Depressive and anxiety symptoms in relation to sexual dysfunction in female patients with psoriasis

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Received: 14 October 2019
Revised: 30 October 2019
Accepted: 3 November 2019
Published: 22 January 2020

Egyptian Journal of Psychiatry 2020, 41:25–32

Background
Psoriasis is a chronic, inflammatory cutaneous disease with worldwide estimated prevalence ranging from 0.9 to 8.5%. Psoriasis has been associated with psychological problems, including low self-esteem, depression, anxiety, sexual dysfunction, or suicidal ideation.
Objectives
To assess depressive and anxiety manifestation in relation to sexual functions in female patients with psoriasis compared with healthy controls.
Patients and methods
One hundred female patients with psoriasis were recruited from the dermatology outpatient clinic of the medical faculty of Beni-Suef University, and 80 female participants were included as a control group. The study was conducted after obtaining the approval of the ethical committee of the Faculty of Medicine, Beni-Suef University. All participants were subjected to the following: Beck Depression Inventory, Beck Anxiety Inventory, and Female Sexual Function Index.
Results
Patients with psoriasis showed a highly significant depressive and anxiety symptoms and scores on Beck Depression Inventory and Beck Anxiety Inventory, respectively, compared with control group (65 vs. 26.1% and 74 vs. 66.1%, respectively). Psoriasis cases exhibited a statistically significant decrease in all domains of Female Sexual Function Index compared with control group, except satisfaction. Cases with sexual dysfunction showed significantly higher anxiety symptoms and scores (but not depression) than cases with normal sexual dysfunction.
Conclusion
Patients with psoriasis showed more depressive and anxiety symptoms. Moreover, they showed more sexual dysfunction, particularly on the desire, arousal, lubrication, and orgasm components of sexual function in female patients. Sexual dysfunction is associated with anxiety but not with depression in female patients with psoriasis.

Keywords:
anxiety, depression, female sexual function, psoriasis

Egypt J Psychiatr 41:25–32

1110-1105

Introduction

The common embryological origin of skin and central nervous system has led to the assumption that their disorders affect each other. Dermatological clinics have higher prevalence of psychiatric morbidity in dermatology patients than the general population. At least one-third of patients seen in dermatology clinics present with a complaint that involves a significant psychological component (Filakovic *et al.*, 2008). Common psychiatric conditions seen in patients with skin diseases may present with both primary psychiatric disorders and psychiatric disorders secondary to dermatologic pathology (Wakkee and Nijsten, 2009).

Psoriasis, a chronic erythematosquamous dermatitis that affects ~2–3% of the population, is characterized by abnormal keratinocyte hyperproliferation, which makes thickening of the epidermis and of the stratum corneum. Psoriasis vulgaris accounts for 90% of the psoriasis cases (Coimbra and Santos-Silva, 2015).

Psoriasis has been associated with different psychological problems, including low self-esteem, depression, anxiety, sexual dysfunction, or suicidal ideation (Dubertret *et al.*, 2006). The effect of psoriasis upon sexual function seems to be substantial, and it can result in significant alterations in quality of life (Rieder and Tausk, 2012). The

 DOI: 10.4103/ejpsy.ejpsy_36_19

prevalence of depression and anxiety in those with psoriasis is higher than that observed in the general population. Psychiatric morbidity is higher, and quality of life scores are lower (Ghajarzadeh *et al.*, 2012).

One might attribute the association between psoriasis and mood disorders as simply resulting from the related embarrassment, shame, and social anxiety incurred from the physical manifestations of disease; however, the prevalence of mood symptoms in psoriasis is higher than that observed with many other disfiguring skin disorders (Kumar *et al.*, 2013). Sexual dysfunction is defined as difficulty experienced by an individual or couple during any stage of normal sexual activity, including physical pleasure, desire, preference, arousal, or orgasm; it can have a profound effect on an individual's quality of sexual life (Eden and Wylie, 2009). Female sexual complaints are common. However, it is difficult to accurately determine their prevalence worldwide. Western studies use different definitions of normal and abnormal sexual functions (SF) and use heterogeneous populations (Latif and Diamond, 2013). Some research studies have pointed out some factors that could be responsible for female sexual dysfunction (FSD), including depression/anxiety, stress, drug or alcohol abuse, interpersonal relationship issues, such as partner performance and technique, or lack of partnership quality (Jyoti *et al.*, 2001).

This study aimed at assessment of depressive and anxiety symptoms and sexual functions in female patients with psoriasis and also to investigate the relation between both depressive and anxiety symptoms and the sexual dysfunction in those patients.

Patients and methods

Study design and setting

This was an observational case–control study conducted between 2017 and 2018 in the Dermatology Departments of Beni Suef General Hospital and University Hospital to assess depressive and anxiety manifestations and its relation to the SF in a sample of women with psoriasis. The Research Ethical Committee (REC) of Beni Suef Faculty of Medicine approved the study protocol.

Study participants

A total of 100 consecutive females with psoriasis (patient group) and 80 healthy age-matched and sex-matched volunteers (control group) who expressed interest to participate and met the inclusion criteria registered below were included.

Inclusion criteria

The patients and controls were included only if they were between 18 and 45 years, married, and sexually active during the past 6 months, as well as able to read and give consent. The sample was restricted to married women because of cultural sensitivities discussing sexual disorders in unmarried females. Patients were recruited from females attending the dermatology outpatient clinic of the formerly mentioned hospitals. Overall, 50% the of patients were untreated and 50% were treated by 25% topical and 25% phototherapy according to treatment protocol. Control group included normal volunteer women, selected from the family members or relatives, who accompanied the patients to the hospital.

Exclusion criteria

Unmarried, divorced, widowed, and separated females were excluded. Moreover, participants having chronic debilitating disease, participants on antidepressants or known to have history of other psychiatric disorders and other drugs that are known to interfere with sexual function, postmenopausal women, and those having husbands with sexual disorders were excluded.

All participants in the study were subjected to the following:

(1) All patients were diagnosed using the Structured Clinical Interview for DSM-IV Disorders (SCID-I) (First*et al.*, 2002), which had been modified to DSM-V clinical criteria by the same psychiatrist taking care of the patients.
(2) A demographic and clinical data collection form: it was designed by the researchers to gather information about the characteristics of the study participants (age, educational level, number of children, menstrual history, duration of marriage, etc.).
(3) The Arabic version of Female Sexual Function Index (FSFI): the FSFI is a 19-item questionnaire that assesses the SF or problems during the past 4 weeks. Specific domains analyzed in FSFI are the quality of desire (questions 1 and 2), arousal (questions 3–6), lubrication (questions 7–10), orgasm (questions 11–13), satisfaction (questions 14–16), and degree of pain (questions 17–19) (Rosen*et al.*, 2000). The Arabic validated version of FSFI (Anis*et al.*, 2011) was used to assess the SF of the patients and controls. It is a self-administered questionnaire.

Scoring: each domain is scored on a scale of 0 or 1–5. The score of each domain is calculated through

summing up the scores of that domain's questions and multiplying the obtained number by the multiplier factor of that domain. Multiplier factors of 0.6, 0.4, and 0.3 are used for domains, including 2, 3, and 4 questions, respectively. In general, each domain has a minimum (0–1.2/1.8) and a maximum (6). The SF total score is obtained from the sum of the scores of all the domains and is ranged from 2 to 36 (Rosen *et al.*, 2000; Jamali *et al.*, 2014). Regarding cutoff values, FSFI total score of 26.55 was found to be the optimal cutoff score for differentiating women with and without sexual dysfunction. The cutoff scores to determine the presence of difficulties in a particular domain of the FSFI are as follows: less than 4.28 in the desire domain, less than 5.08 in the arousal domain, less than 5.45 in the lubrication domain, less than 5.05 in the orgasm domain, less than 5.04 in the satisfaction domain, and less than 5.51 in the pain domain (Wiegel *et al.*, 2005). Individual domain score and overall FSFI scores were compared between the study groups.

Beck Depression scale by Beck *et al.* (1961) and Arabic version by Abdel-Khalek (1998): this is a self-report scale designed to assess DSM-IV-defined symptoms of depression such as sadness, guilt, loss of interest, social withdrawal, increase and decrease in appetite or sleep, suicidal ideation, and other behavioral manifestations of depression over time to monitor symptoms and to assess response to therapeutic interventions. It has acceptable degree of validity, as it evaluates a wide variety of symptoms and attitudes associated with depression.

The inventory is composed of 21 statements on a four-point scale, with the patient selecting the one that best matches his or her current state. Each statement corresponds to a specific behavioral manifestation. Responses are scored on a 0–3 scale, corresponding to no, mild, moderate, or severe disturbance. The score range varies from 0 to 63, where a higher score indicates greater depression severity. According to Beck *et al.* (1996), the scoring range is as follows: 0–13 indicate no or minimal depression, 14–19 indicate mild depression, 20–28 indicate moderate depression, and 29–63 indicate severe depression.

Beck Anxiety scale by Beck *et al.* (1988) and Arabic version by Al-Issa *et al.* (2000): Beck Anxiety Inventory (BAI) is a 21-item multiple-choice self-report inventory that measures the severity of an anxiety. Each of the items on the BAI is a simple description of a symptom of anxiety in one of its four expressed aspects: (a) subjective (e.g. 'unable to relax'), (b) neurophysiologic (e.g. 'numbness or tingling'), (c) autonomic (e.g. 'feeling hot'), or (d) panic-related (e.g., 'fear of losing control'). It has acceptable reliability and validity.

Respondents are asked to report the extent to which they have been bothered by each of the 21 symptoms in the week preceding (including the day of) their completion of the BAI. Each symptom item has four possible answer choices: not at all, mildly (it did not bother me much), moderately (it was very unpleasant, but I could stand it), and severely (I could barely stand it). The clinician assigns the following values to each response: not at all=0, mildly=1, moderately=2, and severely=3. The values for each item are summed yielding an overall or total score for all 21 symptoms that can range between 0 and 63 points.

Scores from 0 to 7 indicate a minimal level of anxiety. Scores from 8 to 15 indicate mild anxiety. Scores from 16 to 25 indicate moderate anxiety. Scores from 26 to 63 indicate severe anxiety.

Statistical analysis

Numerical data were expressed as mean+SD. Qualitative data were expressed as frequency and percentage. The characteristics of the two groups were compared by the χ^2 test for qualitative variables and the Student's t test for quantitative variables. One-way analysis of variance was used to analyze the difference in multiple groups. The relation between different numerical variables was tested using the Pearson correlation (r). The IBM statistical package for the social science (IBM SPSS), version 20 (SPSS Inc., Chicago, Illinois, USA) was used for statistical analysis. The level of statistical significance was set as P value less than 0.05.

The sample size was calculated with the aid of an online available software (http://www.stat.ubc.ca/~rollin/stats/ssize/). The desired power was set at 0.80 and error at 0.05. The analysis generated a minimum required sample size of 73 for each group, but there was a chance to recruit more patients (180 in totals) to reinforce our findings.

Ethical considerations

A written consent after explanation of the study to the participating women was obtained, and they were ensured of confidentiality.

Results

The present study included 100 female patients with an average age of 32.91±7.07 years, and 80 matched

Table 1 Demographic and clinical characteristics of the study groups

Variables	Cases (*N*=100)	Controls (*N*=80)	*P*
Age (years)	32.91±7.07	31.75±7.50	0.288
Education			
Literate	71	82.5	0.051
Illiterate	29	17.5	
Parity			
2 or less	50.0	33.8	0.020
More than 2	50.0	66.2	
Menstrual status			
Regular	63.0	63.8	0.521
Irregular	37.0	36.2	
Age of menarche (years)	12.63±1.66	12.88±1.72	0.334
Age of marriage (years)	10.73±6.39	10.61±5.38	0.900
Duration since last pregnancy	4.99±4.34	4.49±2.79	0.376

Values are mean±SD or frequency (%).

control females with an average age of 31.75±7.50 years ($P>0.05$). There is no statistically significant difference between cases and controls regarding age, education, regularity of menstrual cycle, age of menarche, age of marriage, and duration since last pregnancy ($P>0.05$) and shows statistically significant difference regarding number of children, as cases showed less number of children ($P<0.05$), as shown in Table 1.

Table 2 shows that there was a statistically significant difference between case and control group regarding severity of depressive and anxiety symptoms ($P<0.05$).

Table 3 illustrates that there was a highly significant difference between the two groups regarding the total as well as individual domain scores, with lower scores among patients ($P<0.05$), except satisfaction domain.

Table 4 shows a statistically significant difference between female sexual dysfunctions and types of psoriasis, as sexual dysfunction more in genital>vulgaris>palmoplantar ($P<0.05$). However, there was no statistically significant difference between female sexual dysfunctions and sociodemographic variables, disease course, duration, and treatment modalities among patients ($P>0.05$).

Table 5 shows a statistically significant difference between sexual dysfunctions and severity of anxiety symptoms as ($P<0.05$). However, there was no statistically significant difference between severity of depressive symptoms and sexual dysfunctions.

Table 6 shows a highly statistically significant negative correlation between sexual dysfunctions reported by

Table 2 Comparison between case and control groups regarding severity of depressive and anxiety symptoms

Depression degree	Groups		Total	*P* value
	Cases	Controls		
No or minimal				
Count	35	59	94	<0.001*
%	35.0	73.8	52.2	
Mild				
Count	25	12	37	
%	25.0	15.0	20.6	
Moderate				
Count	17	8	25	
%	17.0	10.0	13.9	
Severe				
Count	23	1	24	
%	23.0	1.2	13.3	
Total				
Count	100	80	180	
%	100.0	100.0	100.0	
Anxiety degree				
No or minimal				
Count	26	35	61	0.001*
%	26.0	43.8	33.9	
Mild				
Count	25	27	52	
%	25.0	33.8	28.9	
Moderate				
Count	26	14	40	
%	26.0	17.5	22.2	
Severe				
Count	23	4	27	
%	23.0	5.0	15.0	
Total				
Count	100	80	180	
%	100.0	100.0	100.0	

**P* value is considered significant.

FSFI and both of Beck Anxiety and Depression Inventory scores ($P<0.001$).

Discussion

The present study included 100 female patients, with an average age of 32.91±7.07 years, and 80 matched control females, with an average age of 31.75±7.50 years ($P>0.05$).

There was no statistically significant difference between cases and controls regarding age, education, regularity of menstrual cycle, age of menarche, age of marriage, and duration since last pregnancy ($P>0.05$) and shows statistically significant difference regarding numbers of children, as cases showed less number of children ($P<0.05$) (Table 1).

In the current study, cases showed more severe depressive and anxiety symptoms as compared with

Table 3 Comparison of sexual function among cases and controls

	N	Mean	SD	Minimum	Maximum	*P* value
Desire						
Cases	100	3.7	1.1	0	6	<0.001*
Controls	80	4.5	1.2	0	6	
Arousal						
Cases	100	3.7	1	0.6	6	<0.001*
Controls	80	4.3	1.2	1.2	6	
Lubrication						
Cases	100	3.7	1.1	0	6	<0.001*
Controls	80	4.6	1.1	0	6	
Orgasm						
Cases	100	4	1.2	0	6	0.001*
Controls	80	4.6	1.2	0	6	
Satisfaction						
Cases	100	4.4	1.3	0.8	6	0.096
Controls	80	4.7	1.2	1.2	6	
Pain						
Cases	100	3.9	1.2	0.4	6	0.001*
Controls	80	4.6	1.2	0	6	
Total						
Cases	100	23.2	5.5	3	36	<0.001*
Controls	80	27	6.1	4.1	36	

*Significant ($P<0.05$).

the control group ($P<0.05$), as mild, moderate, and severe depressive symptoms were more common among patients compared with controls, with *P* value less than 0.05, as 21 (26.2%) of controls and 65 (65%) of cases have depression and one (1.2%) of controls and 23 (23%) of cases have severe depression. Cases with psoriasis in this study were more likely to have anxiety. Moderate and severe anxiety were more common among patients compared with controls, with significant difference ($P<0.05$), as only 5% of controls have severe anxiety compared with 23% of cases have severe anxiety (Table 2).

These findings are in line with a UK population-based cohort study of 146 042 patients which demonstrated an increased incidence of diagnoses of depression, anxiety, and suicidality in psoriasis; the authors estimated that more than 10 400 diagnoses of depression, 7100 diagnoses of anxiety, and 350 diagnoses of suicidality were attributable to psoriasis each year (Kurd *et al.*, 2010). In another study which stated that with exclusion of demographic characteristics such as age, sex, job, and education, the risk of psoriatic disease related to anxiety and depression would have been 4.6 times (2.11–11.7) and six times (2.37–17.41) of healthy participants, respectively (Golpour *et al.*, 2012).

In this study, cases with psoriasis exhibited more significant sexual dysfunction in all domains and scored lower scores on FSFI in all domains except satisfaction as compared with controls ($P<0.001$). It is found that among cases, total FSFI score was 23.2±5.5, desire 3.7±1.1, arousal 3.7±1, lubrication 3.7±1.1,

Table 4 Comparison between sexual functions and sociodemographic variables in the patients (*N*=100)

Variables	No dysfunction	Dysfunction	*P* value
Age			
Mean±SD	30.56±6.87	33.69±6.99	0.054
Last pregnancy			
Mean±SD	4.48±5.33	5.16±3.97	0.50
Education [count (%)]			
Literate	21 (84)	50 (66.7)	0.077
Illiterate	4 (16)	25 (33.3)	
Offsprings [count (%)]			
2 or less	16 (64)	34 (45.3)	0.083
More than 2	9 (36)	41(54.7)	
Menarche age			
Mean±SD	12.32±1.28	12.73±1.75	0.282
Marriage duration			
Mean±SD	8.60±6.55	11.43±6.22	0.054
Regularity of menstrual cycle [count (%)]			
Regular	19 (76)	44 (58.7)	0.093
Irregular	6 (24)	31 (41.3)	
Types of psoriasis [count (%)]			
Genital	3 (8.8)	31 (91.2)	<0.001
Psoriasis vulgaris	5 (14.7)	29 (85.3)	
Palmoplantar	17 (53.1)	15 (46.9)	
Disease course [count (%)]			
Remission and exacerbation	7 (28)	44 (58.7)	0.007
Progressive	18 (72)	31 (41.3)	
Disease duration (mean ±SD)	4.3±6.67	8.8±7.07	0.125
Treatment [count (%)]			
Topical	4 (16)	21 (28)	0.219
Phototherapy	8 (32)	17 (22.7)	
Stop medication	4 (16)	21 (28)	
Untreated	9 (36)	16 (21.3)	

Some variables measured by χ^2 tests, others measured by analysis of variance.

Table 5 Comparison between sexual functions and severity of depressive and anxiety symptoms among patients (*N*=100)

Variables	No dysfunction	Dysfunction	*P* value
Depression [*n* (%)]			
No or minimal	9 (36)	26 (34.7)	0.098
Mild	10 (40)	15 (20)	
Moderate	4 (16)	13 (17.3)	
Severe	2 (8)	21 (28)	
Anxiety [*n* (%)]			
No or minimal	9 (36)	17 (22.7)	0.042
Mild	9 (36)	16 (21.3)	
Moderate	6 (24)	20 (26.7)	
Severe	1 (4)	22 (29.3)	

Table 6 Correlation between sexual dysfunction and both depressive, anxiety scores

Groups	Total
Case group	
Depression	
Pearson correlation	−0.446
P value	<0.001*
N	100
Anxiety	
Pearson correlation	−0.585
P value	<0.001*
N	100
Control group	
Depression	
Pearson correlation	−0.095
P value	0.404
N	80
Anxiety	
Pearson correlation	−0.390
P value	<0.001*
N	80

*Significant ($P<0.05$).

orgasm 4±1.2, satisfaction 4.4±1.3, pain 3.9±1.2; all showed significant dysfunction, as *P* value was less than 0.001, except satisfaction (Table 3). These results are comparable to the results of the study conducted by Mercan *et al.* (2008), who found that sexual dysfunctions were more common in the group of patients with psoriasis than in the control group. In another study done by Molina-Leyva *et al.* (2015), it was reported that the prevalence of sexual dysfunction was 53.7% in patients with psoriasis versus 17.5% in healthy volunteers ($P<0.001$). The frequency of sexual dysfunction, in the crude analysis, was higher in patients with psoriasis compared with controls (odds ratio=5.5, 95% confidence interval, 2.6–11.3, $P<0.001$) (Molina-Leyva *et al.*, 2015).

Psoriasis itself may play an important role in sexual dysfunction development in these patients. In this sense, patients with involvement of areas of sexual impact (ASI), frequently affected by psoriasis and corelated with important stigmatization, are more likely to experience sexual dysfunction than patients who are free of lesions in these areas (Schmid-Ott *et al.*, 1999; Wolkenstein, 2006).

This association was independent of anxiety or depression levels, and these areas were thus referred to ASI. Physiological and pathological changes in body image, such as pregnancy or surgical sequelae, have been linked to sexual dysfunction through the impairment of self-esteem and sexual distress (Nobre and Pinto-Gouveia, 2008; Pauls *et al.*, 2008; Rossen *et al.*, 2012). Sexual dysfunction secondary to psoriasis affecting ASI could probably be facilitated by feelings of stigmatization, shame, low self-esteem, and increased sexual distress (Sanchez and Kiefer, 2007; Seikowski *et al.*, 2008; Hrehorów *et al.*, 2012).

Regarding comparison between patient with sexual dysfunction and patient without sexual dysfunction in sociodemographic characteristics (age, education, number of children, menstrual regularity, menarche age, and marriage duration), the two groups were comparable, as *P* value in all was more than 0.05, and these results are consistent with findings of a study by Golpour *et al.* (2012), who stated that the case group of patients with psoriasis was assessed for relationship between depression and sex, education level, and employment, but there was no statistically significant difference ($P>0.05$).

However, comparison regarding clinical data and disease characters revealed that cases with sexual dysfunctions were more in genital type of psoriasis; moreover, cases with sexual dysfunctions demonstrated a significant more frequent exacerbations and/or progressive course than cases without sexual dysfunctions ($P<0.05$). However, there was no statistically significant difference between sexual dysfunction, disease duration, as well as treatment modalities ($P>0.05$) (Table 4). These findings are in agreement with other studies, such as the study done by Meeuwis *et al.* (2011), who showed the effect of genital psoriasis on sexual health and quality of life ($n=487$) and found that psoriasis has a detrimental effect on quality of life and sexual health. Patients with genital lesions reported even significantly worse quality of life than patients without genital lesions; quality of life (mean±SD) scores were 8.5±6.5 versus 5.5±4.6, respectively ($P<0.0001$). Sexual distress and dysfunction were particularly prominent in women (reported by 37.7 and 48.7% of the female patients, respectively). Sexual distress is especially high when genital skin is affected. Sexual distress (mean±SD) scores in patients with genital lesions were 16.1±12.1 vs. 10.1±9.7 in patients without genital lesions ($P=0.001$) (Meeuwis *et al.*, 2011). In the current study while investigating the relation between depression and anxiety symptoms and sexual dysfunction in psoriatic patients, it was found that patients with sexual dysfunction and patients with no sexual dysfunction were comparable regarding depression scores on Beck Depression Inventory ($P>0.05$)(Table 5). This result was consistent with the results of a study of Türel Ermertcan *et al.* (2006) which was conducted on 66 female

participants (39 with psoriasis and 27 healthy volunteers as a control group), and FSFI total score was found to be significantly decreased in female psoriatic patients without depression and psoriatic patients plus depression compared with healthy controls (24.09±5.33 vs. 24.25±4.52 vs. 28.12±3.48, respectively, P=0.004). However, FSFI score was not significantly different between patients with psoriasis without depression and those with psoriasis plus depression (P>0.05). The results of the study demonstrated that patients with psoriasis, especially females have distinct sexual dysfunction compared with healthy controls, and coexistent depression has no additional negative effect on sexual dysfunction in the patients. Patients with psoriasis should be evaluated in terms of sexual function to provide a better quality of life (Türel Ermertcan *et al.*, 2006).

Patients with sexual dysfunction experienced more severe anxiety symptoms than patients without sexual dysfunction (P<0.05) (Table 5). These results were consistent with Fortune *et al.* (2003), who found that the prevalence of anxiety is higher than depression in psoriatic patients. Even psoriatic patients have reported significantly higher degrees of anxiety than other chronic diseases such as cancers. Furthermore, the severity of anxiety would be greater in patients with palms and soles psoriasis (Fortune *et al.*, 2003).

Correlation of the Beck's Depression and Anxiety scores with the FSFI total score indicated significant negative correlation (R, −0.446d, P<0.001, and R, −0.585, P<0.001, respectively) (Table 6). These results indicated the negative effect of depression and anxiety on female sexual function. These results were in line with Molina-Leyva *et al.* (2015) who reported that the frequency of anxiety symptoms was higher in patients with psoriasis than in the overall population (50 vs. 20%, respectively; odds ratio, 4.0, 95% confidence interval, 1.9–8.0, P<0.001). The same was observed for symptoms of depression. Although the absolute magnitude was lower than that of anxiety (32.5 vs. 4.9% for psoriasis patients and healthy volunteers respectively), the relative magnitude of the association was higher (odds ratio, 9.1, 95% confidence interval, 3.0–27.7, P<0.001). As nearly all the participants with symptoms of depression also presented symptoms of anxiety, a new variable, 'symptoms/evidence of anxiety and/or depression,' which included all the subjects with a cut-off score higher than 7 on the hospital anxiety depression scale (HADS) anxiety subscale or HADS depression subscale, was coded. Therefore, there seemed to be a correlation between psoriasis, symptoms of anxiety and/or depression, and sexual dysfunction (Molina-Leyva *et al.*, 2015).

We acknowledge some methodological weakness in our study: (a) the cases had lesser number of children than controls. (b) We have included relatively chronic cases of psoriasis in the analyses but not new cases, and therefore, the relational hypothesis should be supported by investigating new cases as well. However, the magnitude of the found associations is very strong, and we should consider the potential role of the psoriasis itself on sexual dysfunction occurring in affected patients. A larger study with incident cases of psoriasis should be performed to comprehensively explore the relational hypothesis.

In conclusion, we have found a high frequency of sexual dysfunction problems in female patients with psoriasis. We suggest that the assessment of sexual function should be a part of the comprehensive care of patients with moderate to severe psoriasis. Screening and treatment of anxiety and depression, which are quite prevalent in this group of patients, should also be considered because clinical signs of these conditions can significantly impair sexual function.

Acknowledgements

The authors thank all participants in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

Abdel-Khalek AM (1998). Internal consistency of an Arabic adaptation of the Beck Depression Inventory in four Arabic countries. Psychol Rep 82:264–266

Al-Issa I, Al Zubaidi A, Bakal D. (2000). Beck Anxiety Inventory symptoms in Arabic college students. Arabic J Psychiatry 11:41–47.

Anis TH, Gheit SA, Saied HS, Al Kherbash SA (2011). Arabic translation of female sexual function index and validation in an Egyptian population. J Sex Med 8:3370–3378.

Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J (1961). An inventory for measuring depression. Arch Gen Psychiatry 4:561–571.

Beck AT, Steer RA, Garbin MG (1988). Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation. Clin Psychol Rev 8:77–100.

Beck AT, Steer RA, Ball R, *et al.* (1996). Comparison of Beck Depression Inventories-IA and –II in psychiatric outpatients. J Person Assess 67:588–597.

Coimbra S, Santos-Silva A (2015). A specific molecular signature for psoriasis and eczema. Ann Transl Med 3:76.

Dubertret L, Mrowietz U, Ranki A, van de Kerkhof PC, Chimenti S, Lotti T, *et al.* (2006). European patient perspectives on the impact of psoriasis: the EUROPSO patient membership survey. Br J Dermatol 155:729–736.

Eden KJ, Wylie KR (2009). Quality of sexual life and menopause. Women's Health (Lond Engl) 5:385–396.

Filakovic P, Biljan D, Petek A (2008). Depression in dermatology: an integrative perspective. Psychiatr Danub 20:419–425.

First M, Gibbon M, Spitzer R, Williams J (2002). Structured clinical interview for DSM-IV-TR axis I disorders. New York: Biometrics Research Department.

Fortune DG, Richards HL, Kirby B (2003). Psychological distress impairs clearance of psoriasis in patients treated with photochemotherapy. Arch Dermatol 139:752–756.

Ghajarzadeh M, Ghiasi M, Kheirkhah S (2012). Associations between skin diseases and quality of life: a comparison of psoriasis, vitiligo, and alopecia areata. Acta Med Iran 50:511–515

Golpour M, Hosseini SH, Khademloo M, Ghasemi M, Ebadi A, Koohkan F, *et al.* (2012). Depression and anxiety disorders among patients with psoriasis: a hospital-based case-control study. Dermatol Res Pract 2012:381905.

Hrehorów E, Salomon J, Matusiak L, Reich A, Szepietowski JC (2012). Patients with psoriasis feel stigmatized. Acta Derm Venereol 92:67–72.

Jamali S, Zarei H, Jahromi AR (2014). The relationship between body mass index and sexual function in infertile women: a crosssectional survey. Iran J Rep Med 12:189.

Jyoti Y, Louis AG, Uma R (2001). Female sexuality and common sexual dysfunctions: evaluation and management in a primary care setting. Prim Care Update Ob Gyns 8:5–11.

Kumar V, Mattoo SK, Handa S (2013). Psychiatric morbidity in pemphigus and psoriasis: a comparative study from India. Asian J Psychiatry 6:151–156.

Kurd SK, Troxel AB, Crits-Christoph P, Gelfand JM (2010). The risk of depression, anxiety, and suicidality in patients with psoriasis: a population-based cohort study. Arch Dermatol 146:891–895.

Latif EZ, Diamond MP (2013). Arriving at the diagnosis of female sexual dysfunction. Fertil Steril 100:898–904.

Meeuwis KA, de Hullu JA, van de Nieuwenhof HP (2011). Quality of life and sexual health in patients with genital psoriasis. Br J Dermatol 164:1247–1255.

Mercan S, Altunay IK, Demir B, Akpinar A, Kayaoglu S (2008). Sexual dysfunctions in patients with neurodermatitis and psoriasis. J Sex Marital Ther 34:160–168.

Molina-Leyva A, Almodovar-Real A, Carrascosa JC, Molina-Leyva I, Naranjo-Sintes R, Jimenez-Moleon JJ. (2015). Distribution pattern of psoriasis, anxiety and depression as possible causes of sexual dysfunction in patients with moderate to severe psoriasis. An Bras Dermatol 90:338–345.

Nobre PJ, Pinto-Gouveia J (2008). Cognitive and emotional predictors of female sexual dysfunctions: preliminary findings. J Sex Marital Ther 34:325–342.

Pauls RN, Occhino JA, Dryfhout VL (2008). Effects of pregnancy on female sexual function and body image: a prospective study. J Sex Med 5:1915–1922.

Rieder E, Tausk F (2012). Psoriasis, a model of dermatologic psychosomatic disease: psychiatric implications and treatments. Int J Dermatol 51:12–26.

Rosen R, Brown C, Heiman J, Leiblum S, Meston CM, Shabsigh R, *et al.* (2000). The Female Sexual Function Index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther 26:191–208.

Rossen P, Pedersen AF, Zachariae R, von der Maase H (2012). Sexuality and body image in long-term survivors of testicular cancer. Eur J Cancer 48:571–578.

Sanchez DT, Kiefer AK (2007). Body concerns in and out of the bedroom: implications for sexual pleasure and problems. Arch Sex Behav 36:808–820.

Schmid-Ott G, Kuensebeck HW, Jaeger B, Werfel T, Frahm K, Ruitman J, *et al.* (1999). Validity study for the stigmatization experience in atopic dermatitis and psoriatic patients. Acta Derm Venereol 79:443–447

Seikowski K, Gelbrich M, Harth W (2008). Sexual self-reflection in patients with atopic dermatitis and psoriasis. Hautarzt 59:297–303.

Wakkee M, Nijsten T (2009). Comorbidities in dermatology. Dermatol Clin 27:137–147.

Wiegel M, Meston C, Rosen R (2005). The female sexual function index (FSFI): cross-validation and development of clinical cutoff scores. J Sex Marital Ther 31:1–20.

Wolkenstein P (2006). Living with psoriasis. J Eur Acad Dermatol Venereol 20:28–32.