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Original Article Dermatology

The relationship between seborrheic dermatitis and body composition parameters

Aysegul Ozgul, Nihal Altunisik, Dursun Turkmen, Serpil Sener

Department of Dermatology, Inonu University Faculty of Medicine, Malatya, Turkiye

ABSTRACT

OBJECTIVE: Seborrheic dermatitis (SD) is a chronic, recurrent inflammatory skin disease characterized by clinically scaly patches. It is known that skin diseases with chronic inflammation are associated with comorbid conditions such as metabolic syndrome, obesity, cardiovascular diseases (CVD) and diabetes. In recent years, there are studies investigating the relationship of SD with metabolic syndrome, hypertension, obesity and nutritional factors. However, there is no study evaluating body composition parameters in SD patients. In the light of this information, it was aimed to evaluate the relationship between SD and body composition parameters.

METHODS: The study was conducted on a total of 78 participants, including 39 SD patients over the age of 18 and 39 age- and gender-matched control patients, who applied to the University Faculty of Medicine Dermatology outpatient clinic. Body composition parameters were measured for each participant with the Tanita MC 580 Body Analyzer. In addition, SD area severity ındex (SDASI) was calculated in the SD patient group. These parameters were compared between the case and control groups.

RESULTS: There was no significant difference concerning height (p=0.208), weight (p=0.309), body mass index (p=0.762), fat mass (p=0.092), metabolic age (p=0.916), body density (p=0.180), mineral (p=0.699), visceral adiposity (p=0.401), protein (p=0.665), and other body composition parameters, between the case and control groups. There was only positive correlation between SDASI and height (p=0.026) and protein (0.016) value.

CONCLUSION: SD may be associated with obesity, metabolic syndrome, insulin resistance, and CVD, but the results are unclear and further studies are needed.

Keywords: Seborrheic dermatitis; body composition parameters; dermatitis.

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Seborrheic dermatitis (SD) is a chronic and recurrent inflammatory skin disease that is clinically characterized by dandruff patches [1]. SD, which especially affects the adolescent and post-adolescent age group, is seen in 3–5% of the general population and 1–3% in young people [1]. Its etiology is multifactorial. SD contains various predisposing factors, both endogenous and exogenous. The fact that it is more common in males and begins to develop in adolescence compared to the infantile group suggests an important hormonal effect, especially androgens [2]. Large sebaceous glands and high sebum rates are shown in neonates. The fact that SD lesions regress with decreased sebum in infants after 6 months supports the role of sebum in the etiology [1].

Body composition consists of three main nutritional compartments. These are adipose tissue, muscle tissue, and visceral protein compartment. Effective measurement of body composition plays a key role in

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Correspondence: Dursun TURKMEN, MD. Inonu Universitesi Tip Fakultesi, Dermatoloji Anabilim Dalı, Malatya, Turkiye.
Tel: +90 530 223 69 55 e-mail: dursunturkmen44@gmail.com

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making important health-related decisions in different branches of clinical sciences [3]. The bioelectrical impedance analysis (BIA) method, which is one of the most effective methods in the evaluation of body fat ratio, is based on the principle of determining body composition by applying electric current to the human body at a very low level and at different frequencies [3, 4]. With this method, the speed and power of electrical currents passing through the body are measured, and these results are used to determine the body fat ratio of the person, together with information such as height, weight, and gender [3]. It has been used with increasing frequency in recent years in the evaluation of diseases such as obesity, metabolic syndrome, osteoporosis, insulin resistance, and nutritional status [5]. It is more reliable than body mass index (BMI) in the assessment of obesity [6]. There are studies in the literature investigating the role of nutritional factors in the etiology of SD and the relationship between SD and metabolic syndrome [7]. In addition, BIA measurements of body composition are useful for monitoring changes in nutritional status. With this evaluation based on the electrical permeability difference of lean tissue mass and fat, various body tissue compositions, such as body fat mass (FM), body muscle mass (MM), lean body mass, and amount of body water, can be evaluated, as well as various data, such as basal metabolic rate, target muscle, and fat weight change recommendations, recommended calorie intake and exercise plan, can be given by the device [3].

To the best of our knowledge, there is not any study in the literature that has investigated body composition parameters in SD patients using the BIA method. In this study, we aimed to examine the relationship between SD and body composition parameters.

MATERIALS AND METHODS

The present study was conducted in accordance with the Declaration of Helsinki. The study protocol was approved by the decision of Inonu University Faculty of Medicine Clinical Research Ethics Committee dated January 15, 2020 and numbered 2020/11. Informed consent was obtained.

In this study, 78 participants, including 39 SD patients over the age of 18 who were admitted to the dermatology outpatient clinic and were clinically diagnosed with SD, and 39 age-and gender-matched control patients, were included in the study.

Highlight key points

- Our study is the first study to examine body composition parameters in SD patients with BIA method.
- There was no significant difference between the groups in terms of body composition parameters
- In the correlation analysis, a positive correlation was found between SDASI and height and protein in the SD patient group.

Information about age, gender, height, and additional disease of the patients and control subjects were obtained. Clinical anamnesis of SD patients, including disease duration, age of disease onset, localization of disease, and whether they had received any previous treatment for SD, were taken and dermatological examination was performed. The SD area severity index (SDASI) was calculated for each patient. Disease localization was determined as scalp, face, and trunk involvement. Disease severity was evaluated according to the SDASI scoring system [8]. Erythema and scaling for each of a total of nine anatomical regions (scalp, forehead, eyebrow, nasolabial, cheek/chin, ear, behind the ear, thorax, and back) rated as 0 – absent, 1 – mild, 2 – moderate, and 3 – severe according to the involvement. The total SDASI score was determined by adding the scores obtained by multiplying the score of each region by the area coefficient (scalp [0.4], forehead [0.1], eyebrow [0.1], nasolabial [0.1], behind the ear [0.1], ear [0.1], thoracic [0.2], back [0.2], and cheek or chin [0.1]) (0–12.6).

BIA was administered on an empty stomach after an empty bladder and at least 8 h of night rest. Tanita MC 580 Body Analyzer was used in the procedure. The metal and ornaments on the patient and large metal clothing items (such as belts, mobile phones, if any) were removed. The individual to be measured was removed to the device in a dress, but with his/her shoes and socks off. With the help of this device, FM (kg), fat percentage (F[%]), fat-free mass (FFM) (kg), MM (kg), total body water (TBW) (kg), TBW (%), obesity level, metabolic age, BMI, visceral adiposity, mineral, protein, and body density values were measured. These parameters were compared between the two groups. At the same time, the relationship between these parameters and SDASI was examined.

Statistical Analysis

Analyses were evaluated using the SPSS 22 (Statistical Package for the Social Sciences; SPSS Inc., Chicago, IL) package program. In this study, descriptive data were

Table 1. Baseline characteristics of the patients and controls

	Patients		Controls		p
	n	%	n	%	
Gender					0.802*
Female	12	30.8	10	25.6	
Male	27	69.2	29	74.4	
Age (year), mean±SD	25.5±6.1 (24.0)		26.8±6.1 (24.0)		0.185**

SD: Standard deviation; *: Chi-squared test; **: Mann Whitney U-test.

shown as n and % values in categorical data, and mean±standard deviation (mean±SD) and median values in continuous data. Chi-square analysis (Pearson Chi-square) was used to compare categorical variables between groups. Conformity of continuous variables to normal distribution was evaluated by the Kolmogorov–Smirnov test. Student t-test was used for normally distributed variables and Mann–Whitney U-test was used for non-normally distributed variables in the comparison of paired groups. Spearman correlation test was used to examine the relationship between continuous variables. The statistical significance level in the analysis was accepted as $p<0.05$.

RESULTS

In this study, 12 (30.8%) women and 28 (69.2%) men patients were included in the study, with a mean age of 25.5±6.1 years. Of the 39 individuals in the control group, 10 (25.6%) were female and 29 (74.4%) were male, with a mean age of 26.8±6.1 years. There was no significant difference between the groups concerning gender (p=0.802) and age (p=0.185) (Table 1).

There was no significant difference concerning height (p=0.208), weight (p=0.309), BMI (p=0.762) and level of obesity (p=0.807), FM (p=0.092), F (%) (p=0.095), FFM (p=0.948), MM (p=0.992), TBW (p=0.671), TBW (%) (p=0.070), metabolic age (p=0.916), body density (p=0.180), mineral (p=0.699), visceral adiposity (p=0.401), and protein (p=0.665) between the case and control groups (Table 2).

A significant positive correlation was observed between SDASI and height and protein (Table 3, Fig. 1, 2).

When the patients in the case group were evaluated regarding disease duration, there was no significant dif-

Table 2. Comparison of the bioelectrical impedance results of the patients and controls

	Patients Mean±SD	Control Mean±SD	p
FM	17.8±6.2 (16.2)	15.6±5.1 (15.2)	0.092
F (%)	23.5±5.6 (22.8)	21.3±5.5 (20.8)	0.095
FFM	56.9±10.5 (58.9)	57.0±9.3 (59.9)	0.948
MM	54.0±10.0 (55.9)	54.1±8.8 (56.5)	0.992
TBW	39.7±7.7 (40.9)	49.8±61.9 (42.0)	0.671**
TBW (%)	53.4±4.4 (54.2)	55.3±4.4 (55.8)	0.070
Metabolic age	26.2±6.7 (26.0)	26.1±6.1 (25.0)	0.916
Body density	1.0±0.0 (1.0)	1.1±.1 (1.1)	0.180
Mineral	4.1±0.8 (4.3)	4.2±0.7 (4.3)	0.699
Visseral fat	4.6±2.9 (4.0)	4.0±2.5 (3.0)	0.401**
Protein	13.1±2.9 (12.9)	12.8±2.2 (13.3)	0.665

SD: Standard deviation; FM: Fat mass; F (%): Fat percentage; FFM: Fat-free mass; MM: Muscle mass; TBW: Total body water; TBW (%): Total body water percentage; *: Student's t-test; **: Mann Whitney U-test.

Table 3. Correlation of SDASI value with various parameters

	SDASI	
	R	p
Height	**0.357***	**0.026**
Weight	0.293	0.070
FM	0.140	0.395
F (%)	-0.074	0.652
FFM	0.291	0.072
MM	0.291	0.072
TBW	0.257	0.114
TBW (%)	0.038	0.817
Metabolic age	0.095	0.563
BMI	0.170	0.299
Degree of obesity	0.146	0.376
Body density	0.081	0.625
Mineral	0.229	0.160
Visseral fat	0.253	0.120
Protein	**0.384***	**0.016**

BMI: Body mass ındex; FM: Fat mass; F (%): Fat percentage; FFM: Fat-free mass; MM: Muscle mass; TBW: Total body water; TBW (%): Total body water percentage; SDASI: Seborrheic Dermatitis Area Severity Index; *: <0.05; **: <0.01.

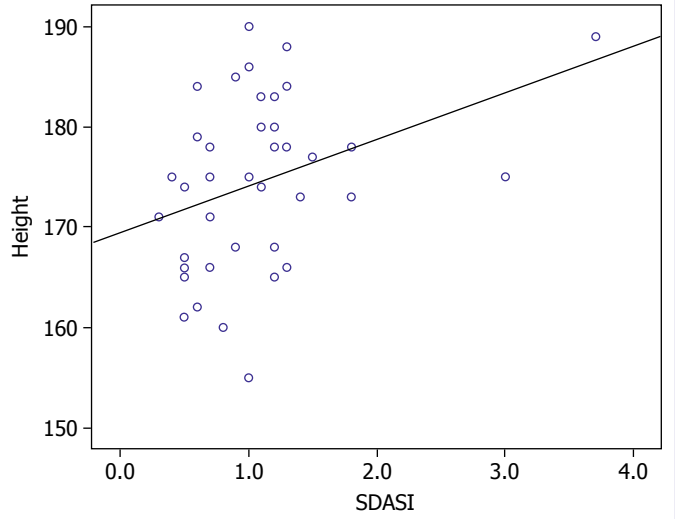

Figure 1. Height correlation with seborrheic dermatitis area severity index.

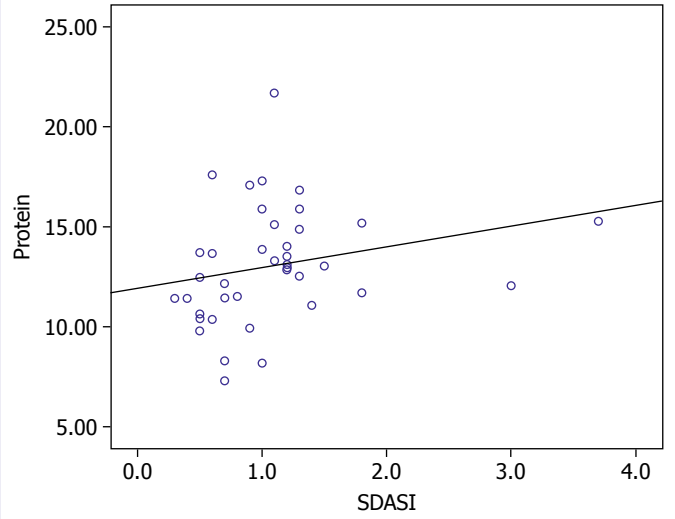

Figure 2. Protein correlation with seborrheic dermatitis area severity index.

ference in terms of height (p=0.143), weight (p=0.519), BMI (p=0.988), obesity level (p=0.945), FM (p=0.936), F (%) (p=0.807), FFM (p=0.381), MM (p=0.381), TBW (p=0.396), TBW (%) (p=0.696), metabolic age (p=0.572), body density (p=0.829), mineral (p=0.186), lubrication (p=0.214), protein (p=0.805), and SDASI (p=0.496).

DISCUSSION

SD is a chronic inflammatory skin disease clinically characterized by dandruff patches [1]. Skin diseases progressing with chronic inflammation are associated with comorbid conditions, such as metabolic syndrome, obesity, cardiovascular diseases (CVD), diabetes, and insulin resistance [9]. Recent studies show the relationship of SD with metabolic syndrome, nutrition, diet, hypertension, and insulin resistance [10, 11]. In a study conducted by Imamoglu et al. [12], investigating the relationship between SD and metabolic syndrome, serum HDL levels were significantly lower compared to the control group. In another study conducted by Linder et al. [11], which included 9255 patients and 9246 control groups, it was shown that there is a relationship between SD and hypertension. The findings showed that the prevalence of hypertension was high in the patient group with SD.

There are also studies in the literature investigating the relationship between nutrition and diet in patients with SD [7, 10]. Diet can be a significant source of substrate for sebum synthesis. While sebum can be synthesized de novo from various sources (for example, glucose, acetate, and fatty acids) in the sebaceous glands, some dietary lipids (especially fatty acids) can pass directly from the circulation to fat cells unchanged [13]. In one study, it was found that sebum secretion decreased by an average of 40% in 18 obese patients who fasted for periods of 4–8 weeks [14]. In a study by Sanders et al. [7], it was found that a fruit-based diet was associated with a low risk of SD, while a western-style diet was associated with a higher risk in women. In a study conducted by Tamer [10], the findings showed that the nutrient content of the control group was more vegetable-based compared to the patient group. These data suggest that diet amount and content play an important role in the development of SD.

Studies examining body composition parameters with the help of BIA in patients with chronic inflammatory diseases, such as hidradenitis suppurativa and psoriasis, have been reported [6, 15]. Body composition parameters were evaluated in psoriasis patients in Engin et al.'s [16] study, which was performed on 242 psoriasis patients, parameters such as weight, body F (%), FM, TBW (%), metabolic age, visceral adiposity, BMI, and obesity level were statistically significant between the patient and control groups, and they were recorded as higher in the patient group. In the same study, the psoriasis area severity index (PASI) score was calculated in psoriasis patients who received and did not receive systemic treatment in the past 3 months, and the relationship between body composition parameters was examined. There was a significant negative correlation between PASI and height, FFM, MM and bone mass

in the treated group, while a positive significant correlation was found between FFM, TBW, MM, and bone mass in the untreated group.

In a study examining body composition parameters in Hidradenitis suppurativa patients, BMI, body F (%), and visceral adiposity were higher in the patient group compared to the control group. MM and bone mass were lower than the control group [6].

To the best of our knowledge, there is not any study in the literature examining body composition parameters in SD patients. Based on the available studies showing the relationship of SD disease with nutrition, diet, metabolic syndrome, and hypertension, we aimed to show whether there is a difference between body composition parameters in SD patients and normal healthy control groups.

Our study was conducted on 39 patients and 39 healthy volunteers, and for each patient, FM, F (%), FFM, MM, TBW, TBW (%), BMI, obesity level, metabolic age, adiposity, mineral, protein, and body density measures were recorded. No significant difference was found between the case and control groups.

In our study, the relationship between SDASI and body composition parameters was also examined. A significant positive correlation was found between SDASI and height and protein value. The positive correlation between SDASI and height does not match with the literature data. It has been reported that a carbohydrate-heavy diet may be a risk factor for the development of SD. A diet rich in carbohydrates increases insulin and insulin-like growth factor-1 (IGF-1) levels. Insulin and IGF-1 stimulate transcription factors that initiate lipogenesis necessary for sebum production from sebaceous glands [10]. In a study conducted by Kenawy et al. [17], which is investigating serum IGF-1 levels in SD patients, the findings showed that serum IGF-1 levels were high in SD patients.

We could not find a significant difference between the case and control groups compared to studies in the literature examining the relationship between body composition parameters in psoriasis and hidradenitis suppurativa patients. Our study was conducted on a small number of people. We should note that although there are studies in the literature that reveal the relationship between SD and metabolic. A study by Dowlati et al. [18] failed to associate high insulin levels with SD formation. In addition, in a study showing the association of SD with hypertension, it is unclear whether hypertension is the result of SD or perhaps the cause due to drugs used in the treatment of hypertension [11]. In another study showing the relationship between SD and metabolic syndrome, although serum HDL level was lower than the control group, no significant difference was found between abdominal obesity, blood pressure, triglyceride level, and glucose levels, which are the other parameters of metabolic syndrome [12].

The relationship between SD and obesity has not been fully understood. In a study investigating the prevalence of SD in adolescents and effective factors, the body fat of the patients, which was evaluated by the triceps skinfold measurement method, was higher than the healthy control group. However, the mechanism by which this happens is not known exactly. One reason may be that obese patients show a hyperandrogenic state and increased androgens increase sebum secretion [19]. In addition, chronic inflammation, which plays a role in the etiopathogenesis of SD, may be involved in the etiology of obesity, one of the components of metabolic syndrome [11]. On the other hand, insulin resistance and IGF-1 levels also increased in obese patients [20]. Increased IGF-1 level is associated with SD [10].

Conclusion

As a result, although there are studies showing the relationship between SD and metabolic syndrome, insulin resistance, CVD, and obesity in the literature, the results are unclear. Thus, further studies are needed.

Ethics Committee Approval: The Inonu University Clinical Research Ethics Committee granted approval for this study (date: 15.01.2020, number: 2020/11).

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Authorship Contributions: Concept – AO, NA, DT; Design – NA, DT; Supervision – AO, NA, DT; Fundings – AO, NA, DT, SS; Materials – AO, NA, DT; Data collection and/or processing – AO, NA, DT, SS; Analysis and/or interpretation – AO, NA; Literature review – AO, NA, DT; Writing – AO, NA, DT; Critical review – AO, NA, DT.

REFERENCES

1. Aksoy M, Aksu Arıca D. Seborrheic dermatitis: review. [Article in Turkish]. Turkiye Klinikleri J Dermatol 2016;26:90–100. [CrossRef]
2. Dessinioti C, Katsambas A. Seborrheic dermatitis: etiology, risk factors, and treatments: facts and controversies. Clin Dermatol 2013;31:343–51. [CrossRef]
3. Özçetin M, Khalilova F, Kılıç A. An uncommon method of evaluating nutritional status: BIA. [Article in Turkish]. J Child 2017;17:61–6.

4. Canbolat E. Possible role of phase angle from bioelectric impedance analysis parameters as diagnostic criteria. [Article in Turkish]. İnönü Üniversitesi Sağlık Bilimleri Derg 2018;7:58–65.
5. Lee SY, Gallagher D. Assessment methods in human body composition. Curr Opin Clin Nutr Metab Care 2008;11:566–72. [CrossRef]
6. Miller IM, Rytgaard H, Mogensen UB, Miller E, Ring HC, Ellervik C, et al. Body composition and basal metabolic rate in Hidradenitis Suppurativa: a Danish population-based and hospital-based cross-sectional study. J Eur Acad Dermatol Venereol 2016;30:980–8. [CrossRef]
7. Sanders MGH, Pardo LM, Ginger RS, Kiefte-de Jong JC, Nijsten T. Association between diet and seborrheic dermatitis: a cross-sectional study. J Invest Dermatol 2019;139:108–14. [CrossRef]
8. Cömert A, Bekiroglu N, Gürbüz O, Ergun T. Efficacy of oral fluconazole in the treatment of seborrheic dermatitis: a placebo-controlled study. Am J Clin Dermatol 2007;8:235–8. [CrossRef]
9. Hu Y, Zhu Y, Lian N, Chen M, Bartke A, Yuan R. Metabolic syndrome and skin diseases. Front Endocrinol (Lausanne) 2019;10:788. [CrossRef]
10. Tamer F. Relationship between diet and seborrheic dermatitis. Our Dermatol Online 2018;9:261–4. [CrossRef]
11. Linder D, Dreiher J, Zampetti A, Sampogna F, Cohen AD. Seborrheic dermatitis and hypertension in adults: a cross-sectional study. J Eur Acad Dermatol Venereol 2014;28:1450–5. [CrossRef]
12. Imamoglu B, Hayta SB, Guner R, Akyol M, Ozcelik S. Metabolic syndrome may be an important comorbidity in patients with seborrheic dermatitis. Arch Med Sci Atheroscler Dis 2016;1:e158–61. [CrossRef]
13. Sakuma TH, Maibach HI. Oily skin: an overview. Skin Pharmacol Physiol 2012;25:227–35. [CrossRef]
14. Pochi PE, Downing DT, Strauss JS. Sebaceous gland response in man to prolonged total caloric deprivation. J Invest Dermatol 1970;55:303–9.
15. Galluzzo M, Talamonti M, Perino F, Servoli S, Giordano D, Chimenti S, et al. Bioelectrical impedance analysis to define an excess of body fat: evaluation in patients with psoriasis. J Dermatolog Treat 2017;28:299–303. [CrossRef]
16. Engin B, Kutlubay Z, Yardımcı G, Vehid HE, Ambarcıoğlu P, Serdaroğlu S, et al. Evaluation of body composition parameters in patients with psoriasis. Int J Dermatol 2014;53:1468–73. [CrossRef]
17. Kenawy MZ, Mikhael NW, El-fallah AA, Shehata RA. Serum levels of insulin like growth factor-1 (IGF-1) in patients with seborrheic dermatitis. Benha J Appl Sci 2020;5 Part 2:229–31. [CrossRef]
18. Dowlati B, Firooz A, Khamesipour A, Lotfi M, Stuart CA, Smith EB, et al. Insulin quantification in patients with seborrheic dermatitis. Arch Dermatol 1998;134:1043–5. [CrossRef]
19. Breunig Jde A, de Almeida HL Jr, Duquia RP, Souza PR, Staub HL. Scalp seborrheic dermatitis: prevalence and associated factors in male adolescents. Int J Dermatol 2012;51:46–9. [CrossRef]
20. Nagpal M, De D, Handa S, Pal A, Sachdeva N. Insulin resistance and metabolic syndrome in young men with acne. JAMA Dermatol 2016;152:399–404. [CrossRef]