

Introduction/Background

Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder among women of reproductive age. Insulin resistance is a key aspect of PCOS. Acanthosis Nigricans (AN) is a visible and easily recognized cutaneous marker that indicates underlying metabolic issues.

Objective

To evaluate Acanthosis Nigricans as a clinical screening marker for PCOS among Young women

Material and Methods

A prospective cross-sectional study was conducted from October 2024 to March 2025 among female university students (aged ≥ 18 years) at Dr. D. Y. Patil Unitech Society, Pune. Acanthosis Nigricans (AN) was evaluated using Burke's scale, which assesses the severity of neck involvement based on skin texture and thickening, with scores ranging from 0 to 4. Statistical analysis was performed using chi-square test, one-way ANOVA, logistic regression, and Pearson's correlation test, with $p < 0.05$ considered statistically significant.



Fig no-1 Clinical grades of AN (Burke's scale); Courtesy: Dr. Gulrez Tyebkhan, Saifee Hospital, Mumbai; Grade 1: Present; Grade 2: Mild; Grade 3: Moderate; and Grade 4: Severe

Location and score	Description
Neck severity	
0	Absent: Not detectable on close inspection
1	Present: Clearly present on close visual inspection, not visible to the casual observer, extent not measurable
2	Mild: Limited to the base of the skull, does not extend to the lateral margins of the neck (usually 3 inches in breadth)
3	Moderate: Extending to the lateral margins of the neck (posterior border of the sternocleidomastoid) (usually 3-6 inches) should not be visible when the participant is viewed from the front
4	Severe: Extending anteriorly (6 inches), visible when the participant is viewed from the front

Table 1: Burke's scale for AN

Result and Analysis

Among the 540 participants, 440 (81.48%) were classified as normal, 51 (9.4%) had a previous diagnosis of Polycystic Ovary Syndrome (PCOS), and 49 (9.1%) were identified as high-risk for PCOS. Among the high-risk participants, 8 (16.3%) underwent pelvic ultrasonography (USG), of whom 4 (50%) were confirmed to have PCOS. Additionally, 2 participants showed bulky ovaries but did not meet the complete diagnostic criteria for PCOS.

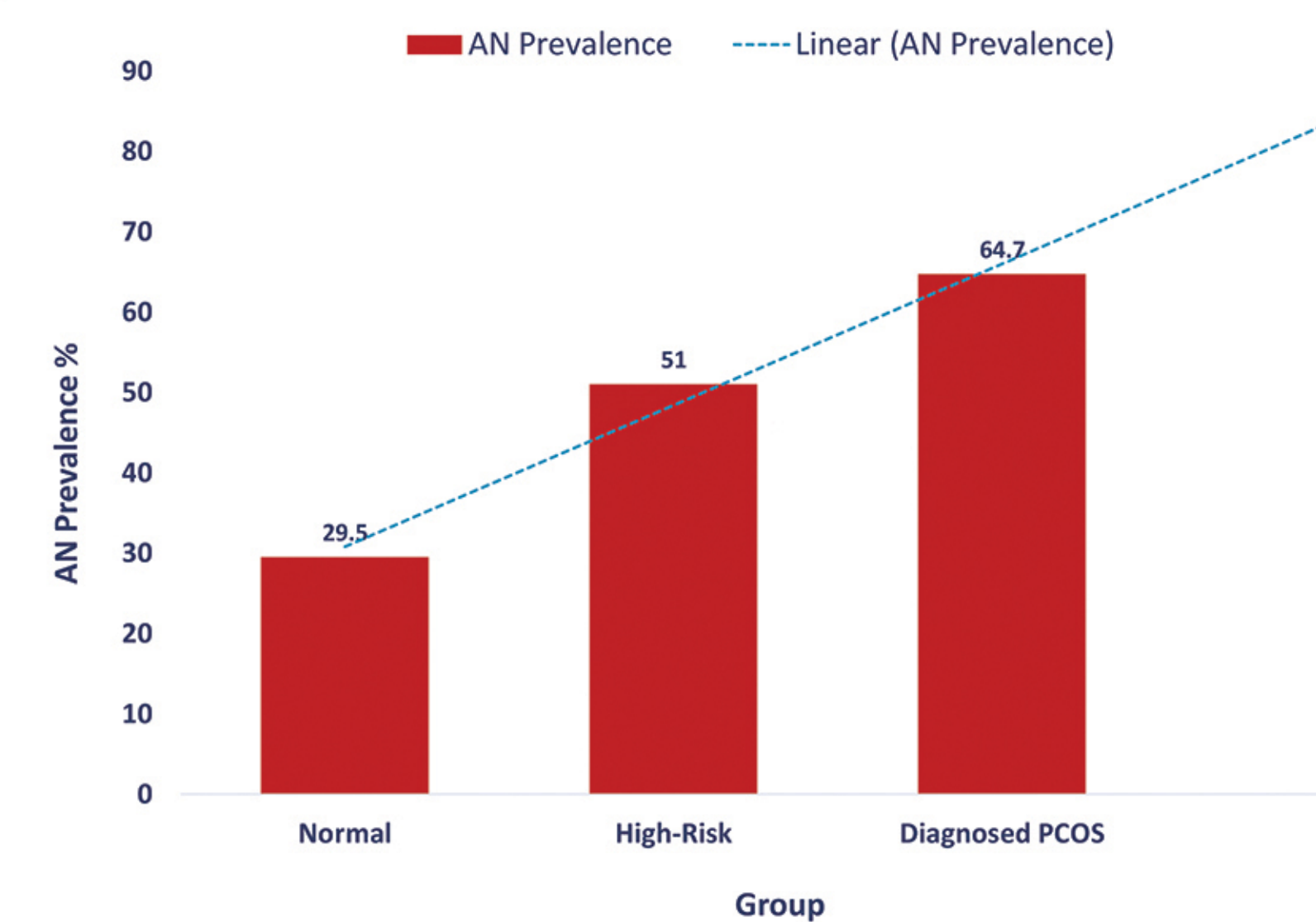


Chart 1: PCOS Risk Vs Prevalence of Acanthosis Nigricans

Variable	Total (n=540) Mean \pm SD	Normal (n=440) Mean \pm SD	High Risk (n= 49) Mean \pm SD	Diagnosed PCOS (n=51) Mean \pm SD	Significance
Acanthosis Nigricans	0.48 \pm 0.77	0.38 \pm 0.67	0.76 \pm 0.92	1.04 \pm 1.076	<0.001*

Table 2: Quantitative independent variable grouped based on Population groups and the significance of observed differences

The prevalence of AN is observed to be 29.5% among individuals with normal status, which increases to 51.0% in the high-risk group and further rises to 64.7% among those diagnosed with PCOS. This trend demonstrates that as the risk and severity of PCOS increase, the prevalence of Acanthosis Nigricans nearly doubles. Acanthosis Nigricans was significantly more present in the diagnosed PCOS group (41.2%) compared to the high-risk (32.7%) and normal groups (23.2%) ($p < 0.001$). We observed a steady increase in AN severity from the normal group to the diagnosed PCOS group. The average Burke scores were lowest in the normal group (0.38 \pm 0.67), higher in the high-risk group (0.76 \pm 0.92), and highest in those diagnosed with PCOS (1.04 \pm 1.07) ($p < 0.001$).

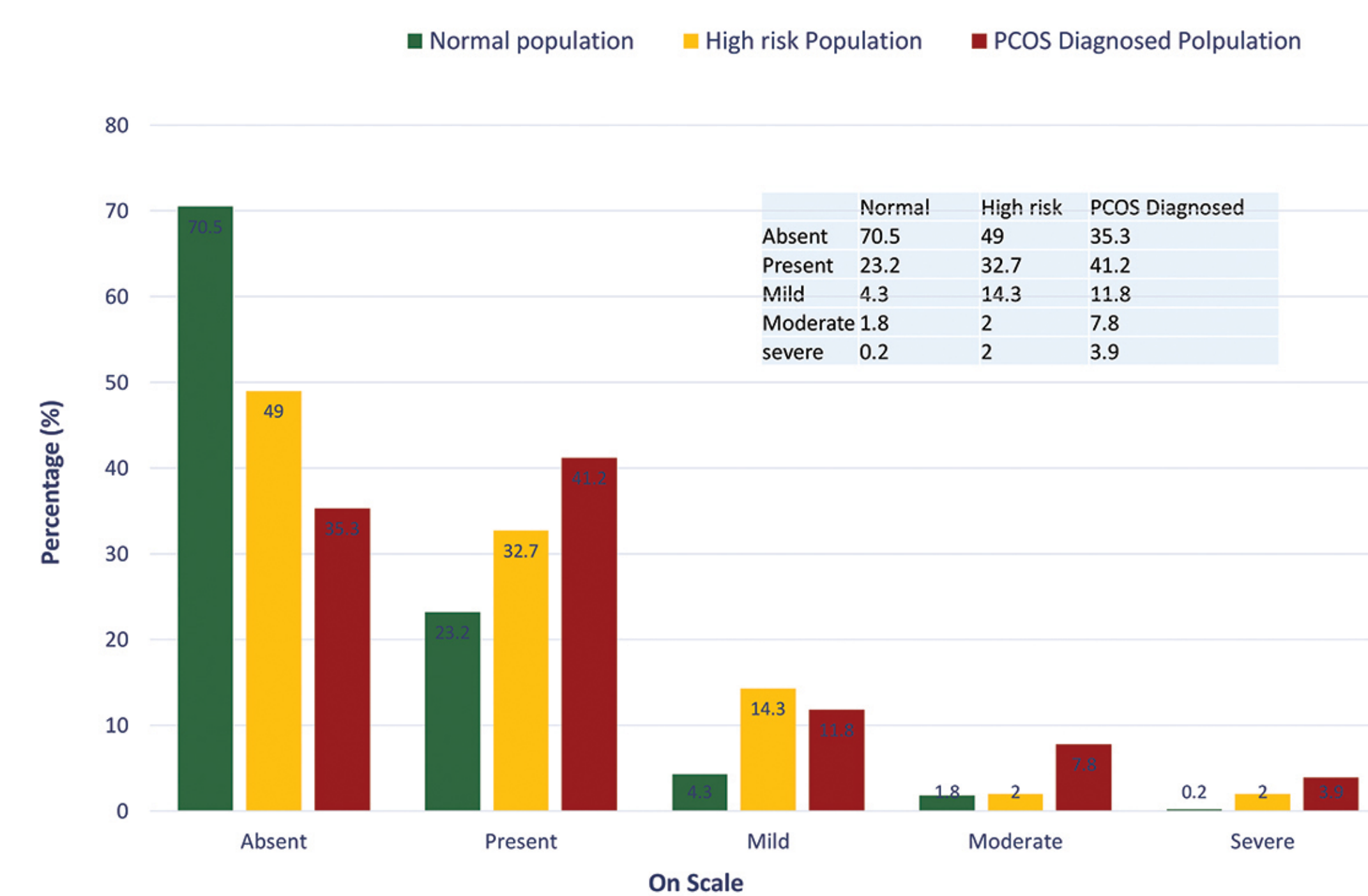


Chart 2 : Severity of Acanthosis Nigricans across Population Groups (Significant Difference: $p < 0.001$)

Variables	PCOS Diagnosed		High-Risk		PCOS Diagnosed		High-Risk	
	Univariate Binary Logistic Regression	Multivariate Logistic Regression	Univariate Binary Logistic Regression	Multivariate Logistic Regression	Univariate Binary Logistic Regression	Multivariate Logistic Regression	Univariate Binary Logistic Regression	Multivariate Logistic Regression
Acanthosis Nigricans	Unadjusted odds Ratio (95%CI)	Significance	Adjusted odds Ratio (95%CI)	Significance	Unadjusted odds Ratio (95%CI)	Significance	Adjusted odds Ratio (95%CI)	Significance
	2.2(1.6-3.0)	<0.001	1.8(1.2-2.7)	0.003	1.7(1.2-2.4)	<0.001	2.4(1.7-3.4)	<0.001*

Table 3 :Unadjusted and adjusted odds ratio of significant variables.

- AN significantly associated with PCOS in univariate analysis (OR: 2.2; $p < 0.001$)
- AN confirmed as an independent predictor of PCOS in multivariate analysis (AOR: 1.8; $p = 0.003$)
- Significant association observed in high-risk group (OR: 1.7; $p < 0.001$)
- AN remained a strong predictor of high-risk status after adjustment (AOR: 2.4; $p < 0.001$)

Conclusion

Acanthosis Nigricans is a common and clinically meaningful finding among women with PCOS and those at high risk. This skin condition is a clinical surrogate for insulin resistance, which is implicated in 50-70% of PCOS cases. It is non-invasive assessment therefore making it practical and cost-effective screening method for early identification of PCOS in young populations.

Clinical Significance & HEOR Implications

- Early screening of AN may help in timely referral, diagnosis, and management of PCOS among young women.
- Acanthosis Nigricans (AN) may serve as a simple and cost-effective clinical marker for early PCOS risk identification.
- AN-based screening may offer value in resource-limited settings from a HEOR perspective.

Reference

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2. Tyebkhan G, Velaskar S, Yadav P. An Indian Expert Group Review of Acanthosis Nigricans with Recommendations for Early Detection and Timely Management. *J Assoc Physicians India* 2024;72(6):74-84 2024;

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