



A CROSS SECTIONAL STUDY OF SKIN MANIFESTATIONS IN OVERWEIGHT AND OBESE SCHOOL CHILDREN AGED 11-18 YEARS.

Paediatrics

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ABSTRACT

Background: Childhood obesity has become a significant public health concern globally, and its impact on the skin is a growing area of interest. Obese children are more likely to develop various skin conditions, including immune-mediated diseases like alopecia areata, atopic dermatitis and psoriasis^{1,2}. The skin manifestations associated with obesity in children can be a marker of insulin resistance and metabolic abnormalities³.

Materials and Methods: This cross-sectional study will be among Overweight and obese school going children aged 11-18 years. Overweight and obese children will be recruited based on the World Health Organization (WHO) growth reference for school-aged children and adolescents⁴. A pre-structured pro forma will be used to record demographic details, weight, height and BMI. The study was carried out among 135 children over a period of august 2023 to July 2024 in school going children in Devanahalli, Bengaluru rural. The collected data was analyzed using SPSS version 25. **Results:** Most of the patients were overweight(76%). Females (60%) outnumbered males(40%) in our study. Majority of the patients had acanthosis nigricans (78%), which was followed by striae distensae (20%), acne Vulgaris (8%) and rest of them had no skin manifestations.

Conclusion: This study highlights the significant relationship between obesity and skin manifestations in school children aged 11-18 years. The findings suggest that overweight and obese children are more likely to develop various dermatological conditions, which can have a substantial impact on their quality of life. The study's results emphasize the importance of addressing obesity as a comprehensive health issue, incorporating dermatological care as an essential component of overall health management. Early identification and treatment of skin manifestations can help mitigate the negative effects of obesity on skin health and improve the overall well-being of affected children. Healthcare providers should be aware of the dermatological consequences of childhood obesity and provide comprehensive care that addresses skin health. Parents and caregivers should be educated about the skin-related risks associated with obesity and encouraged to promote healthy lifestyle habits.

KEYWORDS

BMI (Body Mass Index), Quality of life (QoL), AN (Acanthosis nigricans)

INTRODUCTION

- Childhood obesity has become a significant public health concern globally, with far-reaching consequences for the physical and mental health of affected children [1]. One often-overlooked aspect of obesity is its impact on the skin. Obese children are more likely to develop various skin conditions, which can have a significant impact on their quality of life [2].
- The skin plays a crucial role in maintaining overall health, and obesity can disrupt its normal functioning [3]. Excess weight can lead to changes in skin physiology, increasing the risk of various dermatological conditions [4]. Understanding the relationship between obesity and skin health is essential for developing effective prevention and treatment strategies.
- This study aims to investigate the frequency and types of skin manifestations in overweight and obese school children aged 11-18 years, providing valuable insights into the dermatological consequences of childhood obesity.

Objectives

- The aim of this study is to determine the frequency and types of skin manifestations in overweight and obese school children aged 11-18 years. Specifically, the study aims to:
- Identify the common skin manifestations associated with obesity in this age group
- Evaluate the relationship between skin manifestations and anthropometric data, such as body mass index (BMI)
- Assess the impact of skin disorders on the quality of life (QoL) of young people with obesity

MATERIALS AND METHODS

Study Design and Setting

This cross-sectional study was conducted to evaluate skin manifestations in overweight and obese school children aged 11-18 years. The study was carried out over a period of august 2023 to July 2024 in school going children in Devanahalli, Bengaluru rural. Data on demographic details, weight, height and BMI were collected and analyzed using SPSS version 25.

Study Population

The study included 135 school going children in Devanahalli, Bengaluru rural who were overweight and obese.

Inclusion and Exclusion Criteria

Inclusion Criteria

- School children aged 11-18 years
- Overweight or obese according to the World Health Organization (WHO) growth reference for school-aged children and adolescents.⁵
- Willingness to participate in the study and provide informed consent (for parents/guardians) and assent (for children).

Exclusion Criteria

- Children with known skin diseases not associated with obesity
- Children taking medications that may affect skin manifestations
- Children with chronic illnesses that may affect skin health

Data Collection

Data were systematically collected using a pre-structured questionnaire administered through interviews with parents/guardians and, where appropriate, the children. The questionnaire included:

- Demographic details, weight, height and BMI.
- The different cutaneous manifestations will be noted

Data Analysis

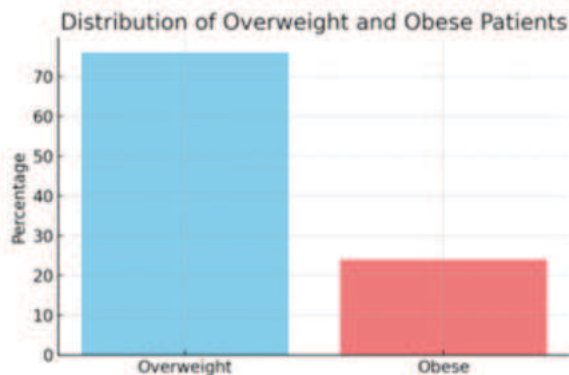
Collected data were entered into a computer and analyzed using Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Frequencies and percentages were calculated for categorical variables.

Ethical Considerations

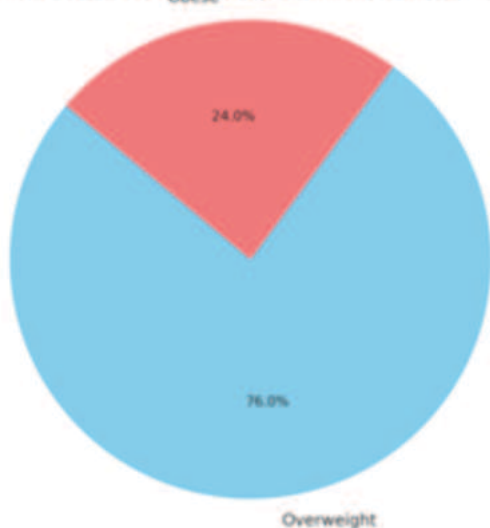
The study was conducted in accordance with ethical guidelines, and approval was obtained from the institutional ethics committee. Informed consent was obtained from the parents or guardians of all participating children. Assent was also taken from children above 7 years of age, as per ethical guidelines.

RESULTS

Bar Graph 1- Bar Graph: Distribution of Overweight and Obese Patients



Distribution of Overweight and Obese Patients



Pie Chart: Distribution of Overweight and Obese Patients

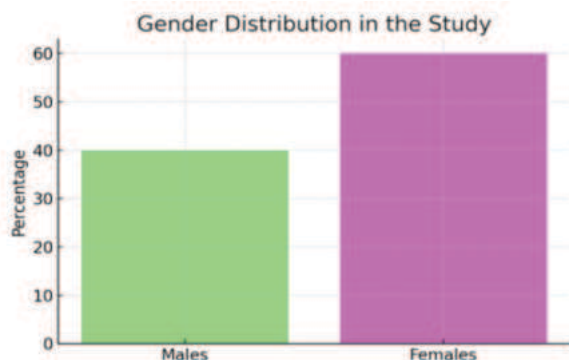
This pie chart illustrates the proportion of overweight and obese school children aged 11–18 years included in the study. Overweight children constituted the majority at 76%.

The remaining 24% were classified as obese.

This indicates a higher prevalence of overweight status compared to obesity in the study population.

Bar Graph 2 : Gender Distribution in the Study

This graph displays the gender-wise distribution of participants:



Females (60%) outnumbered males (40%) in this study.

This may reflect either a higher prevalence of overweight/obesity among females in the sample or a higher participation rate.

Together, these graphs highlight key demographic characteristics and

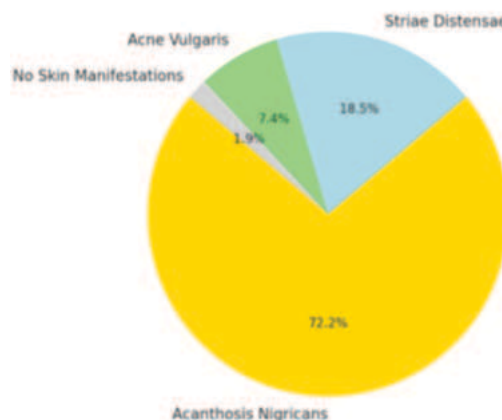
weight categories among the study population, which are crucial for planning targeted skin and metabolic health interventions.

Here are the Visual and Tabular Representations of Skin Manifestations in Overweight and Obese Children:

Skin Manifestation	Percentage (%)
Acanthosis Nigricans	78%
Striae Distensae	20%
Acne Vulgaris	8%
No Skin Manifestations	2%



Skin Manifestations in Overweight and Obese Children



In this cross-sectional study, skin manifestations were frequently observed among overweight and obese participants. The findings are summarized as follows:

Acanthosis Nigricans (78%)- This was the most commonly observed skin condition. It is characterized by dark, velvety patches typically seen in body folds such as the neck, axillae, and groin. Acanthosis nigricans is strongly associated with insulin resistance, which is common in overweight and obese children.

Striae Distensae (20%)- Also known as stretch marks, these are linear bands of atrophy of the skin resulting from rapid weight gain and stretching of the dermis. They were seen predominantly on the abdomen, thighs, and arms.

Acne Vulgaris (8%)- Acne was present in a smaller proportion of children and may be related to hormonal changes associated with obesity and puberty. Increased sebaceous gland activity and androgen levels contribute to its pathogenesis.

No Skin Manifestations were seen in 2% only a minority of the study population showed no cutaneous signs, highlighting that skin involvement is a common external marker of metabolic status in overweight and obese adolescents.

DISCUSSION

In the present cross-sectional study, we observed that skin manifestations were present in 98% of overweight and obese school children aged 11–18 years. This finding aligns with previous literature indicating a strong correlation between adiposity and dermatological changes in pediatric populations.

Acanthosis nigricans (78%) was the most frequent cutaneous manifestation in our study, similar to findings reported by Mishra et al., who found AN in 74.5% of overweight and obese children, suggesting a consistent association between AN and insulin resistance in this age group⁶. Another study by Bhuria et al. found AN in 82.1% of obese adolescents, reinforcing its utility as a clinical marker for early metabolic dysfunction.⁷

Striae distensae (20%) were the second most prevalent finding. Our results were consistent with those of Madhuri et al., who reported striae in 23.6% of obese adolescents, mainly over the abdomen and thighs⁸. However, a study by Sudhakar et al. reported a higher prevalence (31%), possibly due to a larger proportion of severely obese participants in their cohort⁹. These variations suggest that striae may correlate more strongly with the degree of obesity and rapidity of weight gain.

Acne vulgaris (8%) was noted in our study, which is lower compared to the 13.7% prevalence reported by Ranjan et al. among obese adolescents¹⁰. The difference may be attributed to hormonal variations, differences in pubertal staging, or regional dietary factors influencing sebum production. Obesity is known to exacerbate acne through increased androgen activity and insulin resistance, though not all children with obesity will present with acne.

Gender Distribution

In our study, females (60%) outnumbered males (40%). This is consistent with the findings of Kumar et al., who reported a higher prevalence of obesity and overweight among girls in urban school settings, possibly due to lifestyle factors including reduced physical activity and higher psychosocial stress¹¹. The gender disparity may also be due to increased body image awareness and health-seeking behavior among adolescent females.

Comparison of Prevalence of Overweight vs Obesity

The predominance of overweight children (76%) over obese children (24%) in our study is comparable to national data. Ranjani et al. conducted a systematic review and noted that the pooled prevalence of overweight among Indian school children was 12.6%, while obesity stood at 3.9%, suggesting that overweight remains a larger burden than obesity in Indian school settings¹². The higher percentage in our study could reflect a regional variation or urban school setting with increased sedentary behavior and dietary risks.

Skin Manifestations as Screening Tools

The high prevalence of skin changes in overweight/obese children highlights the potential of dermatological signs as early non-invasive markers for metabolic syndrome. This is supported by Phiske et al., who emphasized the utility of AN as a surrogate clinical indicator of insulin resistance and metabolic risk¹³.

CONCLUSION

The present study highlights a high prevalence of skin manifestations among overweight and obese school-going children aged 11–18 years. Acanthosis nigricans emerged as the most common dermatological finding, followed by striae distensae and acne vulgaris. These cutaneous markers serve as important, visible indicators of underlying metabolic disturbances, particularly insulin resistance and rapid weight gain.

Given the rising trend of childhood obesity, early recognition of such skin changes can aid in prompt identification, risk stratification, and timely intervention to prevent long-term metabolic complications. Routine dermatological evaluation should therefore be integrated into the clinical assessment of overweight and obese children, particularly in school health screening programs.

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