at the same time.

CONCLUSION

Acne is more common in males than females, but the sever form was among female. There is a relationship between acne and gender, family history, stress, menstruation, and personal hygiene. It is possible that acne is caused by an overlap of more than one type of microorganisms at the same time; these microorganisms may be bacterial or fungal.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: This study was approved by Ethics committee (91-183-4) of Anbar University.

REFERENCE

1. Krowchuk DP. Managing acne in adolescents. *Pediatric Clinics of North America*. 2000 Aug 1;47(4):841-57.
2. Tan HH, Tan AW, Barkham T, Yan XY, Zhu M. Community-based study of acne vulgaris in adolescents in Singapore. *British Journal of Dermatology*. 2007 Sep;157(3):547-51.
3. Kindt TJ, Goldsby RA, Osborne BA, Kuby J. *Kuby immunology*. Macmillan; 2007.
4. Shaheen B, Gonzalez M; Acne sans P. acnes. *J Eur Acad Dermatol Venereol.*, 2013; 27(1): 1–10.
5. Simpson NB, Cunliffe WJ. Disorders of the sebaceous glands. *Rook's textbook of dermatology*. 2004 Jan 1:2121-96.
6. Wolff H. Diseases of Hair. In: Burgdorf WH, Plewig G, Wolff HH, Landthaler M, editors. *Braun-Falco's Dermatology*. 3rd ed. Berlin: Springer; 2009; p. 1050–2.
7. Demircay Z, Seckin D, Senol A, Demir F. Patient's perspective: an important issue not to be overlooked in assessing acne severity. *Eur J Dermatol*. 2008;18:181-4.
8. Doshi A, Zaheer, Stiller MJ. A comparison of current acne grading systems and proposal of a novel system. *Int J Dermatol* 1997;36:416-8.
9. Baron EJ, Finegold SM. *Diagnosis microbiology*. 8th edition, The CV Mosby Company, Methods for testing antimicrobial effectiveness; 1990, p. 171–194.
10. Waqar Al-Kubaisy, Nik Nairan Abdullah, Sabzali Musa Kahn, and Maram Zia. Sociodemographic Characteristics of Acne among University Students in Damascus, Syria. *Hindawi Publishing Corporation Epidemiology Research International Volume* 2014, Article ID 974019, 4 pages.
11. Ertam I, Babur Y, Unal I, Alper S. The frequency of skin diseases among students in a university clinic. *Skinmed*. 2010;8(5):261-3.
12. Al AR. Prevalence, knowledge, beliefs and psychosocial impact of acne in University students in Central Saudi Arabia. *Saudi medical journal*. 2005 Dec;26(12):1958-61.
13. Tan HH, Tan AW, Barkham T, Yan XY, Zhu M. Community-based study of acne vulgaris in adolescents in Singapore. *British Journal of Dermatology*. 2007 Sep;157(3):547-51.
14. Hanisah A, Omar K, Shah SA. Prevalence of acne and its impact on the quality of life in school-aged adolescents in Malaysia. *Journal of primary health care*. 2009;1(1):20-5.
15. Uslu G, Sendur N, Uslu M, Savk E, Karaman G, Eskin M. Acne: prevalence, perceptions and effects on psychological health among adolescents in Aydin, Turkey. *J Eur Acad Dermatol Venereol* 2008; 22(4): 462–9.
16. Noorbala MT, Mozaffary B, Noorbala M. Prevalence of acne and its impact on the quality of life in high school-aged adolescents in Yazd, Iran. *Journal of Pakistan Association of Dermatology*. 2016 Dec 15;23(2):168-72.
17. Mbuagbaw J, Abongwa C, Ozoh G, Blackett K. The prevalence of acne vulgaris in secondary *Indian Journal of Public Health Research & Development, January 2019, Vol.10, No. 1* 489

- school students in Yaoundé, Cameroon. *The Internet Journal of Dermatology*. 2006;5(2):1-4.
18. Kubota Y, Shirahige Y, Nakai K, Katsuura J, Moriue T, Yoneda K. Community-based epidemiological study of psychosocial effects of acne in Japanese adolescents. *J Dermatol* 2010; 37(7): 617–22.
 19. Law MP, Chuh AA, Lee A, Molinari N. Acne prevalence and beyond: acne disability and its predictive factors among Chinese late adolescents in Hong Kong. *Clinical and Experimental Dermatology: Clinical dermatology*. 2010 Jan;35(1):16-21.
 20. Yen SSC, Vela P, Rankin J, Littell AS. Hormonal Relationships During the Menstrual Cycle. *JAMA*. 1970;211(9):1513–1517. doi:10.1001/jama.1970.03170090029006.
 21. Stolla S, Shalita AR, Webster GF, Kaplan R, Danesh S, Penstein A. The effect of the menstrual cycle on acne. *Journal of the American Academy of Dermatology*. 2001 Dec 1;45(6):957-60.
 22. Sultana N. Knowledge on Acne Vulgaris and Menstrual Cycle: A Study on Adolescent Girls. *ASA University Review*. 2012 Jan 1;6(1).
 23. Hanisah A, Omar K, Shah SA. Prevalence of acne and its impact on the quality of life in school-aged adolescents in Malaysia. *J Prim Health Care*. 2009;1:20-5.
 24. Dhillon KS, Varshney KR. Study of microbiological spectrum in acne vulgaris: an in vitro study. *Sch. J. App. Med. Sci*. 2013;1(6):724-7.
 25. Thiboutot D; New treatments and therapeutic strategies for acne. *Arch Fam Med.*, 2000; 9(2): 179–187.