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Eye Affection in Psoriatic Arthritis Patients and its Relation to Disease Activity

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ABSTRACT
Background: Various ocular complications could develop due to psoriatic arthritis or through adverse effects of different treatment modalities.
Objective: Analyze whether ocular abnormalities and psoriatic arthritis disease activity are linked in any way.
Patients and methods: A total of 54 patients from those attending outpatient clinics of Rheumatology and Rehabilitation, and Ophthalmology Departments, Zagazig University Hospitals who were diagnosed as psoriatic arthritis (PsA) patients. They were investigated for presence or absence of ocular affections and the ocular affections were correlated to the activity of the psoriatic arthritis. **Results:** There was significant and inverse relation between best corrected visual acuity (BCVA) and ESR, CRP. Also, there was significant and direct relation between anterior chamber cells (acute iritis) and LDI. While there was significant and direct relation between macular thickness and LDI. Significant relation between Disease Activity in Psoriatic Arthritis (DAPSA) activity level among PsA patients and eye affection. These eye affections were associated with moderate and high DAPSA activity.
Conclusion: Ocular manifestations represented 38.9% of cases of psoriatic arthritis; dry eye, iritis and intraocular inflammation were the most common distributed types. A statistically significant relation was found between DAPSA activity level among PsA patients and eye affection.
Keywords: Eye Affection, Psoriatic Arthritis, Zagazig University.

INTRODUCTION

Inflammatory and chronic illness psoriatic arthritis is considered. It is a result of a combination of hereditary and environmental factors. One to three percent of the world's adult population suffers from it. As many as 30 percent of patients have a recurrent and relapsing course of joint disease [(1)].

Psoriatic arthritis (PsA) is a spondyloarthritis-related type of psoriatic arthritis that manifests as a variety of symptoms. Peripheral joint illness, axial involvement, enthesitis, dactylitis, and psoriatic arthritis of the skin and nails are the health issues that are involved. Spondylitis, Dip arthritis, arthritis mutilans, oligoarticular and polyarthritis are the five distinct psoriatic arthritis patterns [(2)]. Psoriatic arthritis can cause multiple ocular problems, affecting practically every area of the eye. Psoriatic arthritis patients with one or more ocular manifestations are about 10% of the total psoriatic population [(3)].

Ocular damage may develop as a result of psoriatic arthritis flare-ups, according to current thinking. Psoriatic arthritis-related immune-mediated inflammatory processes, as well as the consequences of psoriatic arthritis treatments, may all have a role in the development of ocular symptoms. Psoriatic arthritis has been linked to ophthalmic inflammatory disorders, such as uveitis. There have also been findings of ocular anterior segment diseases and abnormalities in the tear film in people with psoriatic arthritis [(4)].

The relationship between these ocular ailments and PsA is a topic of debate. Uveitis may be the first indication of psoriatic arthritis in up to 11.4% of patients, according to some studies, although others claim that PsA can occur before uveitis [(4)].

Treatments for psoriatic arthritis can have a variety of side effects, including ocular ones. Eye problems such as nyctalopia, cataracts can be caused by long-term use of systemic corticosteroids and/or oral retinoids [(5)]. Consequently, ophthalmologists urge regular eye exams for psoriatic arthritis patients in order to achieve an early diagnosis and avoid ocular morbidity [(6)]. It was the goal of this trial to analyze the potential correlations between morphological and functional ocular abnormalities and psoriatic arthritis disease activity.

PATIENTS AND METHODS

Fifty-four patients from those attending outpatient clinics of Rheumatology and Rehabilitation, and Ophthalmology Departments, Zagazig University Hospitals who were diagnosed as psoriatic arthritis (PsA) patients were included in this cross-sectional observational study.

Inclusion Criteria: (All included patients were diagnosed as psoriatic arthritis (PsA) patients according to **CASPAR classification criteria [(7)].**

Exclusion Criteria:

1- Other seronegative spondylo-arthropathy: e.g. (Ankylosing spondylitis, inflammatory bowel disease, and reactive arthritis).
2- Other autoimmune diseases: e.g., rheumatoid arthritis.
3- Connective tissue diseases: e.g. (Systemic lupus erythematosus, scleroderma, and overlap syndrome and mixed connective tissue disease).
4- Other causes of eye manifestations: e.g.

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- Patients with systemic or ocular diseases that are well known to result in ocular surface disorders, retinopathies, anterior or posterior uveitis, elevated intraocular pressure, and infections.
- Patients with history of ocular trauma, allergy, abnormal eyelid movement, ocular surgery, and use of contact lenses.
- Patients using systemic or ocular medications known to cause ocular complications e.g., beta-blockers, antihistaminic drugs, tranquilizers, cytotoxic drugs, and other drugs having an atropine – like action.
- Patients with psoriatic arthritis who are being treated with retinoids, psoralen, and ultraviolet-A (UVA) or ultraviolet-B (UVB) radiation.

Ethical consent:

Research Ethics Council at Zagazig University approved the study (ZU-IRB#9621) as long as all participants provided informed consent forms. Ethics guidelines for human experimentation were adhered to by the World Medical Association's Helsinki Declaration.

All studied groups underwent the following:

- Complete history taking: including rheumatological complaints, ophthalmological complaints, family and past history of rheumatological diseases.
- Full clinical examinations; general examination as well as: Examination of the spine; it included examination of cervical, dorsal and lumbosacral regions, nail examination, examination for dactylitis (Leeds Dactylitis Index): examination for enthesitis (Leeds Enthesitis Index (LEI).

Assessment for psoriatic arthritis activity: psoriatic arthritis activity parameters are:

1) Leeds Enthesitis Index (LEI).
2) Leeds Dactylitis Index (LDI):

Disease Activity in Psoriatic Arthritis (DAPSA) is the sum of following items: (a) Patient global VAS in centimeters 1-2-3-4-5-6-7-8-9-10. (b) Patient pain VAS in centimeters 1-2-3-4-5-6-7-8-9-10. (c) Swollen count of 66 joints. (d) Tender count of 68 joints. (e) CRP. A higher number indicates that the disease is more active. DAPSA score 0-4 remission, 5-14 means low disease activity, 15-28 moderate activity, and DAPSA score > 28 means high disease activity **[8].**

Eye examination:

Thorough ocular examination was done to detect incidence and severity of ocular affection, particularly ocular surface disorders, anterior and/or posterior uveitis, and retinal and/or optic nerve affection. It included:

1- Landolt's broken rings chart for detecting best corrected visual acuity (BCVA).
2- Evaluation of ocular surface involvement through the following:

- **Tear break-up time:** A wetted fluorescein strip was used for the test. Using a cobalt blue filter, the ocular surface was examined under a slit lamp. In this trial, researchers timed how long it took after a blink for a dark spot to appear on the cornea. It was determined that the average of three separate measurements was used. Dry eye was diagnosed with time intervals less than 10 seconds. Without local anesthetic, the Schirmer's I test was done. The length of the wetted portion of the strip was measured after 5 minutes. A diagnosis of dry eye was made if the readings fall below 5 mm. A tear meniscus with a height of less than 0.3 mm was regarded as abnormal.
- **The 12-item ocular Surface Disease Index and Scoring Algorithm** was used to evaluate the impact of dry eye on vision-related quality of life (questionnaire). The OSDI categorizes dryness of the ocular surface as follows: In the range of 0–12, OSD is absent, mild OSD 13–22, moderate OSD 23–32, and severe OSD 33–100.
- Higher scores represented greater disability.

3- Bitôt' spots, tarsal injection, conjunctivochalasis, and papillary hypertrophy were examples of conjunctival abnormalities. For the lack of abnormalities, the grade was "0," whereas the presence of abnormalities received a "1.".
4- Anterior chamber examination by slits lamp.
5- Lens abnormalities (cataract).
6- Fundus examination by direct ophthalmoscope.
7- Spectral domain-Optical Coherence Tomography (OCT) was used to scan the patient's posterior pole (SD-OCT), dilatation of the pupils was done with mydriatic eye drops.

Laboratory investigations: included (1) Complete blood picture. (2) Erythrocytic sedimentation rate (ESR) (mm 1st hour). (3) C- reactive protein. (4) Rheumatoid factor titer using ELISA technique; positive ≥ 15 U/ml. (5) Kidney function tests. (6) Liver function tests.

Statistical analysis:

In order to analyze the data acquired, Statistical Package for the Social Sciences version 20 was used to execute it on a computer (SPSS). The quantitative data were presented in the form of the mean, median, standard deviation, and range. The information was presented using qualitative statistics such as frequency and percentage. Pearson Chi-Square and Fisher's exact test were used to assess qualitatively independent data. The significance of a P value of 0.05 or less was determined.

RESULTS

Basic demographic, clinical parameters, laboratory and eyes affection of studied psoriatic arthritis patients are shown in table 1. The most common affection was conjunctivitis in 32 patients (59.26%) and BCVA was affected in 85 eyes out of 108 (78.7%)

Table (1): Basic demographic, clinical parameters, laboratory and eyes affection of studied psoriatic arthritis patients (n.54)

Variables	N (%)	Variables	N (%)
Demographic characters		**enthesitis**	30(55.2%)
Age in years (mean±standard deviation)	45.7± 11.8	en.:PF	11(20.4%)
Sex Males Females	 30(55.6) 24(44.4)	en.:achilis	13(24.1%)
Family history Positive Negative	 7(13) 47(87)	en.:med. Fem	2(3.7%)
Joint affection		en.:lat. Hum	4(7.4%)
Duration of joint affection (median (range))	4 (1-13)	LEI (median (range))	0(0-4)
Pure axial	13(24.1%)	**Laboratory finding**	
Both peripheral and axial	21(38.9%)	WBC (mcL) (mean±standard deviation)	8.2±2
Predominant peripheral	20(37%)	HB (g/dL) (mean±standard deviation)	12.6±1.8
NTJ	18(33.33%)	ALT (U/L) (mean±standard deviation)	23± 5.1
NSJ	20(37.03%)	AST (U/L) (mean±standard deviation)	25.7±5.6
DAPSA		S.CRT (mean±standard deviation)	0.66±0.18
Mild	28(51.9%)	BUN (mg/dL) (mean±standard deviation)	13.2±3.9
Intermediate	24(44.4%)	ESR (mm/hr) (mean±standard deviation)	30±4.3
High	2 (3.7%)	CRP (mg/l) (mean±standard deviation)	4±0.41
Skin affection		**Eye affection**	34 (63%)
Duration of skin affection (median (range))	10(3-10)	Blepharitis	18 (33.33%)
Skin subtypes		Conjunctivitis	32(59.26%)
Plaque	44(81.5%)	Blepharo-conjunctivitis	21(38.89%)
Gutate	4(7.4%)	Dry eye	26(48.15%)
Pustular	0	Keratitis	8(14.81%)
Inverse	0	Anterior uveitis	6(11.11%)
Erethrodema	6(11.1%)	Posterior uveitis	11(20.37%)
Nail affection	38(70.4%)	Cataract	2(3.7%)
Dactilitis dac.:hand	 9(16.7%)	Elevated IOP	3(5.56%)
dac.: feet	6(11.1%)	BCVA (n.108)	85(78.7%)
LDI (median (range))	0(0-13.4)		

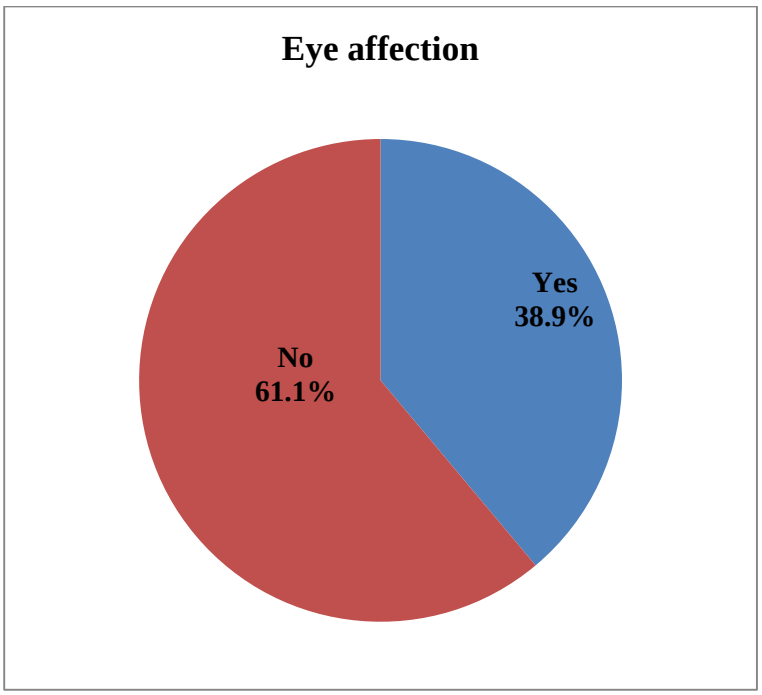

Figure (1): Prevalence of eye affection among psoriatic arthritis patients

This table (2) shows that there was significant and inverse relation between BCVA and ESR, CRP. Also, there was significant and direct relation between anterior chamber cells (acute iritis) and LDI. While there was significant and direct relation between macular thickness and LDI.

Table (2): Correlation between eye affection parameters and PsA disease activity (n=54)

	BCVA		**Anterior chamber cells grade**		**Macular thickness**	
	(r)	**p**	**(r)**	**p**	**(r)**	**P**
DAPSA	-0.126	0.363	0.061	0.66	0.032	0.819
LDI	0.091	0.512	**0.071***	**0.033**	**0.382****	**0.004**
LEI	0.075	0.592	-0.141	0.309	-0.146	0.293
ESR	**-.51****	**0.0001**	-0.004	0.976	-0.093	0.503
CRP	**-.35****	**0.009**	-0.214	0.121	0.013	0.928

***: Significant, ** Highly significant**

Table (3) shows the relation between DAPSA in PsA patients and their eye affection. It showed eye affection occurred with moderate and high PsA disease activity.

Table (3): Prevalence and characteristics of ocular affections in patients; included in the study

Total Ocular Affections			**34\54 (62.96%)**
Incidence of ocular complaints			**30 (55.56%)**
1- The eyelids	Blepharitis	18 (33.33 %)	29\54 (53.7 %)
	Psoraiatic scales	6 (11.11 %)	
	Ectropion	3 (5.56 %)	
2- Conjunctivitis	Chronic nonspecific conjunctivitis	10 (18.52 %)	32\54 (59.26 %)
	Mucopurulent conjunctivitis	22 (40.74 %)	
3- Blepharo-conjunctivitis			21\54 (38.89 %)
4- **Dry eye** (Xerosis)	Abnormal Schirmer's I test	26 (48.15 %)	26\54 (48.15 %)
	Abnormal BUT	21 (38.89 %)	
	Dry conjunctival (Bitôt') spots	5 (9.26 %)	
	OSDI – Mild	20 (37.03 %)	26\54 (48.15 %)
	OSDI – Moderate	4 (7.4 %)	
	OSDI – Severe	2 (3.7 %)	
5- Cornea (Keratitis)			8\54 (14.81%)
6- Anterior uveitis	Acute iridocyclitis	4 (7.4 %)	6\54 (11.11 %)
	Iris atrophy (recurrent iritis)	2 (3.7 %)	
7- Lens (Cataract)			2\54(3.7%)
8- Posterior uveitis	Increased macular thickness (Macular edema)	9 (16.67 %)	11\54 (20.37 %)
	Chorioretinitis	2 (3.7 %)	
9- Elevated intraocular pressure (IOP)			3\54 (5.56 %)
10- Best corrected visual acuity	6\6	23 (21.2%)	23/108
	6\6 to 6/12	68 (62.9%)	85/108 (78.7%)
	6\12 to 6/60	9 (8.3 %)	
	< 6\60	8 (7.4%)	
11-DAPSA(n=54)	**Eye affection**	-	**P value**
Mild (n=28)	8	-	0.78
Moderate (n=24)	24	-	0.0001**
High (n=2)	2	-	0.0001**

**** Highly significant**

Table 4 shows that patients who had conjunctivitis, eyelid affection, dryness, anterior and posterior uveitis had significantly high DAPSA, LDL, LEI. ESR and CRP value. Other parameters i.e., keratitis had non-significant relationship with PsA disease activity.

Table (4): Relation between PSA activity parameters and eye affection parameters (n.54)

PsA **Eye Affection**	**DAPSA**	**LDI**	**LEI**	**ESR**	**CRP**
Conjunctivitis	15.2 6.5-23.9	6.3 0-12.6	0	36 27-45	7 5-9
U	1.19	1.169	1.266	0.246	1.37
P	1	0.279	0.140	0.447	0.108
Eyelid	16.4 5.3-22.3	0	0 0-4	36 20-40	3 3-6
U	0.419	**2.439**	0.114	0.398	1.457
P	0.675	**0.015***	0.909	0.691	0.145
Dryness	19.3 9.3-22.9	0 0-13.1	0	20.0 12-49	3.0 1-9
U	0.552	0.815	1.66	0.284	0.756
P	0.581	0.415	0.095	0.777	0.450
Blepharo-conjunctivitis	19.3 9.3-22.9	0 0-13.1	0	20. 12-49	3. 1-9
U	0.552	0.815	1.66	0.284	0.756
P	0.581	0.415	0.095	0.777	0.450
keratitis	18.3 5.3-23.9	0 0-12.6	0 0-4	40 20- 57	4 3-9
U	1.89	0.98	0.74	**2.87**	0.44
P	0.059	0.327	0.459	**0.004***	0.66
Anterior uveitis	18.3 18.3-19.3	0	0	40.0 20-40	3 3-3
U	1.19	1.169	1.266	0.246	1.37
P	0.234	0.242	0.205	0.806	0.169
Posterior uveitis	23.9 (23.9-37.1)	13.1 (13.1-13.4)	4 (4-4)	85 (57-88)	11 (9-18)
U	**2.5**	**3.58**	**3.13**	**2.79**	**2.68**
P	**0.005****	**0.0001****	**0.002****	**0.005****	**0.007****

***: Significant, ** Highly significant**

DISCUSSION

The present study included 54 patients diagnosed as having psoriatic arthritis according to CASPER criteria. They were investigated for presence or absence of ocular affections and the ocular affections were correlated to the activity of the psoriatic arthritis.

In our study PsA had a higher incidence of both axial and peripheral (38.9 %) than either axial (37.0 %) or peripheral (24.1 %) PsA, these results agree with **Marsal *et al.*** [9] as 14% of the patients had both axial and peripheral joints affection while 4% were peripheral only and 1% were axial. These results also agree with **Gladman *et al.*** [10] as 16% were both axial and peripheral, 12% peripheral and 2% axial. In contrary to **Veale *et al.*** [11] their results showed that peripheral joint affection was higher as 16% while axial affection was 4% and both peripheral and axial was 2%. in the study of **Helliwell** [12] the results were 51% axial, 39% peripheral and 10% both axial and peripheral. Moreover, the variation in definitions that might been used by individual investigators, and the fact that the patterns likely change over time, may be responsible for variations in incidence among various studies.

In this study signs of PsA (tenderness and swelling) appeared in joints of the included patients in a ratio of 37.03% and 33.33% respectively. Our results are higher than those of **Kaltwasser *et al.*** [13] who reported 19% tenderness and 12% swollen, **Kavanaugh *et al.*** [14] as 23% tenderness and 12% swollen, **Mease** [15] 11.6% tenderness and 11.2 swollen, **Wong *et al.*** [16] as 13.6% tenderness and 11.5% swollen, and **Dubash *et al.*** [17] as 18.5% tenderness and 9.7% swollen. The difference in our results may be explained by the difference in education, medical insurance systems, and the affordability of treatment of patients included in these studies.

In the current study, conjunctivitis was represented in 59.26%. It varied from chronic non-specific (18.52%) to mucopurulent conjunctivitis (40.74%). These results agree with those of **Kaldeck** [18] who reported an incidence of diffuse nonspecific conjunctivitis of 12.22% in psoriatic arthritis patients. On the other hand, our results differs markedly than results of **Beniwal *et al.*** [19] who reported diffuse conjunctival injection in 5.33% of their psoriatic arthritis patients. Meanwhile, eyelid affections reached 53.7% in our study; they varied from blepharitis (33.33%), psoriatic periorbital scales (11.11%),

ectropion (5.56%), to multiple affections (3.7%). The incidence of blepharitis is relatively in accordance with that of **Beniwal *et al.*** [19] who reported an incidence of 24%. In contrary, it is much lower than that of **Erbagci *et al.*** [20] who showed 65% prevalence of blepharitis in psoriatic arthritis patients. Blepharitis was most common in patients with plaque psoriatic arthritis followed by erythrodermic psoriatic arthritis. The etiopathogenesis being meibomian duct occlusion by psoriatic scale, as well as underlying lower tear film break-up time in these patients [21].

The prevalence of eye dryness in our study reached 48.15% in the included patients; 26 patients had abnormal Schirmer's test while 21 patients showed abnormal TBUT. Our results are in accordance with that of **Lima *et al.*** [22] who found abnormal Schirmer's test in 50% of their psoriatic arthritis patients and 67% abnormality in TBUT. On the other hand, **Maitray *et al.*** [23], reported a lower incidence of 37.3%. **Beniwal *et al.*** [19] explained the reason for the low prevalence rate in their study by the rigid diagnostic criteria used to classify dry eye.

Affection of the posterior uvea varied in our study between increased macular thickness; macular edema (16.67%) and chorioretinitis (3.7%). **Chimenti *et al.*** [24] reported a lower incidence of retinal affection in psoriatic arthritis. Studies are needed to examine retinal structures at both neuronal and vascular levels to provide complementary information, according to the researchers. Psoriatic arthritis duration was also taken into account by the researchers. Also, they suggested that the drugs used in treatment of psoriatic arthritis might cure posterior uveitis simultaneously; thus, they may be responsible for lower incidence of uveitis.

Affection of the cornea in the form of superficial punctate keratitis was found in an incidence of 14.81% in our study. This result agreed with that of **Eom *et al.*** [25]. They found that fluorescein staining revealed the most common corneal abnormality to be superficial punctate keratitis, primarily affecting the lowest third of the corneal epithelium.

Affection of the anterior uvea in our study included acute iridocyclitis (7.4%) and iris atrophy from recurrent iritis (3.7%). These results agreed with those of **Omar** and **Helaly** [26] who reported an incidence 12.29%.

As regards incidence of cataract in this study; it reached 3.7% in the form of posterior cortical lens opacifications. **Erbagci *et al.*** [20] and **Chandran *et al.*** [27] discovered that psoriatic arthritis patients do not have an increased risk of developing cataracts compared to the general population. **Beniwal *et al.*** [19] research suggests that the prevalence of cataract in patients under the age of 65 may have been caused by the disease itself, a side effect of systemic therapy, or an unintended consequence. In contrary, **Omar** and **Helaly** [26] reported absence of cataract cases in 100 cases of Egyptian psoriatic arthritis patients although 21 patients had PsA.

In our study, the correlation between the eye affection and parameters of PsA disease activity; revealed an inverse significant relation between BCVA and both ESR and CRP. In contrary, there was direct significant relation between LDI and both anterior chamber cells (acute iritis) macular thickness. These results agree with the conclusion of **Peluso *et al.*** [28] even though there was no statistical significance due to the small sample size, ocular signs were more common in patients with high overall disease activity as measured by DAPSA criteria. The patients should be monitored for ocular symptoms in the early clinical phase, as these may worsen over time.

The results of our study showed a significant relation between pattern of arthritis among PsA patients and their eye affection as the axial pattern and both axial and peripheral pattern were associated with high incidence of eye affection. **Chimenti *et al.*** [29] has suggested that even evaluating disease activity at the joint level may be adequate for PsA patients to measure disease activity: Early visual loss can be detected through ophthalmological examinations and the study of visual function, which may indicate the presence of a chronic inflammatory state.

CONCLUSION

Ocular manifestations represented 38.9 % of cases of psoriatic arthritis; dry eye, iritis and intraocular inflammation were the most common distributed types. There was a statistically significant relation between DAPSA activity level among PsA patients and eye affection.

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