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Correlation between Vitiligo Severity and Dermatology Life Quality Index (DLQI) in Vitiligo Patients Undergoing Phototherapy at Bali Mandara General Hospital

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ABSTRACT

Introduction: Vitiligo is an autoimmune disease characterized by macule and patch depigmentation with various shaped cause by melanocyte destruction or loss of skin function. Global prevalence of vitiligo ranges from 0,5% to 2%. The Vitiligo Area Scoring Index 9VAS) is a quantitative method for assessing the severity of vitiligo by assessing the extent of lesions based on body surface area. Patients with vitiligo often experience psychological impacts, resulting reduce quality of life. A commonly used measure of quality of life is the Dermatology Life Quality Index (DLQI) questionnaire.
Objectives: to determine the correlation between vitiligo severity and the quality-of-life index in vitiligo patients undergoing phototherapy.
Material and methods: An observational analytical study was conducted at the Spectra Polyclinic, Bali Mandara Regional General Hospital, Denpasar, from June to July 2025. The study subjects were 66 vitiligo patients (36 men and 30 women). The VASI score and DLQI were then measured. Data normality was tested using the Kolmogorov-Smirnov test, followed by a Fisher's Exact correlation test ($p<0.05$).
Results: VASI score dominated by mild severity (97%), with the highest quality of life index being mildly affected (39.4%). The correlation test showed no significant correlation ($p=0.248$).
Conclusion: The severity of vitiligo can affect the psychosocial well-being and appearance of vitiligo patients, thus affecting their quality of life, but this depends on the area of lesion involved.
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Keywords: Vitiligo, VASI, DLQI

INTRODUCTION

Vitiligo is an autoimmune disease characterized by depigmented macules and patches of various shapes caused by the destruction of melanocytes or loss of skin function. Vitiligo causes several areas of the body, including the skin, hair, and mucous membranes, to appear white and colorless. Vitiligo was first known as Kilăsa in 2200 BC.[1] Vitiligo can occur at any age, with the peak age being childhood, with approximately 50% of vitiligo developing before the age of 20. The global prevalence

of vitiligo ranges from 0.5% to 2%. Studies in the United States show that black people have a higher risk of vitiligo than white people.[2] Vitiligo can affect men and women equally, but some studies show that vitiligo tends to be more prevalent in women because they are more likely to experience autoimmune diseases or be concerned about their appearance, leading them to seek advice and treatment for their complaints.[1] The estimated prevalence of vitiligo in Asia in 2016 was 0.1%, with geographical variations ranging from 0.23% in East Asia to 0.52% in South Asia.[3] The prevalence of vitiligo in Indonesia has not been previously determined. Based on medical records of vitiligo patients at the Cosmetic Division of the Dermatology and Venereology Outpatient Clinic at Dr. Soetomo General Hospital in Surabaya from 2018 to 2020, there were 115 vitiligo patients, 1.4% of all visits to the Cosmetic Division or 0.3% of all patients at the Skin and Sexually Transmitted Diseases Outpatient Clinic at Dr. Soetomo Regional General Hospital.[4] The incidence of vitiligo at the Bali Mandara Regional General Hospital Dermatology and Venereology Outpatient Clinic from January 2023 to October 2022 was 100 patients (4%) out of 2,499 visits, with more female patients (60.36%) than male patients (39.63%).[5]

The clinical signs and symptoms of vitiligo are milk-colored or white depigmented macules or patches surrounded by normal skin. Vitiligo lesions have clear borders, vary in size, and are generally asymptomatic. According to the 2012 Vitiligo Global Issues Consensus Conference (VGICC), vitiligo classification is based on clinical presentation and natural disease course, divided into non-segmental, segmental, and mixed types.[6] The goals of vitiligo therapy are to limit disease progression, induce pigmentation, and maintain pigmentation, thereby minimizing psychological stress.[7] Therapeutic modalities are selected based on the extent and location of the lesions. The Vitiligo Area Scoring Index (VASI) is a method for quantitatively assessing the severity of vitiligo by measuring the extent of lesions based on body surface area.[8]

Changes in appearance due to vitiligo can cause psychosocial stress due to the stigma associated with the disease, leading to social isolation and low self-confidence.[7] Sawitri et al. in 2023 reported a significant relationship between the severity of vitiligo and the quality of life of vitiligo patients at Dr. Soetomo General Hospital in Surabaya, where the more severe the vitiligo, the higher the quality-of-life index score. Meanwhile, a study by Mishra et al. found no association between body surface area and the quality-of-life scores of vitiligo patients, which is thought to be due to differences in characteristics and epidemiology.[9]

Patients with vitiligo often experience psychological impacts in the form of an increased risk of mental disorders, sleep disorders, and reduced quality of life.[2] A commonly used measure of quality of life is the Dermatology Life Quality Index (DLQI) questionnaire. The DLQI questionnaire consists of 10 validated questions developed by Finlay in 1994 and is used to assess the severity of several skin disorders such as vitiligo, psoriasis, acne vulgaris, and atopic dermatitis.[10]

Based on the above background, the author sought to analyze the relationship between the severity of vitiligo and the quality-of-life index of vitiligo patients undergoing phototherapy so that it could be used as a basis for holistic treatment, including psychological treatment of vitiligo patients.

MATERIALS & METHODS

This study was an observational analytical study with a cross-sectional approach. Data collection was conducted at the Spectra Polyclinic of Bali Mandara Regional General Hospital in Denpasar during the period from June to July 2025. The study subjects consisted of 66 patients, comprising 36 males and 30 females, diagnosed with vitiligo based on medical history and physical examination. The age range of the

study subjects was 16-65 years. The inclusion criteria were vitiligo patients who were willing to fill out the informed consent form and questionnaire, while the exclusion criteria were patients under the age of 16 and those who could not read (illiterate).

All patients completed the DLQI questionnaire, which contained 10 questions, and were clinically evaluated using the VASI score (Appendix 1). The quality-of-life index was classified into the following categories: no impact (0-1), mild impact (2-5), moderate impact (6-10), severe impact (11-20), and very severe impact (21-31). VASI scores of 0-10 were classified as mild, 11-20 as moderate, and >20 as severe.

The data were grouped based on variables for processing and analysis using IBM SPSS version 25 computer software. Data normality was tested using the Kolmogorov-Smirnov test to determine consistency. Descriptive statistical analysis was performed for several variables, including age, gender, education level, and vitiligo type. Fisher's Exact correlation test was performed to find the relationship between the severity of vitiligo (VASI) and the subject's quality of life index. Data were considered significant if the p-value was <0.05. The data obtained were then presented in tabular form and described.

RESULT

There were 66 patients with vitiligo who were subjects in this study. The characteristics of the research subjects were presented in categories of age, gender, education level, and type of vitiligo. The average age of the research subjects was 42.6±14.7 years, with the gender distribution slightly dominated by males (54.5%) compared to females (45.5%). The type of vitiligo was predominantly vulgaris, followed by acrofacial, focal, and segmental. The majority of the subjects had mild vitiligo (97%). The characteristics of the research subjects are presented in Table 1.

Table 1. Characteristic of samples

Characteristic	N%/MEAN±SD
Age (years old)	42,6 ± 14,7
16-25 years old	13 (19,7%)
26-35 years old	10 (15,2%)
36-45 years old	11 (16,6%)
46-55 years old	15 (22,7%)
56-65 years old	17 (25,8%)
Sex	
Male	36 (54,5%)
Female	30 (45,5%)
Education	
Elementary school	3 (4,5%)
Secondary school	2 (3%)
Senior high school	32 (48,6%)
Diploma	9 (13,6%)
Bachelor	16 (24,2%)
Master	4 (6,1%)
Type of Vitiligo	
Acrofacial	17 (25,8%)
Focal	10 (15,2%)
Mucosa	0 (0%)
Segmental	4 (6,1%)
Vulgaris	35 (53%)
Universal	0 (0%)
DLQI	
No effect	12 (18,2%)
Mild effect	26 (39,4%)
Moderate effect	22 (33,3%)
Severe effect	6 (9,1%)
Very severe effect	0 (0%)
VASI score	
Mild	64 (97%)
Moderate	2 (3%)
Severe	0 (0%)

Table 2. Normality Kolmogorov-Smirnov test DLQI and VASI score

	Kolomgorov-Smirnov
DLQI	0.00
VASI	0.00

Table 3. Corelation Fisher's Exact test between VASI and DLQI on vitiligos

		DLQI					*P*
		No effect	Mild effect	Moderate effect	Severe effect	Very severe effect	
VASI	Mild	14	26	20	6	0	0.248
	Moderate	0	0	2	0	0	
	Severe	0	0	0	0	0	

The collected data were tested for normality, with the results showing that the data were not normally distributed ($p<0.05$) (Table 2). Fisher's exact correlation analysis showed no significant correlation with a value of 0.248 ($p>0.05$) (Table 3).

DISCUSSION

Vitiligo comes from the Latin word "vitilius," which means calf, referring to the white spots found on calves.[11] Vitiligo is an autoimmune disease of the skin characterized by the selective loss of melanocytes associated with genetic predisposition, autoimmunity, and environmental factors.[12,13] The global prevalence of vitiligo is approximately 0.5-2% of the total population. Based on systematic reviews and meta-analyses, the prevalence of vitiligo in South Asia is 0.73%, West Asia 0.77%, and East Asia 0.12%. The prevalence of vitiligo in Indonesia is not yet fully known. A study at Dr. Cipto Mangunkusumo General Hospital in Jakarta in 2018 found 255 cases of vitiligo.[13] Meanwhile, the incidence of vitiligo at the Skin and Sexually Transmitted Diseases Clinic of Bali Mandara Regional General Hospital from January 2023 to October 2022 was 100 patients (4%).[5]

The average age of vitiligo patients in this study was 42.6 ± 14.7 years, with a predominance of the 56-65 age group (25.8%) followed by the 16-25 age group (19.7%). Vitiligo occurred in two categories of age onset: one-third of cases with early-onset (mean age 10.3 years) and two-thirds with late-onset (mean age 34 years). Over time, the average onset of vitiligo continues to increase, which is related to adult environmental exposure such as chemicals that induce vitiligo (hair dye, cleaning products, cosmetics, and other household products), the use of sunscreen against UV exposure to control the disease, and changes in the gut microbiome from various factors.[12] Most cases of vitiligo, about 25%, begin before the age of 12.[14] While this study is consistent with the 2020 study by Neilagh AM et al. in Iran, where late-onset vitiligo patients were more common in males. Women are said to be more dominant in early-onset vitiligo, which may be because women are more concerned about their appearance and therefore seek medical attention sooner.[15] The ratio of women to men in late-onset vitiligo is 0.83:1.[16] In line with previous studies, this study was dominated by men (54.5%) with late-onset vitiligo.[15] This study is also in line with a study in China that reported a higher incidence of vitiligo in men (0.71%) than in women (0.41%).[17] Although the incidence of vitiligo is considered to be balanced between men and women, several studies have reported a higher prevalence in women due to mental and social factors such as depression, anxiety, and social isolation.[14]

The educational level of the subjects in this study was dominated by high school graduates, accounting for 32 (48.6%) subjects. This study is in line with a study by Dewi et al. in Gianyar in 2025, which found that vitiligo patients were predominantly high school graduates.[16]

There are many hypotheses regarding the pathogenesis of vitiligo, but in general, immunological mechanisms cause the destruction of melanocytes. The pathogenesis of vitiligo can be explained based on segmental and non-segmental vitiligo types, which are also related to hypotheses such as oxidative stress, neural mechanisms, melanocytolysis, and the theory of self-destruction. Several studies also associate inflammation with other factors.[18]

Table 4. Pathomechanism of vitiligo.[7]

Genetic	• Many genetic loci such as NLRP1, PDGFRA, PTPN22, FOXD3, XBP1, CTLA-4 • Vitiligo is often associated with autoimmune diseases such as type 1 diabetes mellitus, autoimmune thyroiditis, Addison's disease, systemic lupus erythematosus, and alopecia areata.

Autoimmune	• Melanocytes communicate stress to antigen presenting cells (APCs) via exosomes, extracellular vesicles containing micro-RNA, heat shock protein 70 (hsp70) and DAMPs (damage-associated molecular patterns). • Interferon-γ production results in the activation of CXC chemokine ligands (CXCL9, CXCL10, and CXCL11) and attracts more CD8+ T cells to the vitiligo area. • Dysfunction of regulatory T cells (Tregs) and CD8+ tissue-resident memory T cells (Trm).
Oxidative stress	• Excessive production of oxidative stress markers and reduced antioxidants • UPR (unfolded protein response) components such as XBP1 cause the release of immune mediators such as IL-6/8, which produce Tregs • Significant reduction of nuclear factor erythroid 2-related factor (Nrf2) and mTORC1 (mammalian target of rapamycin complex 1) causes oxidative stress in melanocytes.
Neural	• Various neurochemicals released from nerve endings in the skin kill melanocytes and damage cells • Increased levels of norepinephrine in plasma and catecholamine catabolites in urine • Increased neuropeptide Y (NPY) in vitiligo lesions and skin periläsions

The clinical presentation of vitiligo consists of white patches or macules, which are asymptomatic, have well-defined borders, and are typically circular, oval, or linear in shape.13 Clinical signs of active lesions may include the Koebner phenomenon (new lesions in areas of skin trauma), trichrome lesions (three colors marked by normal skin color, depigmentation, and hypopigmentation), inflammatory lesions (erythema and scaling at the edges of the lesion), and confetti-like depigmentation (clustered depigmented macules).[12] Diagnosis can be aided by examination with a Wood's lamp or UVA light or “black light” in a dimly lit room, which enhances the visibility of the lesions, especially in fair skin types. Wood's lamp examination in the differential diagnosis of vitiligo, such as pigmented nevus, pityriasis alba, tinea versicolor, and other diseases, may show hypopigmentation rather than depigmentation.[12]

Vitiligo is classified into segmental and non-segmental based on clinical presentation and disease course. Acrofacial vitiligo involves the face, orifices, and extremities. Focal vitiligo is characterized by one or a few macules in a single area but without a segmental distribution pattern. Mucosal vitiligo is marked by depigmentation limited to mucous membranes. Segmental vitiligo has unilateral macules and does not cross the midline of the body, usually occurring in children. Meanwhile, vulgaris/mixed vitiligo has multiple lesions and a scattered distribution, not following a pattern.[6,19] This study was dominated by the vulgaris type (53%), followed by acrofacial (25.8%) and focal (15.2%). This study aligns with a study by Hariana et al. in Tangerang in 2024, where multiple lesions (82.92%) were more commonly found than single lesions (17.02%).[20] It also aligns with a study at Hasan Sadikin General Hospital in Bandung in 2017, which found that the most common type of vitiligo was vulgaris (77.27%). [21] A study in Yogyakarta in 2023 also showed that the vulgaris type of vitiligo was dominant compared to other types.[22]

The severity of vitiligo can be measured using the Vitiligo Area Severity Index (VASI) score, which is a quantitative assessment method that is easy to use and highly applicable. Quality of life is assessed using the validated DLQI questionnaire, commonly used in various skin disorders, including vitiligo in adult patients (≥16 years).[23,24] This study shows that the majority of VASI scores are mild (97%), followed by moderate (3%), with no severe severity. The quality-of-life index was dominated by mild (39.4%), moderate (33.3%), and no impact (18.2%). Meanwhile, vitiligo patients with mild VASI scores all had a moderate quality of life

index. A retrospective study at Dr. M. Djamil General Hospital in Padang in 2019 also reported that the average VASI score for mild vitiligo patients was 79% and for moderate vitiligo patients was 21%. This is likely due to the location of the vitiligo lesions and the involvement of a small body surface area (BSA).[25] Vitiligo patients with larger lesion areas are more likely to experience impaired quality of life.[16] The high prevalence of mild vitiligo may also be influenced by the fact that the subjects in this study were patients undergoing phototherapy, so there may have already been improvement in the lesions or they may only have affected a small area of the body.[27]

No significant correlation was found between VASI and DLQI scores ($p>0.05$) in this study. The lesions in the subjects of this study were predominantly of the vulgaris type, which can be covered by clothing, thereby minimizing the impact on quality of life. [27] A cross-sectional study in India in 2014 reported no significant difference between DLQI in local, general, progressive, or stable vitiligo because the distribution of patients between groups was not the same.[26] This may be due to the small sample size and the inability to represent the entire range of severity categories and quality of life index.

CONCLUSION

The severity of vitiligo can affect the psychosocial condition and appearance of vitiligo patients, thereby impacting their quality of life, but this depends on the area of the lesion involved.

Declaration by Authors

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