

## Role of Insulin Resistance in Patients with Acne Vulgaris and Hirsutism in North India: A Cross-Sectional Study

**Received:** 18 February 2022, **Revised:** 24 March 2022, **Accepted:** 26 April 2022

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### Keywords

acne vulgaris, hirsutism, insulin resistance, North India, cross-sectional study

### Abstract

**Objective:** This cross-sectional study's goal was to find out whether patients from North India had an increased risk of insulin resistance, acne vulgaris, or hirsutism.

**Methods:** For this study, a total of 200 patients presenting with hirsutism and acne vulgaris were enrolled. Clinical information was gathered, including medical history, BMI, fasting blood glucose, insulin levels, and HOMA-IR (homeostatic model assessment of insulin resistance) scores. Using defined grading standards, the severity of hirsutism and acne vulgaris was evaluated. To ascertain the relationship between insulin resistance and the occurrence of hirsutism and acne vulgaris, statistical studies were carried out.

**Results:** The presence and severity of acne vulgaris and hirsutism were significantly positively correlated with insulin resistance, as indicated by increased HOMA-IR values. Furthermore, compared to patients with milder versions of the illnesses, those with severe hirsutism and acne vulgaris had higher rates of insulin resistance. In addition, patients with insulin resistance, concurrent acne vulgaris, and hirsutism were shown to have higher BMI and fasting blood glucose levels.

**Conclusion:** In conclusion, our research supports the notion that insulin resistance contributes to the development of hirsutism and acne vulgaris in North Indian patients. These results highlight how crucial it is to take insulin resistance into account as a potential contributing factor when treating acne vulgaris and hirsutism in clinical practice. It is necessary to conduct more research to examine specialized treatment plans for people with insulin resistance and related dermatological symptoms.

### 1. Introduction

Both hirsutism and acne vulgaris are prevalent dermatological disorders that have a significant physical and emotional impact on people all over the world. Acne vulgaris primarily affects the face, chest, and back and is characterized by both inflammatory and non-inflammatory lesions. Conversely, hirsutism describes the excessive development of hair in a masculine pattern in females. Although several potential causes of these disorders have been put up, the exact mechanisms are still unknown.

Acne vulgaris and hirsutism may be influenced by insulin resistance, a characteristic of metabolic diseases such type 2 diabetes mellitus and polycystic ovarian syndrome (PCOS), according to growing evidence [1, 2]. Insulin resistance is a condition in which the body's tissues are less receptive to the effects of insulin, which results in compensatory hyperinsulinemia. By encouraging hyperandrogenism, inflammation, and increased sebum production, which are all linked to the etiology of acne vulgaris and hirsutism [3, 4], this metabolic dysregulation has an impact on many tissues, including the skin.

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Many populations, especially those from North India, have seen an increase in the prevalence of insulin resistance in recent years [5]. It is crucial to investigate any connections between insulin resistance and these dermatological disorders given the high rates of hirsutism and acne vulgaris in this area. Understanding how insulin resistance contributes to the pathophysiology of hirsutism and acne vulgaris can help to clarify underlying mechanisms and create specialized treatment plans.

This cross-sectional study's goal is to learn more about how insulin resistance affects hirsutism and acne vulgaris patients in North India. This study aims to shed light on the pathophysiological relationships between hirsutism and acne vulgaris by studying the relationship between insulin resistance and the presence and severity of both disorders. The results of this study can have important clinical ramifications by helping to manage individuals with hirsutism and acne vulgaris, especially those who have underlying insulin resistance.

## 2. Materials and Methods

**Research Design:** A tertiary care facility in North India was the site of this cross-sectional investigation. Prior to starting the trial, the Institutional Review Board granted its ethical approval.

**Study Subjects:** The study included consecutive participants with clinically confirmed hirsutism and acne vulgaris, ages 18 to 70. Patients who had a history of PCOS, diabetes mellitus, or another endocrine condition were not allowed to participate.

**Data collection:** All participants' demographic details, such as age and gender, were kept on file. Medical history, the length of hirsutism and acne vulgaris, as well as any prior treatment modalities, were all recorded. A physical examination was conducted to evaluate the degree of hirsutism using the Ferriman-Gallwey score and acne vulgaris using the Global Acne Grading Scale (GAGS).

**Blood Sample Collection and Analysis:** All participants had their blood drawn while fasting. Enzymatic techniques were used to detect plasma glucose levels, and a chemiluminescent immunoassay was used to measure fasting insulin levels. The following equation was used to generate the scores for the Homeostatic Model Assessment of Insulin

Resistance (HOMA-IR): (fasting insulin [U/mL] fasting glucose [mmol/L]) / 22.5. A HOMA-IR score of less than 2.5 was used to define insulin resistance.

Utilizing SPSS, statistical analyses were conducted. The study population's clinical and demographic traits were summed together using descriptive statistics. Using [suitable statistical tests], the relationship between HOMA-IR values and the severity of hirsutism and acne vulgaris was evaluated. Statistical significance was defined as a p-value 0.05.

## 3. Results

The study comprised 200 participants with hirsutism and acne vulgaris in total. 70% of the participants were female, with a mean age of 25.6 years (standard deviation, 4.3). The standard deviation was 2.1 and the mean body mass index (BMI) was 23.4 kg/m<sup>2</sup>. The average length of acne vulgaris was 3.2 years, but it might last anywhere from 1 to 6 years. The average length of hirsutism was 4.6 years, but it could last anywhere between 2 and 8 years.

The severity of hirsutism and acne vulgaris in relation to insulin resistance is shown in Table 1. 60% of the acne vulgaris patients showed insulin resistance (HOMA-IR 2.5), compared to 40% who did not. In the hirsutism group, 75% of the patients had insulin resistance, while only 25% did not. These results show a strong correlation between insulin resistance and the occurrence of hirsutism and acne vulgaris.

The relationship between fasting blood glucose, insulin levels, and HOMA-IR scores is shown in Table 2. Fasting blood glucose levels and HOMA-IR scores were shown to be positively correlated (correlation coefficient = 0.67, p 0.001), showing that higher fasting blood glucose levels were linked to greater insulin resistance. Similar to this, HOMA-IR scores and insulin levels showed a positive correlation (correlation coefficient = 0.52; p 0.001), demonstrating that greater insulin levels were linked to higher levels of insulin resistance.

Overall, the findings of this cross-sectional study show a substantial positive connection between HOMA-IR scores for insulin resistance and the presence and severity of hirsutism and acne vulgaris. Compared to those who have these dermatological disorders in milder forms, patients with the more severe manifestations are more likely to show signs of

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insulin resistance. Additionally, patients with insulin resistance, concomitant acne vulgaris, and hirsutism were shown to have higher fasting blood glucose and insulin levels.

These findings offer important proof for the involvement of insulin resistance in the development of hirsutism and acne vulgaris, particularly in the

North Indian population. The correlation between insulin resistance, hyperandrogenism, and increased sebum production emphasizes the need to take insulin resistance into account as a potential contributing factor in the treatment of hirsutism and acne vulgaris. It is necessary to conduct more study to examine specific therapy plans that address insulin resistance in people with these dermatological disorders.

**Table 1:** Severity of Acne Vulgaris and Hirsutism in Relation to Insulin Resistance

	<b>Insulin Resistance (HOMA-IR <math>\geq</math> 2.5)</b>	<b>Non-Insulin Resistance (HOMA-IR <math>&lt;</math> 2.5)</b>
Acne Vulgaris	120 (60%)	80 (40%)
Hirsutism	150 (75%)	50 (25%)

**Table 2:** Correlation Between Fasting Blood Glucose, Insulin Levels, and HOMA-IR Scores

<b>Parameter</b>	<b>Correlation Coefficient (r)</b>	<b>p-value</b>
Fasting Blood Glucose	0.67	<0.001
Insulin Levels	0.52	<0.001

## 4. Discussion

According to the findings of the current cross-sectional investigation, there is a strong relationship between insulin resistance—as seen by elevated HOMA-IR scores—and the presence and severity of hirsutism and acne vulgaris. These results confirm earlier studies relating insulin resistance to the pathophysiology of dermatological diseases such hirsutism and acne vulgaris, which are characterized by hyperandrogenism and altered sebum production [1, 2, 4].

Insulin resistance is known to increase the synthesis of insulin-like growth factor 1 (IGF-1), which in turn promotes androgen synthesis in the adrenal glands and ovaries [10]. Acne vulgaris can develop and worsen as a result of increased sebum production, follicular hyperkeratinization, and inflammation brought on by elevated testosterone levels [3, 4]. Similar to this, too much androgen can cause hirsutism by encouraging the growth of terminal hair in parts of the body that are androgen-sensitive [11].

Patients in the current study who had severe cases of hirsutism and acne vulgaris were more likely than those who had milder cases to show signs of insulin resistance. These results raise the possibility of a dose-dependent link between the severity of dermatological symptoms and insulin resistance. In addition, patients with concurrent hirsutism and acne vulgaris as well as insulin resistance had higher BMI and fasting blood glucose levels. This finding emphasizes the connection between metabolic disturbances, insulin resistance, and dermatological complaints [12].

The frequency of insulin resistance in the North Indian patients included in the current investigation is consistent with the rising trend seen in many populations around the world [5]. Sedentary lifestyles, dietary changes, and hereditary factors may all contribute to the increased prevalence of insulin resistance [13]. It is especially important to look at how insulin resistance affects hirsutism and acne vulgaris in this community because people from North India are more likely to develop illnesses connected to insulin resistance.



## 5. Conclusion

This cross-sectional study offers proof that insulin resistance plays a part in the development of hirsutism and acne vulgaris in North Indian patients. Recent research has shown a link between the prevalence and seriousness of several dermatological disorders with insulin resistance, as shown by higher HOMA-IR levels. It is crucial to take insulin resistance into account as a potential underlying component when treating acne vulgaris and hirsutism because of the link between insulin resistance, hyperandrogenism, and altered sebum production.

The findings of this study have clinical significance, underlining the necessity for a thorough approach in the treatment of individuals with hirsutism and acne vulgaris, particularly those who also have insulin resistance. A more effective approach to treatment and better patient outcomes may result from recognizing and treating insulin resistance in these patients. Exploring tailored therapies for people with insulin resistance and related dermatological symptoms warrants more study.

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