Research Article

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Maintaining Low Disease Activity Among Psoriatic Arthritis Patients in the UAE: a Multi-Center Cross Sectional Study

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Abstract

Aim: This study aims to (1) Describe a multi-ethnic cohort of PsA patients seen in rheumatology centers in UAE, in terms of socio-demographic features, clinical and disease characteristics, and treatment trends (2) Explore relationship between active combination (biologics and methotrexate (MTX)) or MTX users and achieving minimal disease activity (MDA).

Methods: Patients ≥ 18 years with PsA from a database of two rheumatology centers in the UAE were included. Continuous data were presented as mean and standard deviation (SD); dichotomous data were presented as percentages. To estimate the treatment effect on MDA the odds ratio and 95% confidence interval (CI) were calculated.

Results: 143 patients were included (mean age 43.5 (SD: 10.2), 60% male; ethnicity: South Asian (45%), Arab (16%) and Caucasian (33%)). Using Disease Activity in Psoriatic Arthritis (DAPSA) scores, 29 (18%) were in remission, 65 (45%) in low disease activity (LDA), 32 (22%) moderate disease activity and 17 (11%) in high disease activity (HDA). Using the Group for Research and Assessment of Psoriasis and Psoriatic Arthritis (GRAPPA) scores, MDA was achieved in 88/143 (62%). Active users of combination therapy (OR 4.8, 95% CI [1.29, 17.8]; p = 0.02) or biologics alone (OR 5.36, 95% CI [2.10, 13.70]; p=0.0004) were at increased odds of achieving MDA.

Conclusion: this study provides insight on the epidemiology, disease and treatment trends in PsA in UAE where by majority of our PsA patients that were largely on biologics or combination therapy, had well controlled disease. This supports the early use of biologics in treatment of PsA.

Keywords: Psoriatic arthritis • Epidemiology • Minimal disease activity • Biologics • Methotrexate

Introduction

Psoriatic arthritis (PsA) is a chronic immune-mediated inflammatory disease made up of a plethora of clinically diverse and heterogeneous phenotypes including peripheral arthritis, dactylitis, enthesitis, skin psoriasis and nail disease or predominantly axial disease [1]. It exists in 30% of patients with established skin psoriasis [2]. PsA is often aggravated by its known associations with multiple comorbidities including metabolic syndrome, obesity, cardiovascular disease, and depression [3]. More than half of patients with PsA develop progressive, erosive arthritis, often associated with functional impairment and reduced quality of life [4,5]. As such, early diagnosis and timely intervention are crucial for optimal patient care. It is well recognized that there is considerable variation in the reported prevalence across geographic regions ranging from 0.25% in the United States to 0.19% in Europe [6,7]. This is partly explained by the variable expression of HLA-B27, different demographics and methodologic characteristics. As for the prevalence and incidence of PsA in the Middle

East and North Africa (MENA) region, the reporting is sporadic and inconsistent with very few published studies available. This particular issue was recently highlighted in a non-systematic review by Bedaiwi et al calling for more epidemiological studies of PsA in the region [8]. Moreover, the heterogeneity of PsA also presents a considerable challenge in treatment as one drug does not fit all phenotypes. For some time, methotrexate (MTX), a conventional disease-modifying anti-rheumatic drug (DMARD), remains one of the most widely used medications in the treatment of PsA [9]. In the last decade, the treatment of PsA has transformed by the introduction and use of biological DMARDs (bDMARDs) and synthetic DMARDs (tsDMARDs), targeting proinflammatory cytokines, such as a tumor necrosis factor (TNF), interleukin IL-12/Il-23 and IL-17, and inhibiting phosphodiesterase-4 (PDE4) or Janus kinases (JAKs) respectively [10]. While the efficacy of MTX is known in Rheumatoid Arthritis (RA), firm evidence from a placebo-controlled trial to support its use in PsA is scant [11]. Published in 2012, the Methotrexate in Psoriatic Arthritis (MIPA) study, the largest randomized placebo-controlled trial of MTX in PsA, found no significant effect of MTX compared with placebo on American College of Rheumatology 20% improvement criteria (ACR20) although it improved skin disease[12]. On the other hand, the Tight Control in PsA (TICOPA) study, an open-label multicenter randomized controlled trial of 206 DMARD naïve patients with early PsA, found some benefit of MTX at higher doses where by almost 40% of patients in the tight control (treat-to-target arm) were in minimal disease activity (MDA) at 48 weeks, compared with 25% in the standard care arm [13]. Similarly, the open label Remicade Study in Psoriatic Arthritis Patients Of Methotrexate-Naive Disease (RESPOND) trial which compared MTX monotherapy with MTX plus infliximab combination therapy, found that ACR20 response was achieved in 66.7% of patients in the MTX monotherapy arm although the combination arm was still superior [14]. Despite these observed clinical benefits in PsA, both studies lacked a placebo comparator due to the open label nature [15]. In addition, evidence from RCTs and observational studies suggest that MTX has limited disease-modifying effect in PsA [16,17]. For instance, the Study of Etanercept and Methotrexate in Combination or as Monotherapy in Subjects with Psoriatic Arthritis (SEAM-PsA) study showed that 10.6% of patients treated with MTX monotherapy still had radiographic progression from baseline at 48 weeks [18]. Remission (REM) and low disease activity (LDA) is a difficult target for the majority of patients with PsA [19].In spite of the lack of evidence from high-quality RCTs, MTX remains recommended as first line choice treatment in the latest European League Against Rheumatism (EULAR) recommendations in PsA [20]. In contrast, the Group for Research and Assessment of Psoriasis and Psoriatic Arthritis (GRAPPA) considers other conventional DMARDs including MTX without a definite preference [21,22]. In response to the low-quality available evidence of MTX in PsA, the ACR/National Psoriasis Foundation (NPF) PsA Treatment Guidelines conditionally recommend the use of a anti-TNF biologic over MTX or other oral small molecules in treatment-naïve patients with active PsA [23]. To date, there is very little data about the epidemiology, the disease burden and treatment trends of PsA in the Middle East [8,24,25]. In response, the objective of this multi-center cross sectional study is to (1) Describe the socio-demographics, clinical, disease and treatment trends of our PsA cohort seen in rheumatology clinics in the United Arab Emirates (UAE). For disease trends, we will establish percentage of our patients achieving LDA by DAPSA score or target of MDA as defined by the GRAPPA group. In addition, we also aim to (2) explore the relation of active treatment use and achieving MDA. Ultimately, this could potentially contribute to the understanding of PsA in the region particularly when there is no national registry. Additionally, this sheds light on the role of conventional and bDMARDs in treating PsA in the Middle East.

Methods

Subjects and study variables

We conducted a multi-center cross sectional study at two Rheumatology Centers over a 3 year period from July 2018 – March 2020 at a specialized arthritis center and a rheumatology clinic in Dubai, UAE. We recruited consecutive patients over the age of 18 who fulfilled at their first visit to our clinic the ACR classification criteria for PsA (CASPAR). They had to have at least one follow up ≥ 6 months following initial treatment. Exclusion criteria included patients less than 18 years of age, patients with missing follow up visits or multiple data entries, and patients having other types of inflammatory arthritis including rheumatoid arthritis, spondyloarthropathies, and inflammatory bowel disease related arthritis. The study was approved by an internal ethics committee at the specialized arthritis center and was conducted in accordance with the recommendations of the Declaration of Helsinki. Informed consent was obtained. Demographics features such as age, height, weight, sex, ethnicity, insurance, employment status, marital status, education, body mass index (BMI), smoking status, family history of PsA and other autoimmune diseases, as well as comorbidities including obesity, dyslipidemia, hypertension, diabetes mellitus

(DM), renal and liver disease, osteoarthritis, osteoporosis, stroke, myocardial infarction, thrombosis, pulmonary hypertension, gastritis, and joint replacement were obtained. Clinical data including delay to diagnosis in years, previous and current use of DMARDs specifically MTX monotherapy vs. combination therapy with bDMARDs, reasons for discontinuation of MTX as well as use of alternative therapies (acupuncture, ayurveda, traditional Chinese, herbal unani, homeopathy, and diet therapies) were recorded for all patients. All patients had a health assessment questionnaire disability index (HAQ-DI), disease activity in psoriatic arthritis score (DAPSA score), MDA, erythrocyte sedimentation rate (ESR), and C - reactive protein (CRP). HLA-B27 collected for some patients at their first visit.

Statistical analysis

Continuous data are presented as mean ± standard deviation (SD). Dichotomous data were presented as percentages with/without absolute count. For normally distributed data, the difference in two groups' means was analyzed using an independent t-test; binary data was analyzed using a χ^2 test ($\alpha = 0.05$). A p-value of <0.05 was considered to be statistically significant. To estimate the treatment effect on MDA the odds ratio and 95% Confidence interval were calculated and presented in a forest plot using RevMan 5.4 [26]. All statistical analyses were performed using the statistical package SPSS.

Results

Socio-Demographic features and comorbidities

A total of 143 consecutive PsA patients were included from July 2018 – March 2020, at specialized arthritis center and rheumatology department of a multi-specialty medical center in Dubai, UAE. Table 1 summarizes the socio-demographic characteristics of this patient population. The mean age of the patients in years was 43.5 ±10.2 and were mainly male (60%) vs. female (40%). The patients were predominantly South Asian (n=64, 45%), while others included Caucasian (n=47, 33%), Arab (n=23, 16%), Far East (n=4, 3%) and Hispanic (n=2, 1%). Majority of the patients had a certain degree of education, and worked full time jobs (n=101, 70%). About 32% (n=46) patients smoked with a body mass index (BMI) of 27.8 ± 4.2. Comorbidities included dyslipidemia (n= 33, 23%), hypertension (n=34, 24%), and diabetes melitus (n=19, 13%).

Table 1: Socio-Demographic Features And Comorbidities Of PsA Patients.

Sex (n, %)	**(n = 143)**
Female	58 (40%)
Male	85 (60%)
Age in years, Mean ± SD	43.5 ± 10.2
Ethnicity (n, %)	
African	3(2%)
Arab	23 (16%)
Caucasian	47 (33%)
Far East	4 (3%)
Hispanic	2 (1%)
South Asian	64 (45%)
Education (n, %)	
College	4 (16%)
Intermediate	5 (21%)
Postgraduate	6 (25%)
Secondary	3 (13%)
Other	6 (25%)
Occupation (n, %)	
Full time	101 (70%)
Part time	7 (7%)
Student	2 (1%)
Home maker	29 (20%)
Retired	4 (2%)
Body Mass Index (BMI) (Mean± SD)	27.8 ± 4.2
Smoking Status (n, %)	
Yes (n, %)	46(32%)
Comorbidities (n, %)	
Diabetes Mellitus	19 (13%)
Obesity	3 (2%)
Hypertension	34 (24%)
Osteoarthritis	14 (10%)
Osteoporosis	2 (1%)
Renal Disease	2 (1%)
Liver Disease	2 (1%)
Dyslipidemia	33 (23%)
Stroke	1 (0.6%)
Myocardial Infarction	1(0.6%)
DVT	1(0.6%)
Pulmonary Embolus	1(0.6%)
Pulmonary Hypertension	2 (1%)
Gastritis	1(0.6%)
Uveitis	1(0.6%)
Keratoconjunctivitis Sicca	1(0.6%)
Joint replacement	1(0.6%)

Clinical and disease characteristics

Using GRAPPA scores, of the 143 PsA patients, MDA was achieved in 62% (n=88) while 38% did not (n =55) (Table 2). Interestingly, there was a longer delay to diagnosis in those that did not achieve MDA, approximately 2.8 years ± 3.7 vs. 1.5 years ± 3 in those achieved MDA. In addition, based on the HAQ-DI, most of our patients (n=139, 97.2%) had mild difficulties to moderate disability and none with very severe disability. Using the DAPSA scores, of the 143 PsA patients, almost half of the patients (n=65, 45%) achieved LDA and 29 (20%) achieved REM. However,

Table 2: Clinical and Disease Characteristics of PsA Patients	
CLINICAL AND DISEASE CHARACTERISTICS	**(n=143)**
MDA* (n, %)	
MDA achieved	88 (62%)
MDA not achieved	55 (38%)
Delay to diagnosis in years (mean ± SD)	
MDA Achieved	1.5 ± 3
MDA Not Achieved	2.8 ± 3.7
HLA B27 Status (n, %)	
Present	5 (3%)
Absent	50 (35%)
Not done/Unknown	88 (62%)
HAQ-DI* (n, %)	
Mild difficulties to moderate disability	139(97.2%)
Moderate to Severe Disability	4(2.8%)
Severe to Very Severe Disability	0(0%)
DAPSA* (n, %)	
Low disease activity	65 (45%)
Moderate disease activity	32 (22%)
High disease activity	17 (11%)
Remission	29 (20%)

*__HAQ-DI:__ Health Assessment Questionnaire-Disability Index; __DAPSA:__ Disease Activity in Psoriatic Arthritis; __MDA:__ Minimal Disease Activity using GRAPPA scores; __DVT:__ Deep Vein Thrombosis

Table 3: List of Past or Current Treatments Received In PsA Patients	
Name of therapy (n,%)	**Total Received (n/total PsA patients= %) (n=143)**
DMARD*	
MTX*	108 (76%)
Leflunomide	18 (13%)
Sulfasalazine	15 (10%)
Biologics[1]	98 (69%)
Abatacept	1(1%)
Adalimumab	33(23%)
Certolizumab	13(9%)
Etanercept	45(31%)
Golimumab	32(22%)
Infliximab	9(6%)
Ixekizumab	8(6%)
Rixekinzumab	1(1%)
Secukinumab	1(1%)
Ustekinumab	10(7%)
MTX alone	27 (19%)
Biologics alone	17 (12%)
Both biologics and MTX	81 (57%)
Alternative therapy used prior to first clinic visit	
Ayurveda	38 (27%)
Traditional Chinese	4 (3%)
Herbal	6 (4%)
Unani	2 (1.3%)
Homeopathy	24 (17%)
Acupuncture	16 (11%)
Diet therapy	24 (17%)
Delay in rheumatology treatment due to alternative therapy	16 (11%)

32 (22%) and 17 (11%) continued to have moderate and HDA respectively.

Treatment

Table 3 summarizes the list of past or current treatments PsA patients received. About three quarters of patients received MTX (n=108, 76%), of which 27 (19%) used MTX alone, and 81 (57%) used it in combination with biologics. A small proportion of patients were on other disease modifying anti-rheumatic drugs (DMARDs) including leflunomide (n=18, 13%) and sulfasalazine (n=15, 10%). In terms of biologics, most patients (n=98, 69%) received biologics at one point in time, mainly anti-TNF agents – adalimumab (23%) and etanercept (31%), and anti-interleukin 17 agents (n=10, 7%). Seventeen (12%) received biologics alone while others in combination with MTX. Some patients also used alternative therapies prior to first clinic visit, listed in Table 3, among them includes Ayurveda (27%), homeopathy (17%), diet therapy (17%), followed by acupuncture (11%). Only 16 (11%) PsA patients had delay in receiving rheumatology treatment as a result of alternative therapy. Moreover, slightly more than half of the patients (n= 77, 53%) stopped MTX. Reasons for discontinuation are listed in Table 4, including primarily side effects (n=34, 44%), primary lack of efficacy (5%), and secondary loss of efficacy (36%). Only one patient stopped MTX because of remission. When specifically looking at the PsA patients who were actively using treatments at the time MDA was measured, those on biologics alone or combination of biologics and MTX were significantly at increased odds in achieving MDA compared to MTX alone (odds ratio (OR) 4.8, 95% CI [1.29, 17.8]; p = 0.02 and OR 5.36, 95% CI [2.10, 13.70]; p=0.0004 respectively). On the other hand, no significant difference found when comparing combination of biologics and MTX to biologics alone (OR 1.12, 95% [0.35-3.54], p=0.85).

Discussion

This observational multi-center cross sectional study of 143 PsA patients helped identify sociodemographic, clinical and disease features as well as provide insight on treatment use namely MTX and biologics, in relation to achieving MDA. Our cohort of PsA patients were predominately male, mean age of 43.5 ± 10.2, seen across multiple ethnicities, mainly South Asian and Caucasian (Table 1), with mostly either absent or unknown HLA B27 status. Almost one third of the PsA patients smoked with a relatively high mean BMI of 27.8 ± 4.2, falling within the range of overweight (Table 1). Together with multiple co-morbidities seen in our cohort (Table 2) such as dyslipidemia and hypertension, this has been previously shown to be associated with

Table 4: Reasons For Discontinuation Of Methotrexate

Reason for discontinuation (n, %)	(n/total # of patients stopped MTX = %) n=77
Primary lack of efficacy	4 (5%)
Secondary loss of efficacy	28 (36%)
Side effects	34 (44%)
Achieved remission	1 (1.2%)
Infection	1 (1.2%)
Patient preference	5 (6.5%)
Pregnancy/plans for pregnancy	4 (5%)
Other	1 (1.2%)

Some patients attempted multiple categories of biologics

***DMARD:** Disease Modifying Anti-rheumatic Drug, **MTX:** Methotrexate

poor functional outcomes specifically increased risk of metabolic syndrome and cardiovascular disease [3]. As such, it is crucial that patient education highlights these risks and in turn help prevent such morbidity and mortality. Most strikingly, the majority of our PsA patients achieved MDA (n=88, 62%) based on GRAPPA scores, and largely had mild to moderate difficulties (n=139, 97.2%) based on HAQ-DI, with almost half (n=65, 45%) achieving LDA and about 20% in REM (Table 2). Patients who did not achieve MDA had a longer delay to diagnosis which may be a contributing factor. For treatment, most of our PsA patients were on biologics with more than half on an anti-TNF agent or combination therapy with MTX. This provides insight on the anti-TNF usage in the region, which is poorly reported. Most common reason for discontinuation of MTX was side effects followed by secondary loss of efficacy over time. This may very well explain the low active usage of methotrexate compared to biologics or combination when studying their relation to MDA. When studying the current use of treatments specifically biologics and MTX in relation to MDA, biologics alone or combination therapy compared to MTX alone, increased the odds of achieving MDA by almost five times, favouring the use of biologics. No significant difference was found when comparing combination therapy to biologics alone. This raises the question whether there is meaningful benefit of combination therapy. Indeed, this has been studied in the literature. An observational study of 595 PsA patients from the British Society for Rheumatology Biologics Register, found similar EULAR response rates at 6 months in patients receiving anti-TNF monotherapy (79.5%), anti-TNF in combination with MTX (78.1%) [27] That said, some studies demonstrate the loss of efficacy of anti-TNF monotherapy over time, suggesting that concomitant MTX use improves anti-TNF survival [28]. When comparing disease and treatment trends of our study to North America and Europe, generally our cohort of PsA patients achieved a higher prevalence of MDA, REM and LDA. For instance, in a recent systematic literature review with metanalysis in PsA reported REM/LDA status in only 1/3 of recent studies of PsA with pooled prevalence of REM of 13.1% and 23. % using very LDA and DAPSA-REM respectively. For LDA the pooled prevalence was 36.3% and 52.8% using MDA and DAPSA-LDA respectively [19]. One possible reason that partly explains this difference is perhaps related to the higher usage of biologics in PsA over DMARDs. Support for the use of biologics over MTX in treatment of PsA has been shown in RESPOND and SEAM-PsA studies [14,18]. Unlike in some guidelines, this advocates for the use of biologics specifically anti-TNF as first line rather than cDMARDs in treatment of PsA patients. In terms of limitations, HLA-B27 testing was not performed in all patients which may be due to cost, insurance coverage, low-pre-test probability, or technical issues in testing. Although, a large number of PsA patients were entered in the data registry, these observations may not be generalizable and representative at a national level or regional level. It is also important to note that access to biologics in our cohort may have been easier due to high insurance policy coverage which may not apply to the general population; where by accessibility to biologics varies. Nonetheless, to date this is the largest series of PsA patients in the region

Conclusion

In summary, this study provides insight on the epidemiology, disease and treatment trends in PsA in UAE, where by majority of our PsA patients achieved MDA or LDA were largely on biologics or in combination with DMARDs. Low active usage of MTX was largely secondary to lack of efficacy and adverse effects. Active combination (MTX and biologics) or biologic alone users were at increased odds of achieving MDA when compared to active MTX users alone. Overall, our findings favor early use of biologics in treatment of PsA patients as first line therapy. In turn, this helps inform the clinical practice and recommendations for management of PsA patients in the region.

References

1. Mease PJ, Armstrong AW. Managing patients with psoriatic disease: the diagnosis and pharmacologic treatment of psoriatic arthritis in patients with psoriasis. *Drugs.* 74, 423-441 (2014).
2. Gladman DD. Recent advances in understanding and managing psoriatic arthritis. *F1000Res.* 5, 2670 (2016).
3. Ferguson LD, Siebert S, McInnes IB *et al*. Cardiometabolic comorbidities in RA and PsA: lessons learned and future directions. *Nat Rev Rheumatol.* 15, 461–474 (2019).
4. Husted JA, Thavaneswaran A, Chandran V *et al.* Incremental effects of comorbidity on quality of life in patients with psoriatic arthritis. *J Rheumatol* 40, 1349–1356 (2013).
5. Torre Alonso JC, Rodriguez PA, Arribas Castrillo JM *et al*. Psoriatic arthritis (PA): a clinical, immunological and radiological study of 180 patients. *Rheumatology.* 30, 245–250 (1991).
6. Stolwijk C, van Onna M, Boonen A *et al.* Global prevalence of spondyloarthritis: a systematic review and meta-regression analysis. *Arthritis Care Res (Hoboken)* 68, 1320– 1331 (2016).
7. Ogdie, Alexis, Pamela W. The Epidemiology of Psoriatic Arthritis. *Rheumatic diseases clinics of North America* 41, 545-68 (2015).
8. Bedaiwi, Mohamed. Disease burden and treatment challenges of psoriatic arthritis in Africa and the Middle East. *Rheumatology international* 39, 1321-1329 (2019).
9. Mease P. MTX in psoriatic arthritis. *Bull Hosp Jt Dis* 71, (2013).
10. Lie E, Fagerli KM, Mikkelsen K *et al*. First- time prescriptions of biological disease-modifying antirheumatic drugs in rheumatoid arthritis, psoriatic arthritis and axial spondyloarthritis 2002-2011: data from the NOR-DMARD register. *Ann Rheum Dis* 73, 1905–1906 (2014).
11. Wilsdon, Tom D et al. MTX for psoriatic arthritis. The Cochrane database of systematic reviews (2019).
12. Kingsley GH, Kowalczyk A, Taylor H, et al. A randomized placebo-controlled trial of MTX in psoriatic arthritis. *Rheumatology (Oxford)* 51, 1368–1377 (2012).
13. Coates LC, Moverley AR, McParland L *et al*. Effect of tight control of inflammation in early psoriatic arthritis (TICOPA): a UK multicentre, open-label, randomised controlled trial. *Lancet.* 386, 2489–2498 (2015).
14. Baranauskaite A, Raffayova´ H, Kungurov NV *et al*. Infliximab plus MTX is superior to MTX alone in the treatment of psoriatic arthritis in MTX-naive patients: the RESPOND study. *Ann Rheum Dis.* 71, 541–548 (2012).
15. Ye, Weiyu, Laura C Coates. Should MTX Have Any Place in the Treatment of Psoriatic Arthritis? . *Rheumatic diseases clinics of North America vol.* 45, 325-339 (2019).
16. Ruhoff JT, Horn HC, Ellingsen T *et al.* Efficacy of MTX in management of peripheral psoriatic arthritis - a systematic review. *Dan Med J*. 66, 5570 (2019).
17. Maese J, Diaz Del Campo P, Seoane-Mato D *et al*. Effectiveness of conventional disease-modifying antirheumatic drugs in psoriatic arthritis: a systematic review. *Reumatol Clin*. 14, 81–89 (2018).
18. Mease PGD; Collier DH; Ritchlin CT *et al.* Etanercept and MTX as Monotherapy or in Combination for Psoriatic Arthritis: Primary Results From a Randomized, Controlled Phase 3 Trial. *Arthritis Rheumatol in Press* (2019).
19. Hagège, Benjamin. Remission and low disease activity in psoriatic arthritis publications: a systematic literature review with meta-analysis. *Rheumatology (Oxford, England)* 59, 1818-1825 (2020).
20. Gossec L, Baraliakos X, Kerschbaumer A *et al.* EULAR recommendations for the management of psoriatic arthritis with pharmacological therapies: 2019 update . *Annals of the Rheumatic Diseases* 79, 700-712 (2020).
21. Coates LC, Kavanaugh A, Mease PJ *et al*. Group for Research and Assessment of Psoriasis and Psoriatic Arthritis 2015 treatment recommendations for psoriatic arthritis. *Arthritis Rheumatol.* 68, 1060-1071 (2016).
22. Kavanaugh A, Coates LC, van der Windt DA *et al*. GRAPPA treatment recommendations: updates and methods. *J Rheumatol Suppl.* 96, 41-45 (2020).
23. Singh JA, Guyatt G, Ogdie A *et al*. 2018 American College of Rheumatology/National Psoriasis Foundation Guideline for the Treatment of Psoriatic Arthritis. *Arthritis & rheumatology (Hoboken, NJ).* 71, 5–32 (2019).
24. Al Saleh J, Sayed ME, Monsef N *et al.*The prevalence and the determinants of musculoskeletal diseases in Emiratis attending primary health care clinics in Dubai. *Oman Med J* 31, 117–123 (2016).
25. Elnady B, Shaarawy NK, Dawoud NM *et al.* Subclinical synovitis and enthesitis in psoriasis patients and controls by ultrasonography in Saudi Arabia; incidence of psoriatic arthritis during two years. *Clin Rheumatol*. (2019).
26. Review Manager (RevMan) [Computer program]. Version 5.4, The Cochrane Collaboration, 2020.
27. Saad AA, Ashcroft DM, Watson KD, *et al*. Efficacy and safety of anti-TNF thera- pies in psoriatic arthritis: an observational study from the British Society for Rheu- matology Biologics Register. *Rheumatology (Oxford).* 49, 697–705 (2010).
28. Fagerli KM, Lie E, van der Heijde D *et al*. The role of MTX co-medication in TNF-inhibitor treatment in patients with psoriatic arthritis: results from 440 patients included in the NOR-DMARD study. *Ann Rheum Dis.* 73, 132–137 (2014).