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Association of body mass index with clinical variants of psoriasis

Повезаност индекса телесне масе са клиничким варијантама псоријазе

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Повезаност индекса телесне масе са клиничким варијантама псоријазе

SUMMARY

Introduction/Aim Psoriasis is a common, chronic, immune-mediated, inflammatory and proliferative skin disease in which both genetic and environmental influences have a role in its pathogenesis. The relationship between psoriasis and obesity is probably bidirectional.

The aim of this study was to evaluate the association between psoriasis and obesity, whether a quantitative graduation of overweight using Body Mass Index shows direct correlation with various clinical variants of psoriasis, disease duration and having positive family history of psoriasis.

Methods This prospective, observational descriptive cross-sectional study included 120 psoriatic patients who were referred to Clinic of dermatovenereology at the University Clinical Centre of Vojvodina. Clinical variants of psoriasis were determined. Age, gender, duration of the disease, BMI and family history of psoriasis were measured and compared.

Results 53.3% males and 46.7% females were included in this study. The mean age was 49.5±15.5 years. The most present clinical variants of psoriasis were psoriasis vulgaris (55%) and psoriatic arthritis (30.0%). Most of the patients (42.5%) were overweight, 23.3% were obese and 1.7% were morbidly obese. The mean Body Mass Index was high (27.7±5.2). Mean duration of the disease was 15.6±14.9 years. Positive family history of psoriasis was found in 33 (27.5%) patients.

Conclusion There was no correlation between the Body Mass Index and gender of the patients, psoriasis clinical variants, duration of the disease and positive family history of psoriasis. The slight positive correlation was found between Body Mass Index and age of psoriatic patients. That requires further studies that include physical activities questionnaire, considering that lack of physical activities in older patients might be an explanation.

Keywords: psoriasis; body mass index; BMI

САЖЕТАК

Увод/Циљ Псоријаза је честа, хронична, имунски посредована, инфламаторна и пролиферативна болест коже у чијој патогенези игра улогу и генетика и утицај средине. Повезаност између псоријазе и гојазности је вероватно двосмерна. Циљ ове студије је евалуација повезаности псоријазе и гојазности, односно да ли квантитативно градирање прекомерне тежине уз помоћ индекса телесне тежине показује директну корелацију са различитим клиничким варијантама псоријазе, трајањем болести и позитивном породичном анамнезом на псоријазу.

Методе У ову проспективну, опсервациону дескриптивну студију је укључено 120 пацијената са псоријазом упућених на Клинику за кожно-венеричне болести Универзитетског клиничког центра Војводине. Одређене су клиничке варијанте псоријазе. Узети су подаци о годинама, полу, трајању болести, индексу телесне масе и подаци о породичној анамнези на псоријазу, након чега је урађена обрада и поређење.

Резултати 53,3% мушкараца и 46,7% жена је било укључено у студију. Просек година је био 49,5 ± 15,5. Најзаступљеније клиничке варијанте су биле вулгарна псоријаза (55%) и псоријатски артритис (30%). Већина пацијената (42,5%) је била са прекомерном тежином, 23,3% су били гојазни и 1,7% морбидно гојазни. Просечан индекс телесне тежине је био висок (27,7 ± 5,2). Просечна дужина трајања болести је била 15,6 ± 14,9. Позитивну породичну анамнезу на псоријазу је имало 33 (27,5%) пацијената.

Закључак Није утврђена корелација између индекса телесне масе и пола пацијената, клиничких варијанти псоријазе, трајања болести и позитивне породичне анамнезе на псоријазу. Дискретна позитивна корелација је утврђена између индекса телесне масе и старости пацијената. Такав закључак захтева даља испитивања која би садржала и упитник о физичкој активности, обзиром да мањак физичке активности код старијих пацијената може бити објашњење.

Кључне речи: псоријаза; индекс телесне масе; БМИ

INTRODUCTION

Psoriasis is a common, chronic, immune-mediated, inflammatory and proliferative skin disease in which both genetic and environmental influences have a role in its pathogenesis [1].

It affects approximately 125 million people in the world [2] and usually occurs with bimodal age distribution, with peaks in third and sixth decade. Between 60% and 90% of patients have a family history of the disease [3, 4]. Psoriasis is systemic inflammatory disease accompanied with various comorbidities and exert major impact on both physical and emotional quality of life that is comparable with other major illnesses [5] as with that of cardiovascular and cancer patients [3]. About one third of psoriasis patients develop psoriatic arthritis (PsA), chronic inflammatory arthropathy associated with skin and nail psoriasis, belonging to the spondyloarthritis spectrum [6]. 19% of the psoriasis patients with arthritis suffer from operational inabilities that impact their quality of life greatly [3].

Overweight or obesity is defined as increase in body fat that exceeds the normal level. Usual tool used for estimation of body fat is Body Mass Index (BMI) and represents weight-to-height ratio. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2) [1, 7]. In adults, BMI≥25 is defined as overweight, and BMI ≥ 30 as obesity. It has become one of the leading health issues of the 21st century [8, 9]. The relationship between psoriasis and obesity is bidirectional. Question is which comes first? [3, 10, 11].

Obesity may exacerbate the clinical manifestation of psoriasis or trigger the disease [1] and present in early adulthood may promote the risk of developing PsA [12]. It has been associated with a decreased response to systemic and biologic therapies [10, 11]. Both psoriasis and obesity could cause metabolic alterations that could be the main and triggering effects [13, 14, 15]. Chronic subclinical inflammation plays the major role in obesity and psoriasis, explained as „proinflammatory state'' [16]. Adipose tissue is a large endocrine and secretory organ that produces adipokines and pro-inflammatory cytokines. In obesity, adipocytes are in a state of upregulation of pro-inflammatory adipokines, leptin and resistin, and stimulation of pro-inflammatory cytokine production by macrophages, and downregulation of anti-inflammatory adipokines [16]. Numerous studies revealed higher prevalence of obesity in

psoriatic patients than in general population. There is two-fold increased risk for psoriasis in obese patients comparing to normal weight subjects [10, 17]. A meta-analysis of 16 observational studies found a pooled odds ratio to be 1.66 for the correlation between psoriasis and obesity [5, 18]. Several studies have been reported the association between psoriasis and obesity measuring BMI [1, 10, 19]. In a number of cross-sectional studies has been noted that increased BMI coincides with a greater degree of psoriasis disease severity [5, 20, 21, 22], also a positive correlation between the increased BMI and the severity of psoriasis expressed as psoriasis area and severity score (PASI) has been determined [13, 21].

The main objective of this study was to determine the relation between BMI and psoriasis clinical variants, duration of psoriasis and positive family history for psoriasis in psoriasis patients.

METHODS

This prospective, observational descriptive cross-sectional study included 120 adult psoriasis patients, according to the order of referral to the Clinic of dermatovenereology at the University Clinical Centre of Vojvodina in Novi Sad, Serbia, between January 2019 and February 2020. Exclusion criteria were history of diabetes or hypothyroidism, or refusal to take part in the study and sign the informed consent. The study was approved by the institutional ethics committee. Patient clinical and demographic were recorded in a checklist. Al measurements were performed under fasting condition in the morning using a scale and a measuring type. To determine waist circumference measuring tape was placed at the uppermost part of the hip bone around the abdomen without causing compression on the skin. BMI (kg/m^2) classification in five categories was used, according to WHO classification [7]: underweight (BMI < 18.50 kg/m^2), normal range (BMI 18.50–24.99 kg/m^2), overweight (BMI ≥ 25 kg/m^2), obese (BMI ≥ 30 kg/m^2), morbidly obese (BMI ≥ 40 kg/m^2).

Statistical analysis**:** SPSS v 23.0 was used. χ^2 test was used for comparison of categorical data, t-test for comparison of continuous data and Pearson's correlation test for correlation analysis. The degree of correlation was measured by a Pearson's correlation coefficient and degree of correlation was interpreted according to the recommendation of the British Journal of Medicine [23].

RESULTS

Of 120 adult psoriasis patients included in this study 64 were males (54.3%) and 56 females (46.7%). The mean age was 49.5 ± 15.5 years. Age distribution of patients is presented in Figure 1a.

Psoriasis clinical variants: Plaque psoriasis (vulgaris) was the most frequent clinical variant in total sample, in 66 (55%) patients, and psoriatic arthritis was diagnosed in 36 (30%) patients. 10 (8.3%) patients presented with guttate psoriasis, 3 (2.5%) patients presented with palmo-plantar psoriasis, 2 (1.7%) patients with erythrodermic psoriasis, 2 (1.7%) patients with scalp psoriasis as the only manifestation of psoriasis, and one patient (0.8%) with generalized pustular psoriasis.

Duration of psoriasis was categorized in 5-year intervals. Shortest duration of psoriasis, between 0–5 years was in 43 patients (35.8%); 18 (15%) patients were in the group in which the duration of psoriasis ranged from 6–10 years; 11 (9.2%) patients were in the third group where the duration was from 11–15 years; 13 (10.8%) patients were in the fourth group in which the duration of psoriasis was from 16–20 years and 35 (29.2%) patients had the psoriasis duration above 20 years (fifth group) (Figure 1b).

BMI in psoriasis patients: Differences between gender, psoriasis clinical types and duration of psoriasis.

In total sample of 120 patients, 51 (42.5%) of patients were overweight, 28 (23.3%) were

obese and 2 (1.7%) were morbidly obese. The mean BMI was high (27.7 ± 5.2). The mean BMI in men was 28.4 kg/m^2 (std deviation 4.72, st error of mean 0.59) and in women 26.89 kg/m^2 (std deviation 5.54, std error of mean 0.74) and this difference is not statistically significant (t-test, p = 0.109). Neither the difference in frequencies of patient in each of BMI categories between man and women were statistically significant (χ^2 test, p = 0.283) (Table 1).

Albeit one pustular psoriasis patient has higher BMI than all other patients, due to small number of patients in pustular, erythrodermic and scalp psoriasis groups, these differences did not reach the statistical significance in this study. Also, BMI of patients with psoriatic arthritis was higher than BMI of patients with plaque psoriasis, but this did not reach statistical significance also (t-test, p = 0.456) (Table 2).

The BMI was not correlating with duration of psoriasis (p-value 0.059) (Table 3), and with age of the patients (p-value was 0.038) (Figure 1c).

Correlation between BMI and patient age was low, and no correlation of BMI with duration of psoriasis could have been demonstrated (Table 4).

Positive family history of psoriasis was found in 33 (27.5%) patients. Mean BMI was similar in both groups, with and without positive family history of psoriasis, and BMI was not correlating with positive family history of psoriasis (t = -0,255, p = 0,799) (Table 5).

DISSCUSION

High BMI as an indicator of overweight and obesity has negative impact on manifestation and severity of psoriasis. Obesity at an early age increases the risk of developing PsA. Prevention and early treatment of obesity may decrease the risk of PsA development and help in psoriasis management (1).

In our study observed higher BMI in patients with PSA confirmed results from the literature (1).

The mean BMI was high (27.7 ± 5.2), similar to prospective hospital based cross-sectional study that was conducted by Elobeid HE, et al. in Soudan in which the mean BMI was 25.34 [1], as well as in retrospective case control study in Japan conducted by Naito R, et al. in which the mean BMI was 22.22 ± 3.98 kg/m^2 [24].

No significant statistical difference was found regarding BMI and gender of the patients. The mean BMI in men was 28.40 kg/m^2 and 26.89 kg/m^2 in women similar as in study that was conducted in Japan in which the mean BMI in male psoriatic patients was 22.33 ± 3.78 kg/m^2, and 22.09 ± 4.17 kg/m^2 in women [24] with the difference that in the Japanese study patients were not overweight. Different results were obtained in study conducted in Sudan in which the BMI of more than half of the patients with high BMI (54%) was higher in female patients [1].

In our study, the slight positive correlation between BMI and age of psoriatic patients was found which was opposite comparing to results obtained in study that was conducted in Sudan in which the BMI was not correlating with the age of the patients [1]. In Japanese study female psoriatic patients aged 20–39 years had significantly higher BMI compared to controls represented by patients with other dermatological diseases, and in contrast male psoriatic patients aged older than 40 years had a mean BMI higher than controls [24].

In our study the most prevalent clinical variant was PV in 66 (55%) patients, 36 (30%) of patients had PsA, followed by 10 (8.3%) patients presented with guttate psoriasis.

The results were slightly different in study conducted in India by Appukkuttan et al. [25] where the most common clinical variant was PV (86.1%), followed by pustular psoriasis (3.7%), psoriasis with pustulation (2.8%), and guttate psoriasis (1.85%).

There was no association between BMI and psoriasis clinical variants. The mean BMI was highest in group of patients with PsA (29.4), following BMI in group with PV (27.0), and group with guttate psoriasis (26.5).

Concerning the distribution of the BMI of psoriasis clinical variants in Elobeid HE, et al.

study most of the patients had PV among which 23 patients were with normal BMI (28.40%), 21 were overweight (25.93%), 11 were obese (13.58%), five were underweight (6.17%), and two were morbidly obese 2.47% [1] comparing to our patients with PV among which 23 were with normal BMI (34.84%), 26 were overweight (39.39%), 14 were obese (21.21%), and two patients were underweight (3.03%).

In our study, six patients with PsA had normal BMI (16.66%), 19 were overweight (52.7%), nine were obese (25%), and two (5.55%) patients were morbidly obese (BMI $\geq$ 40).

Regarding the correlation of BMI and duration of the disease the results were similar to the results of Sudanese cross-sectional study conducted on 81 psoriatic patients in which the BMI was not correlating with the duration of the disease [1]. The same finding was observed in study conducted in India [26].

The association between family history of psoriasis and BMI was not found in our study which was different comparing to results of the Bayaraa B, et al. study conducted in Fukoka, Japan. They surveyed whether patients with familial psoriasis were obese at the onset of psoriasis and found that patients with familial psoriasis had lower BMI than those with no familial psoriasis [27].

Study limitations: BMI evaluates excess weight rather than excess fat [28], consequently it poorly distinguishes between fat mass and bone or lean mass [29]. Waist circumference is recommended as additional measurement for fat distribution regarding its high correlation with visceral fat [30]. Study was performed at the University hospital, and that can be the reason why patients with mild skin psoriasis are under-represented. Apart from psoriasis, numerous other behavioral and lifestyle factors can contribute to obesity, but these could not have been investigated in detail in this study.

CONCLUSION

Our finding that more than a half of psoriasis patients are overweight or obese is similar as in most psoriasis studies. There was no association between the BMI and gender of the patients, psoriasis clinical variants, duration of the disease and positive family history of psoriasis. The slight positive correlation was found between BMI and age of psoriatic patients. That requires further studies that include physical activities questionnaire, considering that lack of physical activities in older patients might be an explanation.

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Conflict of interest: None declared.

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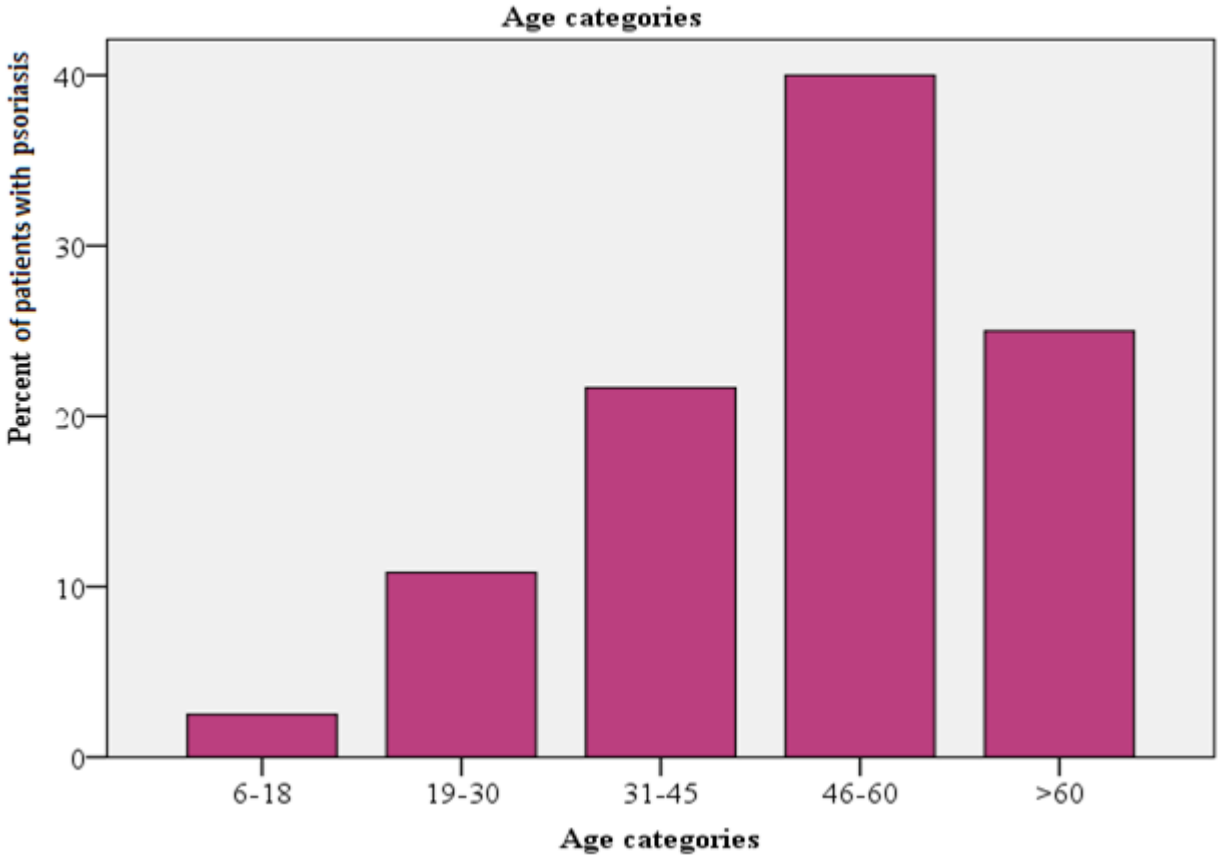

Figure 1a. Percentage of psoriasis patients in each age category

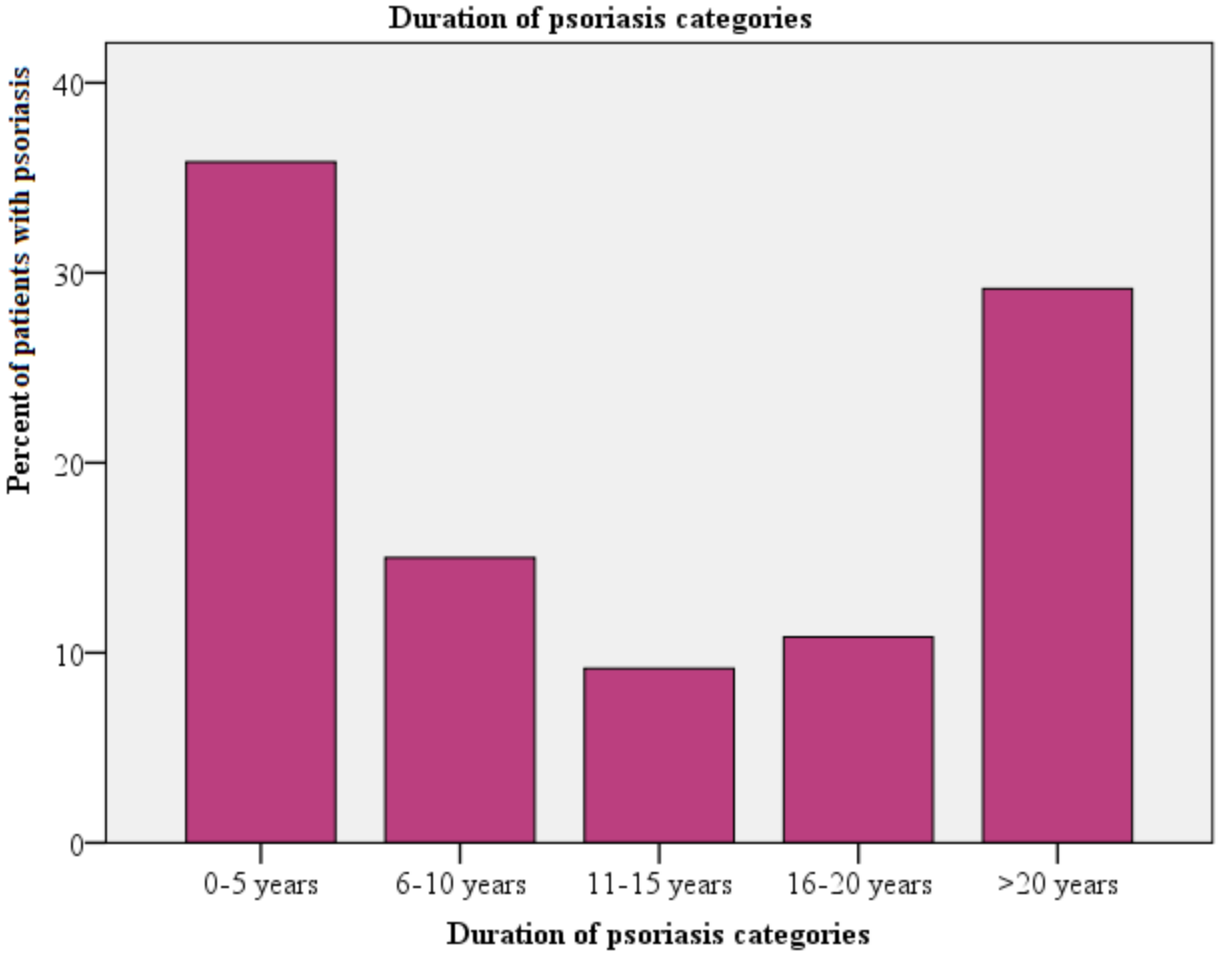

Figure 1b. Percentage of psoriasis patients in each category of psoriasis duration

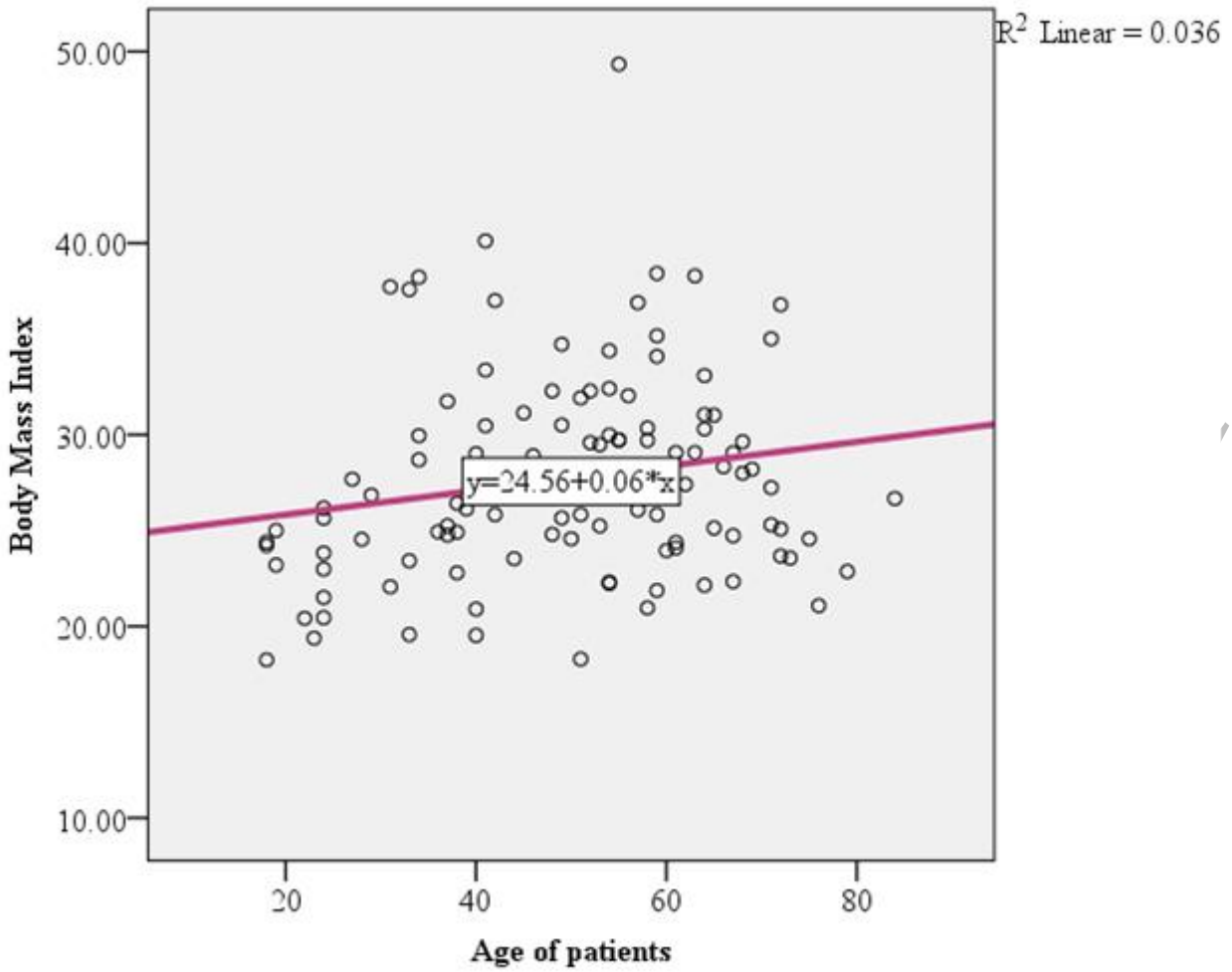

Figure 1c. Correlation between body mass index and the age of patients

Table 1. Frequency of different categories of body mass index in male and female patients with psoriasis

Parameters			Body mass index category					Total	p
			< 18.5	18.5–24.99	> 24.99	> 29.99	> 39.99		
Sex of patient	m	n	0	16	30	17	1	64	0.283
		%	0%	25%	46.9%	26.6%	1.6%	100%	
	f	n	2	21	21	11	1	56	
		%	3.6%	37.5%	37.5%	19.6%	1.8%	100%	
Total		n	2	37	51	28	2	120	
		%	1.7%	30.8%	42.5%	23.3%	1.7%	100%	

Table 2. Body mass index in patient with various psoriasis clinical variants

Types	N	Mean	Standard deviation	Minimum	Maximum	p
Psoriasis vulgaris	66	27.0	4.4	18.3	37.0	
Guttate psoriasis	10	26.5	5.5	20.4	38.2	
Palmoplantar psoriasis	3	28.2	6.1	22.8	34.7	
Pustular psoriasis	1	34.1	.	34.0	34.0	
Erythrodermic psoriasis	2	25.7	1.6	24.6	26.8	0.456
Scalp psoriasis	2	25.6	8.9	19.4	31.9	
Psoriatic arthritis	36	29.4	6.0	20.5	49.3	
Total	120	27.7	5.1	18.2	49.3	

Table 3. Correlation of body mass index and duration of psoriasis

Parameters			Body Mass Index category					Total	p
			< 18.5	18.5–24.99	> 24.99	> 29.99	> 39.99		
Duration of psoriasis categories	0–5 years	N	1	16	18	8	0	43	0.233
		%	2.3%	37.2%	41.9%	18.6%	0%	100%	
	6–10 years	N	1	8	5	3	1	18	
		%	5.6%	44.4%	27.8%	16.7%	5.6%	100%	
	11–15 years	N	0	3	4	4	0	11	
		%	0%	27.3%	36.4%	36.4%	0%	100%	
	16–20 years	N	0	2	4	7	0	13	
		%	0%	15.4%	30.8%	53.8%	0%	100%	
	> 20 years	N	0	8	20	6	1	35	
		%	0%	22.9%	57.1%	17.1%	2.9%	100%	
Total		N	2	37	51	28	2	120	
		%	1.7%	30.8%	42.5%	23.3%	1.7%	100%	

Table 4. Correlation of body mass index and the age of patients and the duration of psoriasis

Correlation		Body mass index
Age of patients	Pearson correlation	**0.190***
	Sig. (2-tailed)	**0.038**
Duration of psoriasis	Pearson correlation	0.059
	Sig. (2-tailed)	0.525

Table 5. Body mass index in patients with and without family history of psoriasis

Parameters	**Family history of psoriasis**	N	Mean	Standard Deviation	Standard Error Mean
Body Mass Index	No	87	27.6241	5.28947	0.56709
	Yes	33	27.8936	4.85408	0.84499

