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Dermatology

AN EPIDEMIOLOGICAL STUDY ON SKIN TAGS AS MARKERS OF DIABETES AND OBESITY

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ABSTRACT **Background:** Skin tags (STs) have been investigated as a marker of type 2 diabetes mellitus (DM), yet the relative of STs to obesity is still a matter of controversy. **Objective:** To explore the relation of number, size, and colour STs to obesity, diabetes. **Methods:** The study included 250 nondiabetic (123 males and 127 females) and 275 diabetic (122 males and 153 females) subjects. We recorded sex, body mass index (BMI), relevant habits, STs color, size, and number in different anatomical sites. SPSS version 21 was used for analysis. **Results:** The presence and the mean number of STs was more in obese than nonobese participants ($P = 0.001$ and $P < 0.001$, respectively) and was not affected by sex. However, the number increased significantly with age. The presence of mixed-color STs was related to obese ($P < 0.01$) participants. Multivariate logistic regression revealed that only BMI was significantly associated with the mixed-color STs. Within cases that developed mixed-color STs, the multivariate analysis showed that only BMI had a significant correlation to the number of STs ($P = 0.034$). **Conclusion:** The study showed that not only the number but also the presence of mixed-color ST was related to obesity, but not to diabetes. The presence of mixed-color STs in nondiabetic subjects needs close inspection of BMI.

KEYWORDS : Age, Diabetes Mellitus, Obesity, Sex, Skin Tags.

INTRODUCTION:

Obesity and impaired glucose tolerance (IGT) are high risk factors for developing diabetes mellitus (DM). IGT is characterized by plasma glucose response to an oral glucose challenge that is above normal but not at the level defining DM. Individuals with IGT manifest abnormalities in both insulin action and early insulin secretion, like those seen in patients with type 2 DM.[1] Obesity and a high fat diet may contribute to the development of both insulin resistance and insulin secretory dysfunction in susceptible individuals.[1] Currently, there are no clear parameters to identify the patients with IGT or obesity who proceed on to DM. Skin tags (STs), soft fibromas, fibroepithelial polyps, or acrochordons are all alternative terms to describe a common benign skin condition, which consists of a bit of skin projecting from the surrounding skin.[2]Histologically, STs is a polypoid lesion with overlying mildly acanthotic epidermis, a loose, edematous fibrovascular core exhibiting mild chronic inflammation and a nerveless dermis.[3] They often develop in areas of skin friction.[4] STs have been reported to be associated with many diseases including type 2 DM[5,6] and obesity.[5] STs have been investigated as a cutaneous marker for type 2 DM and obesity by measuring glucose curve, body mass index (BMI) and insulin level.[7,8] Although the relation of STs to insulin resistance and type 2 DM was established in previous studies, further studies are warranted in the area of obesity and STs.[8]Thus, to explore this area, the relation of the number, size and color of STs to obesity, diabetes, sex and age will be analyzed in one study.

Materials and Methods:

This study was conducted in a university hospital. The total number of participants was 525. The nondiabetic group included 250 participants from the outpatient clinic of dermatology [123 (49%) males and 127 (51%) females]. The diabetic group, including 275 participants (type II DM receiving oral hypoglycemic tablets), were from outpatient clinic of DM (122 (44.2%) males and 153 (55.8%) females. History taking highlighted age, sex, marital status, family history of diabetes, and history of cardiac, hepatic, gastrointestinal or endocrinal disorders, other than DM. MI was calculated for all cases according to the following equation:[9] BMI = [weight (kg)] / [height(m)]2. The internationally accepted range for BMI is as follows: underweight <18.5, normal 18.5–24.9, overweight 25.0–29.9, obesity 30.0–39.9 and extreme obesity >40. The following classification parameters were used (modified from Kahana et al.).[5]Number: Few (1–4), moderate (5–10) and many (>10). Size: Very early (visible not felt), small (projection of <0.5 cm), medium (0.5–1 cm) and large (>1 cm). Site: Eyelids (right–left), neck (right–left), axilla (right–left), trunk (right–left). Color: Flesh color, hyperpigmented or of a mixed color. Mixed-color STs means the presence of both colors, i.e., flesh and hyperpigmented STs in the same anatomical area as in the neck, or in the axillae [Figure 1].

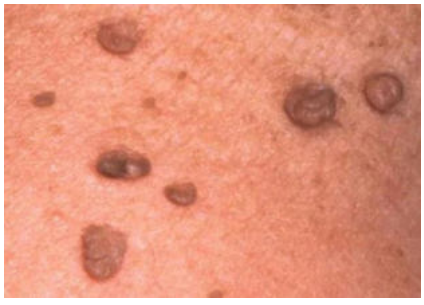

Figure 1 – Skin tag as color

Statistical Analysis:

Data were statistically described in terms of range, mean ± standard deviation (±SD), frequencies (number of cases) and relative frequencies (percentages). For comparing categorical data, Chi square ($\chi 2$) test was performed. Correlation between various variables was done using Pearson moment correlation equation. A probability value (P value) less than 0.05 was considered statistically significant. All statistical calculations were done using "SPSS" version 21.

Table 1- Demographic, Clinical and Skin Tags (ST) parameters of Study Participants

Parameters	N(%)
Sex	
Males	245 (47)
Females	280 (53)
BMI	
Obese	289 (55)
Non-obese	236 (45)
Diabetes	
Yes	275 (59)
No	250 (41)
Skin tags (ST)	
Yes	320 (61)
No	205 (39)
Skin Tags color (N=320)	
Flesh	155 (48)
Hyperpigmented	55 (8)
Mixed	110 (34)

As per table 1 the study was divided into 2 groups of diabetic (59%) and Non- diabetic (41). The study was female preponderance (53%). And most of the females were diabetic. 55% of study participants were obese. Skin tags was seen in 61% of individuals. The most common color was flesh (48%) followed by mixed (34%).

Table 2 – Relation between color of ST with Obesity. (N=320)

Colour	BMI		p-value
	Obese	Non-obese	0.01*
Flesh	80	75	
Hyperpigmented	31	24	
Mixed	74	36	

As per table 2 the prevalence of STs was detected more often among obese participants 185/320 (58%) compared to nonobese participants 110/320 (42%). This was statistically significant (P = 0.001). The mean number of STs was significantly higher among obese participants (7.11 ± 14.998) in comparison to the nonobese (2.92 ± 4.957, P < 0.001). The prevalence of mixed-color STs was significantly more among obese participants [74 (42.2%)] compared to nonobese [36 (17.6%], P < 0.001). On the other hand, the prevalence of flesh-color [80 (56.9%)] and hyperpigmented [26 (25.5%)] STs was also higher in the obese group in comparison to the non-obese group and this was found to be statistically significant.

Table 3– Relation between color of ST with Diabetes. (N=320)

Colour	Diabetes		p-value
	Yes	No	0.12
Flesh	90	65	
Hyperpigmented	28	27	
Mixed	94	16	

As per table 3 the prevalence of STs was more often among the diabetic patients 212⁄320 (66%) in comparison to nondiabetic participants 108⁄320 (34%). However, this finding was not statistically significant (P = 0.12). The mean number of STs was higher among diabetics (6.21 ± 13.745) in comparison to nondiabetics (4.15 ± 10.016). This finding was also not statistically significant (P = 0.08). The prevalence of mixed-color STs was significantly higher among diabetics [94 (85%)] compared to nondiabetics [16 (15%)] (P < 0.001).

Table 4- Factors associated with the occurrence of Skin Tags

Factors	OR	p-value
Age	1.91	0.112
Sex (female)	1.012	0.23
Diabetes	1.76	0.213
BMI	2.67	0.01*

The multivariate logistic regression for the factors associated with the occurrence of STs is given in Table 4. As seen the independent risk factor was found to be BMI (OR=2.67;P=0.01) which was found to be statistically significant. Other factors are not associated independently with skin tags.

DISCUSSION:

In present study the mean number of STs increased with age and reached a peak value, then declined (between 50 and 60 years in the diabetic and the nonobese groups and between 40 and 50 years in the nondiabetic group), except for the obese group in which it continued to rise with age. In a study done by Banik and Lubach,[10] they inspected 750 subjects for STs incidence. They recorded that age of 50 years seems to be a turning point at which a stagnation of increase is observed. In our study, the increase of STs' numbers was found to be related to obesity rather than DM. On one hand, this finding goes with the results of Puneet and Deepak[8] who reported an association between STs, IGT and obesity; it is also in accordance with the results of Garcia-Hidalgo et al.[11] who studied 156 obese patients and found that percentage of those with acrocordons increased with severity of obesity, and recently, the results corroborated the finding of Ramazan Sari et al.[14] [who found that 38/113 (33.6%) of patients with STs were obese. The study of Motala et al.[12]represents a mirror image of these parameters. A 10-year study of oral glucose tolerance test was applied on South African Indians, known for their high prevalence of type 2 DM. The study showed that only 91/563 (16.2%) were diabetics. From the nondiabetic group, only 49 (9.5%) progressed into DM. In our study, the occurrence of STs in the diabetic group was not significantly higher than those in the nondiabetic group. On the other hand, the occurrence of STs in obese participants was significantly higher than nonobese participants (whether diabetic or not). Also, the mean number of STs in obese was significantly higher than the nonobese participants (P < 0.001). This contradicts the results of Kahana et al.[5] who showed that STs were not associated with increased incidence of obesity compared to the general population (as it was a single group study without control subjects gathered specifically for his study) and contradicts the results of Rasi et al.[13] and Ramazan Sari et al.[14] They found no correlation between the number of STs and BMI. But in exploring the factors affecting the occurrence of mixed-color STs by multivariate logistic regression, only BMI was found to be significantly associated with the mixed-color STs (OR = 2.67, P = 0.001).

CONCLUSION:

The results of this clinical study showed that not only the number but also the presence of mixed-color ST was related to obesity, but not to diabetes. The presence of mixed-color STs in nondiabetic subjects need close inspection of BMI.

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