Dyslipidemia and hyperglycemia in patients with acanthosis nigricans: A descriptive cross-sectional study

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ABSTRACT

Background

Acanthosis nigricans is a common dermatosis that typically involves the neck and intertriginous areas of the body. It is usually associated with obesity, dyslipidemia, diabetes mellitus, and insulin resistance. Studies on acanthosis nigricans from Nepal are limited.

Methods

This cross-sectional descriptive study was conducted to assess the prevalence of dyslipidemia and hyperglycemia in patients diagnosed with acanthosis nigricans at a tertiary care hospital from March 2023 to March 2024, following approval of the ethics committee. The diagnosis of acanthosis nigricans was made by a consultant dermatologist. Histopathological confirmation was performed when the diagnosis was uncertain. Demographic data, clinical history, fasting blood glucose, and fasting lipid profiles were collected from 78 consenting patients.

Results

The mean age of the participants was 31±9 years, with a slight male preponderance (59%). All the patients were from Bagmati province. Dyslipidemia was found in 40 patients (51.28%), among whom 20 had hypercholesterolemia, 13 had hypertriglyceridemia, and 7 had both. Hyperglycemia was identified in 17.95% of the patients. Both dyslipidemia and hyperglycemia were found in 10.25% of the patients. In total, 79.48% of the patients had at least one of the two metabolic problems.

Conclusion

A high prevalence of dyslipidemia and hyperglycemia was observed in patients with acanthosis nigricans. These findings underscore the need for comprehensive evaluation and management beyond dermatological treatment.

Key words: acanthosis nigricans; dyslipidemia; hypercholesterolemia; hyperglycemia; hypertriglyceridemia

Introduction

Acanthosis nigricans is a common dermatosis characterized by hyperpigmented, velvety thickening of the skin, primarily affecting the neck, groin, axillae, and other intertriginous areas[1]. It can be associated with obesity, dyslipidemia, insulin resistance, and metabolic syndrome. Acanthosis nigricans can sometimes be a cutaneous manifestation of an internal malignancy[2]. High doses of steroids, nicotinic acid, insulin, and several drugs are implicated in drug-induced acanthosis nigricans[3]. The pathophysiology is thought to involve hyperinsulinemia, which stimulates the proliferation of epidermal keratinocytes and dermal fibroblasts[4]. The management of acanthosis nigricans involves addressing the underlying causes, including metabolic abnormalities and drug exposure, alongside cosmetic and topical interventions[5]. Timely diagnosis and treatment are important.

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Acanthosis nigricans has also been reported to be associated with various demographic parameters like gender, age, socio-economic status, education level, and ethnicity[6-8]. This could be because of a complex interplay of factors like genetics, diet, environmental exposure, and health-seeking behaviors. Reports on the association of dyslipidemia and hyperglycemia with acanthosis nigricans vary in the literature. This has been variably reported as modest and non-significant to very strong[9-14]. There are very few published studies from Nepal that have explored the prevalence of hyperglycemia and dyslipidemia in patients with acanthosis nigricans[15]. The available studies from Nepal were conducted in rural or semi-urban settings. The primary objective of this prospective study was to investigate the prevalence of dyslipidemia and hyperglycemia in patients diagnosed with acanthosis nigricans in a teaching hospital of an urban setting in Nepal.

Materials and Methods

This is a hospital-based descriptive study of patients diagnosed with acanthosis nigricans over one year. The study was conducted in the Department of Dermatology, Venerology, and Leprology of a tertiary care teaching hospital in Kathmandu. The study was started after obtaining ethical approval (Ref. No.: 10022023/02). Non-probability convenient sampling technique was used for patient selection. The study included 78 consenting patients with acanthosis nigricans who attended the hospital's dermatology clinics from March 2023 to March 2024. Histopathology was performed when the clinical diagnosis was uncertain. Fasting lipid profiles and fasting blood glucose levels were obtained from all patients.

Dyslipidemia was defined as either elevated fasting blood cholesterol level (>200 mg/dl), or elevated fasting blood triglyceride level (>150 mg/dl), or if the patient was on any lipid-lowering drug. Hyperglycemia was defined as either fasting blood glucose greater than 110 mg/dl or if the patient had an established diagnosis of diabetes mellitus.

Demographic details, like age, gender, level of education, family history of acanthosis nigricans, duration of disease, associated symptoms, and laboratory reports, were recorded in the pre-designed proforma. Descriptive figures and charts were prepared in Microsoft Excel 2019.

Results

We enrolled a total of 78 patients with acanthosis nigricans. A representative photograph of the lesion is presented in Figure 1.

Figure 1: A representative photograph of a patient with acanthosis nigricans

There were 46 males (59%) and 32 females (41%). The mean age of the patients was 31±9 years. The majority of the patients were Brahmin (Hill). The ethnic distribution of the patients is presented in Figure 2.

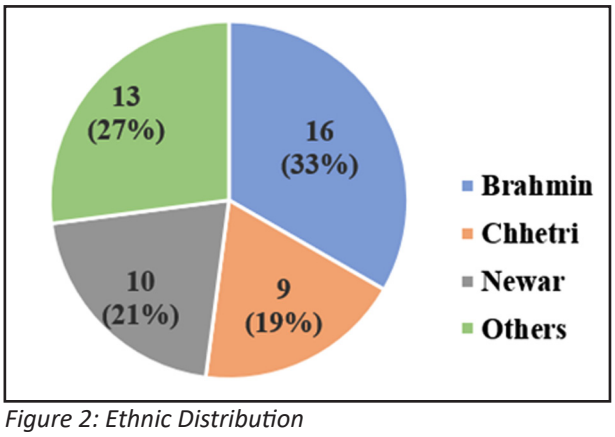

Figure 2: Ethnic Distribution

All the patients were from Bagmati province. There were 47 patients (60%) from Kathmandu, 20 patients (26%) from Bhaktapur, and 11 patients (14%) from Lalitpur districts. A total of 35 patients had completed graduation, 22 patients had completed grade 12, and 21 patients had only completed grade 10. A total of 17 patients had a family history of acanthosis nigricans. The median duration of acanthosis nigricans at the time of data collection was 5 years (interquartile range: 4 years). One patient had a history of only 4 months, whereas

the longest duration of illness was 16 years. The neck region was the most commonly affected site. It was involved in all the diagnosed patients. In 13 male patients, there were concomitant lesions in the axilla. There was a history of similar lesions in family members in 17 patients. No patient provided any history of commonly implicated drug use preceding the development of acanthosis nigricans. These details are tabulated in Table 1.

A total of 62 patients (79.48%) with acanthosis nigricans had either dyslipidemia, hyperglycemia, or both. Dyslipidemia was found in 44 patients, among whom 22 had isolated hypercholesterolemia, 15 had isolated hypertriglyceridemia, and 7 had both hypertriglyceridemia and hypercholesterolemia. In our cohort, 18 patients had either elevated fasting glucose or an established diagnosis of diabetes mellitus. There were 5 patients with both dyslipidemia and hyperglycemia. These values have been tabulated in Table 2. Central obesity was noticed in 12 male patients, but only 7 among them had laboratory evidence of a deranged lipid profile or elevated blood glucose levels.

Table 2: Distribution of dyslipidemia and hyperglycemia

Diagnosis	Number (%)
Dyslipidemia Hypercholesterolemia Hypertriglyceridemia Both	40 (51.28%) 20 13 7
Hyperglycemia Elevated fasting glucose Diagnosis of diabetes mellitus	14 (17.95%) 7 7
Both dyslipidemia and hyperglycemia	8 (10.25%)
Total	**62 (79.48%)**

Table 2: Details of acanthosis nigricans

Particulars	
Median duration of disease	5 (IQR: 4) years
Shortest duration of disease	4 months
Longest duration of disease	16 years
Commonest involved area	Neck

Discussion

This study highlights a high prevalence of metabolic abnormalities in patients with acanthosis nigricans. Nearly 80% of the patients exhibited at least one of the two studied comorbidities. More importantly, most of our patients sought dermatological opinion because of concerns about the physical appearance of the disease, and were unaware of their underlying associated disorders. These findings emphasize the need for routine metabolic screening in patients presenting with acanthosis nigricans.

Previous studies have shown varying rates of association of acanthosis nigricans with metabolic disorders. A previous study conducted in a semi-urban region of Nepal reported a higher prevalence of both dyslipidemia and elevated blood glucose levels compared to our findings[15]. This could be because our patients were relatively younger (31 years ± 9 years) and from urban areas, and were thus more likely to seek timely treatment for dermatological and non-dermatological illnesses. All our patients were from Kathmandu, Bhaktapur, and Lalitpur.

Ethnicity, education, environmental factors, and geographic location influence many dermatological conditions[16-18]. These factors also influence health-seeking behavior and treatment adherence. The majority of our patients were from the Brahmin, Newar, and Chhetri communities. This is consistent with the ethnic distribution of Kathmandu Valley. However, it was beyond the scope of our study to examine the effect of ethnicity, educational level, or geographic location on the presentation of acanthosis nigricans. Such demographic information will be important when designing future studies in this field.

There was a slight male preponderance in our study (59%), which contrasts with many studies that show a nearly equal sex ratio in acanthosis nigricans[19]. This could be because male patients are more likely to seek healthcare compared to their female counterparts in Nepal. The relatively small sample size of the study also probably contributed to the skewed nature of the data. Our study included 12 male patients with central obesity, but only 7 of them had a deranged lipid profile or increased blood sugar level. Overall, the neck was the most commonly involved anatomic site. This finding is consistent with other studies[20,21].

This study used a cross-sectional, descriptive design, which is vulnerable to biases and limitations, including selection bias, information bias, and incomplete data. The patients were enrolled in an urban, single-center tertiary care hospital, so

these findings may not be generalizable to other healthcare settings. Most of our patients sought dermatological opinion because of concerns about the physical appearance of the disease, rather than the underlying associated disorders.

Conclusion

In this study, a substantial proportion (79%) of patients with acanthosis nigricans exhibited dyslipidemia, hyperglycemia, or both. These findings underscore the importance of recognizing acanthosis nigricans as a potential clinical marker of underlying metabolic dysfunction. Dermatologists should maintain a high index of suspicion for associated systemic comorbidities when evaluating patients with this condition. Larger studies are warranted to better understand the relationship between different subtypes of acanthosis nigricans and various metabolic abnormalities in our population.

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