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The Effect of Complementary Prana Therapy on Serotonin Levels, Perceived Stress Scale (PSS) Scores and Psoriasis Area and Severity Index (PASI) Scores of Psoriasis Vulgaris Patients

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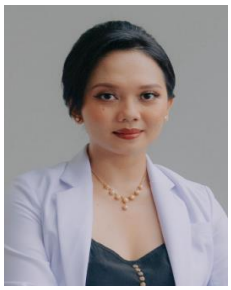

Keywords

complementary therapy;
perceived stress scale;
prana;
psoriasis vulgaris;
serotonin;

Abstract

Psoriasis vulgaris is a skin problem that has become a global concern with an increase in new cases reaching around 150,000 cases each year. This condition certainly reduces the quality of life and increases the patient's anxiety regarding the disease they are experiencing. This research was conducted to examine the effect of pranic complementary therapy on serotonin levels, Perceived Stress Scale (PSS) scores and Psoriasis Area and Severity Index (PASI) scores in psoriasis vulgaris patients. Experimental research using a single-group pre-test and post-test study design approach was carried out on 17 patients with psoriasis vulgaris. The resulting data was then analyzed using SPSS. This study showed that there was a significant decrease between pre and post-therapy serotonin levels with a mean difference of 44.69 ng/ml (p=0.002). Providing pranic therapy can also reduce the severity of psoriasis through (PASI) by 2.92 ± 3.82 (p = 0.006; 95% CI = 0.95-4.89). Meanwhile, prana was also found to reduce the stress index (PSS) by 3.88 ± 4.54 (p = 0.003; 95% CI = 1.10-6.21). Complementary pranic therapy affects serotonin levels, Perceived Stress Scale (PSS) scores and Psoriasis Area and Severity Index (PASI) scores in psoriasis vulgaris patients.

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Contents

1 Introduction

Psoriasis is a skin disorder that has become a global concern reaching 60 million cases in adults and children. Men and women have the same prevalence of cases with the average onset of psoriasis being 33 years of age. The number of cases found in various countries in the world such as Europe and North America, the incidence of psoriasis reaches 2% of the total population, and psoriasis cases are expected to continue to increase every year, even reaching 150,000 new cases. Especially in Indonesia, the prevalence of psoriasis was found to be 2.5% of the total population and most of this population has not received treatment (Dewi & Indira, 2018; Krisnarto et al., 2017; Parisi et al., 2013).

Psoriasis is a skin lesion with an erythrosquamous appearance and is characterized by primary lesions in the form of erythematous, circumscript plaques and covered by secondary lesions in the form of silvery-white scales. This condition is based on the process of keratinocyte proliferation and differentiation which is mediated by the inflammatory process in the epidermis and dermis structures of the skin. Antigen-presenting cells (APC) and also an increase in T helper 1 lymphocyte cells resulting in the synthesis of pro-inflammatory cytokines consisting of IL-1, IL-6, and IL-10, Tumor Necrosis Factor-α (TNF-α) and also interferon -Ɣ. Pro-inflammatory cytokine mediation triggers the release of various growth factors such as vascular endothelial growth factor (EVGF), epidermal growth factor (EGF), and nerve growth factor (NGF), causing keratinocyte proliferation and accompanied by inflammation (Griffiths et al., 2021; Rendon & Schäkel, 2019). Various factors can influence psoriasis exacerbations such as trauma, drugs, infections, and stress. In particular, psychological stress was found to be a trigger factor for the onset of psoriasis in 44% of patients and caused exacerbation of skin lesions, even reaching 88% of psoriasis patients (Woźniak et al., 2021).

Psychological stress and mood disorders experienced by a person are directly related to serotonin which is mediated through various receptor subtypes so that cortisol can activate pro-inflammatory cytokines as a stress response. This condition is associated as a risk factor for the occurrence of psoriasis (Thungady et al., 2020). One method that can be applied to regulate psychological stress conditions is the application of complementary pranic therapy. Complementary pranic therapy can be defined as the art, science, and technology of healing based on subtle energy originating from within the body or what is called prana (Sui, 2004).

Case-control studies show that serotonin levels influence inflammatory mediators, especially TNF-α, which plays an important role in pathogenesis through activation of serotonin receptors. If there is a decrease in serotonin due to psychological stress, it can trigger increased activation of pro-inflammatory cytokines which can trigger psoriasis. Another study that examined the relationship of complementary pranic therapy to reduce anxiety levels in elderly patients after COVID-19 found a decrease in Geriatric Anxiety Inventory (GAI) scores with a p-value <0.000 and when compared between the case and control groups before and after therapy, a decrease in levels was found anxiety with a statistically significant p-value of 0.006 (<0.05) (Diniari et al., 2023). Thus, by regulating stress through complementary pranic therapy, it is hoped that it can increase serotonin levels in psoriasis patients (Wardhana et al., 2019a). However, information regarding pranic complementary therapy and its impact on psoriasis vulgaris is still limited. Thus, this research was conducted to provide the effect of pranic complementary therapy on serotonin levels, Perceived Stress Scale (PSS) scores, and Psoriasis Area Severity Index (PASI) in psoriasis vulgaris patients.

2 Materials and Methods

This study design is an experimental study with a single group pre-test and post-test approach carried out at the Dermatology and Venereology Polyclinic and Pranic Healing Polyclinic, RSUP Prof. Dr. I.G.N.G. Ngoerah for nine months, namely from February 2023 to October 2023. Materials used in this study include PSS questionnaires, human serotonin ELISA kits, EDTA tubes, microtubes, multichannel pipettes, and a guidebook of pranic complementary therapy.

Participants involved in this study were patients who met the inclusion criteria including being aged 18-65 years, meeting the criteria for a clinical diagnosis of psoriasis vulgaris, not having received treatment from certain biological agents, good general condition, willing to take pranic complementary therapy, and willing to take part as a research participant by filling out informed consent. Researchers also applied exclusion criteria in the form of patients with acute or chronic infectious diseases, who were pregnant or breastfeeding, patients who had taken basic therapy for psoriasis vulgaris (such as systemic anti-inflammatory agents) for at least the last four weeks, patients who had taken anti-malarial agents for at least four weeks. in the last week, patients who consumed alcohol in the last four weeks, patients who were active smokers, patients with immune system disorders, and patients with psychological disorders (Zhang et al., 2016).

Research participants who have been selected based on inclusion and exclusion criteria will be involved in complementary pranic therapy at the Pranic Healing Polyclinic, RSUP Prof. Dr. I.G.N.G. Ngoerah. Pranic complementary therapy is carried out by two pranic healers who have mutual perceptions regarding therapeutic procedures, research activities, and objectives. Each patient will take part in complementary pranic therapy with a duration of 30 minutes, carried out twice a week for 4 weeks (a total of eight therapy sessions). Both before the first therapy session and after the last therapy session in the research period, patients will be involved in calculating PASI scores, and PSS scores, and taking venous blood samples for testing serotonin levels (Ruisoto et al., 2020).

Taking venous blood specimens to test the patient's serotonin levels begins with the vein identification stage assisted by applying a tourniquet, then continues with disinfection of the area around the target vein using an alcohol swab, puncturing the target vein with a syringe and extracting 3 cc of venous blood. The examination of serotonin levels in the specimens obtained was carried out at the Integrated Biomedical Laboratory, Faculty of Medicine, Udayana University. Serotonin level examination is carried out based on the enzyme-linked immunoabsorbent assay (ELISA) principle using reagents provided by the serotonin ELISA kit. The stress level of research participants was measured by filling out the perceived stress scale (PSS) questionnaire which was then grouped into mild (PSS score 0-13), moderate (PSS score 14-26), and severe (PSS score 27-40). The severity of psoriasis vulgaris is clinically determined according to the psoriasis area and severity index (PASI) carried out by 2-3 clinicians. Based on this procedure, the severity of the research participants' psoriasis was grouped into mild (PASI<5), moderate (PASI 5-10), and severe (PASI>10) categories.

The data analysis process was carried out with the help of SPSS for Windows version 25.0 software and used a confidence level reference of 95% ($\alpha = 0.05$). The data analysis stage begins with descriptive analysis to provide an overview of the characteristics of the research sample regarding age, gender, occupation, serotonin levels, stress levels, and PASI scores. Next, normality and homogeneity tests were carried out using the Shapiro-Wilk test and Levene test, respectively. Comparative analysis of PASI score categories, PSS, and serotonin levels was carried out using the Wilcoxon test after normality and homogeneity tests. Tests will be carried out on each data from paired variables between assessments before and after pranic complementary therapy (Easthope et al., 2000).

3 Results and Discussions

The results of the study obtained 19 samples with 2 dropout samples so the total sample in this study was 17 samples. The mean age in this study was 43.88±11.97. Based on gender, it was found that the majority of the samples were male (82.4%), while only 17.6% were female. The majority of the sample worked as private employees (57.9%), while 41.2% of them worked as civil servants, and only 5.9% worked as housewives. The

majority of the sample had no comorbidities (58.9%), while others suffered from comorbidities such as hypertension (23.5%), asthma (5.9%), type 2 diabetes mellitus (T2DM) (5.9%), and breast cancer (5.9%).

When getting Pranic Complementary Therapy, patients are also given the main therapy. As for the type of therapy, the majority received single therapy of methotrexate (58.9%), and cyclosporine (23.5%), the rest received combination therapy in the form of methotrexate with phototherapy (17.6%).

In this study, clinical disease progressivity was assessed using the PASI score, PSS psychological stress level, and serotonin levels in the body both before (pre) and after (post) administration of Pranic Complementary Therapy. From the examination results, the PASI, PSS, and serotonin scores before the intervention were 12.58 ± 8.10, 17.29 ± 3.33, and 80.63 ± 92.25 ng/ml, respectively. Of the three parameters, there was a decrease in PASI score (9.66±6.83) and PSS score (13.41±4.74), as well as an increase in serotonin levels (125.32±101.95 ng/ml) after receiving Pranic Complementary Therapy intervention. This study also evaluated the PASI score based on gender. Before being given Pranic Complementary Therapy, the PASI score in men (13.55 ± 8.35) was higher than that of women (8.06 ± 5.92), as well as the PASI score after giving Pranic Complementary Therapy.

Table 1
Sample characteristics

Sample Characteristics	N (17)
Age, years (Mean±SD)	43.88± 11.97
Gender, n(%)	
Male	14(82.4)
Female	3 (17.6)
Jobs, n(%)	
Housewife	1(5.9)
Civil servants	7(41.2)
Private employee	9(57.9)
Comorbidity, n(%)	
Asthma	1(5.9)
T2DM	1(5.9)
Hypertension	4(23.5)
Breast Cancer	1(5.9)
None	10(58.9)
Therapy History, n(%)	
Biologic	5(29.4)
Non-Biologic	12(70.6)
Type of Therapy, n(%)	
Methotrexate	10(58.9)
Methotrexate + Photo therapy	3(17.6)
Cyclosporin	4(23.5)
Pretreatment PASI Score[a], (Mean±SD)	12.58 ± 8.10
Male	13.55±8.35
Female	8.06±5.92
Posttreatment PASI Score [b], (Mean±SD)	9.66 ± 6.83
Male	10.59±6.94
Female	5.33±5.08
Pretreatment PSS Score[a], (Mean±SD)	17.29 ± 3.33
Posttreatment PSS Score[b], (Mean±SD)	13.41 ± 4.74
Pretreatment Serotonin Level[a], ng/ml (Mean±SD)	80.63±92.25
Posttreatment Serotonin Level[b], ng/ml (Mean±SD)	125.32±101.95

[a]Before Pranic Complementary Therapy, [b]After Pranic Complementary Therapy

Relationship between pranic complementary therapy and serum serotonin levels in psoriasis vulgaris patients

The mean difference between serotonin levels before and after the action was 44.69 ng/ml. In this study, there was a statistically significant increase between serotonin levels and the provision of interventions (p=0.002).

Table 2
Pretreatment vs post treatment serotonin level in psoriasis vulgaris patients with pranic complementary therapy

Serotonin level (ng/ml)[a]	Mean Difference	Standard Deviation	95% CI	*p*-value
Pre vs Post	44.69	63.36	-77.26 – (-12.11)	0.002*

[a]Wilcoxon analysis; *p-value significant (p<0.05)

The relationship of pranic complementary therapy to Psoriasis Area Severity Index (PASI) score in psoriasis vulgaris patients

In this study, there was a significant decrease between the PASI score and the intervention with a mean difference of 2.92±3.82 (p=0.006; 95%CI=0.95-4.89).

Table 3
Pretreatment vs post treatment PASI score in psoriasis vulgaris patients with pranic complementary therapy

PASI Score[a]	Mean Difference	Standard Deviation	95% CI	*p*-value
Pre vs Post	2.92	3.82	0.95 – 4.89	0.006*

[a]Paired T-test analysis; *p-value significant (p<0.05)

The relationship of pranic complementary therapy to Perceived Stress Scale (PSS) score in psoriasis vulgaris patients

In this study, there was a significant decrease between the PSS score and the intervention with a mean difference of 3.88±4.54 (p=0.003; 95%CI=1.10-6.21).

Table 4
Pretreatment vs post treatment PSS score in psoriasis vulgaris patients with Pranic Complementary Therapy

PSS Score[a]	Mean Difference	Standard Deviation	95% CI	*p*-value
Pre vs Post	3.88	4.54	1.10 – 6.21	0.003*

[a]Paired T-test analysis; *p-value significant (p<0.05)

Relationship between the provision of therapy history and the PASI score in patients with psoriasis vulgaris

In addition, this study also analyzed the relationship between therapy history and PASI Score in Psoriasis Vulgaris patients. From the results of the examination, it was found that the pre-intervention PASI score in the group that received non-biological therapy was higher than the biological group (12.96 ± 9.25 vs 11.68 ± 5.11). However, the difference between them was not significant (p=0.77). Meanwhile, the post-intervention PASI score of the non-biological therapy group was lower than the biological group (9.40 ± 7.22 vs. 10.28 ± 6.18), with the difference between the two not significant (p=0.81). These results suggest that with pre-pranic complementary therapy, patients who had a history of non-biological therapies such as immunosuppressants (methotrexate and cyclosporine) and phototherapy showed higher PASI scores. The difference in pre and

post-scores on the therapeutic history of each group is shown in Table 5. This study has not examined the relationship between pre and post-PASI scores based on therapy history variables to prana variables due to lack of samples.

Table 5
Relationship between the provision of therapy history and the PASI score in patients with psoriasis vulgaris

PASI Score[a]	Non-Biologic therapy	Biologic therapy	95% CI	*p*-value
Pre	12.96 ± 9.25	11.68 ± 5.11	-8.18 – 10.76	0.77
Post	9.40 ± 7.22	10.28 ± 6.18	-8.86 – 7.12	0.81

[a] Unpaired T-test Analysis

Multivariate analysis of pranic complementary therapy on PSS Score, PASI Score, and serotonin level in psoriasis vulgaris patients

After bivariate analysis, multivariate analysis was continued. Variables with a p-value ≤ 0.25 will continue with multivariate analysis. From the results of multivariate analysis, it was found that pranic complementary therapy could affect the PASI Score by 0.4% while 99.6% was influenced by other variables. Likewise with other variables such as a decrease in PSS score which is influenced by the provision of Pranic Complementary Therapy by 9.4%, while 90.6% is influenced by other variables. The increase in serotonin levels can be influenced by prana therapy by 5.4%, while the other 94.6% is influenced by other variables. For this reason, due to its minimal effect on PASI scores, PSS, and serotonin levels, Pranic Complementary Therapy cannot influence these variables independently (p>0.05). This indicates that besides pranic complementary therapy, other factors affect PASI scores, PSS scores, and serotonin levels.

Table 6
Multivariate Analysis

Variables [a]	R^2	*p-value*
PASI Score	0.004	0.819
PSS Score	0.094	0.231
Serotonin level (ng/ml)	0.054	0.370

[a]Linear regression, * p-value significant (p<0.05)

This study succeeded in collecting 17 psoriasis patients, with an average age of 43.88 ± 11.97 years. The findings of this study are similar to research by Segar et al in 2019 in Denpasar which found that the age range of 36-45 years was the age range with the highest prevalence of psoriasis (23.2%) (Segar et al., 2019). However, different results were found in research by Boham et al in 2016 at RSUP Prof. Dr. Kandou, where most cases of psoriasis were found in the age range 45-64 years, namely 50.53% of cases (Boham, Suling, & Pandaleke, 2016). Psoriasis can appear in all age ranges, but most often occurs in the 50-69 year age range. Although it can be found across the age range, the clinical picture and severity of psoriasis can differ depending on the age group. Several studies have found that psoriasis can appear at two peak age points, the first in the 30-39 year age range, and the second in the 50-59 year or 60-69 year age range (Alakbarov et al., 2021). Differences in age range also influence the stress load faced by a person which increases the risk of flares or exacerbations in cases of psoriasis. Several previous studies have shown that younger psoriasis patients (16-18 years) generally have lower stress levels compared to adult psoriasis patients (Mrowietz, 2018).

This difference in age range influences the clinical picture of psoriasis patients. Pediatric psoriasis patients generally arrive more often with plaque psoriasis, while adult patients generally present with guttate psoriasis (As'ad Naufal et al., 2021). However, in this study, all of the patients collected had plaque psoriasis. So in this study, we found differences in variability in the types of psoriasis lesions, where there were no cases of guttate psoriasis or other types of psoriasis other than plaque psoriasis. In research conducted by Yudistira

et al, all patients at Buleleng District Hospital in the period 2012 - 2013 were classified as psoriasis vulgaris (Yudistira & Wiraguna, 2014). In line with research conducted by Alverina et al which reported that the majority of types of psoriasis in West Nusa Tenggara in 2016 - 2020 were psoriasis vulgaris (75%), followed by guttate psoriasis (12.1%), scalp psoriasis (7.1%), erythroderma (5%), and psoriasis inverse (0.7%) (Alverina, Hidajat, Hendrawan, & Medikawati, 2021). Another research was conducted by Budianti et.al at the Dr. National Central General Hospital. Cipto Mangunkusumo (RSCM) for the period October 2017 - September 2018 found the most types of psoriasis, namely psoriasis vulgaris at 73%, erythroderma at 9%, and guttate psoriasis at 9% (Budianti et al., 2019). In line with several previous studies, research conducted at Dr Soetomo Hospital saw the majority of patients diagnosed with psoriasis vulgaris (77.3%) (Agustina et al., 2020).

Based on gender, this study found that the proportion of male patients was greater than female, namely 82.4% of patients were male, and only 17.6% were female. The findings of this study are in line with the findings of Segar et al.'s 2019 study in Denpasar which found that 63.4% of psoriasis patients were male (Segar et al., 2019). A similar thing was also found in research by Boham et al in 2016 at RSUP Prof. Dr. Kandou, where with a psoriasis prevalence of 5.26%, the majority of cases are male (57.98%) (Boham et al., 2016). The higher incidence of psoriasis found in male patients could be because male patients are generally more frequently exposed to risk factors that trigger psoriasis such as trauma. Apart from that, male patients are also often faced with a higher stress burden than women (Boham et al., 2016). The finding of a higher incidence of psoriasis in men carries a higher risk of morbidity in the form of sexual dysfunction compared to female patients. El-Mawla et al. (2018), research found that the prevalence of erectile dysfunction in psoriasis patients was found to be higher than in the control group. This certainly creates a burden of stress and reduces the quality of life of male psoriasis patients (Abd El-Mawla et al., 2018). However, inverse results were found in those conducted by Alverina et al., in West Nusa Tenggara who found that the proportion of psoriasis patients was greater in women (52.1%), compared to men (47.9%). This is associated with women being more concerned with their appearance, thereby increasing their desire for treatment, apart from environmental factors or stress factors which can also support this incident (Alverina et al., 2021).

Gender differences in psoriasis patients also provide different presentations of psoriasis. Although the incidence, prevalence, and clinical features of psoriasis between the two sexes are relatively similar, genetic exposure and environmental factors cause differences in psoriasis presentation. In general, female patients have a lower level of psoriasis severity as assessed by PASI (Guillet et al., 2022). In line with the findings in this study, the mean PASI score of male patients (13.55) was higher than that of female patients (8.06). Similar results were also found in research conducted by Hagg et al who reported that the median PASI score in 5,438 psoriasis patients in Sweden was higher in men (7.3) than in women (5.4). This difference is statistically significant ($p<0.001$) (Hägg et al., 2017). Similar findings were found in research conducted in China. This study found that the majority of median PASI scores for men were higher (8.2) than for women (5.5). This difference is statistically significant ($p=0.001$) (Chen et al., 2023). However, the results of this study are slightly different from findings in Germany and Switzerland which found that women's PASI scores were higher than men's (Maul et al., 2021).

In addition to stress and environmental factors, biologically female sex hormones, especially estrogen, can have beneficial effects on skin, water binding capacity, and wound healing. For example, the use of transdermal estrogen in perimenopausal women can increase the water storage capacity of the skin, potentially improving the barrier function of the stratum corneum. Apart from that, female sex hormones also influence the manifestation of the disease and the severity of psoriasis. High estrogen levels, as seen in pregnancy, and an increased estrogen-to-progesterone ratio are positively correlated with improvement in psoriasis. This has also been proven in several studies which report improvement of psoriasis during pregnancy in around 50% of psoriasis patients. This could be because low estrogen levels are associated with a dominant Th1 cell immune response and pro-inflammatory cytokines, and estrogen is a negative regulator of tumor necrosis factor (TNF), which plays an important role in the pathogenesis of psoriasis (Guillet et al., 2022).

Based on therapy history, 70.6% of patients in this study were still receiving non-biological therapy, while the remaining 29.4% had received biological therapy. This could also influence the research results because most of the study respondents received non-biological therapy. Previous research showed that 46 patients received biologic therapy, 12 patients received non-biologic systemic therapy, and 18 patients used a

combination of both. The initial Simple-Measure for Assessing Psoriasis Activity (S-MAPA) in patients on biologic therapy was 74, while the S-MAPA of patients on non-biologic systemic therapy was 62.25. At week 24, S-MAPA increased by 70.2% in patients on biologic therapy, whereas patients treated with non-biologic systemic therapy only increased by 40.4% (P<0.05). So it is stated that biological therapy shows superior results compared to non-biological systemic therapy in patients with moderate to severe psoriasis (Au et al., 2013). In a cohort study, no significant difference was found in the efficacy of administering biologic therapy versus non-biologic therapy. However, in elderly patients, a higher incidence of side effects was found with non-biological treatment compared with biological treatment (P=0.033) (Garber Ba et al., 2015).

Conventional therapy for psoriasis includes the administration of corticosteroids, vitamin D analogs, calcineurin inhibitors, methotrexate, cyclosporine, acitretin, phototherapy, and biological agent therapy. This therapy can be administered topically or systemically and utilizes the effects of phototherapy. Along with the development of research regarding the effects of biological agents on psoriasis, several therapeutic options have developed, such as T cell inhibitors (alefacept and efalizumab) and TNF-a inhibitors (adalimumab, etanercept, and infliximab). The administration of biological agents is generally directed at patients with moderate to severe psoriasis with mild side effects when compared with conventional therapy. However, the administration of biological agents still requires close monitoring to prevent unexpected side effects (Dewi, 2021).

In this study, the majority of the sample did not have comorbidities (58.9%), while others suffered from comorbidities such as hypertension (23.5%), asthma (5.9%), T2DM (5.9%), and breast cancer (5.9%). The increased incidence of cardiovascular disease in psoriasis patients usually takes the form of hypercholesterolemia, and metabolic syndrome, including hypertension, dyslipidemia, obesity, and diabetes mellitus. Mechanistic studies suggest that chronic inflammatory processes trigger earlier formation of atherosclerosis through shared immunopathogenic mechanisms in psoriasis patients (Takeshita et al., 2017). The incidence of allergic diseases such as allergic rhinitis, atopic dermatitis including asthma can also increase the risk of psoriasis. A cohort study in Korea showed that asthma patients had a 4 times greater risk of developing psoriasis compared to healthy controls. Asthma was previously thought to be a Th2-driven disease. However, it is now known that Th17 cells and neutrophils contribute to inflammation in asthma. Asthma, especially the IL-17-high subtype, is associated with bronchial epithelial dysfunction, up-regulation of antimicrobial responses, and activation of IL-1β, IL-6, IL-8, and β-defensins, similar to the immunophenotype of psoriasis. Such shared immunological mechanisms support the association between the two diseases (Han et al., 2021). Malignant diseases are also associated with psoriasis. A case-control study with a total of more than 12 thousand respondents showed that the five types of cancer currently found to be associated with psoriasis are breast cancer, prostate cancer, lung cancer, melanoma, and lymphoma. This is by the findings of this study that there were patients with comorbid breast cancer. The increased risk of psoriasis in cancer patients is associated with long-term exposure to chemotherapy drugs which will affect the immune system (Fiorentino et al., 2017).

In this study, a comparative analysis was not carried out between the history of therapy, current use of therapy, and comorbidities with the condition of psoriasis patients because the sample size did not meet the requirements for a comparative bivariate test.

Until now there has been no specific research examining the effect of providing pranic complementary therapy with increasing serotonin levels in psoriasis vulgaris patients. This shows that this research is the first research to examine this topic. This study found that there was an increase in serotonin levels from 80.63±92.25 ng/ml to 125.32±101.95 which was statistically significant (p=0.002; 95%CI=-77.26 – (-12.11)). Normal serum serotonin levels in female individuals are 80-450 ng/ml, while in men it is 40 – 400 ng/ml (Diagnostika, 2013). Another study at Sanglah General Hospital Denpasar in 2016 - 2017 classified serotonin levels in psoriasis patients into low levels if <141 ng/ml and normal levels if ≥141 ng/ml. This cut-off has a sensitivity value of 94% and a specificity of 64% in psoriasis cases (Wardhana et al., 2019a).

Research by Rajagopal et al. applying pranic complementary therapy to patients experiencing moderate to severe depression with a double-blinded randomized controlled trial research design. There was a significant difference in the Hamilton Depression Rating (HAM-D) score in the group that received pranic complementary therapy compared to the control (p=0.002). The study showed that 100% of depressed patients experienced improvement after receiving medication with a combination of complementary pranic therapy. Depressed

people have a depleted and inactive base chakra. In Chinese medicine, the root chakra corresponds to an acupuncture point which in Sanskrit is called Mooladhara Chakra. In this study, the application of complementary pranic therapy to the root chakra was one of the important steps that improved the results of therapy (Rajagopal et al., 2018). The serotonin theory related to depression states that a decrease in serotonin signalling is the pathophysiology of major depressive disorder. A decrease in the amount of neurotransmitters serotonin, norepinephrine, and dopamine in the central nervous system is associated with depression due to monoamine deficiency (Shatri, 2023).

Another study by Astuti et al applied complementary pranic therapy to primigravida third-trimester pregnant women for 30 minutes, once a week and carried out for 3 weeks. These results show decreased stress and anxiety values, as well as improved physical condition. Research by Rasmana et al. found stress levels significantly decreased (p=0.001) in 30 people with carcinoma who applied pranic complementary therapy (Rasmana, 2021). Healing in complementary pranic therapy can occur due to emotional stabilization by resetting the flow of energy (chi) through the chakras in the human body. Chakras that have been activated with complementary pranic therapy reach prime condition so they can distribute energy better (Astuti et al., 2019). There are no studies that provide a direct correlation between pranic complementary therapy and serotonin levels in psoriasis vulgaris patients. However, many studies have linked pranic complementary therapy to stress levels, which can also be found in psoriasis vulgaris patients. The stages of carrying out complementary pranic therapy in cases of stress or anxiety are to do a general sweeping three times, then do a local sweeping on the crown chakra, ajna chakra, heart chakra, and solar plexus chakra then energize with prana. Observe the patient again to stabilize and release the projected energy. Repeat this three times a week to speed up the patient's recovery and should be accompanied by medical therapy as well as counselling by finding out the biggest stressors and staying away from things that make the patient stressed (Nurjanah, 2017).

Currently, several studies have proven that psychological and neuroendocrine stress can influence the immune response with clinical manifestations such as atopic dermatitis, alopecia, acne vulgaris, psoriasis, and others. Serotonin is known as a neurotransmitter in the central nervous system and is involved in many processes including cognition, memory, and responding to psychological stress. Psychological stress can reduce serotonin synthesis influence many immunological processes and cause a decrease in proinflammatory cytokines such as tumor necrosis factor (TNF-α) (Wardhana et al., 2019a). Serum peripheral serotonin was increased in psoriasis cases but was found to decrease after treatment. It was also found that serotonin levels increased in acute psoriasis, and only increased in psoriasis patients with anxiety. The expression of serotonin and its receptors in psoriatic skin lesions is increased compared with normal skin, thereby facilitating the development of psoriasis by promoting keratinocyte proliferation and acting as inflammatory mediators. In addition, there was also an increase in serotonin transporter (SERT) expression in inflammatory cells, such as dendritic cells in the psoriasis epidermis, and a positive correlation was found between the severity of psoriasis and the number of SERT-positive dendritic cells, indicating that SERT regulation has a role in the development of psoriasis (Minxue et al., 2021).

Serotonin levels can be influenced by various things, including biopsychosocial and cultural aspects. In a biological aspect, serotonin is involved in human behavior by modulating the excitability and plasticity of neurons (Stockmeier, 2003). Serotonin is produced by less than 0.1% of brain neurons mainly located in the dorsal raphe nucleus (DRN), but is released widely throughout the brain. In the synaptic cleft, serotonin can interact with various types of receptors that can be influenced by chemical affinity, cellular effects, and other biological conditions (Maximino, 2022; Salvan et al., 2023). In psychosocial and cultural aspects, serotonin levels can change along with changes in the patient's psychological condition which is influenced by social support or rejection, support from friends and family, and local culture, including the stigma of an illness (Babalola et al., 2017; Preller et al., 2016).

Until now there has been no specific research examining the effect of providing pranic complementary therapy on reducing PSS scores in psoriasis vulgaris patients. This shows that this research is the first research to examine this topic. This study found that there was a decrease in the PSS score of 3.88 ± 4.54 points, which was statistically significant (p = 0.003; 95% CI = 1.10-6.21).

These results are from several previous studies. Nittur et al's 2023 study examined the effects of pranic complementary therapy in reducing stress and improving clinical outcomes in patients with diabetic foot ulcers. This study involved a total of 30 patients with diabetic foot ulcers who were divided into two groups,

namely the intervention group who received complementary pranic therapy for 5 weeks, and the control group who only received standard diabetes therapy. The complementary pranic therapy given is carried out for 50 - 60 minutes every day and is carried out in a blinded manner. The results of this study found that 76.92% of patients given pranic complementary therapy showed lower levels of stress, compared to only 22.22% of patients in the control group (Nittur et al., 2023).

Another study by Astuti et al in 2019 examined the effect of providing pranic complementary therapy on stress levels in third-trimester primigravid women. This research involved 42 research samples divided into two groups, namely control and intervention. The intervention group received complementary pranic therapy for 30 minutes once a week for 3 weeks. Stress levels were measured using a Gas Discharge Visualization (GDV) camera once a week for 4 weeks. The results of this study showed that there was a significant improvement in stress levels in the group that received complementary pranic therapy (p=0.001), while in the control group, there was no significant change (p=0.164) (Astuti et al., 2019).

Castellar et al's 2014 research examined the effect of providing complementary pranic meditation therapy on the mental health and quality of life of breast cancer patients. One of the components assessed in this research is physical stress. This research succeeded in collecting 75 samples of breast cancer patients who were given pranic therapy for 20 minutes, twice a day for 8 weeks. This research found that there was an increase in mental health parameters in the form of physical stress (p=0.001) after being given complementary pranic therapy (Castellar et al., 2014).

The concept of pranic complementary therapy is rooted in Yoga principles but uses different techniques. Complementary pranic therapy is practised by sitting in stasis, using effort to focus attention to calm the mind and achieve inner calm. This condition allows people who undergo prana to be able to control their ability to surrender, concentrate, balance, and direct prana and use it to improve and maintain the health of their body (Castellar et al., 2014).

Several mechanisms can explain the effect of pranic complementary therapy on improving the stress levels of patients who undergo it. By focusing your mind through breathing and visualization techniques you can reduce levels of anxiety, stress, and other psychological complaints. In addition, with the suggestion that patients who undergo prana can improve their health and quality of life and can practice it independently, it can increase the patient's self-confidence and the patient's hope of being able to recover and avoid excessive stress (Castellar et al., 2014).

When looking at the effect of providing pranic complementary therapy on reducing PSS scores, no consensus or research states that reducing PSS scores can be said to be effective. This is related to the characteristics of the PSS questionnaire which is subjective based on the patient's perception of stress for one month. The PSS cannot assess cumulative stress and does not assess the quantity of a person's negative events. This causes the PSS's ability to describe the patient's cumulative stress level regarding their psoriasis condition to be limited. However, PSS has categories based on score values. Patients with a score range of 0-13 are categorized as low stress, a score of 14-26 is categorized as moderate stress, and a score of 27-40 is categorized as high stress. This can be used as a benchmark for the effectiveness of an intervention against stress based on the PSS score (Henning et al., 2020).

The PASI score is a scoring that can be used to assess the clinical condition of psoriasis patients. The PASI score consists of 3 components, namely erythema, induration, and desquamation which are calculated according to the area of the affected body surface, then totaled. Until now there has been no specific research examining the effect of providing pranic complementary therapy on reducing PASI scores in psoriasis vulgaris patients. This shows that this research is the first research to examine this topic. This study found that there was a significant decrease in the PASI score after giving the intervention by 2.92 ± 3.82 (p = 0.006; 95% CI = 0.95-4.89).

Pranic complementary therapy is a form of complementary therapy that can be used in the treatment of patients. Several previous studies have examined the effect of providing complementary therapy on improving the clinical condition of psoriasis patients. Gaston et al's 1991 study examined the effects of meditation on scalp psoriasis patients. The study conducted a randomized, observer-blind, placebo-controlled trial for 12 weeks. A total of 24 patients were divided into 4 groups, where 5 patients were in the meditation group, 4 patients were in the meditation and imagery group, 5 patients were on the waiting list, and 4 patients did not receive specific therapy. Of the total sample, 18 completed the research. It was found that there was an

improvement in the clinical condition of psoriasis patients as indicated by a decrease in skin thickness, erythema, and number of plaques on the affected skin surface area (pre: 11.5 vs. post: 9.1; p<0.01) (Gamretv et al., 2018; Gaston et al., 1991).

Another study by Zachariae et al in 1996 examined the effect of guided imagery and meditation on the severity of psoriasis. This research was an observer-blind controlled study with a total of 51 patients. Patients in the intervention group received 7 individual psychotherapy sessions over 12 weeks, while the control group received no psychotherapy. This study found a minimal but statistically significant decrease in PASI scores between the intervention group (7.4±1.6) and the control group (8.1±2.7) (Gamret et al., 2018; Zachariae et al., 1996).

Patients who practice pranic complementary therapies are also better able to absorb, concentrate, balance, and direct prana or bioenergy and use it to maintain their health. Several previous studies have found that bioenergy can provide positive biological effects such as reducing levels of inflammation, and pain, and increasing immunity so that it can be beneficial for patient diseases (Castellar et al., 2014).

Psoriasis area and severity index (PASI) is one of the assessments used to assess the severity of a person's psoriasis. An intervention is said to be effective in reducing the severity of psoriasis if a 75% reduction in the PASI score (PASI75) is found. This benchmark has been used as the benchmark endpoint in the majority of psoriasis clinical trials. However, several studies hypothesize that reducing the PASI score by 50% has provided a significant change in the quality of life of psoriasis patients (Carlin et al., 2004). In this study, there was one patient who experienced a decrease in PASI75 between the PASI scores before and after the intervention.

The results of the multivariate analysis in this study found that pranic complementary therapy could influence the PASI score by 0.4%, while 99.6% was influenced by other variables. Likewise with other variables such as the decrease in PSS scores which was influenced by the provision of complementary pranic therapy by 9.4%, while 90.6% was influenced by other variables. The increase in serotonin levels can be influenced by pranic therapy by 5.4% while the other 94.6% is influenced by other variables (p>0.05). This shows that other factors influence serotonin levels and stress levels in psoriasis patients.

In this study, there may be several external factors that influence the significance of the results, such as genetic factors, immune defects, psychology, physical trauma, history of therapy and drugs, and infections. Serotonin expression in psoriasis patients is strongly influenced by genetic factors. Serotonin biosynthesis is catalyzed by the tryptophan hydroxylase (TPH) enzyme which is coded for by two genes, namely the tph1 gene and the tph2 gene. Meanwhile, the serotonin degradation process is regulated by the enzymatic activity of monoamine oxidase. This condition causes serotonin levels in the body to be very dependent on this biosynthesis process. Furthermore, serotonin is not only produced by enterochromaffin cells in the gastrointestinal tract and serotonergic neurons in the brain but can also be secreted by lymphocytes and stored in platelets for release to inflammatory sites, causing serotonin levels to fluctuate in different inflammatory conditions (Ronpirin & Tencomnao, 2010).

In conditions of physical trauma, serotonin levels can also be affected. This is because, in inflammatory conditions resulting from an injury response, serotonin can be released to the location of the injured tissue by dendritic cells. However, under normal conditions, immature dendritic cells can inhibit the release of serotonin by platelets or mast cells to the injury site. The release of serotonin to the injury site stimulates inflammation through the 5-HT1AR receptor pathway which is associated with melanocytes, keratinocytes in the upper epidermis, and mast cells in the walls of blood vessels (Thorslund, 2012).

Furthermore, serotonin levels in the blood also depend on the body's response to emotional stress. Conditions of excessive emotional stress can trigger an increase in serotonin levels and exacerbation of psoriasis through dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, sympathetic-adrenal-medullary axis, peripheral nervous system, and immune system. In response to stress, skin cells release several neuropeptides and hormones including those that are functionally analogous to the HPA axis. The release of these inflammatory mediators then causes neurotransmitter imbalance and risks causing psychiatric disorders such as depression and anxiety (Marek-Jozefowicz et al., 2022). Serotonin levels and anxiety levels, which are influenced by several external factors, of course also influence the PASI score, causing the findings in this study to only be influenced by 0.4% by pranic complementary therapy.

Other factors that could influence the PASI score in this study are the main therapy for psoriasis vulgaris received by the entire sample during the intervention period and the comorbid conditions that some of the

sample had. When receiving pranic complementary therapy, patients also continued to receive therapy in the form of single therapy methotrexate (58.9%), cyclosporine (23.5%), and combination therapy in the form of methotrexate with phototherapy (17.6%). Suwarsa et al reported that psoriasis vulgaris patients treated with methotrexate experienced a 90% reduction in PASI (PASI90) (50%) and PASI75 (33.3%) in three months. Meanwhile, the group of patients treated with cyclosporine experienced a decrease in PASI90 and PASI75 of only 16.7% each (Suwarsa et al., 2021). Although the majority of the sample in this study did not have comorbidities (58.9%), there were samples with comorbidities such as hypertension (23.5%), asthma (5.9%), T2DM (5.9%), and breast cancer (5.9%). The clear pathogenesis of comorbidity in psoriasis vulgaris patients is still unknown; however, they are often associated with shared inflammatory pathways, cellular mediators, genetic susceptibility, and risk factors. Physicians and patients need to recognize the potential for increased risk of cardiovascular disease and other comorbidities as the duration and severity of psoriasis increase (Takeshita et al., 2017).

4 Conclusion

Based on the results of the study, several things can be concluded, namely as follows: (1) There is an increase in serotonin levels in psoriasis vulgaris patients after complementary prana therapy, (2) There is a decrease in Perceived Stress Scale (PSS) scores in psoriasis vulgaris patients after complementary prana therapy, and (3) There is a decrease in the Psoriasis Area Severity Index (PASI) score in psoriasis vulgaris patients after administering Pranic Complementary Therapy.

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