

<http://dx.doi.org/10.3126/njdvl.v16i1.19408>

Association Between Acne and Body Mass Index: A Hospital Based Cross Sectional Study

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Abstract

Introduction: Acne vulgaris is a common and chronic inflammatory skin disease of pilosebaceous unit. Obesity is one of the biggest problems in western life style but nowadays, the problem is increasing even in low and middle-income countries. Body Mass Index (BMI) is used to accurately measure obesity.

Objective: To find out the association between different categories of BMI and severity of acne.

Materials and methods: This was a cross sectional prospective study conducted in the outpatient department of Gandaki Medical College from January to July, 2017. All the newly diagnosed patients with acne were included in the study. Height and weight of the patients was recorded and BMI was calculated. BMI was categorized as underweight, normal weight, overweight and obese. Type of lesions were noted and severity of acne was graded from 1 to 4. Statistical analysis was performed using SPSS version 17.0 for windows. One-way Analysis of Variance between groups (ANOVA) test was applied. P value of less than 0.05 was considered significant.

Results: There were altogether 249 patients with acne. Age of the patients ranged from 10 to 44 years with mean age of 20.82 ±5.9 years. Most of the patients were in the age group of 11-20 years. Female: male ratio was 1:1.4. Majority of patients (65.5%) had normal BMI. Most of the patients had Grade 2 acne (52.6%). There was no significant association between the BMI and severity of acne (p=0.129).

Conclusion: There was no significant association between BMI and severity of acne.

Key words: Acne vulgaris; comedones; hyperandrogenism; nodules; obesity; overweight

Introduction

Acne vulgaris is a common skin disease and is clinically characterized by the presence of comedones, papules, pustules, nodules and scars.

Obesity is an emerging problem. It is one of the biggest problems in western countries but nowadays, the problem is increasing even in low and middle-income countries. According to the report of WHO, in 2016, 39% of adults were overweight and 13% were obese.¹ Obesity is associated with peripheral hyperandrogenism; hence obesity may be associated with development of severe acne.² Body Mass Index (BMI) is used to accurately measure obesity.² There are

controversial findings regarding association between acne and BMI.

Given the increasing prevalence of acne and overweight and obesity, this study was designed to investigate the relationship between acne and BMI. We are not aware of any other studies of similar kind from our part.

Submitted: 1st February 2018

Accepted: 9th March 2018

Published: 21st March 2018

How to cite this article

Neupane S, Basnet B, Sharma TD. Association between acne and body mass index: A hospital based cross sectional study. Nepal Journal of Dermatology Venereology and Leprology. 2018;16(1):53-6. doi:<http://dx.doi.org/10.3126/njdvl.v16i1.19408>



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Objective: To find out the association between different grades of acne and BMI.

Materials and Methods

This was a cross-sectional prospective study carried out in the department of dermatology of Gandaki Medical College. Study period was from January to July 2017. Approval from the institutional review board was obtained before starting the study. Sampling method used was consecutive sampling technique. All the newly diagnosed patients of acne were enrolled in the study. Follow up patients of acne who were already under medication for acne were excluded from our study. Similarly, those under other systemic medicines which could influence acne and those who did not give consent were also excluded from the study. Informed consent was obtained from all the patients. Information on demographic data was obtained. Family history of acne in the first-degree relatives, if it was positive or negative was recorded. Height and weight were measured. BMI was calculated by dividing weight in kilograms by height in meters squared, or kg/m^2 . The World Health Organization Asian Pacific Guideline 2000 was followed for categorization of BMI.³ The patients were classified into one of the following categories: underweight (BMI < 18.5), normal weight (BMI: 18.5–23.9), overweight (BMI: 24–26.9) and obese (BMI \geq 27). Patients were examined for the types of lesions like comedone, papule, pustule, cyst, abscess or scar and the severity of acne was graded using Indian classification, which classifies acne into four grades from 1 to 4.⁴ Grade 1: Comedones, occasional papules. Grade 2: Papules, comedones, few pustules. Grade 3:

Predominant pustules, nodules, abscesses. Grade 4: predominantly cysts, abscesses, widespread scarring. Statistical analysis was performed using SPSS 17.0 for windows. One-way Analysis of Variance between groups (ANOVA) test was applied. P value was calculated and value of less than 0.05 was considered statistically significant.

Results

A total of 249 patients with acne were included in the study. Age of the patients ranged from 10 to 44 years with mean age of 20.82 ± 5.9 years. Most of the patients were in the age group of 11-20 years (Table 1). There was slightly a female preponderance with female: male ratio of 1:1.4. According to BMI, 65.5% were normal, 12% were overweight, 20.5 % were underweight and 2% of patients were obese. Majority of the patients had Grade 2 acne (52.6%). Only 4.8% had grade 4 acne. Acne of Grade 2 and 3 were more prevalent in females whereas grade 3 and 4 acne were more common among males (Table 2). A positive family history of acne was seen in 48 (19.3%) patients (Table 2). When comparison of BMI was made with the grades of acne, mean BMI was within the normal range for all grades of acne. Maximum number of obese patients had grade 4 acne, maximum number of overweight patients had grade 2 acne and maximum number of underweight patients had grade 1 acne. But there was no significant association between the BMI categories and grades of acne ($p=0.129$). Similarly, there was no significant association between the age and grades of acne ($p=0.61$).

Table 1: Distribution of patients according to age group.

Age Group	Frequency	Percentage
0-10	1	0.4
11-20	152	62.0
21-30	77	30.9
31-40	16	6.4
41-50	3	1.2
Total	249	100

Table 2: Comparison of different variables with grades of Acne.

Variables	Grades of Acne			
	Grade 1	Grade 2	Grade 3	Grade 4
No of Patients	58 (23.3%)	131 (52.6%)	48 (19.3%)	12 (4.8%)
Mean Age \pm SD (yrs)	19.5 \pm 5.2	21.2.5 \pm 6.1	21.5 \pm 6.3	19.7 \pm 3.5
BMI (mean) \pm SD (kg/m^2)	21.1 \pm 4.0	21.4 \pm 3.4	21.1 \pm 2.7	21.3 \pm 3.5
Family history (+)	11 (19%)	25 (19%)	11 (23%)	1 (8%)
Male/Female	18/40	46/84	29/19	8/4

BMI: Body mass index, SD: standard deviation

Table 3: Comparison of grades of acne with BMI.

Grade of Acne		Frequency	Percent
Grade 1	Underweight	19	32.8
	Normal	30	51.7
	Overweight	6	10.3
	Obese	3	5.2
	Total	58	100.0
Grade 2	Underweight	22	16.8
	Normal	88	67.2
	Overweight	20	15.3
	Obese	1	0.8
	Total	131	100.0
Grade 3	Underweight	7	14.6
	Normal	37	77.1
	Overweight	4	8.3
	Total	48	100.0
Grade 4	Underweight	3	25.0
	Normal	8	66.7
	Obese	1	8.3
	Total	12	100.0

Discussion

Acne vulgaris is one of the most common skin disorders affecting mostly the adolescent age group that frequently continues into adulthood.⁵ Most of our patients also belonged to the similar age group. Acne has been found more commonly in females.² Our study has also confirmed the similar finding.

Obesity affects skin physiology through various mechanisms.⁶ Fat tissue is the source for androgen production.⁷ There is a clear role of obesity in peripheral hyperandrogenism.⁸ The end effect of hyperandrogenism is the increased sebaceous glands activity which is the key factor for the development of acne.

There are still controversial reports regarding the association between BMI and acne.

There have been several studies which have confirmed the association between acne and BMI. Jancin B conducted a study in female teens and reported that moderate to severe acne was more prevalent among overweight and obese individuals.⁹ Alan S and colleague also observed a positive correlation between BMI and severity of acne, the groups with higher BMI had severe grades of acne.¹⁰ Smith RN et al observed a significant association between acne lesion counts and BMI in men aged 18 to 25 years.¹¹ Later, this

finding was also confirmed by Lu LY et al, severe acne was observed in overweight and obese individuals of age 18-25 years.¹² A study conducted on Italian adolescents and young adults reported that the acne risk was reduced with lower BMI, especially in males.¹³ A study conducted in British male soldiers revealed that individuals with acne tended to be heavier.¹⁴ In a study conducted in school children in Taiwan, acne was less prevalent in those having lower BMI (< 18.5).² A study by Halvorsen JA also showed that overweight and obesity were associated with acne in girls of age 18 and 19 years.¹⁵

On the other hand there are studies which have refuted the association between acne and its severity. A study conducted exclusively in adult women found no difference in BMI when compared to severity of acne.¹⁶ A study from Taiwan has even highlighted a negative phenomenon, obese women presented with less acne than the non-obese cases.¹⁷ In our study, there were underweight and overweight individuals in all the grades of acne. Obese individuals were also found in all the grades of acne except in grade 3. But the association between BMI and severity of acne was not significant.

Conclusion

Although there were proportion of patients who were underweight, normal, overweight or obese in almost all

the grades of acne, there was no significant association between BMI and severity of acne. However, a larger population-based study is indicated to validate our finding.

Financial disclosure: None.

Conflict of interest to disclosure: The principal author has not taken any part in the editorial decision.

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