www.jmscr.igmpublication.org
Impact Factor 5.84
Index Copernicus Value: 71.58
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v5i10.23

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

# Dermatological Maifestations of Obesity

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**ABSTRACT**
**Background**: *Obesity has reached epidemic proportions in many parts of the world. Obesity causes abnormalities in several functions of skin and cause several skin manifestations.*
**Objective:** *To study the various dermatological manifestations of obesity.*
**Methods:** *This was a descriptive comparative study which was conducted in the Obesity Clinic of the Department of Physical Medicine and Rehabilitation in a tertiary care hospital. The study compared the skin manifestaions of hundred obese individuals above 12 years with that of hundred non obese individuals.*
**Results:** *The commonest skin manifestation was acanthosis nigricans. Features of hyperandrogenism and increased incidence of cutaneous infections were seen.*
**Conclusion:** *Although obesity is recognised as a major health problem , little attention has been paid to the impact of obesity on the skin and hence this study was undertaken*
**Keywords:** *Dermatological manifestations ,Obesity, acanthosis nigricans.*

## Introduction

Obesity is defined as an increase in body weight beyond skeletal and physical standards as a result of excessive accumulation of body fat. The World Health Organisation defines obesity as a BMI equal to or more than 30[1]. Obesity is increasingly being recognized as a major public health problem. Environmental and genetic factors play a role in the development of obesity.[2] The most widely accepted method for determining obesity is by measuring body mass index [3]

BMI = Weight in kilograms / Height in meter$^2$
BMI 30 and above – obese

Obesity increases the risk of coronary heart disease, hyperlipidaemia, osteoarthritis, diabetes and sleep apnoea. Obesity is the single most reason for the development of metabolic syndrome. It is also directly linked with many other disorders like PCOD, Cushings syndrome, bulimia nervosa, GERD, fatty liver, cholelithiasis, colonic cancers, stroke, breast cancers.[3]

Obesity causes abnormalities in several functions of the skin, including sebum production, skin barrier function and sweat production. It also induces changes in lymphatics, collagen structure and function and subcutaneous fat. Two gene products leptin and pro-opiomelanocortin are thought to mediate these skin abnormalities.

Skin manifestations of obesity include acanthosis nigricans, acrochordon, keratosis pilaris, hirsutism, striaedistensae, adiposis dolorosa and redistribution of body fat. Acanthosis nigricans is the most common dermatological manifestation of obesity. Acrochordon is strongly associated with diabetes than obesity. Hyperandrogenism leads to hirsutism, acne vulgaris, hidradenitis suppurativa and androgenic alopecia. Skin diseases aggravated by obesity include lymphoedema, chronic venous insufficiency, plantar hyperkeratosis, cellulite, skin infections, psoriasis, tophaceous gout.[2]

Though obesity is recognized as a major health problem, there is a dearth of studies on the effects of obesity in the skin. Hence the present study was undertaken to study the various cutaneous manifestations of obesity.

**Methods**

This was a descriptive comparative study conducted in 100 obese persons above 12 years. Those persons with normal BMI were included as comparative group. Patients with diabetes mellitus, thyroid disorders and other endocrine disorders were excluded from the study. After an informed consent, detailed clinical examination and relevant laboratory investigations were done.

Data was analysed using the computer software, Statistical package for Social Sciences (SPSS). Data was expressed in frequency and percentage. Chi square test was used to assess statistical significance .For all statistical evaluations, a two-tailed probability of value < 0.05 was considered significant.

**Results**

Hundred obese persons were compared with hundred non obese persons. Maximum number of patients belonged to the age group of 31 to 40 years (31%) out of which 77 were females. 63 among cases and 56 among controls were homemakers. Family history of obesity was present in 63 cases and 7 among the controls with a p value < 0.001.

Among cases 96 were obese (BMI – 30 to 39.9), four cases were morbidly obese (BMI > 40).

Acanthosis nigricans was the commonest skin manifestation encountered in 96 cases and 5 controls. (p value<0.001). Striaedistensae was present in 87 cases and 41 controls (p value < 0.001) Acrochordon was present in 53 cases and 11 among the control group (p value < 0.001).( figure 1) Keratosis pilaris was present in 42 cases and 14 controls (p value < 0.001). (figure 2) Cellulite was encountered in 7 cases and adiposis dolorosa in one case (figure 3)

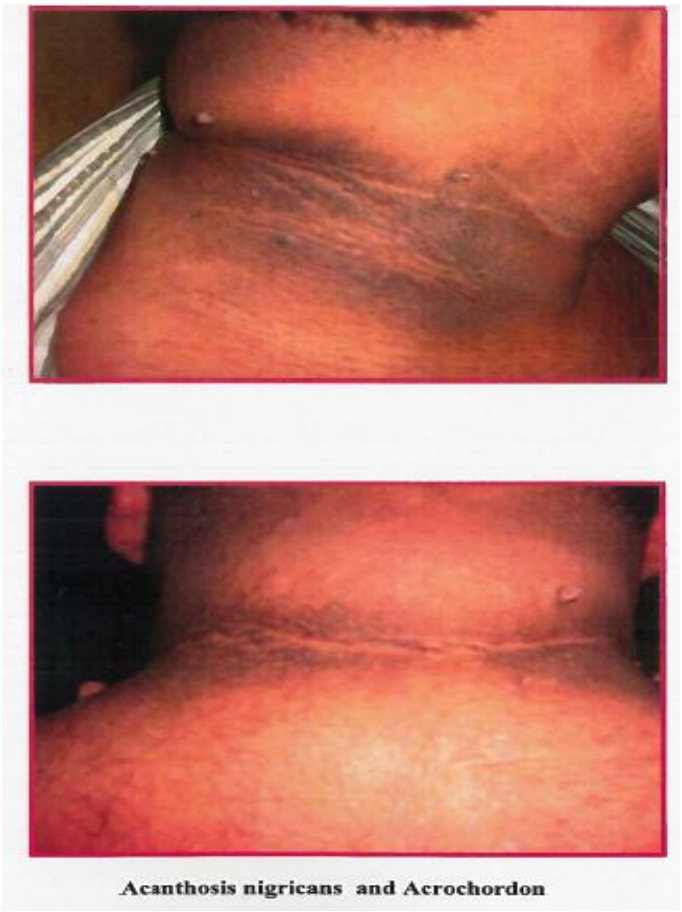
Features of venous insufficiency were seen more in obese persons compared to non obese persons. Varicose veins were present in 15 cases and 1 control (p < 0.001), stasis dermatitis in 5 , lipodermatosclerosis in 1 case. Lymphoedema was present in one case.

Bacterial and fungal infections were common in obese individuals. (figures 4,5,6) Intertrigo was present in 19 cases and 1 control where the p value was less than 0.01.

Features of hyperandrogenism were more among cases than controls (figure 7) Acne vulgaris was present in 17 cases and 7 controls with a p value < 0.05.

Seboorrhoeic dermatitis in 22 cases, seborrhoeic melanosis in 8, ichthyosis vulgaris in 4, xerosis in 15, psoriasis in 2 ,DPN in 32 cases were the other dermatoses encountered in obesity. Plantar hyperkeratosis was present in 74 cases and one control (p value < 0.001). Fissure foot was present in 48 cases and 16 among the controls (p value< 0.001).

**Figure 1**



Acanthosis nigricans and Acrochordon

**Figure 2**

Keratosis pilaris

**Figure 3:** Common skin manifestations in obesity

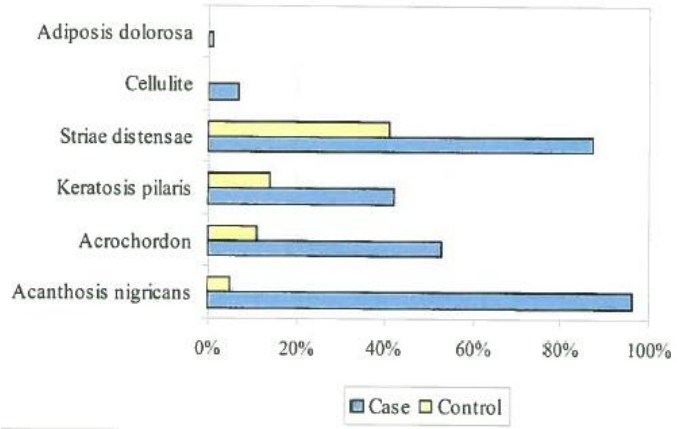



**Figure 4:** Bacterial and fungal infections encountered in the study

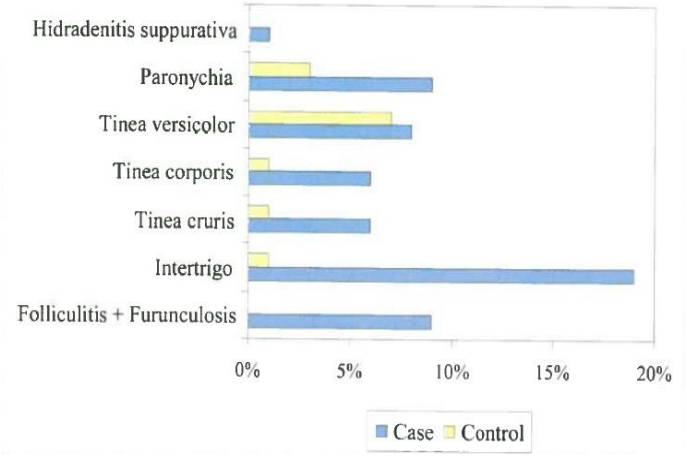
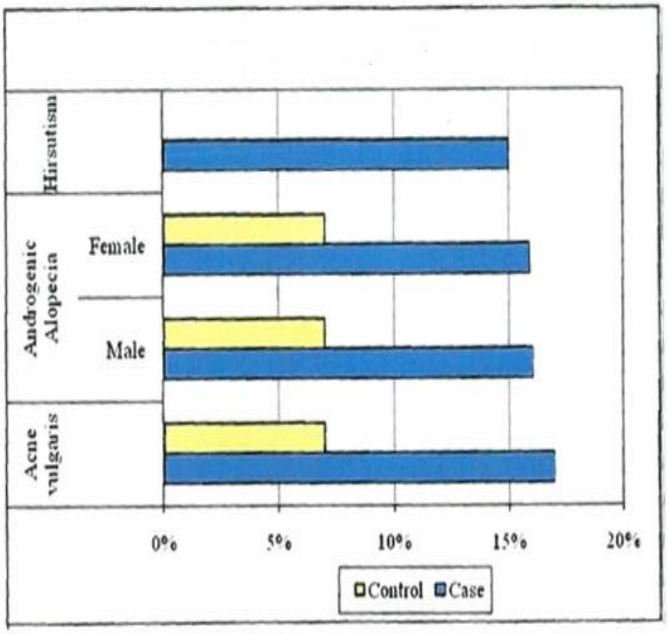



**Figure 5:** Hidradenitis suppurativa

**Figure 6**

**Tinea corporis**

**Figure 7:** Features of hyperandrogenism




## Discussion

Among the 100 persons with obesity, the maximum number of patients belonged to the age group of 31 to40 years which was concordant with a study conducted in women by Majumdar et al.[4] Female preponderance noted in the study was concordant with studies by Dehghan et al[5] and Divyashree et al.[6]

Acanthosis nigricans was the commonest dermatological manifestation in this study which was also observed by Scheinfeld et al,[7] Yosipovitch et al. In the study by Divyashree et al skin tag was the commonest finding. Striaedistensae was present in 87 cases. 43% had striaedistensae in a cross-sectional study of 156 patients with obesity [8]. Acrochordon was seen in 53 patients in this study. Increased incidence of skin tags in obesity was observed by Yasipovitch et al, Gupta M,[9] Divyashree et al. Keratosis pilaris was present in 42 cases and one control. Yosipovitch et al reported that, even though keratosis pilaris was the commonest manifestation in atopic individuals, it is also associated with an increase in BMI. 21 cases had features of chronic venous insufficiency. Lymphoedema was seen in one morbidly obese case and none among controls. Asch et al reported a case of massive lymphoedema in a morbidly obese male.[10] Features of hyperandrogenism were more in obese cases compared to controls. The study conducted by Tsai et al reported an increased prevalence of acne in obese children.[11] Increased incidence of bacterial and fungal infections was noted in this study which was concordant with several previous studies. Plantar hyperkeratosis was present in 74 cases and one control. Fissure foot was present in 48 cases. Hidalgo et al first reported plan tarhyperkeratosis as a manifestation of obesity.[12] However in the study conducted by Spink et al on plantar hyperkeratosis, there was no association with obesity[13].

## Conclusion

Obesity being an emerging epidemic requires a multidisciplinary approach to tackle not only the co-morbidities associated but also the physical distress associated, as this can hamper an individual's self image and confidence. Dermatologists must work with primary care

physicians and patients to reduce the detrimental effects of obesity on the skin. Considering the small number of patients studied, the findings in this study may not be conclusive and needs further studies with more number of patients.

**Sources of support:** Nil

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