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The critical role of body dysmorphic disorder in dermatological patients' body image: patients' desire to seek even more medical treatments increases after dermatological treatment

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Abstract

Objective: To investigate whether patients with a visible skin disorder (acne) and non-visible disorder (psoriasis/eczema) present body image changes after dermatological treatment. Secondly, to examine whether the existence of body dysmorphic disorder (BDD) influences patients' desire to receive more medical treatments after initial treatment.

Materials and methods: A battery of questionnaires assessing body image, BDD and satisfaction with the medical outcome was shared with patients before treatment and with a six-month follow-up (after each patient completed their treatment). The sample included 54 patients with visible facial acne, 54 patients with non-visible psoriasis/eczema, and 54 participants without a dermatological disorder (control group). All patients were treated by dermatologists and were 18-35 years old.

We examined body image and demographic characteristics using Multivariate analysis of covariance (MANCOVA) between all the study groups. Performing MANCOVA analysis we investigated patients' body image and appearance satisfaction, before and after treatment, compared to the control group. Finally, to examine the role of BDD on patients' desire to receive more treatments, MANCOVA analysis was performed, with BDD diagnosis as a covariate variable.

Results: At both research phases, both groups of dermatological patients exhibited lower levels of appearance satisfaction, compared to the control group. MANCOVA analysis revealed that after treatment, acne patients diagnosed with BDD presented even lower levels of facial and overall satisfaction. Moreover, acne patients showed a higher desire for more treatments that improve the skin's appearance, compared to psoriasis/eczema patients.

Conclusion: Dermatological disorders negatively affect patients' body image, which does not improve even after dermatological treatment completion. Patients with acne seem to be more dissatisfied with their facial and overall appearance, while their dissatisfaction is projected on other body parts. Lastly, the coexistence of BDD symptomatology increases patients' desire to seek further aesthetic and cosmetic treatments, to further improve the skin's appearance after treatment.

Keywords

Acne, psoriasis, eczema, body image, body dysmorphic disorder, psychodermatology

INTRODUCTION

The existence of a dermatological disorder affects patients' body image. Accumulated findings suggested that negative body image is often accompanied by depressive symptoms, anxiety, and decreased self-esteem, even in the absence of any physical illness (Cash & Fleming, 2002; Noles et al., 1985; Powell & Hendricks, 1999). Due to the alteration they cause to the skin, dermatological disorders significantly affect, and often influence the way patients perceive their body image and several studies have investigated dermatological patients' body image, each one from a different perspective.

Body image in patients with acne

Acne is one of the most well known visible dermatological disorders that manifests in early adolescence and affects mainly younger individuals. However, the diagnosis of acne can remain during the patients' lifespan (Layton et al., 1997). In the study conducted by Bowe et al. (2007), body image in patients with acne was investigated and showed that patients who appeared to have a disordered body image also had a depressed mood. Moreover, it was

shown that a higher disordered body image appeared to have a high correlation with high preoccupation, distress and impairment. Reduced perception of

attractiveness is also cited by Layton (2006), as a psychological consequence for acne patients, while the study by Kornblau et al. (2007) showed that adolescents with acne evaluated their overall body self-esteem and their sexual attractiveness lower than their partners who did not have acne. Lastly, Motley and Finlay (1989) reported that patients with facial acne felt unattractive, socially isolated, and unwilling to go for a date.

Body image in patients with psoriasis and eczema

Regarding patients with psoriasis and eczema, many researchers highlighted that their body image presents to be negative and that these dermatological disorders can affect their quality of life, and more specifically their social and sexual relationships (Vardy et al., 2002; Wahl et al., 2000). Reduced sexual function was also supported by the research of Khoury et al. (2014), who conducted interviews with eight patients with psoriasis, whose skin disorder had visible anatomical localisation. Their results showed that the changing body image due to dermatological disorder had psychosocial effects on their sample. More specifically, psoriasis that was visible to others affected patients and led to behaviours such as regular coverage of their body and reduced exercise, as well as have sexual inhibitions. In addition, Graham-Brown's (1996) argued that patients with eczema/atopic dermatitis showed high concerns about their appearance and personal attractiveness, which limit their ability to form close personal relationships.

Furthermore, in the study of Gupta and Gupta (1995), with a sample of 215 adult patients with psoriasis, it was found that patients' age groups of 18 to 29 and 30 to 45 years showed more problems related to appearance and socialisation, compared with the oldest patient' group aged 45 to 65 years. Similarly, Chernyshov (2016), supported that both negative perceptions of body image by peers, as well as the self-perception of patients with eczema/atopic dermatitis may be even more exacerbated in adolescent patients. In addition, the recent study of Wojtyna et al. (2017), which recruited a sample of 219 patients with psoriasis, found that improved body image may play a preventive role in depression, especially in women. Despite the great interest in the field, most body image studies with dermatological patients lacked a control group. However, the recent study conducted by Nazik et al. (2017), with a sample of 92 patients with psoriasis and 98 healthy subjects, showed that dermatological patients' body image was significantly lower compared with healthy participants.

How does dermatological treatment help patients with acne, psoriasis and eczema?

Medical dermatological studies have found that dermatological treatment can have positive effects on the mental sphere of several patients, especially those with acne (Capoore et al., 1998). In cases of facial dermatological disfigurement due to acne scars, dermatologists' intervention is considered to be very beneficial for the psychosocial well-being of young patients (Kish & Lansdown, 2000). Furthermore, Marron et al. (2013) and Rubinow et al. (1987) underlined that the emotional state of patients with acne improved after dermatological treatment, while other researchers report that dermatological treatment improves the severity of acne itself, but not the severity of the psycho-emotional state of patients (Kellett & Gawkrodger, 1999).

On the other hand, research suggests that dermatological interventions may also improve how patients with atopic dermatitis and psoriasis perceive their body. In the study of Czech et al. (2000), with a sample of adult patients with atopic dermatitis, it was found that dermatological treatment improved their quality of life. This finding is also supported by other researchers who used a sample of patients with mild to moderate psoriasis (Hashimoto et al., 2012; Mueller et al., 1979; Touw et al., 2001). However, even if all of the above-mentioned studies included an experimental design of repeated measures "before and after the completion of the dermatological treatment", they did not focus on investigating patients' body image by using a standardised clinical psychometric tool, nor did they compare the results between two groups of dermatological patients.

Since positive body image is associated with psychosocial well-being and through satisfaction with appearance the interpersonal social contacts are achieved (Cash & Smolak, 2011), we conclude that dissatisfaction with the body can lead to negative beliefs towards oneself, low self-esteem and reduced social interaction. For these reasons, patients with a dermatological disorder which affects their appearance, appear to be more sensitive and with lower self-esteem in terms of their body image (Thompson, 2011). Based on the above, we consider that further research is needed in order to investigate patients' body image, both among groups with different dermatological disorders (with visible and non-invisible anatomical localisation), and also in comparison with a control group. Also, since the experience of the dermatological disorder causes significant discomfort in terms of appearance, further

psychological research is needed in order to investigate whether it remains at the phase when patients complete their dermatological treatment. These studies will focus on two research phases: both at the time when patients seek dermatological services, as well as at the phase when patients complete their dermatological treatment. Current literature lacks similar studies.

Body Dysmorphic Disorder and Dermatological Disorders

Although most research reflects dermatological and cosmetological patients' perceptions towards their body (or specific body parts) (Blum, 2003; Davis, 1995; Gimlin, 2010; Thomas & Goldberg, 1995), the investigation of the field of body image cannot be complete without particular emphasis on the possibility of the existence of BDD, a disorder that is most often difficult to diagnose. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), BDD belongs to the obsessive-compulsive disorder spectrum. Diagnostic criteria include: 1) excessive preoccupation with one or more defects on the appearance of the body, which are not observed or evaluated as insignificant by others; 2) repetitive behaviours (repetitive mirror checking, excessive grooming or treating of the specific body area, reassurance seeking) or thoughts as a mental act (comparing their appearance with that of others); 3) the preoccupation leads to clinically significant distress and reduction in all important areas of functioning; 4) the preoccupation cannot be better explained by concerns about excessive fat or weight and individual's symptoms do not meet the criteria for an eating disorder. Lastly, to diagnose BDD, it is necessary to define the two specifiers: muscle dysmorphia and insight specifier (APA, 2013).

Many patients often turn to a dermatologist for various complaints regarding their skin, while experiencing anxiety and negative mood. Although their main symptomatology often indicates the presence of BDD, these patients rarely turn to mental health professionals (Gordon-Elliott & Muskin, 2013; Gupta, 2006). Tartakovsky (2016) and Phillips (2001) argued that patients with acne often lack a supportive network, might have reduced social contacts and experience isolation, difficulties which also occur in people with BDD. Also, the risk of suicide is often reported in patients with severe acne, a phenomenon which is often seen in patients with symptoms of BDD (Halvorsen et al., 2011). Additionally, in the study of Bowe et al. (2007), half of the sample patients with acne who did not meet the criteria for BDD showed severe discomfort and preoccupation with the facial appearance, similar to those patients who met the criteria for BDD. High rates of BDD have been reported not only in patients with acne (Uzun et al., 2003) but also in patients with different dermatological disorders (Phillips et al., 2000; 1993).

Since many patients with BDD do not turn to mental health professionals, they often end up on the operating table of a plastic surgeon, the office of a dermatologist or a dentist, in order to receive medical interventions or treatments which are often unnecessary and do not seem to reduce their inner discomfort (Castle et al., 2004; Phillips, 1991). Satisfaction with aesthetic or cosmetic treatments for people with BDD can be maintained for a short period, but when the body heals, patients' anxiety can be focused on another part of their body (Phillips et al., 2006). Finally, the results of the medical treatments that patients with BDD choose to receive do not appear to be satisfactorily experienced, even if they are considered medically successful (Veale, 2000). According to the literature, there are not enough findings on the pharmacological or psychotherapeutic treatment of BDD, which makes it a difficult-to-treat disorder (Crerand et al., 2005).

In conclusion, the literature lacks research data on the possibility of the existence of BDD among different groups of dermatological patients, while also checking how patients perceive their body before and after their dermatological treatment. Based on the gaps in the literature, this research will provide information on whether body image changes among two groups of dermatological patients (with visible and non-visible skin disorder), after the completion of their dermatological treatment. Furthermore, it aims to investigate whether the presence of BDD reinforces patients' desire to seek more treatments (aesthetic and cosmetic) after dermatological treatment, to improve their skin's appearance even more, despite the success of their treatment.

There were three hypotheses in the current study. Firstly, it is hypothesised that dermatological patients of group A (visible disorder – facial cystic acne) and group B (non-visible disorder – eczema/psoriasis), exhibit lower levels of satisfaction with their external appearance, at both phases of the study (before and after treatment), compared to the control group (group C). Secondly, it is assumed that patients with visible facial cystic acne (group A) exhibit lower levels of satisfaction with their external appearance, compared with the patients with psoriasis and eczema (with non-visible localisation) (group B), both before and after dermatological therapy. Thirdly, we hypothesised that the existence of BDD diagnosis can be as a covariance in the relationship between dermatological disorder and body image, therefore BDD can influence

patients' desire to receive further medical treatments after their dermatological treatment.

METHODS

Study design. This study was conducted in Cyprus and enrolled 108 dermatological patients who were treated by four dermatologists from two towns of Paphos and Limassol. The follow-up phase started six months after each dermatological patient completed their treatment with their dermatologist. Patients diagnosed with visible severe facial cystic acne (group A, n = 54) and with non-visible psoriasis/eczema (group B, n = 54) were included. A group of healthy participants, with no skin disorder was also included as a control group (group C, n = 54). Patients were diagnosed exclusively by their dermatologists before dermatological treatment and have agreed to start pharmacological treatment. At this point, they have also agreed to participate in the current study and to meet with the researcher. The exclusion criteria for all three groups of participants included being <18 or >35, having any additional medical condition that may affect their body image, having any physical disability, being pregnant and being unable to complete a self-reported questionnaire. Patients with possible psychiatric disorders were not excluded, since neither dermatologists nor the researcher could control each patient's medical history. Six months after each participant completed their dermatological treatment, they again met with the researcher for the post-dermatological treatment phase assessment. Participants from group A with severe visible facial cystic acne followed treatment with retinoids and antibiotics, while participants from group B followed treatment with oral medications (corticosteroids and antibiotics), as well as topical medications (salicylic acid, creams and shampoos). Cyprus National Bioethics Committee approved the study procedure, as well as all the tools used with the approval decision number (ΕΕΒΚ ΕΠ 2015.01.103).

Study population: Recruitment and screening.

When participants from groups A and B were diagnosed by their dermatologist, they were informed about the research. Those patients who showed interest in participating in the research signed a consent form for the researcher to contact them. At the first meeting with each participant, the researcher gave information on the nature of the research, while explaining the need to attend the follow-up phase (six months after each participant completed their dermatological treatment). Participants were also informed about the confidentiality of their personal data, the voluntary scope of the study, their right to withdraw from the study at any time, even without having to explain their reasons why. Group C participants were recruited by using the snowball sampling method and the same six-month follow-up procedure, followed by the two groups of dermatological patients was also applied.

Before dermatological treatment, a sociodemographic questionnaire was administered as a brief interview, providing demographic information, the reason for seeking dermatological treatment, information about the body parts affected, its visibility and the prescribed dermatological treatment. This questionnaire also screened participants for their eligibility. Next, they were administered the BDD Diagnostic Module (for adults) and finally, the Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS).

After dermatological treatment – when each patient completed their pharmacological treatment (six months after the first administration of the research tools), all participants were again administered the MBSRQ-AS. Additionally, a short self-reported questionnaire which investigated patients' satisfaction with the dermatological treatment's outcome was administered only to dermatological patients of group A and B.

Study variables. Sociodemographic questionnaire and skin disorder characteristics.

The questionnaire was developed for this study and administered as a brief interview for all the groups of participants. It gathered demographic information (gender, age, education) reason for seeking dermatological treatment, information about the nature and localisation of the skin disorder (visible to others since it is located on the face or non-visible; that is it could be covered with clothes) and the prescribed dermatological treatment followed. The questionnaire was administered only before dermatological treatment.

BDD Diagnostic Module – for adults.

This tool was administered to identify participants with symptomatology that fulfilled the criteria of BDD. It is a semi-structured tool in the form of the Structured Clinical Interview (SCID-IV), based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth

Edition (DSM-IV) criteria. To qualify for the diagnosis of BDD, all items of the tool had to be coded 3. The answer scale ranged from 1 "absent" to 3 "threshold or true". The three items were summed up and created one variable for BDD diagnosis. The diagnosis of BDD was used as a covariate variable in the analysis, to examine whether BDD affects dermatological patients' desire to seek further aesthetic and cosmetic procedures, after the completion of their dermatological therapy. The tool was developed by a psychiatrist (Phillips, 2009) and is considered to have good reliability (Phillips, 2005). Its version used for adults (18 years and older) was chosen for the current study and was administered by the researcher who was a registered clinical psychologist and trained to make diagnosis assessments. At the current study's stage of administration, the questionnaire was not yet complied with the DSM-V criteria; never has it been used before in the Greek-Cypriot population, nor has it been translated into the Greek language. For this reason, and after the permission of K. Phillips, the tool was translated with the method of double-reverse translation, by two translators who were native speakers of the Greek language. For the current study, the reliability was a= .74.

Multidimensional Body–Self Relations Questionnaire (MBSRQ-AS).

This self-reported questionnaire is a multidimensional tool by which the attitudes and behaviours that people display for the personal assessment of their body image are calculated (Cash, 2000). It consists of 34 items (sentences-behaviours). Respondents are asked to indicate the extent to which each statement pertains to them personally. The answer scale ranged from 1 "I definitely disagree" to 5 "I definitely agree". Attitudes-Behaviours are divided into 5 subscales: 1) Appearance evaluation, 2) Appearance orientation, 3) Overweight preoccupation, 4) Self-classified weight, and 5) the Body areas satisfaction scale (BASS). In the current study, particular interest was given to participants' answers to the items of the subscales: "Appearance evaluation", "Appearance orientation" and the "Body areas satisfaction scale-BASS" (face, hair, lower torso, mid-torso, upper torso, muscle tone, weight, height and overall appearance). Higher scores indicate a more positive body image, while lower scores relate to a more negative body image. The questionnaire has been translated and used in the Greek language (Argyrides & Kkeli, 2013) and as for its psychometric properties, the internal consistency reliability of the tool scales ranged from .82 to .89. The questionnaire was administered to all participants, before and after the dermatological treatment phase. In the current study, it had a very good internal consistency (α =0.80).

Questionnaire on patients' satisfaction with the dermatological treatment's outcome.

This questionnaire was developed for the current study and consisted of questions that collected information on patients' adherence to treatment and their satisfaction with the treatment outcome. It also included questions that explored patients' further desire to receive more medical treatments (aesthetic and cosmetic), to improve the appearance of their skin, after the completion of their dermatological treatment. More specifically, patients were asked to mention their desired medical treatments (aesthetic and cosmetic) in an open-ended question, among the following: chemical peeling, microneedling, chemical peeling, fractional laser, injectable dermal fillers. All the above-mentioned treatments improve skin's appearance and minimise scarring. The questionnaire was administered only to participants of group A and B, at the stage when each dermatological patient completed their pharmacological treatment (six months after their first meeting with the researcher).

Plan of analysis. All the relevant assumptions have been tested by using the

SPSS Statistics 22 for Windows. This is a software package used for interactive or batched statistical analysis. Specifically, the sample distribution follows a normal distribution, which was tested using the Kolmogorov-Smirnov test ($D(162) = .11$ $p > .05$) and was non-statistically significant, indicating that the sample followed the normal distribution.

To identify statistically significant differences between the three groups, ANOVA analysis of variance was applied, in terms of their demographic characteristics at the first research phase. To examine the hypothesis that the two groups of dermatological patients would appear to have a more negative body image, in comparison with the control group, at both research phases (before and after dermatological treatment), a mix ANOVA analysis was performed with two repeated measures. Subsequently, post hoc comparisons were performed to identify differences in body image scales among the groups of dermatological patients (group A and B) compared to the control group (group C). Bonferroni correction with p <.001 criterion was used to avoid type I statistical error.

Moreover, a Multivariate Analysis of Covariance (MANCOVA) was performed to investigate potential differences among the two groups of dermatological patients (with acne and with psoriasis/eczema), regarding their need to receive more a) cosmetic and b) aesthetic treatments, at the stage after the completion of their dermatological treatment, while taking into account the presence of BDD diagnosis (covariate). According to Field (2013), there are two reasons to enter a covariate in the ANOVA analysis. Firstly, to reduce the within-group error variance and secondly to eliminate the confounding variables that can affect the experimental manipulation.

Additionally, MANCOVA analysis was run to examine differences among the two dermatological groups, regarding their satisfaction with their facial appearance and overall appearance, after treatment. Before conducting the main statistical analysis of MANCOVA, the relevant assumptions were tested. As suggested, MANCOVA assumptions examined the level and measurements, since they assume that the independent variables are categorical and the dependent variables are continuous or scale variables. Covariate variable can be either continuous, ordinal, or dichotomous. Therefore, the assumptions examined whether the relationship between the independent variable, dependent variable and covariate are linear (Field, 2013). Specifically, almost all of the measures used indicated that the data were normally distributed. Moreover, according to Levene's test, the homogeneity of the covariance matrices assumption was met. To reduce Type I error, because there were 159 DF, a Bonferroni correction was adjusted to p <.001.

RESULTS

Sample characteristics. The study included 162 participants from two towns of Cyprus (Paphos and Limassol). 108 dermatological patients who were diagnosed by four dermatologists were enrolled: patients with visible severe facial cystic acne consisted group A (n = 54), and patients with non-visible psoriasis/eczema consisted group B (n = 54). Also, healthy participants were included in a control group (group C, n = 54). Participants were between 18>35 years old (76 males; *mean age*= 24.9 years old). As for the educational level, 55.6% of participants completed high school education, whereas 44.4% completed a bachelor's degree. Moreover, regarding their occupational status, 54.1% of participants were undergraduate students, 21.3% were employees, 14.8% were soldiers, 8.6% were unemployed and 1.2% was postgraduate students. According to their financial status, the majority of participants had high economic status (77.8%), whereas 21% and 1.2% of participants had middle and poor economic status respectively.

After dermatological treatment, it appears that all dermatological patients from group A (n = 54) reported that they have completed their pharmacological treatment with their dermatologist. Regarding the group B participants (patients with psoriasis/eczema), all patients reported that they have completed their pharmacological treatment, except for one participant (n = 53). Indicative statistical analyses performed by excluding the specific participant did not show significant changes in our findings. For this reason, the participant was not excluded from the statistical analyses, since he/she completed his/her participation in our research, although he/she discontinued the pharmacological treatment with their dermatologist.

Hypothesis 1: Investigation of differences in body image among group A (acne), group B (psoriasis/eczema) and the control group (group C), before and after treatment.

Differences in the subscales of MBSRQ-AS questionnaire which evaluates body image between groups, before and after dermatological treatment.

Repeated ANOVA measures with two repeated measurements were used in order to investigate whether the two groups of dermatological patients will have more negative body image at both research phases, in comparison with the control group. Dependent variables were the body image subscales of MBSRQ-AS questionnaire (appearance evaluation, appearance orientation), as well as all items of the BASS (face, hair, lower torso, mid-torso, upper torso, muscle tone, weight, height and overall appearance). The time factor (before and after dermatological treatment) was used as a within-subjects factor and the group as a between-subjects factor. Through this procedure, it was examined whether the dermatological treatment influenced each groups' body image. No significant change was observed for the group of patients with psoriasis/eczema and the control group.

The subscales of the MBSRQ-AS questionnaire in which there were statistically significant interactions between the two factors (time and group), suggesting that the participants of groups react differently to the effect of time (before and after the dermatological treatment) in terms of the levels of each subscale are the following: appearance evaluation (p <.05), satisfaction with the face (p <.001) and satisfaction from overall appearance (p = .04). Below, the above-mentioned differences are described in detail. In the group of patients with acne, after the completion of the

dermatological treatment, it is observed that the mean value of the subscale "Satisfaction with face" changes significantly and decreases (p <.001). The results were not caused by the presence of only time or group, but it is the cause of interaction between the two conditions (see Table 1).

Hypothesis 2: Investigation of the differences between patients with visible facial cystic acne (group A) and patients with psoriasis and eczema (with non-visible localisation) (group B), regarding their levels of satisfaction with their external appearance and the appearance of their face, before and after treatment.

Differences in appearance evaluation scale.

The interaction of the two factors (time and group) is statistically significant, F (2,159) = 4.18, p <.02, η^2 = .05. Also, both groups of dermatological patients evaluate lower their external appearance, compared to the control group, at both research phases (p <.001), while they do not differ significantly from each other.

Differences in body areas satisfaction scale – satisfaction with face.

The mix ANOVA performed to examine whether dermatological patients' appearance satisfaction changed after the completion of the dermatological treatment compared to the control group (hypotheses 1+3). The interaction of the two factors (time and group) is statistically significant, F (2,159) = 18.37, p <.001, η^2 = .188. It is observed that satisfaction with the appearance of the face decreased significantly among the groups of dermatological patients (p <.001), as well as between dermatological patients and the control group (p <.001), at both research phases.

Table 1. shows the mean and standard deviation (SD) values of the subscales of the MBSRQ-AS questionnaire, before and after dermatological treatment.

Subscales	Acne (group A)				Psoriasis/eczema (group B)				Controls (group C)			
	Before dermatological treatment		After dermatological treatment		Before dermatological treatment		After dermatological treatment		Before dermatological treatment		After dermatological treatment	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Appearance evaluation	2,76	.65	2,94	.57	3,05	.45	3,06	.51	3,73	.61	3,88	.57
Appearance orientation	4,14	.57	4,13	.52	3,67	.45	3,64	.54	3,31	.55	3,36	.69
Satisfaction with face	3,05*	.87	2,33*	.61	3,46	.54	3,42	.57	4,20	.49	4,09	.68
Satisfaction with hair	3,48	.84	3,59	.74	3,37	.94	3,55	.79	3,96	.77	4,0	.67
Satisfaction with lower torso	2,91	.68	2,98	.68	2,68	.54	2,76	.61	3,50	.86	3,61	.81
Satisfaction with mid torso	2,79	.73	2,85	.68	2,76	.77	2,78	.70	3,37	.91	3,59	.88
Satisfaction with upper torso	2,98	.83	3,07	.74	3,05	.81	3,11	.72	3,65	.87	3,85	.85
Satisfaction with muscle tone	2,88	.66	2,85	.71	2,92	.69	2,92	.75	3,44	.98	3,46	.96
Satisfaction with weight	2,81	.67	2,98	.83	2,81	.70	2.77	.79	3.28	.87	3.37	.87
Satisfaction with height	3,35	.87	3,41	.92	3,68	1,02	3,76	.86	4,04	.91	4,20	.76
Satisfaction with overall appearance	3,22	.54	2,88	.54	3,22	.45	3,15	.63	4,15	.63	3,85	.68

Note: differences were statistically significant at: *p < .001.
The p-values presented were corrected by using Bonferroni with criterion p <.001.

Also, analysis revealed a significant main effect of group, F (2,159) = 92.88, p <.001, η^2 = 0 .539. More specifically, **g**roup A (acne patients) had lower satisfaction with the appearance of their face before treatment, compared to the other groups (M = 3.05, SD = 0.87), which decreases even more after dermatological treatment (M = 2.33, SD = .61), p <.001 (see Figure 1).

Differences in body areas satisfaction scale – Satisfaction with overall appearance. The interaction of the two factors (**t**ime and **g**roup) was statistically significant, F (2,159) = 3.31, p <.04, η2 = 0.04. Satisfaction with overall appearance differed significantly between the groups of dermatological patients and the control group (p <.001), at both research phases, while the groups of dermatological patients did not differ significantly from each other (see Figure 2).

Hypothesis 3: Examination whether BDD diagnosis can affect dermatological patients' need to receive even more treatments after the completion of their dermatological treatment.

Presence of BDD diagnosis and patients' need to receive further cosmetic and aesthetic treatments, after the completion of their dermatological treatment. Differences among dermatological patient groups.

In the first stage of analysis, a t-test was used to examine whether there are differences between patients with a visible dermatological disorder (group A) and patients with a non-visible dermatological disorder (group B) with BDD affecting their need to receive cosmetic and aesthetic treatments. The BDD diagnosis variable was made when patients met all three criteria of the BDD Diagnostic Module – for adults. Additionally, the need to receive further aesthetic and cosmetic treatments was a dichotomous variable (the responders answered Yes= 1 and No = 2). A lower number indicated a higher need to receive treatments. According to the need to receive cosmetic or additional treatments after the completion of dermatological treatment, results indicated a significant effect of group, t(106)= -.8.78, p < .001, showing that one dermatological group differed significantly in the need of more cosmetic treatments.

Specifically, acne patients had higher need of receiving cosmetic treatments (M = 1.41, SD = .50), compared to psoriasis/eczema patients (M = 2.00, SD = .00). Similarly, acne patients need to receive more aesthetic treatments (M = 1.67, SD = .48), than patients with psoriasis/eczema (M = 1.98, SD =.14), t(106)= -4.67, p < .001.

When BDD was entered as a covariate into the MANCOVA model, the difference between patients' groups reported in

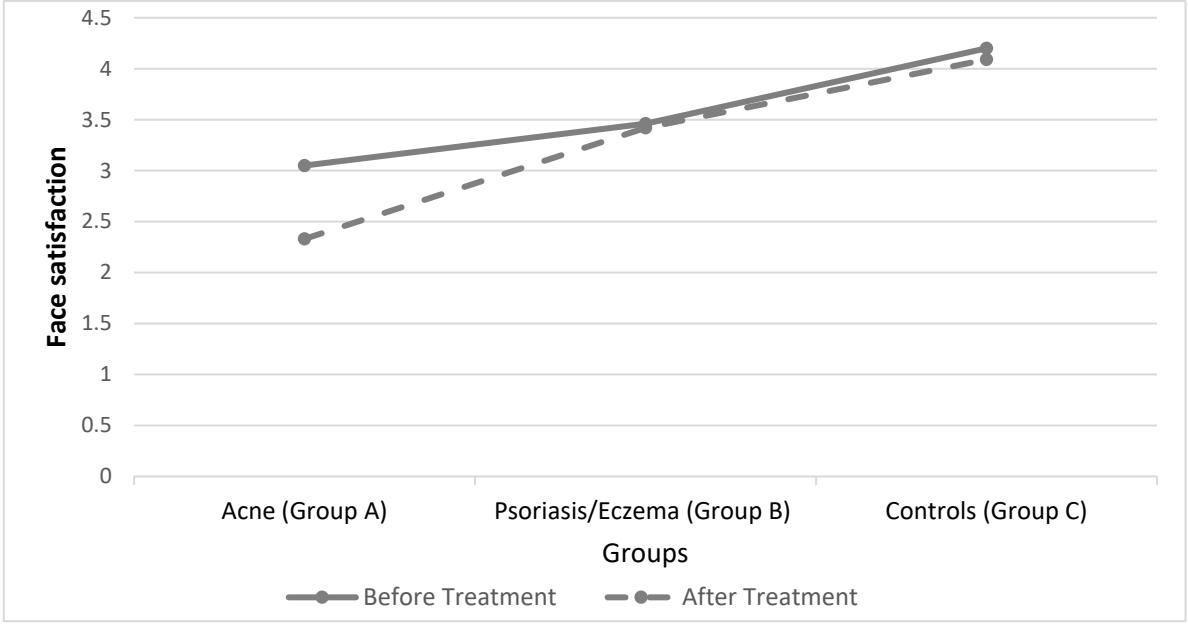

Figure 1. Changes in subscale satisfaction with face among the groups, before and after dermatologists' pharmacological intervention.

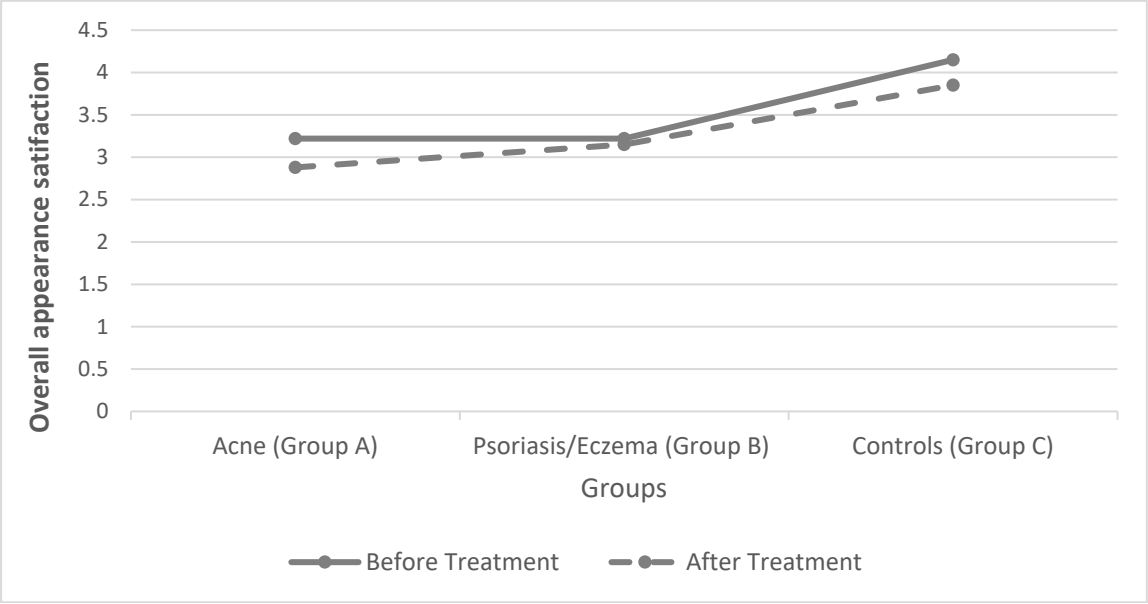

Figure 2. Changes in subscale satisfaction with overall appearance among the groups, before and after dermatologists' pharmacological intervention.

the earlier t-test, remained statistically significant. More particularly, there was a significant main effect of group [V = .32, $F(2,104) = 24.81$, $p < .001$, $\eta^2 = .32$]. The BDD variable was added to examine the second hypothesis, whether the presence of BDD diagnosis influences the need to receive additional treatments in dermatological patients with visible and non-visible disorders. Furthermore, the BDD covariate included in the model affected significantly the need for receiving further cosmetic and aesthetic treatments [V = .25, $F(2,104) = 17.58$, $p < .001$, $\eta^2 = .25$]. This variance was explained by .25% for aesthetic treatment and .53% for cosmetic treatment. Therefore, these results showed that acne patients with BDD diagnosis expressed the highest need to receive additional treatments, after the completion of their dermatological treatment.

Face satisfaction and satisfaction with overall appearance, after the completion of the dermatological treatment. Differences among dermatological patient groups.

To examine the differences between the two groups of dermatological patients regarding their satisfaction with their face and with their overall appearance, after they completed dermatological treatment, MANCOVA analysis was applied. Focusing on patients' satisfaction with their face after dermatological treatment, there were significant differences between the groups $F(2, 159) = 42.15$, $p < .001$. Specifically, acne patients presented the lowest satisfaction with their face appearance, after their dermatological treatment ($M = 3.06$, $SD = .88$), compared to patients with psoriasis/eczema ($M = 3.46$, $SD = .54$) and the control group ($M = 4.20$, $SD = .49$). Regarding to the satisfaction with their overall appearance, groups significantly differed $F(2, 159) = 39.91$, $p < .001$, with both dermatological groups presenting same levels of satisfaction ($M = 3.22$, $SD = .54$), but lower when compared with the control group (M = 4.15, $SD = .68$), after the completion of their dermatological treatment.

To examine the role of BDD diagnosis in patients' appearance satisfaction (hypothesis 3), we added the BDD diagnosis as a covariate into the MANCOVA model. The difference between patients' groups reported in the earlier ANOVA model, remained statistically significant. Particularly, there was a significant main effect of group [V = .36, $F(4,316) = 17.29$, $p < .001$, $\eta^2 = .18$]. The BDD diagnosis significantly influenced negatively the overall appearance satisfaction [V = .15, $F(2,157) = 13.66$, $p < .001$, $\eta^2 = .15$]. This variance was explained by .44% for face satisfaction and .37% for overall appearance satisfaction. Therefore, these results showed that dermatological patients with BDD diagnosis and especially acne patients expressed reduced satisfaction with their face and their overall appearance, after the completion of their dermatological treatment.

DISCUSSION

Body image differences among dermatological patients and the control group, before and after treatment

The strength of the study lies in the fact that it is the

first which compares the findings on body image among two groups of dermatological patients, at two different research phases, before and after dermatological treatment, by also comparing them with a control group. The two research phases measurement had as an ultimate goal to determine whether dermatological treatment affects patients' body image, since most findings in the literature only focus on patients' psychiatric symptomatology, before and after treatment (Akyazi et al., 2011; Fakour et al., 2014; Hull and D'Arcy, 2004; Hull and Demkiw-Bartel, 2000; Karadag et al., 2013; Marron et al., 2013; Simic et al., 2017; Yesilova et al., 2012). Initially, the results of the present study showed that dermatological patients of both groups evaluate with lower levels their external appearance, they have lower satisfaction with their overall appearance, and they rate themselves more negatively on all the body areas satisfaction scales, in comparison with the control group.

Body image among patients with a visible and a non-visible dermatological disorder, before and after treatment

The present study contributes further to the literature by comparing the findings of patients with acne with the findings of patients with psoriasis /eczema, at two research phases, before and after the completion of their dermatological treatment. More specifically, after the completion of their dermatological treatment, the group of acne patients seems to have higher dissatisfaction with the overall appearance, compared to the group of patients with psoriasis /eczema, culminating in dissatisfaction with the facial area, which increases even more. Patients with acne appear to be more dissatisfied with their body, even with their height, which objectively cannot be changed, and is more appearance oriented, compared with the other groups. Based on these findings, we conclude that the dermatological disorder of acne, which has visible anatomical localisation, can affect both the satisfaction with the overall appearance and the satisfaction with individual aspects of the body. One possible explanation for the fact that the satisfaction with the facial appearance is further reduced in patients with acne, at post dermatological treatment face, is that the scars caused by acne remain even after the healing of the dermatological disorder, which was treated by the pharmacological treatment. The current study supports the psychological effects of the remained scars and the dissatisfaction with the facial skin appearance in patients with acne (Amr et al., 2014; Arnold, 2007; Goodman & Baron, 2006) after the completion of the dermatological treatment, while it shows that their intense dissatisfaction can be generalised both in their overall appearance and in individual body areas such as height - which cannot be changed by any medical intervention. In conclusion, body dissatisfaction is generalised, perhaps because it is integrated into the overall picture of the self. Another explanation for the reduction of acne patients' satisfaction with their overall appearance, the appearance of their face and their height at the post dermatological treatment phase, is that the anatomical localisation of acne and its scars, alter patients to be more oriented to their external appearance, compared with the other groups (Dalgard et al., 2018; Lawrence et al., 2004). This makes them even stricter towards the evaluation of their overall appearance, by creating a vicious cycle of resentment thoughts, from which they are not able to escape. Lastly, another explanation for the reduced satisfaction of acne patients after dermatological treatment is that preoccupation with a body part (e.g. skin, face, height) or with overall appearance is often met in patients with BDD (Phillips et al., 2000).

The present study contradicts the findings of previous research, which report that dermatological treatment has positive effects on the emotional well-being of patients with acne (Capoore et al., 1998; Marron. et al., 2013; Rubinow et al., 1987), while it agrees with the finding that it does not improve the emotional state of patients (Kellett & Gawkrodger, 1999). However, all the above-mentioned studies have not focused on body image and they did not use clinical tools for its evaluation. Moreover, previous findings in patients with atopic dermatitis and psoriasis, which report that dermatological treatment improves patients' quality of life (Czech et al., 2000; Hashimoto et al., 2012; Mueller et al., 1979; Touw et al., 2001), appear to conflict with present findings. One reason which may explain this discrepancy is that above-mentioned studies had focused on patients' quality of life, leaving patients' body image unexplored.

Furthermore, the results of the present study revealed a negative body image and a high level of concern related to appearance, in patients with psoriasis/eczema. Our findings agree with those of the recent research by Wojtyna et al. (2017) on the negative beliefs of patients with psoriasis about their appearance, although there are several differences between the two studies. Firstly, Wojtyna et al. (2017) only included a onetime research assessment and their sample did not consist of patients referred by a dermatologist. Thus, the number of treatments that each participant has had in the past, as well as the time between the completion of their dermatological treatment and their participation in their research, could not be determined. These differences are controlled by the present study. Finally, the results of the present study

agree with the findings of Nazik et al. (2017) and Khoury et al. (2014), on the impact of psoriasis on patients' body image, while they are strengthened by findings from two research phases and compared with the second group of dermatological patients and in comparison with a control group. Similar studies on body image in patients with psoriasis and eczema, before and after dermatological treatment are absent in the literature.

Clinical implications of BDD diagnosis on patients' desire to receive further medical procedures after treatment

This is the first study to investigate body image and BDD in the Greek-Cypriot population, among dermatological patients. Additionally, it is the first study, to our knowledge, that controlled the BDD covariate as a factor that has a significant effect on patients' satisfaction with their facial and overall appearance. Firstly, current results show that dermatological patients with acne appeared to have lower levels of satisfaction with facial and overall appearance, compared to the group of patients with psoriasis /eczema and the control group, and at the same time, they present symptomatology that fulfils the criteria of BDD. This seems to strengthen their desire to receive even more aesthetic and cosmetic treatments, in order to improve the appearance of their skin, after dermatological treatment. Based on the above, we can conclude that dermatological treatment cannot positively affect the body image of dermatological patients with acne who fulfil the criteria of BDD, although these patients may seem satisfied with the medical outcome. Current results are in agreement with previous studies (Gordon-Elliot & Muskin, 2013; Gupta, 2006; Phillips et al. 2000; 1993).

Lastly, the current study agrees with previous findings that, regardless of whether acne patients meet the criteria for BDD and regardless of the severity of their dermatological disorder, they report similar preoccupation and discomfort with the appearance of their face, similar to patients who fulfil the criteria for BDD (Conrado et al., 2010; Crerand et al., 2006; Hsu et al., 2009; Phillips et al. 2000; 1993; Veale et al., 1996). The present study reinforces these findings, by investigating them at two research phases, while also reveals the need to use a variety of clinical tools that comprehensively assess body dissatisfaction and BDD, in order to identify subclinical symptoms. Current results cover this literature gap by using clinical tools that assess body image, as well as BDD. In conclusion, dermatological disorders such as acne, psoriasis and eczema are often accompanied by a variety of negative psycho-emotional reactions and especially negative body image, which don't seem to change even after the completion of dermatological treatment. Visible dermatological disorders such as acne tend to have a stronger impact on patients' dissatisfaction with the facial and overall appearance, which can be generalised on more body areas. The physical clinical severity of dermatological disorders, which often appear at young developmental stages, in combination with patients' negative body image, as well as BDD symptomatology, is only observed by dermatologists. As a result, the negative emotions that accompany dermatological disorders are often undiagnosed, and for this reason, they become chronic. Therefore, patients wanting to reduce their body dissatisfaction or skin preoccupation, instead of seeking mental health services, they may choose to apply further aesthetic or cosmetic treatments, to improve the appearance of their skin. Hence, dermatologists need to be educated in identifying if patients' body-related concerns fall in the criteria of BDD or if they are linked only with the severity of their dermatological disorder.

LIMITATIONS

The results should be interpreted in light of some limitations. The first limitation was the use of self-report questionnaires to evaluate body image and post dermatological treatment satisfaction; although these were validated measures, a clinical interview could have provided further findings along with the questionnaires. Secondly, the sample size of the study was small and for this reason the current results can not represent all dermatological patients and be generalised to a national scale. Also, the study sample was recruited from two Cypriot towns (Paphos and Limassol), for this reason future studies are required to represent dermatological patients from the entire Cypriot population. Lastly, since at the time of the current research there was no tool measuring BDD in accordance with the DSM V criteria, the tool used for this study to diagnose BDD was based on the criteria of the DSM-IV.

Despite the above-mentioned limitations, the current study offers significant data according to body image and BDD in the field of psychodermatology. To our knowledge, this is the first study that compared the findings from two different groups of dermatological patients, in comparison with a control group, by using clinical tools which evaluated body image and BDD, at two research phases, before dermatological treatment and six months later, when each patient completed their pharmacotherapy. Further studies with larger samples of patients, coming from a variety of dermatological disorders, as well as samples from

different countries, would control if socio-cultural factors influence patients' perception of their body image.

CONCLUSION

Acne, psoriasis and eczema seem to affect irreparably patients' body image and consequently the way they perceive satisfaction with their overall appearance. Results showed that both groups of dermatological patients evaluate themselves lower regarding their overall appearance, at both research phases compared to the control group. Furthermore, patients whose skin disorder had visible localisation (acne patients) and who were diagnosed with BDD, exhibited lower levels of satisfaction with their facial and overall appearance, after they completed their treatment with their dermatologist. After dermatological treatment, these patients expressed an increased desire to receive further aesthetic and cosmetic treatments, to improve the appearance of their skin, compared to the patients with psoriasis/eczema. It seems that BDD creates a behavioural vicious cycle for these patients, which recycles their concerns related to their body. Dermatologists need to be informed and further educated, to refer these individuals to mental health professionals, in order to learn to manage their negative emotions and behaviours associated with their body. This will allow clinical and health psychologists to study and improve their psychotherapeutic techniques for dermatological patients. Also, they will educate dermatologists on possible complications of managing dermatological patients with BDD, in order to treat them effectively. Lastly, we suggest that similar future studies among different cultures and from different groups of dermatological disorders will contribute to identify if and how cultural differences influence patients' perception of their body. This will allow psychologists to create psychometric tools that can assess body dissatisfaction in-depth, as well as create the appropriate psychotherapeutic interventions.

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CONTRIBUTION OF AUTHORS

Study conceptualisation – CC, IY; study design and protocol development – CC, IY; data collection – CC; data analysis – CC, MP; writing the manuscript - CC; proofreading - CC, IY, MP; overall supervision - IY.

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The study was not registered externally.

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