

TIME-RESTRICTED EATING FOR CHRONIC PLAQUE-TYPE PSORIASIS: A PROSPECTIVE INTERVENTIONAL STUDY ON CLINICAL AND LIFESTYLE OUTCOMES

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ABSTRACT

This study evaluated the effectiveness, safety, and patient satisfaction of a 12-week daytime 16:8 Time-Restricted Eating (TRE) regimen on psoriasis severity, anthropometric parameters, sleep quality, and quality of life in overweight and obese adults with chronic plaque-type psoriasis. Results showed statistically significant improvements across all primary outcomes. Following the intervention, mean PASI decreased from 9.21 to 6.00, representing a 34.85% reduction ($p < 0.001$), with 44.4% of participants achieving a PASI-50 response. Significant weight loss was observed, with mean reductions in body weight (-4.57 kg; 5.63%), BMI (-1.62 kg/m²; 5.61%), and waist circumference (-4.36 cm; 4.65%) ($p < 0.001$ for all). Lifestyle outcomes improved substantially; sleep quality scores (PSQI) decreased by 29.89%, with 72.2% of participants achieving good sleep quality post-intervention ($p < 0.001$). Furthermore, quality of life (DLQI) scores improved by 23.26% ($p = 0.005$), with two-thirds of the cohort reporting enhanced well-being. The intervention was well-tolerated, with only mild, transient side effects and high participant satisfaction (94.4% of willingness to continue). In conclusion, a daytime 16:8 TRE regimen is a safe and effective non-pharmacologic intervention for improving clinical psoriasis severity, metabolic health, sleep, and quality of life. Given the high adherence and positive outcomes, TRE could be a feasible adjunctive lifestyle therapy for managing chronic plaque-type psoriasis in overweight populations.

Keywords: Psoriasis Area And Severity Index, Time-Restricted Eating, Dermatology Life Quality Index, Weight Loss In Psoriasis, Sleep Quality In Psoriasis

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INTRODUCTION

Psoriasis affects approximately 125 million people globally (Coimbra et al., 2012), with patients facing higher all-cause mortality rates than the general population (Springate et al., 2017). Pathologically, the disease is driven by the IL-23/Th17 axis, where infiltrating T-cells trigger an inflammatory cascade, including Interleukins (IL) -1, 6, 23, interferon (IFN) - γ and tumor necrosis factor (TNF) - α , that promotes keratinocyte proliferation (Vičić et al., 2021). Psoriasis and obesity are strongly correlated (Castaldo et al., 2020). compared to lean women, obese women had higher levels of the two main psoriasis cytokines, IL-17 and IL-23 (Sumarac-Dumanovic et al., 2009). Thus, losing weight will lessen the inflammation brought on by obesity, which would then improve skin conditions (Gelfand & Abuabara, 2010). Among dietary interventions, which are the least expensive weight loss strategies, Time-Restricted Eating (TRE) offers a sustainable, calorie-counting-free approach that synchronizes circadian rhythms and provides potent anti-inflammatory effects that can improve psoriasis and sleep (Gray et al., 2023). Beyond physical symptoms, psoriatic patients frequently experience poor sleep quality, which further diminishes their quality of life (Betul et al., 2023). Despite the established link between obesity-driven inflammation and psoriasis severity, sustainable diet interventions addressing metabolic health, sleep, and quality of life remain scarce. This 12-week study fills the research gap by evaluating the feasibility and efficacy of a daytime TRE protocol in a Thai population, addressing the intersection of skin-systemic inflammatory cascade alongside the sleep-skin paradox within a culturally specific context.

LITERATURE REVIEWS

Psoriasis and Inflammation

Psoriasis is an immune-mediated inflammatory disease that is persistent and recurrent. It is known to be triggered by environmental and genetic factors (Coimbra et al., 2012). The inflammation starting from the IL-23/Th17 axis causes abnormal keratinocyte proliferation, differentiation, release of proinflammatory cytokines, and the creation of a feedback loop that perpetuates inflammation (Vičić et al., 2021). The classic form of is psoriasis vulgaris, also known as chronic plaque-type psoriasis. The unique features are erythematous or salmon-pink, well-defined plaques with silvery-white scales, mostly symmetrically distributed on the scalp, elbows, knees, and lumbosacral areas (Coimbra et al., 2012). Psoriasis's proinflammatory cytokines extend beyond the skin leading to systemic inflammation, which represents the term "march of psoriasis" (Vičić et al., 2021). As a result of persistent inflammation, it leads to many comorbidities, mainly obesity, hypertension, metabolic syndrome, diabetes, cardiovascular disease, and depression (Czarnecka et al., 2023).

Psoriasis and Obesity

It has been stated that obesity appears to be involved in the aggravation of psoriasis (Sterry et al., 2007). According to certain research, people who are obese have a higher chance of psoriasis treatment failure (Llamas-Velasco et al., 2021). Thus, treating obesity by adhering to weight-loss plans can reduce psoriasis's clinical symptoms, minimize the flare of psoriasis, enhance treatment effectiveness, and prevent metabolic problems (Czarnecka et al., 2023).

Psoriasis and Sleep

People who have psoriasis are prone to suffer from sleep problems. According to a case-controlled study, 53.6% of psoriasis patients report having poor sleep quality (PSQI >5), which is greater than the general population (21.9%) (P. Jensen et al., 2018). Sleep disruptions cause cortisol and pro-inflammatory cytokines to be released more frequently, which has a deleterious effect on the immune system (Vitale et al., 2019). Lack of sleep is another comorbidity associated with psoriasis that can lead to worse quality of life (Yang et al., 2018).

Psoriasis and Quality of Life

Studies indicate that skin diseases may significantly impact one's ability to operate in social, professional, and psychological domains, as well as the perception of one's quality of life (de Korte et al., 2004). Psychological stress has been linked to psoriasis exacerbation and an earlier

development of psoriasis (Coimbra et al., 2012). Increase in DLQI scores was directly and moderately correlated with higher PASI scores (Houghton et al., 2021).

The Intervention

High costs and side effects of conventional therapies leave many psoriasis patients dissatisfied and seeking affordable alternatives (Porter et al., 2022). Intermittent Fasting (IF), specifically TRE, has emerged as a low-cost strategy that emphasizes meal timing over calorie restriction. Clinical data from Ramadan fasting already indicates significant reductions in PASI scores (Almutairi & Shaaban, 2022; Damiani et al., 2019). The therapeutic efficacy of TRE centers on the "metabolic switch," where the body exhausts glycogen stores and shifts to lipolysis. This process generates ketone bodies, which reduce systemic pro-inflammatory cytokines (IL-1, IL-6, and IL-8) while improving glucose regulation and stress tolerance (Anton et al., 2018). Furthermore, daytime TRE aligns with circadian rhythms and peak diet-induced thermogenesis; consuming calories earlier in the day reduces obesity risk compared to heavy evening intake (Boege et al., 2021; Xiao et al., 2019), potentially offering superior anti-inflammatory benefits for psoriatic patients. Despite these insights of TRE, significant gaps remain. The Ramadan studies lasting only one month are often confounded by nighttime feasting and sleep-disrupting meal shifts that may counteract both circadian rhythm and anti-inflammatory benefits. Current evidence lacks a framework integrating physical, metabolic, somnological, and psychosocial dimensions. In the Thai context, where street food abundance complicates portion control, a timing-based intervention like TRE may improve cultural adherence. This 12-week study addresses these gaps by evaluating whether synchronized daytime TRE can serve as a holistic, zero-cost therapeutic strategy for overweight psoriatic patients in Thailand.

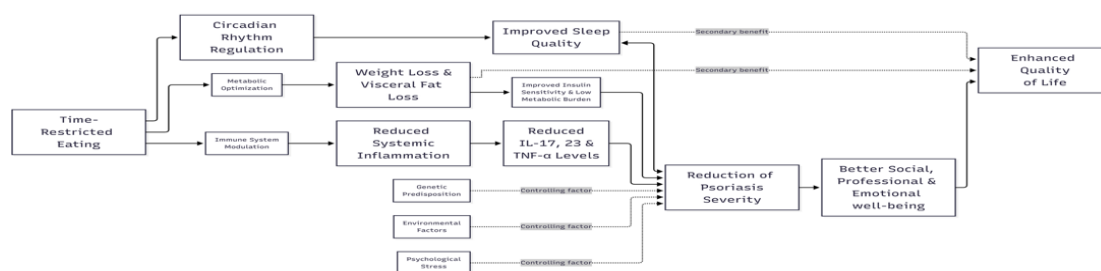


Figure 1 Conceptual Framework

RESEARCH METHODOLOGY

This 12-week interventional prospective study conducted at Mae Fah Luang University Hospital, Bangkok, evaluated the impact of 16:8 TRE on 22 adults (ages 30–60, BMI 25–35 kg/m²) with stable chronic plaque-type psoriasis. Inclusion required participants to be off systemic medications and using a mobile tracker, attend all scheduled visits, while exclusion criteria covered other psoriasis variants, diabetes, major organ impairment, active infections, malignancy, eating disorders, and pregnancy. The protocol utilized a 16:8 schedule (16-hour fast, 8-hour eating window) following a one-week adaptation. During that first week, fasting duration increased progressively: 12 hours on Days 1–2, 13 hours on Days 3–4, and an additional hour each on Days 5 and 6, reaching the full 16-hour fasting zone by Day 7. Participants used the "Intermittent Fasting 16:8" app to log intake, with researchers monitoring adherence weekly. The study measured changes in the Psoriasis Area and Severity Index (PASI), Dermatology Life Quality Index (DLQI), Pittsburgh Sleep Quality Index (PSQI), and anthropometric data (weight, BMI, waist circumference) every four weeks. To eliminate observer bias, PASI scoring was performed by a dermatologist who was not involved in the trial intervention. Statistical analysis using SPSS version 20 employed repeated measures ANOVA for longitudinal metrics and paired t-tests for pre- and post-intervention quality-of-life scores, with significance set at $p < 0.05$.

The study followed Good Clinical Practice guidelines and received approval from the Mae Fah Luang Research Ethics Committee. All participants provided informed consent before enrollment, with guaranteed confidentiality and the right to voluntary discontinuation.

RESEARCH RESULTS

Participant Characteristics and Baseline Status

Of the 22 volunteers initially recruited for this 12-week study, 18 participants (11 males, 7 females; mean age 41.44 ± 9.21 years) completed the TRE protocol, with four withdrawing for personal reasons. The final cohort had a mean disease duration of 8.86 ± 6.7 years, split equally between receiving topical-only and combined topical/phototherapy treatments. Baseline severity was equally distributed (6 mild, 6 moderate, 6 severe). All subjects were classified as overweight or obese, with the means and SDs of anthropometric measurements being mentioned in Table 1. The baseline data revealed generally poor sleep (mean PSQI 7.06 ± 2.92 ; only five "good" sleepers) and a mean DLQI of 7.17 ± 4.71 , indicating that 44.4% experienced a moderate to very large impact on their quality of life.

Psoriasis Severity (PASI)

The 12-week 16:8 TRE protocol significantly reduced psoriasis severity, with the mean PASI score dropping by 3.21 points (34.82%). Statistical analysis confirmed a significant effect of time on PASI ($F(2.139, 36.370) = 12.159, p < 0.001$) with a substantial effect size (partial $\eta^2 = 0.417$). While 44.4% of patients achieved the PASI-50 response threshold, the clinically meaningful endpoint, outcomes varied: one patient showed no change, and another experienced a paradoxical increase in severity due to new lesions.

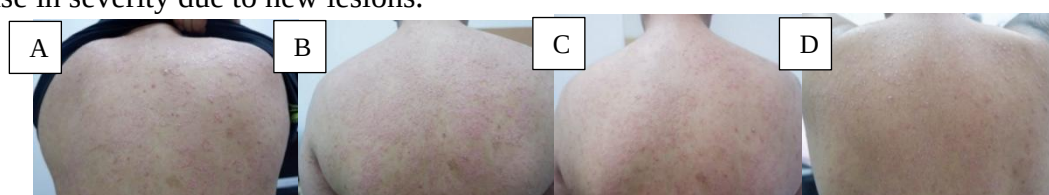


Figure 2 Serial lesion changes (Back): (A)Baseline (B)Week 4 (C)Week 8 (D)Week 12

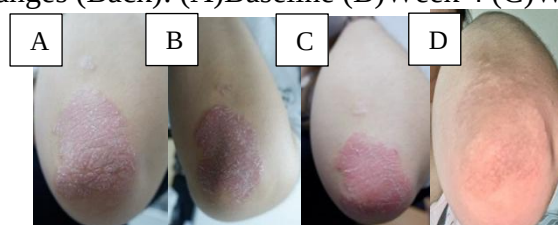


Figure 3 Serial lesion changes (left elbow): (A)Baseline (B)Week 4 (C)Week 8 (D)Week 12



Figure 4 Serial lesion changes (left malleolus): (A)Baseline (B)Week 4 (C)Week 8 (D)Week 12

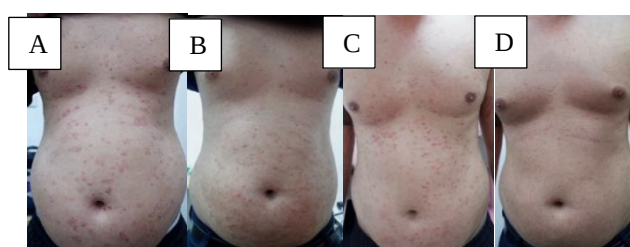


Figure 5 Serial lesion changes (belly): (A)Baseline (B)Week 4 (C)Week 8 (D)Week 12

Anthropometric Parameters

The 16:8 TRE protocol significantly improved all anthropometric parameters over 12 weeks. Participants achieved a mean weight loss of 4.57 kg (5.63%), supported by significant time-effect statistics ($F(1.78, 44.95) = 44.945, p < 0.001$) and a large effect size (partial $\eta^2 = 0.726$). This was mirrored by a 1.68 kg/m² (5.61%) reduction in BMI ($F(1.68, 28.49) = 39.031, p < 0.001$, partial $\eta^2 = 0.697$) and a 4.36 cm (4.65%) drop in waist circumference ($F(2.015, 34.251) = 51.727, p < 0.001$, partial $\eta^2 = 0.753$), indicating a substantial impact on central adiposity.

Table 1 Means and SDs of PASI and Anthropometric measures at each visit with effect size

Primary outcomes	Baseline (Mean $\pm$ SD)	Week 4 (Mean $\pm$ SD)	Week 8 (Mean $\pm$ SD)	Week12 (Mean $\pm$ SD)
PASI	9.21 $\pm$ 7.69	7.42 $\pm$ 6.07	6.36 $\pm$ 5.66	6.00 $\pm$ 6.68
Body weight (kg)	81.18 $\pm$ 13.71	80.05 $\pm$ 13.93	78.11 $\pm$ 14.04	76.61 $\pm$ 13.79
BMI (kg/m ²)	28.86 $\pm$ 3.63	28.45 $\pm$ 3.68	27.73 $\pm$ 3.70	27.24 $\pm$ 3.66
Waist Circumference (cm)	93.61 $\pm$ 13.37	92.15 $\pm$ 13.34	90.33 $\pm$ 13.10	89.25 $\pm$ 12.63

All p -values < 0.001

Sleep Quality (PSQI)

A paired samples t-test showed a significant improvement in sleep quality after TRE ($t(17) = 4.776, p < 0.001$). Mean PSQI scores decreased from 7.06 ± 2.92 to 4.94 ± 2.55 , with a large effect size (Cohen's $d = 1.126$). Post-intervention, 17 of 18 subjects showed improved scores, and the number of good sleepers increased from 5 to 13, highlighting strong clinical relevance.

Quality of Life (DLQI)

Dermatology-specific life quality improved significantly post-TRE ($t(17) = 3.260, p = 0.005$), with mean DLQI scores dropping from 7.17 ± 4.71 to 5.50 ± 5.26 (a 1.67-point reduction). The effect size was medium (Cohen's $d = 0.768$). By Week 12, 12 subjects showed meaningful improvement, and those reporting "no effect" on their life increased from 1 to 5 participants.

Secondary Outcomes

Side Effect Profile

Most TRE adverse effects were mild and transient. Hunger was the most frequent symptom (13 reports), peaking in Weeks 1–3 and resolving by Week 5 alongside food cravings. Baseline insomnia in three participants normalized by Week 6. Gastrointestinal issues were sporadic; constipation was most persistent (12 reports) but manageable, while bloating and stomachaches resolved by Week 4. Other symptoms, fatigue, concentration difficulties, and dry skin, cleared within the first month. Two fever episodes occurred but were linked to intercurrent illness rather than the fasting regimen.

Patient Satisfaction

The mean satisfaction score was 2.22 ± 0.55 on a 3-point scale. Five participants were "very satisfied," 12 were "moderately satisfied," and one was "somewhat satisfied." Notably, 17 of the 18 participants expressed a willingness to continue TRE beyond the study period.

Adherence

Adherence to the 16:8 protocol was high, with all 18 participants meeting the predefined criteria of 14–16 fasting hours daily from Week 2 onward. The mean daily fasting duration across 12 weeks was 15.86 ± 1.09 hours (range: 12–20). No significant fasting burnout was observed, as performance remained stable through the end of the study.

DISCUSSION & CONCLUSION

Clinical Significance of Anthropometric Changes

Most participants ($n=11$) achieved clinically significant weight loss, defined by the American Heart Association as $\geq 5\%$ of initial body weight (M. D. Jensen et al., 2014). The steady, continuous weight loss across all four time points indicates that TRE was both sustainable and well-maintained without regain. Waist circumference reduction was the study's strongest predictor of skin

clearance. This suggests that TRE modulates the Adipo-Dermatological Axis by reducing visceral fat. In obese patients, visceral fat releases inflammatory markers (such as TNF- α , IL-1, IL-6, adiponectin, and leptin) that fuel keratinocyte overgrowth (Czarnecka et al., 2023). By promoting lipolysis, TRE effectively starves psoriatic plaques of this systemic inflammatory fuel. Additionally, TRE improves insulin sensitivity (Hutchison et al., 2019) and lowers IGF-1 levels, both of which are linked to visceral obesity and skin cell hyperproliferation (Wang et al., 2024). Ultimately, TRE acts as a metabolic thermostat, treating psoriasis not just through weight loss, but by systematically cooling the body's inflammatory environment.

Clinical Relevance of PASI Improvement

While previous one-month Ramadan studies (Adawi et al., 2019; Damiani et al., 2019) showed modest PASI reductions (1.59 and 0.89 points), this 12-week TRE intervention nearly doubled those results with a mean reduction of 3.21 points. The most substantial improvements occurred by Week 8, likely driven by the metabolic switch to ketone bodies. This transition triggers autophagy, a cellular housekeeping process that clears damaged components and slows the keratinocyte hyperproliferation responsible for plaques (de Cabo & Mattson, 2019). Although TRE alone did not achieve the PASI-75 clearance levels seen when combining low-calorie diets with systemic medications like cyclosporine (Gelfand & Abuabara, 2010), it proved highly effective as an adjunctive therapy or a primary non-pharmacological option for mild-to-moderate cases approach (MORO et al., 2021). Individual variability was noted via two non-responders, including one participant whose progress was reversed by a COVID-19 infection at Week 7. This suggests that while TRE provides significant metabolic benefits, systemic infections are known to trigger psoriatic flares through shared inflammatory pathways are known to trigger psoriatic flares through shared inflammatory pathways (Shah & Busquets, 2022) that override the intervention's effects.

Sleep Quality Improvements

A major finding of this study was the near-universal improvement in sleep quality, with 94.4% of participants reporting benefits and good sleepers increasing from 27.8% to 72.2%. While some research suggests TRE has a neutral effect on sleep (Gabel et al., 2019; Lowe et al., 2020), there is a reciprocal phenomenon of sleep-immune regulation where sleep can be improved by lessening the inflammation (Irwin, 2019). TRE by lowering inflammatory markers, can improve sleep as found in this study. This addresses the bidirectional link where poor sleep elevates stress hormones and impairs skin repair, while severe symptoms further disrupt sleep (Guo et al., 2024). Mechanistically, skin health is governed by clock genes (e.g., CLOCK and BMAL1) that coordinate cell repair. In psoriasis, these timers are often deranged. By aligning intake with daylight (Duan et al., 2021), TRE resynchronizes these genes; specifically, stabilizing BMAL1 can block the IL-17/IL-23 axis, the primary immune pathway for plaque formation plaques. Additionally, nighttime meals dysregulate circadian rhythms, sleep quality, metabolism increasing obesity risk (Patterson & Sears, 2017). Since weight loss also reduces risks like sleep apnea, the combination of metabolic timing, better sleep, and corrected cell cycles explains why TRE improves psoriasis more effectively than simple calorie counting.

Quality of Life Enhancement

Significant improvements in DLQI scores show that TRE enhances multiple areas of life, including daily activities, work, relationships, and emotional well-being. As skin severity decreases, quality of life typically increases. In this study, the number of participants whose psoriasis no longer interfered with their daily lives increased fourfold. This shift is likely driven by a positive feedback loop: the visible success of reduced waist size lowers anxiety and stress, which in turn reduces stress-induced skin inflammation.

Side Effect Burden

Initial side effects, such as gastrointestinal issues and sleep disturbances, were common but mild and self-limiting during the first month. These symptoms typically reflect the body's natural adaptation to a new dietary schedule. While most issues resolved, a recurrence of constipation in

the final weeks (Weeks 10–12) suggests that long-term TRE may require closer attention to fiber and fluid intake to maintain comfort and sustainability.

Table 2 Previous studies about the adverse effects of TRE

Paper	Key Findings about Adverse Events
(Almutairi & Shaaban, 2022)	21 patients reported hunger, 7 patients experienced fatigue, & 11 patients complained of constipation out of 121 psoriatic patients
(Vizthum et al., 2023)	TRE does not cause significant increases in hunger, nor does it cause binge or uncontrolled eating
(Shalabi et al., 2023)	Minimal side effects of IF: headache (61.3%), fatigue (68%), mood fluctuations (57.8%), polyuria (46.2%), and dizziness (55.8%)

TRE was well-tolerated with only mild, temporary side effects, such as hunger and fatigue, which decreased by >70% between weeks 1 and 12. These symptoms likely reflect metabolic inflexibility as the body adapts to the transition to ketosis (Daley et al., 2026). With no severe adverse events reported, this protocol demonstrated safety and feasibility for adherence.

Patients' Satisfactory Grading

Treatment satisfaction was high among patients whose skin and quality of life issues were under control (Ichiyama et al., 2018). As found in this study, more than two-thirds of the subjects saw visible improvements with moderate satisfaction.

Limitations

It must be acknowledged that this study has important limitations, most notably the small sample size (n=18) and the absence of a non-TRE control group. Although the influence of a trial effect or incidental diet changes cannot be excluded entirely, the consistency of the observed significant improvements suggests a meaningful trend, serving as a foundation for larger-scale and longer-term, randomized controlled trials which are essential to confirm the specific metabolic benefits of TRE. Future studies should focus on how TRE influences specific lipid profiles, insulin sensitivity, and systemic inflammatory markers to further refine its role in personalized dermatological care.

Conclusion

This 12-week daytime TRE intervention demonstrates significant improvements in body weight, BMI, and waist circumference, paired with marked reductions in psoriasis severity and enhanced sleep and life quality. These findings position TRE as a practical, safe, and effective lifestyle strategy for psoriasis management. To optimize patient outcomes, dermatologists can integrate TRE into standard care protocols through the following clinical actions:

- **Initial Counseling & Metabolic Screening:** Introduce TRE during the first consultation as a low-cost, non-pharmacological tool to address obesity and insulin resistance.
- **Adjunctive Therapy:** Recommend TRE alongside conventional systemic or topical treatments to potentially enhance medication efficacy and accelerate skin clearance.
- **Circadian Alignment:** Advise patients to limit food intake to daylight hours to help resynchronize the "skin clock" and improve sleep, which aids in cellular barrier repair.

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