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Cutaneous Manifestations in Obese Patients Attending Outpatient Department of a Tertiary Care Hospital

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Abstract

Introduction: Obesity can have many effects on skin physiology. It is involved in dermatologic diseases like acanthosis nigricans, acrochordons, keratosis pilaris, hirsutism, and striae distensae.

Objectives: To determine the proportion of various cutaneous manifestations in obese patients.

Materials and Methods: This cross-sectional study was conducted at the Outpatient Department of Dermatology in a tertiary care hospital. Any patients over 18 years old with a BMI greater than or equal to 30 kg/m² attending the dermatology OPD were included. The history-taking and examination were done, and the preformed proforma was completed. Statistical analysis was done using Microsoft Excel 2016 and SPSS Version 20.0 for Windows.

Results: Our study included 226 patients. The mean age of patients in our study was 37.45± 13.60 years. There were more females than males in our study. The mean BMI of patients in our study was 32.09±1.81. According to BMI, most patients fell into grade I obesity (89.4%), followed by grade II obesity with 10.6%, and there were no patients with grade III obesity. Acrochordons was the most common dermatosis seen in the study, followed by acanthosis nigricans. The dermatoses that showed a statistically significant relationship with obesity grades were plantar hyperkeratosis (P = 0.001) and lymphoedema (P = 0.0036).

Conclusion: Skin diseases are so common among obese patients that they can be considered a marker for obesity.

Key words: Acrochordons; Obesity; Striae distensae

Introduction

The World Health Organization (WHO) defines obesity as a body mass index (BMI) greater than or equal to 30. BMI is a simple index of weight for height that is commonly used to classify overweight and obesity in adults. About 13% of the world's adult population was obese in 2016. The worldwide prevalence of obesity nearly tripled between 1975 and 2016.[1] According to the Nepal STEPS Survey 2019 Fact Sheet, the proportion of obesity (BMI ≥30.0) was 4.3% overall (men 3.2%, women 5.3%).[2]

Although obesity is recognized as a significant public health problem and is increasing in prevalence, little attention has been paid to the impact of obesity on the skin. Obesity can cause a lot of effects on skin physiology, including skin barrier function, sebaceous glands and sebum production, sweat glands, lymphatics, collagen structure and function, wound healing, microcirculation and macrocirculation, and subcutaneous fat. It is involved in dermatologic diseases like acanthosis nigricans, acrochordons, keratosis pilaris, hirsutism, striae distensae, plantar hyperkeratosis, lymphedema, cellulitis, skin infections, and hidradenitis suppurativa.[3]

Materials and Methods

This was a cross-sectional study conducted at the Department of Dermatology at Gandaki Medical

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College, Pokhara, Nepal, a tertiary care hospital, from February 2020 to January 2021 after obtaining ethical clearance from the institutional review committee of the institute. Any patients aged more than 18 years with a BMI greater than or equal to 30 kg/m² attending the dermatology Outpatient Department (OPD), either themselves or referred from other specialities OPD to the dermatology OPD for dermatological problems, were included. Pregnant females and lactating mothers, known cases of diabetes mellitus and chronic kidney disease, patients on systemic corticosteroids, and severely ill and immunocompromised patients were excluded from our study.

Written and informed consent was obtained in the prescribed format from the patients selected for the study after an explanation of the details of the study. A detailed history, including age, occupation, duration of disease, and site of involvement, was taken. As obesity is a risk factor for diabetes mellitus, all patients had their random blood sugar levels checked for the condition. If the results exceeded the upper limit of a standard value, the patients were excluded from the study and were sent to the General Medicine Department for further workup. Height and weight of the patient were taken, and BMI was calculated using the formula: weight in kilograms divided by height in meters squared. Height was measured using a wall-mounted stadiometer, and weight was measured using a digital weighing machine.

A dermatologist did a dermatological examination with respect to the morphology, distribution, and any special features like bleeding and erosion over the lesions. Other necessary investigations, such as biopsy, Tzanck smear, and KOH mount, were done for relevant cases. A final dermatological diagnosis was done. All this data was recorded in a proforma. Statistical analysis was done using Microsoft Excel 2016 and SPSS Version 20.0 for Windows. A chi-square test was applied to determine the association between two categorical variables. Statistical significance was tested at a 95% confidence interval, and a p-value less than 0.05 was considered significant.

Results

Our study participants were 226 patients above the age of 18 years with a BMI more than or equal to 30 kg/m². The mean age of patients was 37.45± 13.60 years, ranging from 20 to 80 years. There was a female preponderance of cases in our study, with 140 (61.9%) female and 86 (38.1%) male patients.

Acrochordons were the most common disorder in the study, with 45 (19.9%) cases, followed by acanthosis nigricans (17.7%). Striae distensae (12.4%), acne vulgaris (11.1%), candidal intertrigo (8.0%), plantar hyperkeratosis (7.5%), dermatophytosis (7.1%), furunculosis (5.3%), and seborrhoeic dermatitis (5.3%) were the other common disorders seen. Psoriasis vulgaris (3.1%), cellulitis (1.3%), hirsutism (0.9%), and lymphoedema (0.4%) were the least common disorders [Table 1].

Cutaneous manifestations	Frequency	Percentage
Acanthosis Nigricans	40	17.7
Acne vulgaris	25	11.1
Acrochordons	45	19.9
CandidalIntertrigo	18	8.0
Cellulitis	3	1.3
Dermatophytosis	16	7.1
Furunculosis	12	5.3
Hirsutism	2	0.9
Lymphoedema	1	0.4
Plantar Hyperkeratosis	17	7.5
Psoriasis Vulgaris	7	3.1
seborrhoeic dermatitis	12	5.3
Striaedistensae	28	12.4
Total	226	100.0

Table 1: Frequency of various Cutaneous manifestations in obese Patient

The age group of 21-30 years had the highest number of cases in the study, with 72 (31.9%) patients, followed by the 31-40 years age group, which had 68 (30.1%) patients, and the 41-50 years age group, which had 38 (16.8%) patients. The 9.3% of cases were seen in the 51-60 age group, 7.1% in the greater than 60 age group, and 4.9% in the up to 20 years age group. Acrochordons were the most common disorder (8.84%) in the 31-40 age group. Acanthosis nigricans (AN) was most common among the 21-30 (4.8%) and 31-40 (4.8%) age groups. Acne was common among the 21-30 age group (8.84%) [Table 2].

Acrochordons were the most commonly seen disorder in male patients in 20 (23.3%) cases. This was followed by striae distensae in 15 (17.4%) cases. There were no cases of lymphoedema in males. In females, acanthosis nigricans was most commonly seen in 26 (18.8%) cases, followed by 25 (17.9%) cases of acrochordons [Table 3]. Out of 45 cases of acrochordons, 29 (64%) cases had lesions over the neck, and 16 (36%) had lesions over the neck and trunk. The back of the neck and axilla were the most commonly affected sites in cases with AN. There were 26 (65%) cases with lesions over the back of the neck and axilla, but the remaining 14 (35%) cases had lesions over only the back of the neck. Out of 28 cases of striae distensae, the abdomen was the most common site of occurrence, with 14 (50%) cases, followed by the thighs in 7 (25%), arms in 6 (21%), and lower back in 1 (4%). Out of 18 patients with candidal intertrigo, 11 (61%) had lesions over the groin only, 4 (22%) had lesions over both the groin and inframammary fold,

		Categorized age						Total
		Upto 20	21-30	31-40	41-50	51-60	>60	
Diagnosis	Acanthosis Nigricans	3	11	11	6	7	2	40
	Acne vulgaris	5	20	0	0	0	0	25
	Acrochordons	0	13	20	4	4	4	45
	Candidal Intertrigo	0	7	3	3	0	5	18
	Cellulitis	0	0	2	1	0	0	3
	Dermatophytosis	0	3	7	2	3	1	16
	Furunculosis	1	5	1	4	0	1	12
	Hirsutism	0	1	1	0	0	0	2
	Lymphoedema	0	0	1	0	0	0	1
	Plantar Hyperkeratosis	0	0	3	8	3	3	17
	Psorasis Vulgaris	0	0	3	4	0	0	7
	Seborrhoeic dermatitis	0	4	4	2	2	0	12
	Striaedistensae	2	8	12	4	2	0	28
Total		11	72	68	38	21	16	226
Percentage		4.9	31.9	30.1	16.8	9.3	7.1	100

Table 2: Age distribution of the Cutaneous manifestations seen in the study

Diagnosis	Female(%)	Male(%)	Total (%)
Acanthosis Nigricans	26 (18.6)	14(16.3)	40(17.7)
Acne vulgaris	16(11.4)	9(10.5)	25(11.1)
Acrochordons	25(17.9)	20(23.3)	45(19.9)
Candidal Intertrigo	10(7.1)	8(9.3)	18(8.0)
Cellulitis	2(1.4)*	1(1.2)	3(1.3)
Dermatophytosis	10(7.1)	6(7.0)	16(7.1)
Furunculosis	6(4.3)	6(7.0)	12(5.3)
Hirsutism	2(1.4)	0(0.0)	2(0.9)
Lymphoedema	1(0.7)	0(0.0)	1(0.4)
Plantar Hyperkeratosis	15(10.7)	2(2.3)	17(7.5)
Psoriasis Vulgaris	5(3.6)	2(2.3)	7(3.1)
Seborrhoeic dermatitis	9(6.4)	3(3.5)	12(5.3)
Striae distensae	13(9.3)	15(17.4)	28(12.4)
Total	140(100)	86(100)	226(100)

Table 3: Gender distribution of the Cutaneous manifestation

and 3 (17%) had lesions over the inframammary fold only. Out of 12 cases of furunculosis, the thigh was the most commonly affected site, with 5 (42%) cases, followed by the legs in 4 (34%), arms in 2 (16%), and gluteal region in 1 (8%). The heel was the most common site affected by plantar hyperkeratosis, with 10 (59%) cases having the lesion. This was followed by the 1st metatarsophalangeal (MTP) joint with 7 (41%) cases.

Acrochordons were the most commonly seen disorder in obesity grade I, in 43 (21.3%) cases. Acanthosis nigricans followed this in 38 (18.8%) cases. In the obesity grade II, plantar hyperkeratosis was the most common, followed by candidal intertrigo. There were no patients with grade III obesity [Table 4]. The dermatoses that showed a statistically significant relationship with obesity grades were plantar hyperkeratosis (P = 0.001) and lymphoedema (P = 0.0036). Acanthosis nigricans (P = 0.2037), acne vulgaris (P = 0.2546), acrochordons (P = 0.1329), candidal intertrigo (P = 0.0959), cellulitis (P = 0.5474), dermatophytosis (P = 0.2735), furunculosis (P = 0.2201), hirsutism (P = 0.0694), psoriasis vulgaris (P = 0.3543), seborrhoeic dermatitis (P = 0.2201), and striae distensae (P = 0.5235) did not show statistically significant relationships with obesity grades.

Discussion

This study shows that acrochordons were the most typical disorder in the obese, with 19.9%, followed by acanthosis nigricans (17.7%), striae distensae

Diagnosis	Obesity grade I (%)	Obesity grade II (%)	Total (%)	P value
Acanthosis Nigricans	38(18.8)	2(8.3)	40(17.7)	0.2037
Acne vulgaris	24(11.9)	1(4.2)	25(11.1)	0.2546
Acrochordons	43(21.3)	2(8.3)	45(19.9)	0.1329
Candidal Intertrigo	14(6.9)	4(16.7)	18(8.0)	0.0959
Cellulitis	3(1.5)	0(0.0)	3(1.3)	0.5474
Dermatophytosis	13(6.4)	3(12.5)	16(7.1)	0.2735
Furunculosis	12(5.9)	0(0.0)	12(5.3)	0.2201
Hirsutism	1(0.5)	1(4.2)	2(0.9)	0.0694
Lymphoedema	0(0.0)	1(4.2)	1(0.4)	0.0036
Plantar Hyperkeratosis	9(4.5)	8(33.3)	17(7.5)	0.001
Psorasis Vulgaris	7(3.5)	0(0.0)	7(3.1)	0.3543
Seborrhoeic dermatitis	12(5.9)	0(0.0)	12(5.3)	0.2201
Striae distensae	26(12.9)	2(8.3)	28(12.4)	0.5235
Total	202(100.0)	24(100.0)	226(100.0)	

Table 4: Distribution of various Cutaneous manifestations based on grades of obesity

(12.4%), acne (11.1%), candidal intertrigo (8.0%), plantar hyperkeratosis (7.5%), dermatophytosis (7.1%), furunculosis (5.3%), seborrhoeic dermatitis (5.3%), psoriasis vulgaris (3.1%), cellulitis (1.3%), and hirsutism (0.9%). In 1 (0.4%) case, lymphoedema was present. A study by Al-Mutairi N3 showed plantar hyperkeratosis as the most commonly seen dermatosis in the obese, with 45.1% of cases. This was followed by AN 33%, acrochordons 30%, striae 23%, intertrigo 22%, acne 21%, hirsutism 15.8%, and folliculitis, tinea cruris, and hyperhidrosis in a few patients.

Acrochordons, also known as skin tags, were the most common skin condition associated with obesity in our study. They constituted 19.9% of cases in our study. A similar study by Boza JC et al.,[4] showed an apparent correlation between obesity and acrochordons. Skin tags were mainly seen in grade I obesity in our study. Around 21% of all grade I obese patients had skin tags. A study by El SafouryOS et al.,[5] showed higher BMI levels in patients with skin tags. In our study, there were 202 (89.4%) obese cases in grade I and 24 (10.6%) obese cases in grade II. AN was seen in 18.8% of grade I obese cases and 8.3% of grade II obese cases. A similar study conducted by Puri.N[6] showed that 60% of patients with AN had a BMI between 27 and 32, 16.6% had a BMI > 32, and 20% had a normal BMI. A study by Hsu HS et al.,[7] demonstrated that obesity increases the likelihood of developing striae. Our study showed that 28 (12.4%) cases had striae. In our study, 18 (8.0%) cases of candidal intertrigo were seen. A similar study by Krishna et al.,[8] showed an association of intertrigo with obesity in 18.67% of cases.

A study conducted by Divyashree RA et al.,[9] showed that in contrast to bacterial infections, fungal infections, and intertrigo were more common in obese people. Similarly, in our study, there were 7.1% of dermatophytosis cases and 12 (5.3%) cases of furunculosis. A study conducted by Snast I et al.,[10] showed that overweight and obesity are inversely linked with acne in a dose-dependent manner in youth, but 25 (11.1%) cases of all the dermatological disorders seen in our study had acne. Only 7 (3.1%) cases with psoriasis were seen in our research. A similar study by Naldi et al.,[11] showed that obesity doubled the risk of acquiring psoriasis. In our study, 17 (7.5%) cases had plantar hyperkeratosis. Plantar hyperkeratosis should be considered a cutaneous sign of severe obesity, according to a study by García-Hidalgo L et al.[12]

In a study by Gómez AP et al.,[13] statistically significant associations were identified between the degree of obesity and acrochordons (P = 0.001), AN (P = 0.003), and plantar hyperkeratosis. In another study, Niaz F et al.,[14] observed that hirsutism, striae, stasis dermatitis, viral infections, and acanthosis nigricans were all significantly associated with obesity grade II ($p < 0.05$). However, bacterial infections, fungal infections, acrochordons, plantar hyperkeratosis, xanthomas, and psoriasis were not significantly associated with grades of obesity ($p > 0.05$). Similarly, in our study, plantar hyperkeratosis (P = 0.001) and lymphoedema (P = 0.0036) showed statistically significant relationships with obesity grades.

Conclusion

Many skin changes could be interpreted as indicators of being obese. This study shows a greater likelihood of several dermatoses in obese persons, including acrochordons, acanthosis nigricans, striae distensae, acne vulgaris, plantar hyperkeratosis, and fungal infection. Obese patients should have regular cutaneous examinations because many of these conditions are preventable and curable, improving their quality of life. Limitations of the study include the fact that in order to represent the overall population, the sample needs to be population-based rather than hospital-based.

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