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Patient-reported Impact of Menopause and Hormone Replacement Therapy on Psoriasis

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Menopause's impact on psoriasis remains unclear. This study's aim was to gather information on patient perception of the impact of menopause and hormone replacement therapy (HRT) on psoriasis. This survey-based study analysed 139 postmenopausal women with psoriasis from the USA and South Korea. In the combined cohort, most women reported menopause either had no effect on their psoriasis (41.7%) or worsened their psoriasis (33.1%). In the combined cohort, a majority of women (73.4%) reported that there was no change in their psoriasis treatment with menopause. Of the women receiving HRT ($n = 29$), the majority reported no effect on psoriasis (62.1%). In multivariate analysis, alcohol consumption was protective against worsening of psoriasis with menopause (OR 0.19 [95% CI 0.06–0.59], $p = 0.004$). In summary, this study showed that menopause is likely to have a neutral to negative effect on psoriasis. HRT was found to have no effect on the course of psoriasis in the majority of cases.

Key words: hormone replacement therapy; menopause; psoriasis.

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SIGNIFICANCE

Our aim was to gather information on patient perception of the impact of menopause and hormone replacement therapy on psoriasis in North America and East Asia. Most women reported that their psoriasis was either not affected or was worsened by menopause. The majority of women reported that there was no change in psoriasis treatment with menopause. Of women receiving HRT, the majority reported no effect on psoriasis. Our results add to the understanding of the impact of menopause and hormone replacement therapy on psoriasis and may help clinicians to counsel women with psoriasis as they make the menopausal transition.

Psoriasis is a chronic immune-mediated skin condition characterized by scaly plaques and association with a variety of systemic comorbidities (1). While psoriasis has an estimated global prevalence of 2–3%, the prevalence of psoriasis differs by region; within the United States (US) prevalence is 3%, whereas in East Asia prevalence is estimated at 0.14%. The impact of menopause on psoriasis has not been well defined, limiting the amount of information available to guide patient expectations and clinical recommendations. With the average age of menopause occurring at 51.3 years, a significant proportion of individuals within the ageing population fit within this demographic (2).

The menopausal transition may be a time of unease for many women as they potentially experience vasomotor symptoms and begin to consider their risk factors for developing medical conditions associated with the postmenopausal period, which lasts on average at least 30 years and is associated with a decline in oestrogen (2). One common consideration is the initiation of hormone replacement therapy (HRT), a practice once common that has lost favour over time. From 1988–1994, 44% of postmenopausal women in the US either used or were currently using HRT (2). This percentage dropped to 4.7% of women in 2010 following a report from the Women's Health Initiative that indicated that HRT increased the risk of coronary heart disease in post-menopausal women (2, 3). Currently, the US Preventive Services Task Force (USPSTF) recommends against the use of combined oestrogen and progestin, as well as oestrogen alone, for the primary prevention of chronic conditions for postmenopausal women and postmenopausal women who have had a hysterectomy respectively (2).

Psoriasis is a condition characterized by compromised skin-barrier function. It is understood that oestrogen plays a key role in the maintenance of the skin barrier and normal physiologic functioning of the skin. Specifically, oestrogen is understood to protect against transepidermal water loss and to maintain dermal collagen and elastin (4). Oestrogen may confer a protective effect against the pathogenesis of immune-medicated skin conditions such as psoriasis by dampening Th1 immune responses (4–6). However, there is a lack of research examining the impact of menopause on psoriasis.

Several studies have investigated the impact of HRT on the development of psoriasis. Wu et al. conducted a prospective analysis on 163,763 female nurses and found

no significant difference in psoriasis incidence between women who had ever used HRT compared with women who had never used HRT (7). In contrast, Chan et al. analysed data from the Women's Health Initiative and found that while oestrogen HRT had a nonsignificant effect on psoriasis development vs placebo (HR 1.11 [CI 0.82–1.50]), oestrogen+progestin HRT had a significantly protective effect vs placebo (HR 0.77 [0.60–0.98]) (8). In a recent Korean nationwide population study, HRT in postmenopausal women significantly elevated the risk of psoriasis and showed a positive correlation with longer total HRT duration (9). However, there are no studies reporting the effect of HRT on existing psoriasis.

We conducted surveys in North America and East Asia to understand the patient-reported impact of menopause and HRT on women with an existing diagnosis of psoriasis. Our results provide patient-centred data that may help clinicians counsel women with psoriasis as they make the menopausal transition.

MATERIALS AND METHODS

The survey consisted of 35 questions administered to participants online. The survey asked questions about demographics, social history, menopausal history, and psoriasis history and severity. To be deemed eligible, women must have been formally diagnosed with psoriasis by a medical professional and have gone through menopause, defined as having had no menstrual bleeding for ≥ 1 year in the absence of contraception (e.g., birth control pills, intrauterine device, implant, etc.). Survey respondents were recruited from the outpatient dermatology clinics at University of California San Francisco (UCSF) in the US and Hallym University Kangnam Sacred Heart Hospital in Seoul, South Korea. In addition, an invitation to participate in research was sent by the National Psoriasis Foundation to US residents through a clinical trials virtual newsletter. This study was approved by the Institutional Review Boards of UCSF (IRB 22-36241) and Hallym University Kangnam Sacred Heart Hospital (IRB 2023-04-014). Written informed consent was obtained from all participants.

Statistical analysis

Continuous parameters were expressed as means±standard deviations, while for categorical variables, percentages were used. To analyse differences between groups, *S*tudent's *t*-test was used for continuous variables, while the χ^2 test or Fisher's exact test were used for categorical variables. Both univariate and multivariate logistic regression analyses were performed to investigate the association between demographic and clinical features of psoriasis and the effect of menopause on psoriasis. *P*-values < 0.05 were considered significant. All statistical analyses were performed using IBM SPSS Statistics (version 24.0; IBM Corp, Armonk, NY, USA).

RESULTS

Demographic data and clinical features of participants

A total of 139 participants took part in the survey study, with 110 in the US group and 29 in the South Korean group. **Table I** presents the demographic data and clinical characteristics of both groups. Several clinical characteristics showed differences between the US and South Korean groups. Body mass index, history of alcohol consumption, and comorbidities such as dyslipidaemia, anxiety, and depression were higher in the US group. Additionally, family history of psoriasis, the highest body surface area involvement of psoriasis, and histories of topical and biologic treatments were more common in the US group. Regarding psoriasis subtypes, plaque and nail psoriasis were more prevalent in the US group,

Table I. Demographic data and clinical features of psoriasis in postmenopausal women

Factor	US ($n = 110$)	South Korea ($n = 29$)	*p*-value	Total
Age	61.32±8.79	62.59±9.15	0.494	61.58±8.85
Ethnicity				
Hispanic/Latino	4 (3.6%)	0 (0%)	0.58	4 (2.9%)
Not Hispanic/Latino	106 (96.4%)	29 (100%)	0.58	135 (97.1%)
Race				
White	91 (72.0%)	0 (0%)	<0.001*	91 (65.5%)
Black	6 (4.7%)	0 (0%)	0.199	6 (4.3%)
Native Hawaiian or Other Pacific Islander	1 (0.8%)	0 (0%)	0.605	1 (0.7%)
Asian	8 (29.3%)	29 (100%)	<0.001*	37 (26.6%)
American Indian or Alaskan Native	3 (2.4%)	0 (0%)	0.369	3 (2.2%)
Other	1 (0.7%)	0 (0%)	0.605	1 (0.7%)
Fitzpatrick skin type				
I	4 (3.6%),	0 (0%)	0.297	4 (2.9%)
II	35 (31.8%)	0 (0%)	<0.001*	35 (25.2%)
III	32 (29.1%)	7 (24.1%)	0.597	39 (28.1%)
IV	26 (23.6%)	22 (75.9%)	<0.001*	48 (34.5%)
V	11 (10.0%)	0 (0%)	0.076	11 (7.9%)
VI	2 (1.8%)	0 (0%)	0.465	2 (1.4%)
Comorbidities				
Obesity	33 (43.4%)	0 (0%)	<0.001*	33 (23.7%)
Hypertension	52 (47.3%)	10 (34.5%)	0.294	62 (44.6%)
Dyslipidaemia	34 (30.9%)	1 (3.4%)	0.001*	35 (25.2%)
Diabetes	10 (9.1%)	2 (6.9%)	0.708	12 (8.6%)
Anxiety	30 (27.3%)	1 (3.4%)	0.005*	31 (22.3%)
Depression	35 (31.8%)	1 (3.4%)	0.001*	36 (25.9%)
Other	35 (31.8%)	5 (12.5%)	0.123	40 (28.8%)
None	15 (13.6%)	1 (3.4%)	0.192	16 (11.5%)
BMI	29.16±8.42	23.51±3.04	<0.001*	27.98±7.95
Smoking				
Current heavy smoker	0 (0%)	0 (0%)	NA	0 (0%)
Current mild smoker	14 (12.7%)	3 (10.3%)	1	17 (12.2%)
Former smoker	30 (27.3%)	3 (10.3%)	0.084	33 (23.7%)
Never smoker	66 (60.0%)	23 (79.3%)	0.081	89 (64%)
Alcohol	57 (51.8%)	9 (31.0%)	0.046*	66 (47.5%)
Psoriatic arthritis	11(10%)	3 (10.3%)	0.956	14 (10.1%)
Family history of psoriasis	60 (54.5%)	6 (20.7%)	0.001*	66 (47.5%)
Subtype of psoriasis				
Plaque	86 (78.2%)	10 (34.5%)	<0.001*	96 (69.1%)
Guttate	35 (31.8%)	21 (72.4%)	<0.001*	56 (40.3%)
Pustular	16 (14.5%)	4 (13.8%)	0.918	20 (14.4%)
Erythrodermic	3 (2.7%)	4 (13.8%)	0.035*	7 (5%)
Palmoplantar	21 (19.1%)	3 (10.3%)	0.268	24 (17.3%)
Inverse	26 (23.6%)	3 (10.3%)	0.117	29 (20.9%)
Nail	44 (40.0%)	2 (6.9%)	0.001*	46 (33.1%)
Unsure	6 (5.5%)	0 (0%)	0.199	6 (4.3%)
Current BSA	4.25±7.33	2.73±6.02	0.308	3.93±7.08
Worst BSA	21.62±28.85	13.14±11.94	0.018*	19.85±26.43
The history of psoriasis treatment				
Topical	102 (92.7%)	13(44.8%)	<0.001*	115 (82.7%)
Oral	57 (51.8%)	12(41.4%)	0.317	69 (49.6%)
Biologics	68 (61.8%)	11(37.9%)	0.021*	79 (56.8%)
Phototherapy	44(40.0%)	13(44.8%)	0.638	57 (41%)
None	1(0.9%)	0 (0%)	1	1 (0.7%)

BMI: body mass index; BSA: body surface area; NA: not applicable; *$p < 0.05$.

while guttate psoriasis was more common in the South Korean group.

Effect of menopause on psoriasis and treatment

The mean age at menopause onset was 46.45 ± 9.03 in the US group and 50.10 ± 6.15 in the South Korean group ($p = 0.042$). In the combined group, natural menopause was reported in 71.2% of respondents, surgical menopause in 22.3%, and medical menopause in 2.2%.

In terms of the effect of menopause on psoriasis, in the combined group, 10.1% said menopause caused psoriasis, 33.1% said it worsened it, 2.2% said it improved it, and 41.7% said it had no effect. However, there were differences between the two groups, with the frequency of psoriasis causation with menopause being higher in the US group ($p = 0.043$), while no change with menopause was more common in the South Korean group ($p < 0.001$).

In terms of the effect of menopause on psoriasis treatment, in the combined group, 12.2% of respondents reported they started new treatment for psoriasis, 2.2% discontinued psoriasis treatment, 12.2% changed psoriasis treatment, and 73.4% said menopause had no effect on treatment (**Table II**). Among the women who reported that their psoriasis was worsened by menopause ($n = 46$), 13.6% started a new therapy, 2.5% discontinued therapy, and 12.3% changed therapy. Of the women who reported that their psoriasis was caused by menopause ($n = 14$), 28.6% started new therapy and 7.1% changed therapy.

Effect of hormone replacement therapy on psoriasis and treatment

A total of 29 participants reported receiving HRT. Regarding the type of HRT, in the combined group, 62.1% received oestrogen only, 3.4% received progestin only, 20.7% received a combination of oestrogen and progestin, and 13.8% were unsure.

Table II. Effect of menopause on psoriasis and treatments

Factor	US ($n = 110$)	South Korea ($n = 29$)	p-value	Total
Age at menopause onset	46.45 ± 9.03	50.10 ± 6.15	0.042*	47.22 ± 8.62
Cause of menopause				
Natural	74 (67.3%)	25 (86.2%)	0.045*	99 (71.2%)
Surgical	27 (24.5%)	4 (13.8%)	0.316	31 (22.3%)
Medical	3 (2.7%)	0 (0%)	1	3 (2.2%)
Other	6 (5.5%)	0 (0%)	0.344	6 (4.3%)
Effect of menopause on psoriasis				
Caused the development	14 (12.7%)	0 (0%)	0.043*	14 (10.1%)
Worsened	39 (35.5%)	7 (24.1%)	0.249	46 (33.1%)
Improved	2 (1.8%)	1 (3.4%)	0.591	3 (2.2%)
No effect	37 (33.6%)	21 (72.4%)	< 0.001*	58 (41.7%)
Other	18 (16.4%)	0 (0%)	0.02*	18 (12.9%)
Effect of menopause on psoriasis treatments				
Started	14 (12.7%)	3 (10.3%)	1	17 (12.2%)
Discontinued	3 (2.7%)	0 (0%)	1	3 (2.2%)
Changed	15 (13.6%)	2 (6.9%)	0.525	17 (12.2%)
No effect	78 (70.9%)	24 (82.8%)	0.243	102 (73.4%)
History of using HRT	22 (20.0%)	7 (24.1%)	0.626	29 (20.9%)

HRT: hormone replacement therapy; *$p < 0.05$.

Regarding the effect of HRT on psoriasis, in the combined group, 62.1% reported no effect, 3.4% that menopause caused psoriasis, 3.4% said it worsened it, 13.8% said it improved it. The frequency of no effect of HRT on psoriasis was higher in the South Korean group than in the US group ($p = 0.026$).

Similarly, regarding the effect of HRT on psoriasis treatment, in the combined group, no individuals reported starting new treatment for psoriasis, 3.4% discontinued psoriasis treatment, 6.9% changed psoriasis treatment, and 89.7% said menopause had no effect on treatment (**Table III**).

Examination of factors associated with worsening of psoriasis with menopause

Overall, in both groups combined, menopause worsened psoriasis in 33.1% (46/139) of cases. We examined whether any demographic, clinical, or behavioural factors were associated with psoriasis worsening at menopause. Significant associated factors in univariate analysis were obesity (OR 2.66 [95% CI 1.14–6.22], $p = 0.024$), alcohol consumption history (OR 0.41 [95% CI 0.19–0.92], $p = 0.030$), older age (OR 0.95 [95% CI 0.90–0.995], $p = 0.030$), and Asian race (OR 0.39 [95% CI 0.16–0.94], $p = 0.036$) (Table SI). However, in multivariate analysis, only alcohol consumption history remained significant (OR 0.19 [95% CI 0.06–0.59], $p = 0.004$) (Table SII).

DISCUSSION

This study examined two groups of postmenopausal women with psoriasis from the US and South Korea. Interestingly, there were differences in the clinical features of these two groups. A family history of psoriasis was significantly higher in the US group (54.5%) compared with the South Korean group (20.7%), consistent with prior reports (10–12). Plaque psoriasis was significantly

Table III. Effect of hormone replacement therapy on psoriasis and treatments

Factor	US ($n = 22$)	South Korea ($n = 7$)	p-value	Total
Type of HRT				
Oestrogen only	14 (63.6%)	4 (57.1%)	1	18 (62.1%)
Progestin only	1 (4.5%)	0 (0%)	1	1 (3.4%)
Combination oestrogen/progestin	6 (27.3%)	0 (0%)	0.289	6 (20.7%)
Unsure	1 (4.5%)	3 (42.9%)	0.034*	4 (13.8%)
Effect of HRT on psoriasis				
Caused the development	1 (4.5%)	0 (0%)	1	1 (3.4%)
Worsened	1 (4.5%)	0 (0%)	1	1 (3.4%)
Improved	4 (18.2%)	0 (0%)	0.546	4 (13.8%)
No effect	11 (50%)	7 (100%)	0.026*	18 (62.1%)
Other	5 (22.7%)	0 (0%)	0.296	5 (17.3%)
Effect of HRT on psoriasis treatments				
Started	0 (0%)	0 (0%)	NA	0 (0%)
Discontinued	1 (4.5%)	0 (0%)	1	1 (3.4%)
Changed	2 (9.1%)	0 (0%)	1	2 (6.9%)
No effect	19 (86.4%)	7 (100%)	0.557	26 (89.7%)

HRT: hormone replacement therapy; NA: not applicable; *$p < 0.05$.

higher in the US group (78.2%) than in the South Korean group (34.5%), while guttate type was significantly higher in the South Korean group (72.4%) compared with the US group (31.8%). This may be due to the fact that, in Asians, a distinct phenotype known as "small plaque psoriasis" has been reported, which might be reported by some patients as guttate psoriasis (12–14). Regarding comorbidities, obesity, dyslipidaemia, depression, and anxiety were significantly higher in the US group compared with the South Korean group. For psoriasis treatment history, biologic treatment history was significantly higher in the US group (61.8%) compared with the South Korean group (37.9%), which may reflect differences in insurance systems between the two countries, with stricter criteria for biologics coverage in Korea than in the US. Finally, alcohol consumption history was significantly higher in the US group compared with the South Korean group. Alcohol has been linked with severity of psoriasis (15). Differences in psoriasis severity, higher prevalence of psychiatric problems, and cultural differences between the West and East regarding access to alcohol may contribute to higher frequency of alcohol intake in the US group. Taken together, these differences in clinical characteristics between these two transcontinental groups may reflect genetic and environmental differences.

Menopause is a complete cessation of a woman's menstrual cycle, which begins on average between the ages of 45 and 55 (16). In the postmenopausal period, serum oestrogen levels decline by 85–90% from the average premenopausal level (17). The effects of menopause on psoriasis are not fully understood and the findings of the effect of menopause on psoriasis are conflicting. Mowad et al. reported that among 63 menopausal women, psoriasis worsened in 48% of cases, 50% had no change, and 2% responded with improvement (18). An observational study conducted by Wu et al. revealed no significant relationship between menopausal status and psoriasis (7). In 2024, Xiao et al. (19) indicated that later age at natural menopause and prolonged reproductive years were significantly associated with a lower risk of late-onset psoriasis. In our study, 10.1% reported menopause caused psoriasis, 33.1% said it worsened it, and 41.7% responded it had no effect in the combined group. However, patient survey responses regarding the effects of menopause on psoriasis showed some differences between the US and South Korean groups. Patients reported that psoriasis was more frequently caused by menopause in the US group, while no change with menopause was more common in the South Korean group. Although studies with larger patient populations are needed, differences in genetic predisposition, biological responses, environmental factors, and lifestyle between the two groups may influence how menopause affects psoriasis.

Notably, our study sought to investigate demographic and clinical factors associated with worsening effects of menopause on psoriasis. In univariate analysis, obesity, alcohol consumption, age, and Asian race showed the significant association with exacerbation of psoriasis. However, after adjusting confounding factors using multivariate analysis, only alcohol consumption history showed a significant correlation with deterioration of psoriasis. Interestingly, alcohol consumption was found to be a protective factor against worsening psoriasis. Previous research has demonstrated that alcohol, in moderate amounts, is associated with increased oestrogen levels in postmenopausal women. Those individuals engaged in moderate alcohol consumption had significantly higher oestradiol levels compared with those abstaining (20). Therefore, it is possible that alcohol may have an effect on oestrogen levels and alter the course of psoriasis. Further research will be necessary for confirmation of this finding.

The decrease in oestrogen associated with the menopausal transition is considered to be the most important factor affecting the course of psoriasis. The molecular mechanism of oestrogen's effect on psoriasis is still unclear, but it is suggested that it may be due to its immunomodulating effect. An *in vitro* study using normal human keratinocytes demonstrated that generation of chemokines, including RANTES and CCL-2, is suppressed by oestradiol (21,22). In a murine model, oestradiol-mediated inhibition of Th1/Th17, differentiation was found via oestrogen receptor alpha in T cells (23). Ovariectomized mice presented with aggravated psoriatic inflammation, including elevated production of IL-17A and IL-1β, which was abrogated by exogenous oestradiol. Oestradiol inhibited the production of IL-1β by neutrophils and macrophages in mice and by neutrophils in humans (24).

HRT is used in combination with oestrogen and progestin in women with an intact uterus, or oestrogen alone in women who have had a hysterectomy at or after the onset of menopause. Although HRT remains a rational option for the treatment of moderate to severe menopausal symptoms, menopausal hormone therapy has a complicated pattern of risks and benefits. HRT has been shown to reduce fractures and diabetes in postmenopausal women. However, HRT is linked to an increased risk of venous thromboembolism, coronary heart disease, stroke, and invasive breast cancer (25). The effects of HRT in psoriasis are not well understood, and the studies are limited. In our study, the majority of participants stated that HRT had no effect on the course of psoriasis or the treatment of psoriasis. In a previous study, the majority of 63 postmenopausal women with psoriasis responded that HRT had no effect on psoriasis (18), consistent with our finding.

Limitations

Due to the limitations of a retrospective study, there may be selection bias and recall bias. In addition, causal relationships are limited by the study design, and some

results should be interpreted with caution. The two groups in this study may not be fully representative of the population.

Conclusion

In summary, this study showed that menopause is likely to have a neutral to negative effect on psoriasis, with very few women reporting improvement of psoriasis after menopause. However, despite the worsening of psoriasis in some women with menopause, the large majority of women did not need to modify their psoriasis treatment plan after menopause. HRT was found to have no effect on the course of psoriasis in the majority of cases. Alcohol consumption was found to be a protective factor against exacerbations of postmenopausal psoriasis.

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The authors have no conflicts of interest to declare.

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