

Role of Omega-3 supplements in plaque-type psoriasis

Nopriyati, Muhammad Athuf Thaha, Sarah Diba, Odelia Jovita Jusuf Fantoni, Grady Garfendo

Department of Dermatology and Venereology, Sriwijaya University, Dr. Moh. General Hospital, Palembang, Indonesia.

Abstract

Background Psoriasis may severely affect patients' quality of life, leading to depression and self-isolation. Effective treatments are limited by cumulative side-effects and tachyphylaxis. Previous studies have suggested a benefit of omega-3 in psoriasis therapy.

Objective To evaluate the efficacy of omega-3 supplements in improving mild-moderate plaque psoriasis patients' quality of life.

Methods This was an open, non-blinded interventional study comprised of thirty patients; 15 patients were given standard oral medication forming the control group while the remaining 15 were added omega-3 daily in three divided doses. Oral antihistamine agents were given accordingly. The assessments include baseline characteristics of participants, such as age, sex and severity of psoriasis by Dermatology Life Quality Index (DLQI) and Psoriasis Area Severity Index (PASI). Weekly visits were scheduled, with measurement of omega-3 level conducted in baseline and week 12.

Results There is no mean difference in baseline omega-3 levels between group A and group B ($p>0.05$) but at the end of study, omega-3 level of group B has improved significantly. PASI and DLQI score in group A and B compared to baseline were statistically significant ($p<0.000$), while group B had shown better improvement than group A.

Conclusion Improvements were observed in both groups with greater results suggested in the group additionally treated with omega-3 supplements.

Key words

Omega-3; Psoriasis vulgaris; Psoriasis Area Severity Index; Dermatology Life Quality Index.

Introduction

Psoriasis is a polygenic immune skin disorder, characterized by erythematous plaque with thick micaceous silvery scale.^{1,2} Joints may also be affected,¹ and comorbidities especially cardiovascular disease may worsen the patients' condition.³ Psoriasis may also adversely affect the psychosocial well-being of the patient leading to self-isolation and depression.⁴

Address for correspondence

Dr. Odelia Jovita Jusuf Fantoni
Department of Dermatology and Venereology,
Sriwijaya University, Dr. Moh. General Hospital,
Palembang, Indonesia.
Email: odeliafantoni@gmail.com

Conventional treatments including methotrexate, cyclosporine, and narrowband ultraviolet B may be helpful to control the inflammation even though long-term use may contribute to renal and liver dysfunction.²

Psoriasis manifestations can be improved by diet and supplementation which have systemic anti-inflammatory effects.⁵ Recent studies suggested adding omega-3 supplements may be beneficial.^{6,7} Omega-3 fatty acids, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA) can restrict the spreading of an inflammatory process.⁸ Psoriasis is a chronic inflammatory skin disorders, thus

omega-3 can assist on lowering the production of arachidonic acid (AA) by metabolizing through the same pathway as AA.⁴ Not only it can eventually increase the plasma and platelet EPA-to-AA ratios, but also significantly decrease synthesis of leukotriene B4 by neutrophils.⁷

Therefore, the researchers believed that the addition of omega-3 supplements may influence patients' quality of life and severity. This study aim to explore the effect of omega-3 supplementation in people with psoriasis, using the DLQI and PASI as an outcome measure.

Methods

This open, non-blinded interventional study was conducted in the Dermatology & Venereology Department of Mohammad Hoesin General Hospital Palembang for a period of 1 year from October 2020 to October 2021. The study was approved by the Research Ethics Committee of RSUP Dr. Mohammad Hoesin Palembang. During the study period, we enrolled thirty mild-moderate chronic plaque psoriasis patients who attend to our outpatient clinic. Inclusion criteria includes diagnosis of mild-moderate psoriasis by PASI score and age >18 years old. Exclusion criteria consists of other types of psoriasis (pustular, palmoplantar, erythrodermic), use of anticoagulant medication, history of diabetes mellitus type II and coagulation disorders, pregnancy, and breastfeeding. All participants provided written consent to participate in the study.

Patients were then divided into two groups; group A was given standard oral treatments alone (methotrexate) forming the control group. Group B was given an additional daily intake of nine capsules of omega-3 in three divided doses, in which each of them consist of 300 milligrams of EPA and DHA, equivalent to 900 milligrams

of omega-3 per day for 12 weeks. Antihistamines were prescribed as per need. Omega-3 level, PASI score, and DLQI were measured in baseline and week 12. At the end of the study, the outcome was measured by the difference in DLQI and PASI score at 12 weeks compared to the baseline.

Results

Both groups in this study consisted of 15 patients each, with higher proportion of male patients (73.3% in group A and 66.7% in group B). Mean age of patients in group A was 45.26±11.18 years old, while group B had a mean age of 45±12.02 years old. All patients completed the study (**Table 1**).

No mean difference in baseline omega-3 levels between group A and group B (p>0.05) but on the end of study, omega-3 level of group B has improved significantly (**Table 2**).

The PASI score at baseline was 7.08±1.28 for group A and 7.70±3.09 for group B. The DLQI score at baseline was 6.20±1.20 for group A and 7.40±2.6 for group B. The use of independent t-test has proven significant improvement of PASI

Table 1 Demographics distribution of study participants.

Characteristics	Study Groups		p value
	Group A (n=15) n (%)	Group B (n=15) n (%)	
Age			
Mean ± SD (Min - max)	45.26±11.18 (20-65)	45±12.02 (25-61)	0.950
Sex			
- Male	11 (73.3)	10 (66.7)	0.690
- Female	4 (26.7)	5 (33.3)	

Table 2 Omega-3 level between both groups.

Study groups	Omega-3		p value
	Mean±SD Baseline	Mean±SD Week 12	
Group A	2.87±0.79	3.13±0.56	0.140
Group B	2.60±0.71	4.14±0.90	0.000

Table 3 Comparison of PASI score between groups at baseline and week 12.

Study groups	n	PASI score		p value
		Mean ± SD Baseline	Mean ± SD Week 12	
Group A	15	7.08±1.28	5.84±1.44	0.000
Group B	15	7.70±3.09	3.24±1.48	0.000

Table 4 Comparison of DLQI score between groups at week 12.

Study groups	n	Median	Minimum-maximum	p value
Group A	15	5	3 - 6	0.000
Group B	15	3	2 - 6	

and DLQI in group A and B compared to baseline, while group B had shown better improvement than group A (**Table 3**). Likewise, similar results of improvement using Mann Whitney U test were shown in DLQI score at the end of study (**Table 4**).

Discussion

Worldwide prevalence of psoriasis is approximately 2-3%.⁹ The prevalence of psoriasis in India varies from 0.44-2.8% and twice more prevalent in males than females.¹⁰ Another study by Pan *et al.* reported a psoriasis prevalence of 0.11-0.47% in China population. Results also showed that psoriasis may occur at any age and more often in men.¹¹ This corresponded well with our study, which found stronger male predominance in both groups (more than 60%).

Supplementary medicine has been gaining popularity in treating skin diseases especially psoriasis. Most common of these are fish oils supplements (omega-3, EPA & DHA).¹² Millsop *et al.* reviewed twelve controlled studies which showed benefit these supplements in psoriasis patients. It should be taken for longer periods (6 weeks to 6 months) to obtain an effective improvement.⁶ Other systematic review by

Thomsen *et al.* found that omega-3 dosage ranging from 1800-18000 milligrams/day was beneficial in five out of seven studies.¹³ In the contrary, other studies showed inconclusive and even no support of benefit in omega-3 supplementation for psoriasis.^{14,15} During our study, patients were given 900 milligrams/day omega-3 supplements in divided doses and at week 12, patient showed significant improvement of PASI and DLQI with no reported side effects.

Alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA) are the foremost omega-3 fatty acids components. Sources of omega-3 are organically in dietary intake, including fish, seafood, nuts, seeds, plant oils (flaxseed oil, soybean oil, and canola oil).¹⁶ These fatty acids involved in the development and differentiation of stratum corneum, inhibition of proinflammatory eicosanoids and cytokines (tumour necrosis factor-alpha, interferon-gamma, and interleukin-12).¹⁷ In psoriasis, omega-3 may alter the epidermal and blood cell membrane lipid composition. Arachidonic acid and its metabolite (leukotriene B4) were found in high level and considered to be the principal mediator of psoriasis. With fish oil supplementation, EPA was metabolized instead of AA, which then produced far less potent inflammatory mediators (leukotriene B5).⁷ Omega-3 also has favourable impacts on triglycerides, high-density lipoprotein cholesterol, endothelial and vascular function, platelet function, blood pressure and cardiac excitability,⁸ which may prove to be beneficial in treating psoriasis' comorbidities.³

Conclusion

Omega-3 fatty acid showed significant improvement as adjunctive treatment in treating psoriasis, as it appears to be a feasible in

improving severity and quality of life in psoriasis patients.

References

1. Gudjonsson JE, Elder JT. Psoriasis. In: Sewon K, Amagai M, Bruckner AL, Enk AH, Margolis DJ, McMichael AJ, *et al.*, editors. Fitzpatrick's Dermatology in General Medicine. 9th ed. New York: McGraw-Hill Education; 2019. p. 457–97.
2. van de Kerkhof PCM, Nestlé FO. Psoriasis. In: Bologna JL, Schaffer J V., Cerroni L, editors. Dermatology. 4th ed. Beijing: Elsevier Inc.; 2018. p. 168–94.
3. Takeshita J, Grewal S, Langan SM, Mehta NN, Ogdie A, Van Voorhees AS, *et al.* Psoriasis and comorbid diseases: Epidemiology. *J Am Acad Dermatol.* 2017;**76(3)**:377–90.
4. Adil M, Singh PK, Sonkar VK, Chahar YS, Kumar P. Omega-3 fatty acids and quality of life in psoriasis: An open, randomised controlled study. *Dermatol Online J.* 2019;**10(2)**:12–6.
5. Wu AG, Weinberg JM. The impact of diet on psoriasis. *Cutis.* 2019;**104(2)**:7–10.
6. Millsop JW, Bhatia BK, Debbaneh M, Koo J, Liao W. Diet and psoriasis, part III: Role of nutritional supplements. *J Am Acad Dermatol.* 2014;**71(3)**:561–9.
7. Mari NL, Simão ANC, Dichi I. N-3 Polyunsaturated Fatty Acids Supplementation in Psoriasis: a Review. *Nutrients.* 2017;**42(1)**:1–6.
8. Márquez-Balbás G, Sánchez-Regaña M, Millet U. Study on the use of omega-3 fatty acids as a therapeutic supplement in treatment of psoriasis. *Clin Cosmet Investig Dermatol.* 2011;**4**:73–7.
9. Dogra S, Mahajan R. Psoriasis: Epidemiology, clinical features, comorbidities, and clinical scoring. *Indian Dermatol Online J.* 2016;**7(6)**:471–80.
10. Dogra S, Yadav S. Psoriasis in India: Prevalence and pattern. *Indian J Dermatol Venereol Leprol.* 2010;**76(6)**:595–601.
11. Pan R, Zhang J. Epidemiology and treatment of psoriasis: A Chinese perspective. *Psoriasis Targets Ther.* 2014;**4**:37–47.
12. Zuccotti E, Oliveri M, Girometta C, Ratto D, Di Iorio C, Occhinegro A, *et al.* Nutritional strategies for psoriasis: Current scientific evidence in clinical trials. *Eur Rev Med Pharmacol Sci.* 2018;**22(23)**:8537–51.
13. Thomsen BJ, Chow EY, Sapijaszko MJ. The Potential Uses of Omega-3 Fatty Acids in Dermatology: A Review. *J Cutan Med Surg.* 2020;**24(5)**:481–94.
14. Yang SJ, Chi CC. Effects of fish oil supplement on psoriasis: A meta-analysis of randomized controlled trials. *BMC Complement Altern Med.* 2019;**19(1)**:1–9.
15. Upala S, Yong WC, Theparee T, Sanguankeo A. Effect of omega-3 fatty acids on disease severity in patients with psoriasis: A systematic review. *Int J Rheum Dis.* 2017;**20(4)**:442–50.
16. Sokoła-Wysoczańska E, Wysoczański T, Wagner J, Czyż K, Bodkowski R, Lochyński S, *et al.* Polyunsaturated fatty acids and their potential therapeutic role in cardiovascular system disorders—a review. *Nutrients.* 2018;**10(10)**:1–21.
17. Tveit KS, Brokstad KA, Berge RK, Sæbø PC, Hallaråker H, Brekke S, *et al.* A randomized, double-blind, placebo-controlled clinical study to investigate the efficacy of herring roe oil for treatment of psoriasis. *Acta Derm Venereol.* 2020;**100(10)**:1–6.