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Determining the prevalence of Acanthosis nigricans in patients with type 2 diabetes mellitus: A prospective study

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Abstract
Background: Diabetes among Indian population is increasing in alarming rate. Acanthosis nigricans (AN) is reported as an early marker in the development of type 2 diabetes mellitus (T2DM).
Aims and Objective: To determine the prevalence of AN in a population of patients with type 2 diabetes mellitus.
Materials and Methods: Hundred T2DM patients were screened for the AN at Sharma Hospital, Gwalior from February 2016 to July 2016.
Results: Most common age group was 40-50 years (64%) with mean age of 43.56±12. 43 years. Male preponderance was observed (64%). Prevalence of A was 34%. Most common site of AN in present study was neck (96%) followed by axillae (42%).
Conclusion: Prevalence of AN is high, early detection could be used to initiate proper intervention in T2DM patients.

Keywords: insulin resistance, neck, American diabetes association, acanthosis nigricans

Introduction
The American Diabetes Association (ADA) in the year 2000 has put acanthosisnigricans (AN) in the list of risk factor for type 2 diabetes mellitus (T2DM) [1]. AN is reported to be because of increase in insulin concentration resulting in to activation of insulin-like growth factor 1 receptors on keratinocytes and fibroblasts, leading to their proliferation [2].
Clinical findings have revealed that neck is involved most commonly in T2DM patients [3]. It is also well established that progression of T2DM also increases insulin resistance (IR) in diabetes patients. AN has been reported as an early marker for the development of IR in T2DM patients [4].
Hence it will be beneficial to detect IR in the community so the early intervention can be done for the prevention of diabetes. The findings of present study could be used as the screening tool for the detection of IR in T2DM patients.
Hence present study was done to find out the prevalence of AN in the patients with T2DM.

Materials and Methods
Present cross-sectional study was performed on 100 T2DM patients at Sharma Hospital, Gwalior from February 2016 to July 2016.
The inclusion criteria included all T2DM patients and aged 30–70 years seen between February 2016 to July 2016. Patients with known malignancies, heavy alcohol use, known secondary diabetes or current systemic corticosteroid use were excluded from the present study.
A detailed anthropometric measurement including weight, height and BMI was recorded. A detailed history and personal profile including age, sex and past history were recorded. The presence of a was assessed at five location including neck, axilla, elbows, knuckles and knees.
Diagnosis of diabetes was done using a finger-prick blood glucose measurement using Accu- Check® Active (Roche, Mannheim, Germany) and values were recorded in mg/dl. In all the patients fasting blood glucose, post prandial blood glucose and HbA1c was recorded.
All the data analysis was performed using IBM SPSS ver. 20 software. Quantitative data was expressed as mean ± standard deviation (SD) whereas categorical data was expressed as percentage. Cross tabulation and frequency distribution was used to prepare the table and Microsoft excel 2010 was used to prepare the required graph. Level of significance was assessed at 5% level.

Results
Out of 100 patients enrolled, maximum patients were in the age group of 40-50 years (64%). Mean age of study cohort was 43.56±12. 43 years (range 30 to 70 years). Maximum patients were male (65%) followed by female (36%).
Mean duration of diabetes was 5.64±2.43 years. Mean BMI of study cohort was 31.2 kg/m2. Mean FBS, PPG and HbA1c were 154.24±14.89 mg/dl, 256.23±32.56 mg/dl and 8.23±2.12% respectively of the 100 patients, 34% patients were found to have AN.
The most common site of AN was neck (96%) followed by axillae (42%), 38% had AN in both the neck and axillae. AN on the elbows (1%) and knuckles (2%) and knee (0%) was not that common.

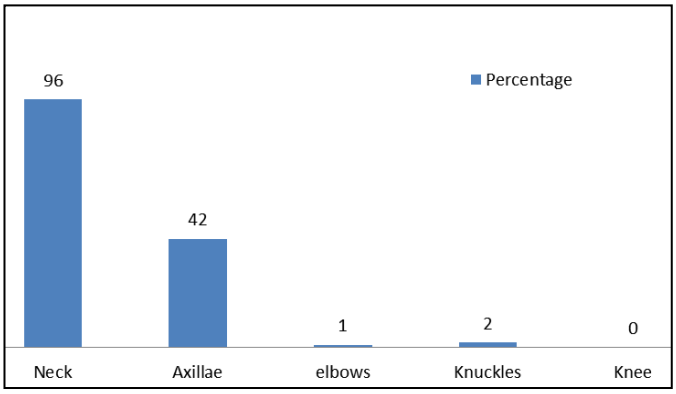

Fig 1: Showing common site of AN

Discussion

American Diabetes Association (ADA) describe AN as one of the important risk factor for the development of T2DM. Because of that AN has been included in the risk assessment protocols since the year 2000. ADA recommend to detect T2DM in patients without diabetes related symptoms who had a BMI of ≥ 25 kg/m2 and patients who have one or more additional risk factor with AN seen as a marker of insulin resistance [5].

In present study AN was seen in 34% of the T2DM patients, higher percentage were reported in the study from the Caribbean (52.7%) [5], New Mexico (47%) [6] and Texas (41.1%) [7]. Evidences are available stating the range of prevalence from 17% reported in Nigeria13 to 73.3% reported in Indian population8. Study done by Stuart *et al* reported a huge difference in insulin sensitivity of affected skin areas as compared to normal skin area [3]. Bhagyanathan *et al* determined whether easily observable presence of AN can be used to screen for increased IR in 507 patients and reported that 39.5% of the patients had which is in agreement to the present study finding [8]. Study done by Hud *et al* reported that 74% of obese population exhibited AN [9]. Some populations have a higher incidence of AN. For example, African-Americans are 25 times more likely to have it as compared to people of American descent [9]. The prevalence of AN in overweight child aged 7–17 years was 23% in Latino patients and 19.4% in African American patients [10].

The back side of the neck was the most common site affected in present study (96%) which is in agreement with the study performed on Indian population which has reported a prevalence of 93.5% [11] and study from Mexico American populations (93%) [7]. Based on the results revealed, it is suggested that inspection of neck can give a fair idea of presence of a and therefore of insulin resistance for mass screening.

International Diabetes Federation reports that more than 59% of the patients with diabetes are still undiagnosed [12]. In present study we found that AN play an important role in detecting obesity mediated insulin resistance and hence it can be used in the screening process of T2DM.

The cross sectional nature of the present study was the main limitation; hence present study findings cannot be applied to whole population. Small sample size was another limitation; a large randomized clinical trial is needed to strengthen the present study findings.

Conclusion

Prevalence of AN in T2DM patient is high. Early detection of precursor to T2DM may allow the community time to put in practice intervention strategies before onset of diabetes and its complications.

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