Association between smoking and acne vulgaris: a case-control study

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Abstract

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Original Article

Association between smoking and acne vulgaris: a case-control study

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ABSTRACT

Acne vulgaris is a very common skin disease. It affects almost everybody at a certain age. Many studies tried to understand the role of smoking in the pathogenesis of acne. Unfortunately, contradictory results have been reported. The goal of this study is to conduct a case-control study investigating the association between smoking and acne vulgaris. A case-control study was performed during October 2017. A questionnaire was administered to be filled carefully. Our cases were outpatients who have visited dermatologists for acne. Controls were students randomly chosen from Al-Quds University. Acne stratification based on mild, moderate, severe was done according to the number and type of acne. Crude and adjusted Odds Ratios (OR) with the 95%confidence interval (95%CI) were used. Crude and adjusted OR between acne and smoking showed no association except for people above the age of 20 years old. Crude OR was at 0.782 with 95% IC= (0.451-1.354); adjusted OR for sex and age was at 1.237 with 95% CI (0.654-2.319) and 1.453 with 95% CI (0.770-2.740), respectively. Adjusted OR for people ≥20 years of age was significant at 1.779 with 95% CI (1.006-3.148). There was no association between acne and smoking based on the results we obtained. Nevertheless, smokers who were ≥20 years of age had a slight increase in risk compared to smokers who were <20 years of age, with a significant adjusted OR ratio of 1.779 95% CI (1.006-3.148).

Keywords: smoking, acne vulgaris

INTRODUCTION

Acne is a very common skin disease. It is mostly encountered during adolescence, and sometimes continues into adulthood (1). It occurs when the hair follicles are clogged with dead skin cells and oil. It presents with blackheads, whiteheads, pimples, and possible scarring. In adolescence, it is usually caused by an increase in testosterone level. Although Adolescence is the period when most people have acne, recent epidemiological studies have shown that acne affects a significant percentage (12–14%) of women between 25 and 50 years of age (2). Post-pubertal acne is described as an inflammatory mild-moderate form, whose cause is still unknown and whose incidence is increasing (3).

Smoking is a worldwide social and health problem. Beyond its known links to cancer, lung and heart disease, it is associated with premature skin ageing, delayed wound healing, and a number of skin diseases. Smoking provokes important alterations on the skin microcirculation, keratinocytes and collagen and elastin synthesis. Nicotine also induces vasoconstriction of vessels and inhibits inflammation through effects on nervous and immune system (4).

Recent studies on the correlation between smoking and acne have reported conflicting results. Some have shown no correlation at all (1); some have concluded that smoking aggravates acne; and on the other hand, some concluded that smoking may have an anti-inflammatory effect and improve the acne condition (2). Interestingly, Researchers at the San Gallicano Dermatological Institute in Rome reported that clinical evidence and experimental data showed a correlation between smoking habit and acne vulgaris only after a specific age after puberty(6).

Now, a true association between acne and smoking has not yet been confirmed. Due to the conflicting previous studies, the goal of this study is to investigate the association between smoking and acne vulgaris.

METHODS

Study Design

This was a case-control study. This study is being reported in adherence to the STROBE checklist (7). Cases were outpatients who have visited dermatologists for acne and still have the disease. Controls were randomly chosen students from Al-Quds University. The questionnaires were distributed and filled in a period between October 1, 2017 to the October 20, 2017. Participants have given their voluntary, informed, and oral consent of the study before filling the questionnaire.

Study participants

The eligibility criteria were as follows: participants' age was set between 14 and 50 years

old, no contraceptive use in women, no history of diabetes or cardiovascular diseases, and no history of anabolic steroids intake. However, individuals with previous medication for acne vulgaris were accepted in the sample.

The sample was chosen randomly; and we did not discriminate based on gender or age. Controls were chosen at the same time among healthy population and from the same community.

Study tools

Currently, there is no accepted universal acne grading system. In our study, we stratified our sample according to classification of Lehmann et al (8) (Table 1). This criterion classifies patients into three groups (mild, moderate and severe) based on the type and number of lesions. A patient with less than 30 lesions is considered a mild case. A patient with 30 to 125 lesions is considered moderate case. A patient with more than 125 lesions is considered a severe case, given the fact that the type of the lesion weighted differently as explained in (Table 1). We selected this grading system because it can be easily applied by the physician who conducted the study and did not require any further laboratory investigations.

Table (1): Basis for classification of acne vulgaris cases used in this study

	Mild	Moderate	Severe
Comedones	<20	20 - 100	>100
Papules / Pustules	< 15	15 - 50	> 50
Nodules / Cysts			> 5
Total	< 30	30 - 125	> 125

This classification was adopted from Lehmann et al

The case to control ratio was almost 1:1.23. The estimate of smoking prevalence among our sample was 47.1%. In this study, a total of 206 patient records were collected (97 patients with acne vulgaris and 109 healthy controls).

A questionnaire was administered on each participant in order to assess the correlation between smoking and acne. The questionnaire comprised essentially of socio-demographic data and questions on smoking habits, prior treatment of acne, and other factors that contribute to acne pathogenesis.

Statistical analysis

Differences between cases and controls were analyzed using parametric and non-parametric tests. Statistical analysis included the range and median of the sample's age and gender, and percentages stratifying the severity of acne. In addition, a binary logistic regression was conducted which indicated the contribution of a particular predictor when other predictors are controlled. The odds ratio was estimated through the calculation of regression with a confidence interval of 95%.

The statistical analysis was conducted using the statistical package SPSS for Windows (release 20). The statistical significance was set at $p < 0.05$.

RESULTS

In this study, there were a total of 206 records (97 patients with acne vulgaris and another 109 healthy individuals). Of the 97 patients with acne vulgaris, 56 were male and 41 were female. The median age of female smokers was 22 years (range 18-40 years) and the median age of male smokers was 20 years (range 15-42 years).The median age of nonsmoker participants was 19 years for females and 19 years for males. Smoker males were 83 participants, of those 34 (40%) had acne. On the other hand, the smoker females were 15 participants, of those nine (60%) had acne. Non-smoker males were 47 (22 cases and 25 controls) and nonsmoker females were 61 (32 cases and 29 controls).

From a clinical point of view, the severity of the cases was as follows: out of 97 cases, 11(11.3%) had a severe grade of acne vulgaris, 48(49.5%) had a moderate grade of acne vulgaris, and 38(39.2%) had a mild grade of acne vulgaris as shown in Figure 1. Similarly, out of 43 smoker-cases, 5(11%) had a severe grade of acne, 20(46%) had a moderate grade of acne vulgaris, and 18(41%) had a mild grade acne as shown in Figure 2.
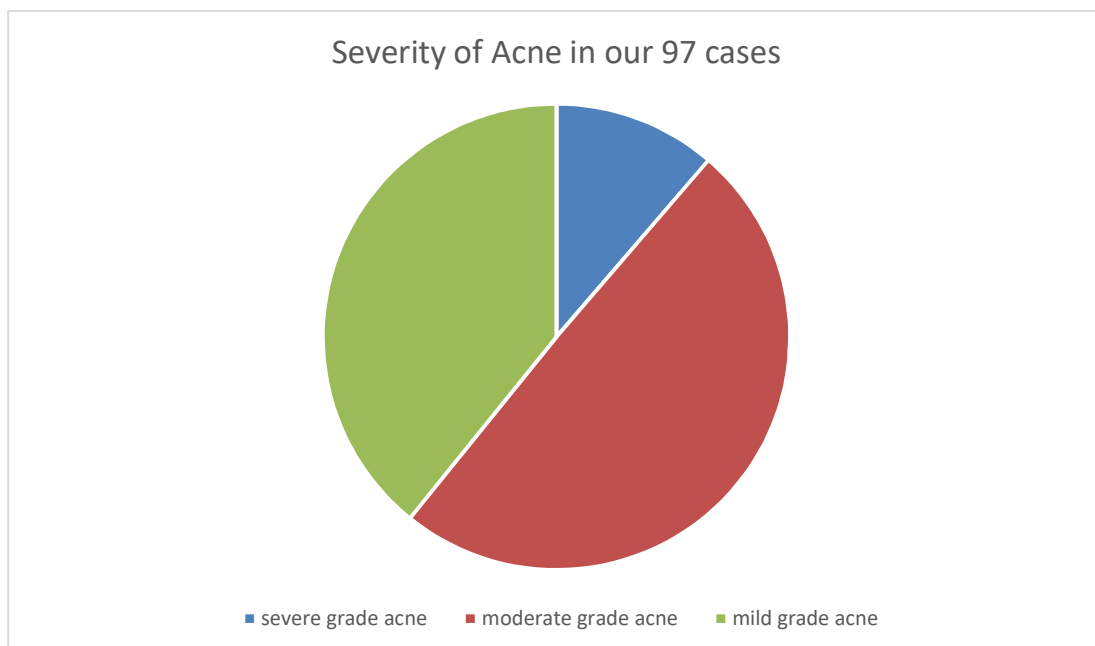
Figure(1): Severity distribution of acne cases (n = 97) who participated in the study
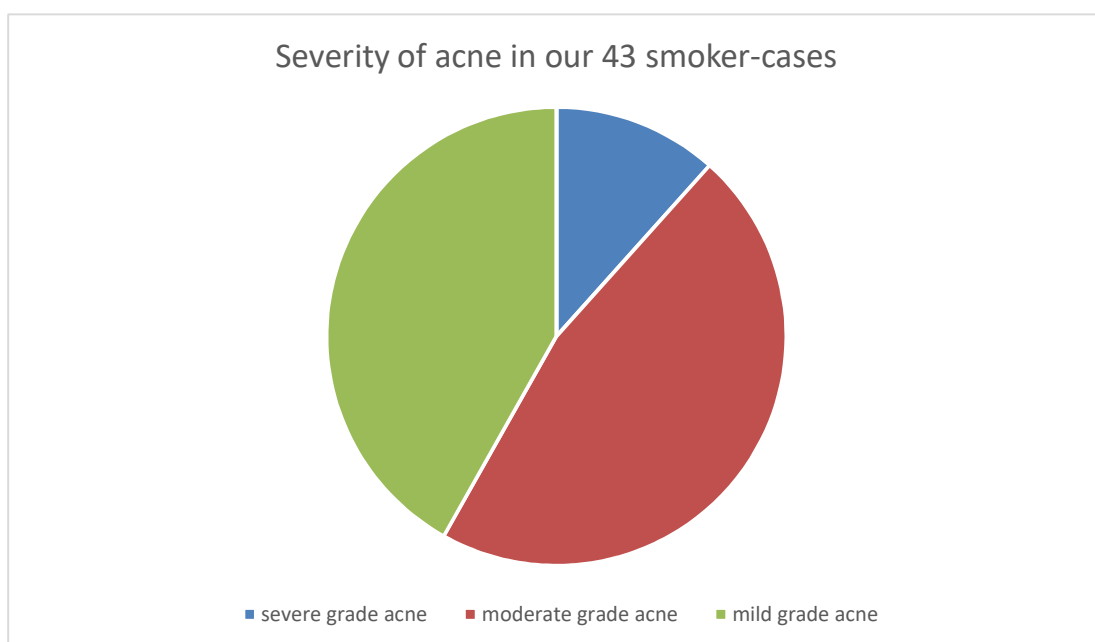
Figure(2): Severity distribution of acne in those who were smokers (n = 43)

The crude OR for the association between acne vulgaris and smoking was 0.782 with a 95% CI (0.451-1.354), while the adjusted OR for sex and age was at 1.237 with a 95% CI (0.659-2.319) and 1.453 with a 95% CI (0.770-2.740), respectively. Adjusted OR for participants who were ≥20 years of age was significant at 1.779 with a 95% CI (1.006-3.148) as shown in Table 2.

Table (2): Association between acne and sociodemographic variables of the study participants

Variables	Case n (%)	Control n (%)	OR(95% CI)	Adjusted OR (95% CI)
Current smokers	43(44.3)	55(50.4)	0.782 (0.451- 1.354)	1.237 (0.659-2.319)
Non–smoker	54(55.6)	54(49.5)		
Female	41(42.2)	35(32.1)	0.646 (0.366-1.141)	1.453 (0.770-2.740)
Male	56(57.7)	74(67.8)		
≥ 20years	56(57.7)	49.(44.9)	0.598 (0.344-1.038)	1.779 (1.006-3.148)
< 20 years	41(42.2)	60(55)		

DISCUSSION

In this study, there was no significant difference in the prevalence of acne and the socio-demographic variables, nevertheless, smokers who are more than 20 years old had a significant increased risk of developing acne.

Acne is a chronic, inflammatory skin condition that causes spots and pimples, especially on the face, shoulders, back, neck, chest, and upper arms. It is one of the most common skin diseases as it affects almost 85 percent of adolescents.

Skin and hair are exposed to various environmental noxious agents, including tobacco smoke. Smoking is associated with skin ageing, and poor wound healing (9). A general observation that smokers tend to be more severely affected than non-smokers by the majority of inflammatory skin diseases particularly psoriasis, hidradenitis suppurativa, cutaneous lupus erythematosus and acne have been reported.

In this study, we were interested in the association between and smoking and acne vulgaris since previous studies showed contradictory results. The choice of our study design (case-control study) is authoritative, which studies the present association between acne vulgaris and smoking, according to an association between the exposure and disease in the past.

Most of the studies regarding this association were conducted in Western communities. Some articles showed a positive association (6), others instead showed a negative association between smoking and acne, assuming that smoking exerts an anti-inflammatory role in pathogenesis of the disease (5). This study aimed to study specifically the Palestinian community and their response to smoking concerning this issue.

In our case-control study, the association between acne vulgaris and smoking showed an adjusted OR was 1.237 with a 95% CI (0.659-2.319) which was not significant. Nevertheless, the study showed a slightly increased risk among smokers who were ≥ 20 years of age compared to smokers who were <20 years of age with a significant adjusted OR of 1.779 with a 95% CI (1.006-3.148).

Results of this study support the idea of a true association between smoking and acne after the age of 20 years. This association has been documented in previous studies as reported by Capitanio et al (6). In contrast, our study does not support that smoking has a direct association with acne for all age groups as suggested by other studies.

LIMITATIONS

Although the research has reached its aims, there were some limitations. This research was conducted on a small size population limited to particular areas in Palestine. Therefore, to generalize the results, the study should have involved more participants from different areas. Overall, we came out with a trustworthy result with an interesting conclusion of an association between smoking and acne for people more than 20 years of age. However, more research on larger samples needs to be conducted to affirm this association.

CONCLUSIONS

Smoking harms nearly every organ of the body. It is responsible for many cancers, skin and health problems. Smoking is certainly a topic to counsel on whenever a smoker visits a

dermatologist. With the raising evidence that smoking has a role in the pathogenesis of acne, dermatologists should make sure to discuss the topic of smoking cessation when counselling their patients for a healthier skin, free of acne.

CONFLICT OF INTERESTS

The authors report no conflicts of interest in this manuscript.

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