1874-3722/23

Send Orders for Reprints to reprints@benthamscience.net

The Open Dermatology Journal

Content list available at: https://opendermatologyjournal.com

SYSTEMATIC REVIEW

Depression and Quality of Life among Saudi Patients with Vitiligo: A Descriptive Quantitative Review

Faisal A. Alzeer[1,*], Abdulmageed Alajlan[1], Sulaiman A. Alshammari[2], Shaik Shaffi Ahamed[2] and Abdulaziz H. Alzeer[3]

[1]*Department of Dermatology, College of Medicine, King Saud University. Riyadh, Saudi Arabia*
[2]*Department of Family & Community Medicine, College of Medicine, King Saud University. Riyadh, Saudi Arabia*
[3]*Department of Critical Care, College of Medicine, King Saud University, Riyadh, Saudi Arabia*

Abstract:

Background:

Vitiligo vulgaris is a disfiguring dermatological disease associated with psychosocial impact and decreased quality of life among its sufferers.

Objective:

To provide an overview of quantitative data on the available literature to evaluate the psychosocial impact of depression among vitiligo vulgaris patients in Saudi Arabia and to assess their quality of life (QoL).

Methods:

We searched MEDLINE (PubMed), ResearchGate, and the Cochrane research database between January 1988 and June 2022 to retrieve all studies that assessed the association between depression and QoL among vitiligo vulgaris patients in Saudi Arabia.

Results:

A total of 11 studies were included—5 studies addressed depression among vitiligo vulgaris patients, and 6 studies addressed QoL. The prevalence of depression among Saudi vitiligo vulgaris patients varies between 37.1% and 54.6%, and the pooled prevalence is 45.81 based on a random effects model. The mean ± standard deviation of the Dermatology Life Quality Index (DLQI) is between 5.64 ± 5.2 and 14.72 ± 5.173. Psychosocial impact is found to be associated with vitiligo vulgaris and an impairment of QoL.

Conclusion:

Depression has common psychosocial symptoms among Saudi vitiligo vulgaris patients and has a negative impact on their QoL.

Keywords: Vitiligo vulgaris, Depression, DLQI, Disfiguring dermatological disease, Depigmentation.

Article History Received: April 16, 2023 Revised: July 06, 2023 Accepted: August 22, 2023

1. INTRODUCTION

Vitiligo vulgaris is a widely common disfiguring skin disease and has an estimated prevalence of 0.5 to 2% worldwide [1, 2]. It is a multifactorial disorder characterized by depigmentation of the skin and mucosa due to deficiency or inactivation of melanocytes in the basal layer of the epidermis [1 - 3]. Its exact etiology is not entirely known. It occurs when there is a dysfunction or death of melanocyte cells due to autoimmune disease. The exact triggering factors of vitiligo's immune complex are unknown. However, contemporary evidence suggests a convergence theory as a comprehensive overview of vitiligo vulgaris etiology [4]. The current evidence emphasizes the pivotal involvement of immune cells and their mediators in the pathogenesis of vitiligo vulgaris. Prominent immune cell players encompass T cells, regularity and resident memory T cells, dendritic cells, natural killer cells, and activation of the type 1-IFN pathway [5]. Because vitiligo's appearance greatly impacts body image, it is unsurprising that the psychosocial well-being of patients suffering from it can be

---

* Address correspondence to this author at the Department of Dermatology, College of Medicine, King Saud University, P.O. Box 18321, Riyadh 11415, Saudi Arabia; Tel: +966555228033; E-mail: faisalalzeerfz@gmail.com

DOI: 10.2174/18743722-v17-e230907-2023-5, 2023, *17*, e187437222309050

greatly impacted [6]. Vitiligo vulgaris is associated with low self-esteem, a tendency to social isolation, self-consciousness, psychological stigmatization, and social discrimination [7 - 9]. Vitiligo vulgaris patients are vulnerable to depression, anxiety, and social phobia [9, 10]. A growing body of evidence suggests a bidirectional association between depression and vitiligo vulgaris, which can be psychologically devastating [11]. This depression may affect vitiligo vulgaris patients' employment and restrict their social activities. These emotional effects have been reported in several systematic reviews [12, 13]. As sufferers from a chronic and often disfiguring disease, patients with vitiligo vulgaris are also associated with a poor quality of life (QoL) that is especially observed among the Asian and dark-skinned populations, married women, and in patients where vitiligo vulgaris appears on exposed sites [7, 14 - 16]. Furthermore, since depression and stress can increase systemic inflammation, the interplay between the burden of psychosocial stress and vitiligo vulgaris can worsen disease activity [3]. For these reasons, a conceptualization and management of the psychosocial aspect of vitiligo vulgaris is worth addressing.

In the Kingdom of Saudi Arabia, the prevalence of vitiligo vulgaris varies from 0.5 to 3.5% [17, 18]. Vitiligo vulgaris is found to demoralize the lives of affected patients and their families [11 - 13]. Considering these somatic morbidities, the psychosocial aspects of vitiligo vulgaris warrant further discussion. Two conceptions are considered in this review. Firstly, the relationship between depression and vitiligo vulgaris among Saudi patients is studied. Secondly, QoL and its effect on vitiligo vulgaris patients is evaluated. Although several studies on the psychosocial well-being of Saudi vitiligo vulgaris patients have been published before, there is no comprehensive understanding of this subject. Therefore, given the clinical importance of this topic, this descriptive quantitative review was carried out to provide a critical reappraisal based on a summary of the results of existing knowledge on depression among vitiligo vulgaris patients in Saudi Arabia. Furthermore, an identification and evaluation of the psychosocial impact of vitiligo vulgaris in a sub-group of Saudi patients tested using different domains of QoL measurements, and an offer of the best evidence of the psychological process for planning therapy for these patients was performed.

2. MATERIALS AND METHODS

2.1. Literature Review

This review was analyzed based on the standard guidelines of Preferred Reporting Items for Systematic Review and Meta-Analyses [19]. A comprehensive online literature review was conducted using search engines such as MEDLINE (PubMed), Research Gate, and the Cochrane database from January 1988 to June 2022. All studies aimed at assessing the association between depression and vitiligo in Saudi Arabia and QoL in vitiligo vulgaris patients were retrieved. As there were no control trials on the subject and due to the heterogeneity of the available studies and lack of common outcome measures (such as odds ratio), we performed a descriptive quantitative review. Thus, we focused on available cross-sectional studies. Our search engine used the following key points: vitiligo vulgaris or skin depigmentation, psychosocial aspects of vitiligo vulgaris (mainly depression), and QoL among Saudi patients.

2.2. Eligibility Criteria

2.2.1. Inclusion Criteria

Articles were included in the study if they met the following criteria: (1) Studies that had a baseline description of the prevalence of depression among Saudi vitiligo vulgaris patients. (2) Studies that examined the QoL among these patients. (3) Studies that were published in the English language. (4) Studies that were considered to be medium- or high-quality based on the Newcastle–Ottawa Quality Assessment Scale [20].

2.2.2. Exclusion Criteria

Our exclusion criteria were as follows: (1) Cohort studies that did not state the prevalence of depression among Saudi vitiligo vulgaris patients. (2) Studies with insufficient data as well as conference abstracts, case reports, case studies, review articles, or commentaries. (3) Studies that were considered to be of low quality based on the Newcastle–Ottawa Quality Assessment Scale.

2.3. Data Extraction

Two authors (FZ and AZ) used standard data extraction based on predefined inclusion and exclusion criteria and independently performed the study selection. Any dispute that arose was resolved through joint discussion. The following data was extracted from the selected studies: name of author, place and year of publication, study design, number of participants, gender, age, prevalence of depression, and QoL among vitiligo vulgaris patients. Due to the heterogeneity of study designs, the authors sought cross-sectional studies. Hence, the Newcastle–Ottawa Quality Assessment Scale was used to assess the comparability and quality of the chosen studies. The quality of the articles was graded as follows: low: <4, moderate: 4–6, and high: >6 [20]. A grade less than 4 was considered insufficient (Tables **1** and **2**).

2.4. Quality and Risk of Bias

In this review, we encountered several methodological problems. There were no randomized control trials of the subjects, and neither were their case controls or cohort studies. The only available study design was cross-sectional.

Data Analysis: There was an inherent flaw in the studies included in this review. Hence, a complete meta-analysis was not possible due to inadequate reporting of similar measures (OR). Therefore, a quantitative review with descriptive meta-analysis was carried out. The Meta-analysis in this systematic review was carried out to estimate the combined (pooled) estimate of proportion (prevalence) of depression in vitiligo vulgaris patients. Forest plots were used to show graphically the pooled prevalence (using both fixed and random effect models) of studies included in the meta-analysis. The Meta-analysis was carried out using MedCalc for Windows version 15.0 (MedCalc Software, Ostend, Belgium).

Table 1. Vitiligo studies included on depression.

Series	Authors/Refs.	Year	Type of Study	Region	N	No. of Depress Pts	Participants	Tools to Measure Depression	Outcomes Measured	NOS Score
1	Alhetheli I *et al.* [21]	2021	Cross sectional	Central, Saudi Arabia	173	93	Mean age- 37.2 ±8.6 BDI II Median Score: Mild depression (25.4±3.3), Moderate Depression (36.1±2.8) 45.1% have mild depression while 8.7% have moderate depression - the sense of being unattractive is the most significant cause of depression (AUC: 0.639±0.05 ; CI: 0.530-0.748, p=0.02).	BDI II	Assess the severity of current depressive symptoms	4
2	Almomani *et al.* [22]	2015	Cross sectional	Central, Saudi Arabia	234	64	Mean age- 30.8±11.23 Mean score HAD for depression: 490±4.06 Females had higher score in HAD for depression (57.8%) compared to males but not significant, meanwhile 60% of low income patients have higher depression score compared to those with higher income, p=0.028.	HADS	Assess depression and anxiety	5
3	Alharbi [23]	2020	Cross sectional	Central, Saudi Arabia	308	168	Mean age= 27±14.5 As per BDI scale 54.5% has depressive symptoms; 52.4%- mild depression; 33.3%-moderate depression 14.3%- severe depression. The prevalence of depression is higher and significantly associated with age (children & adolescent (68.3%)(p=0.003) ; marital status (singles-61.2%) (p,0.001); educational level (lower than high school-64.9%)(p<0.001); shorter duration of the disease (66.7%, ,p<0.001).	BDI	Assess depression	5
4	Alsawaf *et al.* [24]	2020	Cross -sectional	Western, Saudi Arabia	58	34	Mean age: 27±8.564 As per DASS 42 scale; mean score: 22.328±11.106; extremely severe depressed (34.5%), severe depressed (24.1%), mildly depressed (17.2%) Significant association of depression with age, higher in patients less than 30 years old (p=0.001); sex (female (27.889±11.517, p=0.012) ; marital status (singles (28.303±8.907, p=0.001); educational level (post graduate (22.938±8.48, p=0.001); duration of the disease (< 5 years (33.842±5.728, p=0.001).	DASS 42	Assess depression, anxiety, and stress	5
5	Shatla *et al.* [25]	2016	Cross-sectional	Western, Saudi Arabia	132	49	Mean age -30.1± 13.2 Met HADS ≥ 11 (37.1%) criteria for depression; 13.8% for depression alone. Significant association of risk for depression: age (<25 yrs, p=0.03); marital status (single (p=0.013; affected area (exposed, p=0.035); perception of poor personal control (p=0.001) and illness consequences (p=0.003).	HADS	Assess depression and anxiety	4

Legend: BDI- Beck Depression Inventory, BDI II- Beck Depression Inventory II ; HADS-Hospital Anxiety and Depression Scale; DASS 42-Depression Anxiety and Stress Scale; NOS-Newcastle-Ottawa Scale ; N-total number of participants.

Table 2. Vitiligo studies included on quality of life.

Series	Authors/Refs.	Year	Type of Study	Region	N	Participants	Tools to Measure Quality of Life	Outcomes Measured	NOS Score
1	Almomani *et al.* [22]	2015	Cross sectional	Central, Saudi Arabia	234	Mean age- 30.8±11.23 Mean score DLQI – 8.72±6.09 33.8% of patients felt that having vitiligo have large/ extremely large social effect on their lives; significant association on age (<30; 62%, p=0.00); sex(female , 67.1%, p=0.04), income capacity (low income, 63.3%, p=0.00), involvement of the neck p<0.028); and >50% of body surface involvement (p=0.013).	DLQI	to measure the health-related quality of life of adult patients suffering from vitiligo	5
2	Al Robaee *et al.* [15]	2007	Cross sectional	Central, Saudi Arabia	109	Mean age- 26.94±9.73 Mean score DLQI – 14.72±5.173 Married males have higher DLQI score compared to married females (p<0.05), 77.9% of patients feels much a lot of embarrassment because of vitiligo especially on females (<0.005); on choosing clothes to wear (p,0.05), impairment on social life (61%, p<0.001); relationships (p<0.001) DLQI score is higher in patients with generalized vitiligo (16.11±4.96, p,0.05) Family history of vitiligo is significant factor in 50% females *vs* 27.5% males (p<0.005).	DLQI	to measure the health-related quality of life of adult patients suffering from vitiligo	5
3	Al-mubarak *et al.* [26]	2011	Cross-sectional	Central, Saudi Arabia	260	Age: Range Male-19-64 (±9.8), Female 18-53 ((±7.6) In the dimension of QoL Scale used significant difference between male and female QoL Scale 11.1 *vs* 23.92 (p<0.001), mean score between married and divorced 3.24 *vs* 7.75 (p<0.05). Master degree holder had a lower QoL score compared with others 1.25 *vs* 10.7,9.7, and 5.6 The age group 21-30 significant difference (p<0.05). compared with other age groups The QOL scale was higher in those with exposed *vs* non exposed lesions 5.0 vs3.4 (p<0.05).	Customized QoL Questionnaire	to measure the health-related quality of life of adult patients suffering from vitiligo	4
4	Al Shammari *et al.* [16]	2021	Cross sectional	Central, Saudi Arabia	253	Mean DLQI score- 5.64±5.2 SD Male (4.0), Female (5.0) (p=0.09) Median DLQI score higher in married and with progressive vitiligo (p<0.05), no difference in age, gender, education level and occupation 75% with vitiligo areas that have profound impairment effect on DLQI on exposed body surface areas like face, hand and feet.	DLQI	to measure the health-related quality of life of adult patients suffering from vitiligo	4

(Table 2) contd.....

Series	Authors/Refs.	Year	Type of Study	Region	N	Participants	Tools to Measure Quality of Life	Outcomes Measured	NOS Score
5	Al-Shobaili *et al.* [27]	2015	Cross sectional	All Regions, Saudi Arabia	48	Mean Age: 29±10.9 Mean QoL score- before therapy 10.6±4.3 QoL Score statistically significant after excimer laser treatment (p<.001) QoL- Significant improvement in 5 domains of QoL after excimer laser treatment (symptoms & feeling; daily activities; leisure; work & school; and personal relationships (p<.001) Female have longer disease duration, lesions on the face and neck have significant improvement in QoL score after excimer laser treatment (p<.01).	Customized QoL Questionnaire	to measure the health-related quality of life of adult patients suffering from vitiligo	4
6	Alhetheli *et al.* [21]	2021	Cross sectional	Central, Saudi Arabia	173	Mean age- 37.2 ±8.6 Median Score (VIS-22): 28 (IQR: 24;33) Age has an inverse relationship but significant factor in higher VIS-22 score (p<0.001) as well as the duration of disease (p<0.001).	VIS-22	to measure the health-related quality of life of adult patients suffering from vitiligo	4

Legend: DLQI-Dermatology Life Quality Index; VIS-22-Vitiligo Impact Scale 22; QoL-Quality of Life; NOS-Newcastle-Ottawa Scale; N-total number of participants.

2.5. Clinical Assessments

The instruments used to assess the severity of depression in the reviewed articles were the Beck Depression Inventory (BDI), Beck Depression Inventory-II (BDI-II), Hospital Anxiety and Depression Scale (HADS), and Depression Anxiety and Stress Scale 22 (DASS 22).

2.6. Mental Health Outcome

Three mental health outcomes were assessed in this review: depression among Saudi patients with vitiligo vulgaris, QoL measured using the Dermatology Life Quality Index (DLQI), Vitiligo Impact Scale-22 (VIS-22), and a customized QoL scale.

3. RESULTS

The initial database generated a preliminary 124 articles on patients with vitiligo vulgaris. After screening the title and abstract, 96 articles were discarded as they were review articles and were not done in Saudi Arabia. Therefore, 28 articles were found eligible. Finally, 13 articles were found to fulfil the inclusion criteria. Two other studies were also discarded because of insufficient data. The remaining (n = 11) articles fulfilled the inclusion criteria and were included in the final analysis. (Fig. **1**) All the included studies were cross-sectional. Of the included studies, 5 examined the association between vitiligo vulgaris and depression (Table **1**) [21 - 25], while 6 studies examined the association between vitiligo vulgaris and QoL (Table **2**) [15, 16, 21, 26, 27] Inter-rater agreement between the 2 researchers was 96%. There was considerable methodological variability, and the data extracted from different studies was heterogeneous. Most of the studies used BDI and HADS scales to assess depression.

3.1. Prevalence of Depression among Saudi Patients with Vitiligo

All studies did not mention whether their subjects had been previously diagnosed with depression. Rather, we examined whether the depressive symptoms mentioned in a questionnaire were answered. The prevalence of depression is based on a summary of articles, and it varied in different studies and ranged between HAD score = 27.3% by Almomani *et al.* [22] and BDI-II = 54.6% by Alharbi *et al.* [23]: both of these studies were conducted in Riyadh. Studies done in Western regions of Saudi Arabia reported DASS 22 = 58.6% (Mecca) [24] and HAD = 37.1% (Al-Madinah) [25]. The pooled prevalence of depression was 45.81% based on random effects (Table **3**, Fig. **2**). The variation in these studies may suggest a methodical bias and the use of different assessment scales, as there was statistically significant heterogeneity (Q = 56.02 and p <0.001) with 92% inconsistency across the studies included. Nevertheless, the findings of this review should be considered with caution.

3.2. Factors associated with Depression in Vitiligo Vulgaris Patients

The results of the studies showed that vitiligo vulgaris patients in a lower age group (<30 years old) are more prone to depression than vitiligo vulgaris patients in older age groups [23 - 25]. Furthermore, depression is more prevalent among females than it is among males [22, 24]. When we probed the results of the articles reviewed, we found patients perceive hands and exposed areas as the most impactful part of the body: they had an OR of 3.9 (1.1–14.2) and a p-value of 0.035 [25]. Depression was associated with a duration of disease of less than 5 years in different studies (P value = 0.001) [24, 25]. Also, Alharbi *et al.* [23], Shatla *et al.* [25], and Alsawaf [24] reported that the association of depression with marital status was significantly high among single patients ($p = 0.006$, $p < 0.035$, and $p < 0.001$), respectively, while others found no significant difference between single and married patients [22]. Most of the articles suggest that vitiligo vulgaris patients with high education are likely to have depression ($P < 0.001$, $p = 0.037$) [22, 24]. Alharbi *et al*. [23] reported that depression is high among patients with a low educational level ($p < 0.001$). The employment status of vitiligo vulgaris patients has no significant association with being depressed [22, 24, 25]. Pooled odds ratios could not be arrived at due to the lack of this outcome measure across the studies for any factors associated with depression in vitiligo vulgaris patients.

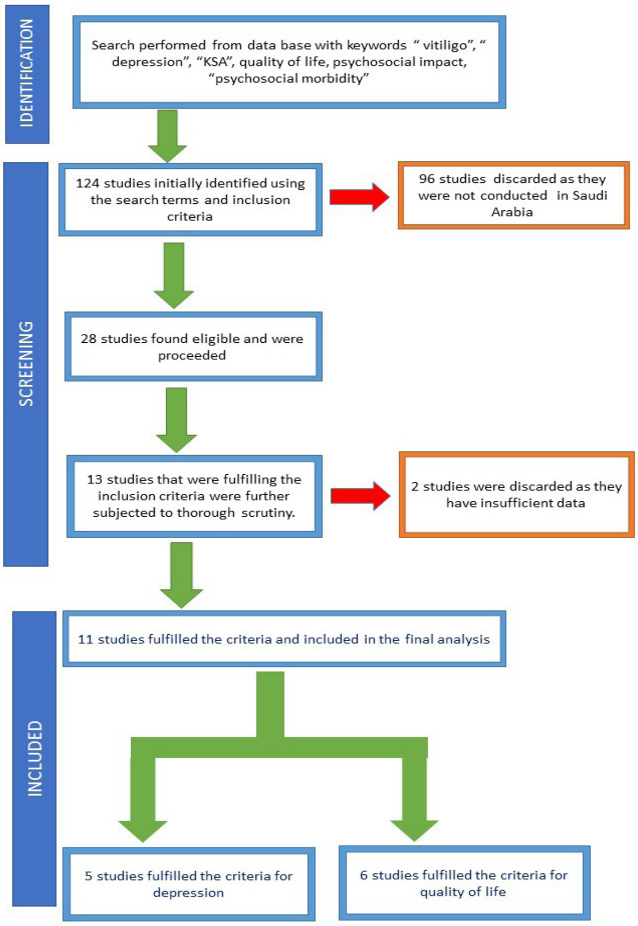

Fig. (1). Flowchart showing the screening of vitiligo studies in compliance to PRISMA guidelines.

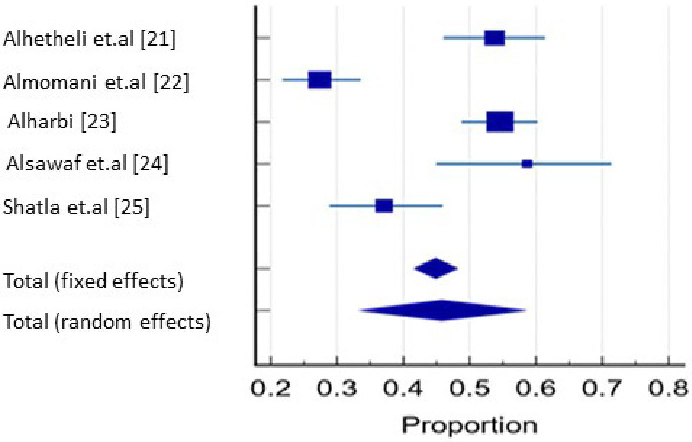

Fig. (2). Forest plot showing the pooled prevalence of depression.

Table 3. Meta-analysis for the prevalence of depression among the vitiligo subjects across the 5 studies.

Study/Refs.	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Alhetheli *et al*. [21]	173	53.757	46.030 to 61.354	19.12	20.37
Almomani *et al*. [22]	234	27.350	21.745 to 33.539	25.82	20.75
Alharbi [23]	308	54.545	48.801 to 60.201	33.96	21.02
Alsawaf *et al* [24]	58	58.621	44.927 to 71.404	6.48	17.91
Shatla *et al*. [25]	132	37.121	28.877 to 45.957	14.62	19.94
Total (fixed effects)	905	44.885	41.620 to 48.184	100.00	100.00
Total (random effects)	905	45.812	33.503 to 58.386	100.00	100.00

3.3. Vitiligo and Quality of Life

Six studies quantified the quality of life in 1,077 patients with vitiligo vulgaris [15, 16, 21, 22, 26]. Total DLQI score was used in 3 studies [15, 23] and interpreted as follows: 0–1 = no effect on a patient's life, 2–5 = a modest effect, 6–10 = a moderate effect, 11–20 = a large effect, and 21–30 = an extremely large effect [28]. Two studies used customized QoL instruments [26, 27], and one used VIS-22 [21]. The mean level of the DLQI score varied in different studies: Al Robaee *et al*. [15], with a mean of 14.72 ± 5.173, had a high score, while Alshammari *et al*. [16], with a mean of 5.64 ± 5.2, had a low score. The DLQI score was significantly high among female patients with vitiligo vulgaris in 3 studies ($p = 0.04$, $p < 0.005$, and $p < 0.001$), respectively [15, 22, 26]. The rest of the studies showed no significant difference between genders. The score was significantly higher among the married than it was among singles in 2 studies [15, 16] ($p < 0.001$ and $p < 0.05$, respectively), while the study by Al-Mubarak *et al*. [26] showed that the mean score was higher in singles compared to married patients: 5.09 *versus* 3.24, respectively; however, among the divorced, the score was 7.75 ($p < 0.05$). The DLQI mean score in patients with exposed lesions was higher than it was among patients with non-exposed lesions ($p < .028$ and $p < 0.05$) [22, 26], respectively. Female patients, compared with males, feel more embarrassment ($p < 0.005$) in choosing clothes to wear ($p = 0.05$), concerning impairment in social life (61%; $p < 0.001$), and in relationships ($p < 0.001$) [15]. One study measured the intention to commit suicide and found that the DLQI score was higher in those who attempted suicide, 21.67 ± 4.93, compared to those who were non-suicidal [22].

4. DISCUSSION

This review was conducted to understand the adverse effect of vitiligo vulgaris on the psychological well-being of Saudi patients. Despite not being life-threatening, the uncertainty of the clinical course of the disease and a lack of effective therapy causes vitiligo vulgaris to have a profound effect on the psychosocial being of patients. Therefore, we aimed to update and expand previous reports on the subject and quantify the level of depression and QoL among these patients. The outcome was inconsistent among studies owing to substantial variability of the results. This review suggests that Saudi patients with vitiligo vulgaris experience a significant disease-related burden and self-perceived depression. In the present study, the pooled data showed that the prevalence of depression is higher among Saudi patients with vitiligo vulgaris compared with average reported data on depression in the general population but is consistent with many international reports [13, 29, 30]. Several systematic reviews and a meta-analysis of the prevalence of depression among vitiligo vulgaris patients yielded divergent results: 12.2% to 59% [13, 31 - 33]. This variation is attributed to diverse ethnic backgrounds, geographical locations, and different assessment tools. In the current review, a young age (<30 yrs), female sex, and a short duration of the disease (less than 5 yrs) were found to be associated with perceived depression. In addition, marital status and low educational levels also offer protection, while the presence of vitiligo vulgaris in an exposed area often has an additional impact on depression. These results are in concurrence with previous reports [12, 32]. Depression is a significant impact factor in the long-term health of patients with chronic diseases, including vitiligo vulgaris, and recent data indicates that there is an increased risk of mortality among patients with depression [32 - 34]. Moreover, vitiligo vulgaris may increase depression, and, in turn, depression could exacerbate vitiligo [3]. The pathogenesis of depression in vitiligo vulgaris patients is unknown. However, the increased activity of hypothalamic–pituitary access with an increased level of catecholamines during chronic stress activates α receptors in skin arterioles, causing vasoconstriction and leading to microcirculation disturbance and epidermal and dermal hypoxia. As a result, the generation of oxidative stress results in cellular stress and the eventual destruction of melanocytes [35, 36]. Furthermore, there is an assumption that H_2O_2-mediated oxidation of acetylcholine esterase causes substantial oxidative stress in vitiligo vulgaris [37]. This assumption may underlie the theory behind the prevalence of depression among vitiligo vulgaris patients. Changes in neurotransmitters have been postulated as the reason behind using antidepressant agents such as amitriptyline, which has significant anticholinergic action and mild norepinephrine reuptake blockage in patients with vitiligo vulgaris and depression [38].

Data from different studies, including ours, show an impairment of the QoL among vitiligo vulgaris patients with gender differences, and the QoL score among vitiligo vulgaris patients is generally lower among females than among males [39 - 43]. This may be because females are vulnerable to experiencing negative emotions regarding their aesthetics, including anxiety, depression, and embarrassment from the stigma of feeling different because of great societal pressures on the female physical appearance [8, 43, 44].

The young are particularly psychologically affected by vitiligo vulgaris and have an overall great impairment of QoL since their age group is especially conscious of physical appearances and social acceptance. The young may view this disease as detrimental to their self-esteem and hindering their chance of finding a life partner [45, 46]. The findings of this review are also consistent with previous studies from Iran and Korea, which showed that QoL is poor among young age groups [42, 47]. Although this review showed that being married resulted in a higher QoL score compared to being single, there are conflicting results between married males and married females. Moreover, the effect of vitiligo vulgaris on the QoL of the married subjects is not as profound in the long run as it is in a single person with vitiligo vulgaris. Marriage is thought to profoundly affect the overall well-being of a vitiligo vulgaris patient as their significant other can offer emotional, physical, and financial support [48]. Unlike singles, the psychological burden of the disease is intense, as having vitiligo vulgaris decreases the chances of intimate relationships and marriage [49].

The impact of the affected body parts- especially exposed areas such as the face, hands, and feet and lesions on a large part of the body- significantly affects the patient's QoL. The result from this review can be compared to previous studies by Bae *et al*. [50] and Benny *et al*. [41]. Vitiligo vulgaris patients may view themselves as flawed and hideous, which may negatively affect their psychological condition as well as their social and professional relationships. Furthermore, this negative perception about oneself can be either a driving force to seek treatment or to hide the visible areas affected using makeup or clothing [32, 39, 51]

5. LIMITATION OF THE STUDY

Our study has methodological shortcomings. Firstly, the reviewed papers were cross-sectional research, which can impede a strong conclusion due to their inherent flaws. Secondly, there may be selection bias as all subjects were recruited from dermatology clinics; this may be misleading because patients who suffer from few psychological complaints are less likely to seek medical advice. Finally, because different instruments were used to quantify depression in different study groups, comparing these studies is imprecise.

CONCLUSION

This review provides a comprehensive overview of existing quantitative data on the impact of vitiligo vulgaris on the mental health of Saudi patients. Vitiligo vulgaris has a substantial negative effect on the QoL of these patients. It is, therefore, important that depressive illness in patients with vitiligo vulgaris is addressed by dermatologists. Screening these patients for depression may help treatment outcomes. Future research should concentrate on high-risk groups in need of psychiatric referral. Owing to the heterogeneity of the results, the data should be interpreted with caution.

LIST OF ABBREVIATIONS

QoL = Quality of life
BDI = Beck Depression Inventory
BDI-II = Beck Depression Inventory-II
DASS 22 = Depression Anxiety and Stress Scale 22
DLQI = Dermatology Life Quality Index

CONSENT FOR PUBLICATION

Not applicable.

STANDARDS OF REPORTING

PRISMA guidelines and methodology were followed.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from the corresponding author, [F.A], upon reasonable request.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

Declared none.

SUPPLEMENTARY MATERIAL

PRISMA checklist is available as supplementary material on the publisher's website along with the published article.

Supplementary material is available on the publisher's website along with the published article.

REFERENCES

[1] Bergqvist C, Ezzedine K. Vitiligo: A review. Dermatology 2020; 236(6): 571-92.
[http://dx.doi.org/10.1159/000506103] [PMID: 32155629]

[2] Krüger C, Schallreuter KU. A review of the worldwide prevalence of vitiligo in children/adolescents and adults. Int J Dermatol 2012; 51(10): 1206-12.
[http://dx.doi.org/10.1111/j.1365-4632.2011.05377.x] [PMID: 22458952]

[3] Silverberg JI, Silverberg NB. Vitiligo disease triggers: Psychological stressors preceding the onset of disease. Cutis 2015; 95(5): 255-62.
[PMID: 26057504]

[4] Poole IC, Das PK, Wijngaard RMJGJ, Bos JD, Westerhof W. Review of the etiopathomechanism of vitiligo: A convergence theory. Exp Dermatol 1993; 2(4): 145-53.
[http://dx.doi.org/10.1111/j.1600-0625.1993.tb00023.x] [PMID: 8162332]

[5] Marchioro HZ, Silva de Castro CC, Fava VM, Sakiyama PH, Dellatorre G, Miot HA. Update on the pathogenesis of vitiligo. An Bras Dermatol 2022; 97(4): 478-90.
[http://dx.doi.org/10.1016/j.abd.2021.09.008] [PMID: 35643735]

[6] Juntongjin P, Abouelsaad S, Sugkraroek S, Taechakraichana N, Lungchukiet P, Nuallaong W. Awareness of vitiligo among multi□ethnic populations. J Cosmet Dermatol 2022; 21(11): 5922-30.
[http://dx.doi.org/10.1111/jocd.15211] [PMID: 35785468]

[7] Amer AAA, Gao XH. Quality of life in patients with vitiligo: an analysis of the dermatology life quality index outcome over the past two decades. Int J Dermatol 2016; 55(6): 608-14.
[http://dx.doi.org/10.1111/ijd.13198] [PMID: 26749040]

[8] Grimes PE, Miller MM. Vitiligo: Patient stories, self-esteem, and the psychological burden of disease. Int J Womens Dermatol 2018; 4(1):

32-7.
[http://dx.doi.org/10.1016/j.ijwd.2017.11.005] [PMID: 29872674]

[9] Elbuluk N, Ezzedine K. Quality of life, burden of disease, co-morbidities, and systemic effects in vitiligo patients. Dermatol Clin 2017; 35(2): 117-28.
[http://dx.doi.org/10.1016/j.det.2016.11.002] [PMID: 28317521]

[10] Osinubi O, Grainge MJ, Hong L, *et al.* The prevalence of psychological comorbidity in people with vitiligo: A systematic review and meta-analysis. Br J Dermatol 2018; 178(4): 863-78.
[http://dx.doi.org/10.1111/bjd.16049] [PMID: 28991357]

[11] Vallerand IA, Lewinson RT, Parsons LM, *et al.* Vitiligo and major depressive disorder: A bidirectional population-based cohort study. J Am Acad Dermatol 2019; 80(5): 1371-9.
[http://dx.doi.org/10.1016/j.jaad.2018.11.047] [PMID: 30528503]

[12] Ezzedine K, Eleftheriadou V, Jones H, *et al.* Psychosocial effects of Vitiligo: A systematic literature review. Am J Clin Dermatol 2021; 22(6): 757-74.
[http://dx.doi.org/10.1007/s40257-021-00631-6] [PMID: 34554406]

[13] Lai YC, Yew YW, Kennedy C, Schwartz RA. Vitiligo and depression: A systematic review and meta-analysis of observational studies. Brit J Dermat 2017; 177(3): 708-18. -12.
[http://dx.doi.org/10.1111/bjd.15199]

[14] Bin Saif GA, Al-Balbeesi AO, Binshabaib R, *et al.* Quality of life in family members of vitiligo patients: A questionnaire study in saudi arabia. Am J Clin Dermat 2013; 14(6): 489-95.
[http://dx.doi.org/10.1007/s40257-013-0037-5]

[15] Al Robaee AA. Assessment of quality of life in Saudi patients with vitiligo in a medical school in Qassim province, Saudi Arabia. Saudi Med J 2007; 28(9): 1414-7.
[PMID: 17768471]

[16] Al-Shammari SA, Alotaibi HM, Assiri MA, Altokhais MI, Alotaibi MS, Alkhowailed MS. Quality of life in vitiligo patients in central Saudi Arabia. Saudi Med J 2021; 42(6): 682-7.
[http://dx.doi.org/10.15537/smj.2021.42.6.20200833] [PMID: 34078732]

[17] Raddadi AA, Abdullah SA, Damanhouri ZB. Pattern of skin diseases at king khalid national guard hospital: A 12-month prospective study. Ann Saudi Med 1999; 19(5): 453-4.
[http://dx.doi.org/10.5144/0256-4947.1999.453] [PMID: 17277519]

[18] Murad MA, Alluhaybi AH, Abu Mughaedh NA, Almohammadi AA, Shaman SA, Khayat GW, *et al.* Prevalence of vitiligo in kingdom of saudi arabia (Cross Sectional Study). Int J Of Adv Res 2020; 900-5.
[http://dx.doi.org/10.21474/Ijar01/12231]

[19] Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLoS Med 2009; 6(7): e1000097.
[http://dx.doi.org/10.1371/journal.pmed.1000097] [PMID: 19621072]

[20] Wells GA, Shea B, O'Connell D, Peterson J, Welch V, Losos M, *et al.* The Newcastle-Ottawa Scale (NOS) for assessing the quality of non randomized studies in meta-analyses. Avaialable from: http://www.ohri.ca/programs/clinical epidemiology /oxford.asp

[21] Alhetheli GI. The impact of vitiligo on patients' psychological status and sexual function: Cross-sectional questionnaire-based study. Open Dermatol J 2021; 15(1): 23-30.
[http://dx.doi.org/10.2174/1874372202115010023]

[22] Almomani N, Abdulmajeed I, Ur Rahman S, Alakkam A. Quality of life and affective health of patients with vitiligo. J Sleep Disord Ther 2015; 4: 190.
[http://dx.doi.org/10.4172/2167-0277.1000190]

[23] Alharbi M. Identifying patients at higher risk of depression among patients with vitiligo at outpatient setting. Mater Sociomed 2020; 32(2): 108-11.
[http://dx.doi.org/10.5455/msm.2020.32.108-111] [PMID: 32843857]

[24] Alsawaf A. Depression and Anxiety among vitiligo patients attending to the dermatology clinic at King Abdul-Aziz Hospital in Makkah AlMokarramah 2018. Int J Curr Res 2020; 12(11): 14726-34.
[http://dx.doi.org/10.24941/ijcr.40104.11.2020]

[25] Shatla M, AlSofyani I, Almitairi S, Alrahili A, Alsolami A. The relation between illness perceptions and psychiatric morbidity among patients with vitiligo, in Al-Madinah, Saudi Arabia. Int J Med Sci Public Health 2016; 5(9): 1966.
[http://dx.doi.org/10.5455/ijmsph.2016.23042016464]

[26] Al-Mubarak L, Al-Mohanna H, Al-Issa A, Jabak M, Mulekar SV. Quality of life in saudi vitiligo patients. J Cutan Aesthet Surg 2011 Jan; 4(1): 33-7.
[http://dx.doi.org/10.4103/0974-2077.79188] [PMID: 21572679] [PMCID: 3081482]

[27] Al-Shobaili HA. Correlation of clinical efficacy and psychosocial impact on vitiligo patients by excimer laser treatment. Ann Saudi Med 2014; 34(2): 115-21.
[http://dx.doi.org/10.5144/0256-4947.2014.115] [PMID: 24894779]

[28] Basra MK, Fenech R, Gatt RM, Salek MS, Finlay AY. The dermatology life quality index 1994-2007: A comprehensive review of validation data and clinical results. Br J Dermatol 2008; 159(5): 997-1035.
[http://dx.doi.org/10.1111/j.1365-2133.2008.08832.x]

[29] Al-Qadhi W, Ur Rahman S, Ferwana MS, Abdulmajeed IA. Adult depression screening in Saudi primary care: Prevalence, instrument and cost. BMC Psychiatry 2014; 14: 190.
[http://dx.doi.org/10.1186/1471-244X-14-190]

[30] Alibrahim OA, Al-Sadat N, Elawad NA. Gender and risk of depression in Saudi Arabia, a systematic review and meta-analysis. J Public Health Afr 2010; 1(1): e7.
[http://dx.doi.org/10.4081/jphia.2010.e7]

[31] Ajose FO, Parker RA, Merrall EL, Adewuya AO, Zachariah MP. Quantification and comparison of psychiatric distress in African patients with albinism and vitiligo: A 5-year prospective study. J Europ Acad Dermatol Venereol 2014; 28(7): 935-2.

[32] Sangma LN, Nath J, Bhagabati D. Quality of life and psychological morbidity in vitiligo patients: a study in a teaching hospital from north-East India Indian J Dermatol 2015; 60: 142-6.

[33] Moulton CD, Pickup JC, Ismail K. The link between depression and diabetes: The search for shared mechanisms. Lancet Diabetes Endocrinol 2015; 3: 461-71.
[http://dx.doi.org/10.1016/S2213-8587(15)00134-5]

[34] Mbakwem A, Aina F, Amadi C. Expert opinion-depression in patients with heart failure: Is enough being done? Card Fail Rev 2016; 2: 110-2.

[35] Morrone A, Picardo M, Luca CD, Terminali O, Passi S, Ippolito F. Catecholamines and vitiligo. Pigment Cell Res 1992; 5(2): 65-9.
[http://dx.doi.org/10.1111/j.1600-0749.1992.tb00003.x] [PMID: 1321419]

[36] Stokes PE, Sikes CR. The hypothalamic-pituitary-adrenocortical axis in major depression. Neurol Clin 1988; 6(1): 1-19.
[http://dx.doi.org/10.1016/S0733-8619(18)30881-8] [PMID: 2837631]

[37] Kussainova A, Kassym L, Akhmetova A, *et al.* Vitiligo and anxiety: A systematic review and meta-analysis. PLoS One 2020; 15(11): e0241445.
[http://dx.doi.org/10.1371/journal.pone.0241445] [PMID: 33170870]

[38] Namazi MR. Prescribing cyclic antidepressants for vitiligo patients: Which agents are superior, which are not? Psychother Psychosom 2003; 72(6): 361-2.
[http://dx.doi.org/10.1159/000073036] [PMID: 14526142]

[39] Abdelmaguid EM, Khalifa H, Salah MM, Sayed DS. Assessment of depression and anxiety in relation to quality of life in patients with vitiligo. Egyp J Dermat Venerol 2020; 40(2): 99.

[40] Baidya S, Dey P, Mohanty R. Assessment of quality of life in vitiligo patients attending a tertiary care hospital-A cross sectional study. Indus Psych J 2021; 30(1): 62.

[41] Benny D, Makkuni A, Thyvalappil A, Mathew P, Sridharan R, Druhin AV. Quality of life and psychiatric comorbidity in vitiligo: A hospital-based cross-sectional study from a tertiary care center in South India. J Dermatol Dermatol Surg 2021; 25(2): 114.

[42] Hedayat K, Karbakhsh M, Ghiasi M, *et al.* Quality of life in patients with vitiligo: A cross-sectional study based on vitiligo quality of life index (VitiQoL). Heal qual lifoutcom 2016; 14(1): 1-9.

[43] Rumsey N. Psychosocial adjustment to skin conditions resulting in visible difference (disfigurement): What do we know? Why don't we know more? How shall we move forward? Int J Wom Dermat 2018; 4(1): 2-7.

[44] Hughes O, Hutchings PB, Phelps C. Stigma, social appearance anxiety and coping in men and women living with skin conditions: A mixed methods analysis. Skin Health Dis 2022; 2(4): e73.
[http://dx.doi.org/10.1002/ski2.73] [PMID: 36479270]

[45] Karelson M, Silm H, Kingo K. Quality of life and emotional state in vitiligo in an Estonian sample: Comparison with psoriasis and healthy controls. Acta Derm Venereol 2013; 93(4): 446-50.
[http://dx.doi.org/10.2340/00015555-1520] [PMID: 23306792]

[46] Vora RV, Kota RKS, Varma J, Kota S, Patel T, Ganjiwale J. Study on assessment of quality of life and depression in patients of vitiligo. Indian Dermatol Online J 2019; 10(2): 153-7.
[http://dx.doi.org/10.4103/idoj.IDOJ_14_18] [PMID: 30984590]

[47] Choi S, Kim D-Y, Whang S-H, Lee J-H, Hann S-K, Shin Y-J. Quality of life and psychological adaptation of Korean adolescents with

vitiligo. J Eur Acad Dermatol Venereol 2010; 24(5): 524-9. [http://dx.doi.org/10.1111/j.1468-3083.2009.03452.x] [PMID: 19807826]

[48] Nguyen C, Beroukhim K, Danesh M, Babikian A, Koo J, Leon A. The psychosocial impact of acne, vitiligo, and psoriasis: A review. Clin Cosmet Investig Dermatol 2016; 9: 383-92. [http://dx.doi.org/10.2147/CCID.S76088] [PMID: 27799808]

[49] Parsad D, Dogra S, Kanwar A. Quality of life in patients with vitiligo. Health Qual Life Outcomes 2003; 1(1): 58. [http://dx.doi.org/10.1186/1477-7525-1-58] [PMID: 14613564]

[50] Bae JM, Lee SC, Kim TH, *et al.* Factors affecting quality of life in patients with vitiligo: A nationwide study. Br J Dermatol 2018; 178(1): 238-44. [http://dx.doi.org/10.1111/bjd.15560] [PMID: 28391642]

[51] Kowalewska B, Jankowiak B, Krajewska-Kułak E, Khvorik DF, Niczyporuk W. Quality of life in skin diseases as perceived by patients and nurses. Advances in Dermatology and Allergology/Postępy Dermatologii i Alergologii 2021; 37(6): 956-61.