Exploring the Affecting Factors on Self-Esteem and Health-Related Quality of Life of Vitiligo Patients: A Web-Based Cross-Sectional Study

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This study aimed to examines the self-esteem and quality of life level of vitiligo patients and to recognise affecting factors on self-esteem and quality of life. Methods: in a web-based cross-sectional study, 88 patients in the vitiligo charity foundation in Saudi Arabia Self-Esteem and Health related Quality of Life of Vitiligo patients were measured using the Rosenberg Self-Esteem Scale, the Dermatology Life Quality Index and the sociodemographic data. Results: The results of this study displayed that the majority of the patients (67%) had moderate self-esteem & vitiligo can have a major effect on patient's quality of life (34.1). Multiple logistic regression analyses were used to recognise affecting factors with self-esteem and quality of life. showed that female ($\beta=-0.228$, t=2.042, p=0.045) negative effect quality of life ,and positive effect on quality of life for divorced ($\beta=0.440$, t=2.976, p=0.004[*]) , lesion localisation site related trunk ($\beta=0.457$, t=3.540, p=0.001) were significantly associated with quality of life . While , the major factors influencing self-esteem patients only psychological stress was negative effect on self-esteem. In addition, there was no correlation between self-esteem and quality of life. Conclusion: Providing some appropriate health care personnel for vitiligo patients may improve quality of life and keeping their psychological status may be vital for preventing suffering from an alteration of self-esteem.

Keywords: *Affecting Factors, Self-Esteem, Health, Quality of Life, Vitiligo*

Introduction

As the skin is the most recognisable organ of the human body, it has been suggested that any damage on its surface may have a detrimental effect on the psychosocial well-being of a person (1Taïeb et al.,2007, Bonotis et al.,2016). Similar to psoriasis or eczema, vitiligo can be seen as a dermatological disorder that affects many people's lives on psychosocial grounds (Bellei et.al. 2019)

Vitiligo is an acquired pigment disease, multifactorial and progressive, characterised by depigmented macules and patches (Rodrigues et al., 2017, Lacerda et al.,2020). Nevertheless, the precise cause of vitiligo is unknown. Research indicates that the development of this disorder includes multiple factors, such as autoimmune, genetic, and environmental influences (Hamidizadeh et al., 2020). Analysis of the psychosocial affect among patients with vitiligo has discovered an augmented risk of anxiety, social isolation, and depression as well as harmful effects on self-esteem and body image (Bonotis et al., 2016, Sarkar et al., 2018). It is assessed that the prevalence of vitiligo differs from fewer that 0.4% to 2.0% worldwide (Silverberg, 2015). Other study mentioned that the prevalence of vitiligo in 82 population- or community-based studies was 0.2 percent and 1.8 percent in 22 hospital-based studies. Vitiligo was found to have a high prevalence in Africa and in female patients. (zhang et al., 2016).

Quality of life (QoL) evaluations help as a vital tool for determining the psychosocial problem among patients with prolonged diseases. This has significance for devotion to treatment and longstanding disease consequences (Pustisek et al., 2016, Moyakine et al., 2018). The Dermatology Life Quality Index (DLQI) is considered to be among the personal satisfaction measurements particularly for skin disorders and can be used to assess life quality. This tool was used in many other studies to assess the health status of patients with dermatological illnesses in specific and general skin diseases in important, mandatory and secondary administrations (Finlay ,2004).

In this article, self-esteem denotes to the person's self-perception. A positive SE is the condition wherever the individual is conscious of his or her positive characteristics such as being sufficient, valuable, effective, diligent, and successful. Many cultures and societies around the world place a high value on beauty, esthetics, and pigmentation. Any condition that has an impact on one's appearance can lead to a loss of privileges, resources, and, in some cases, upward societal mobility (Grimes, 2008). Since skin conditions are so visible, self-esteem is often harmed. As vitiligo is an illness which can be detected by others, it may have consequence in subjective changes in a person's body image (Gümüş et al., 2011, Khour et al., 2014). The current study was planned with the aim to examine the self-esteem and quality of life level of vitiligo patients and to recognise affecting factors on self-esteem and quality of life

Method

Study design

A web–based cross sectional study was started in the vitiligo charity foundation in Saudi Arabia on 88 patients with vitiligo. Data was collected from March to June 2020 via an electronic web–based questionnaire. Exclusion criteria included having skin diseases other than vitiligo or a chronic disease that would have an effect on QOL.

Study tool

These tools consist of three portions as follows:

Part I: Assessment of sociodemographic factors for patients (age, sex, educational level, occupation status, marital status and income).

Part II: The Dermatology Life Quality Index (DLQI) (Arabic version) which was proposed by Finlay and Khan 1994 and later translated into other languages to assess health related quality of life. The questions were subdivided into six headings: Questionnaire containing 10 items on patient emotions and other dimensions of the disease. The questions included 'vitiligo symptoms' (pain, itching and irritation), 'feelings' (distress, anger and embarrassment) 'routine activities' (house works and shopping), 'social or leisure activities' 'kind of clothes,' 'educational activities', 'sexual activities', 'physical exercise', 'interpersonal relationships' (with wife, friends and relatives) and 'treatment options'. Each element was counted on a three-point Likert scale (3=very much, 2=a lot, 1=a little, 0=not at all). Then, the maximum and minimum Likert scores for the questionnaire were 0-30 points. We characterised the developed score to 0-1 designate "no effects on QL", 2-5 "a low effect on QL", 6-10 as "moderate effects on QL", 11-20 as "Very large effect on patient's life", and 21-30 as "Extremely large effect on patient's life. The higher score meaning a more impaired quality of life.

Part III: Rosenberg Self Esteem scale (RSES) (Rosenberg, 1965), which was initially established by Rosenberg (1965). The Arabic form of the Rosenberg self-esteem scale was used to measure self-esteem of the patient. It is a uni-dimensional scale of 10 elements that tests global self-worth by measuring both negative and positive self-perception and thoughts All items are answered using a 4-point Likert scale format which ranges from strongly agreeing to strongly disagreeing. The scale contains five negative elements and five positive elements and needs to be scored therefore by reversing the significance of either the positive or negative element responses. Each item is usually answered on a four-point Likert scale that ranges from "strongly disagree"(1) to "strongly agree" (4). The scale varies according to these responses. From (1-40). Scores below (15) indicate low self-esteem. (15 and 25) are within the normal range. Higher scores specify greater self-esteem. Cronbach's alpha in the present sample was (0.84).

Data Collection Procedure

The researcher applied a pilot study subsequently administering the tools on 10% of the patients to test simplicity, comprehensiveness, practicability and feasibility of the questionnaire. Then, important changes were accomplished according to the findings of the pilot study. After gathering the questionnaires, incomplete cases were excluded. The time spent to complete the questionnaire was 5–10 minutes as observed.

Ethical considerations

Informed consent verbally was attained from each patient who contributed in this study. Subsequently the aim and nature of the study were clarified to them and confirming their right to withdraw from the study at any time without justification.

Statistical design

Data was fed to the computer and analysed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data wasdescribed using number and percent. Quantitative data was described using range (minimum and maximum), mean and standard deviation. Significance of the obtained results was judged at the 5% level. The used tests were Student t-test for normally distributed quantitative variables to compare between the two studied groups; F-test (ANOVA) for normally distributed quantitative variables to compare between more than two groups; Pearson coefficient to correlate between two normally distributed quantitative variables; and regression to detect the most independent/affecting factor for DLQI and Rosenberg Self-Esteem Scale.

Results

The results illustrated that the majority of the vitiligo patients (67%, n=59 and 33 %, n=29) had moderate and high self-esteem, respectively. While the total mean score of self-esteem was found at 24.89. In 34.1% of patients vitiligo had a very large effect of on the patient's life quality. The total mean DLQI is 12.02

Table 1: This study discovered the relationship between Dermatology life quality index (DLQI) and the demographic data found that there were statistical differences between marital status , income , level of eduction have high level effect on quality of life .

Table 2 shown that the relation between Dermatology life quality index (DLQI) and clinical factors with vitiligo found that there were significant statistical differences between quality of life and site of vitiligo lesion, percentage of lesion involvement also causes of vitiligo

Tables 3 and 4: The present study shows that no statistical relation exists between the Rosenberg self-esteem scale, sociodemographic and clinical factors with vitiligo.

shown that the multivariate factor logistic regression analysis showed that females and marital status (divorced) were negative statistically independently related with DLQI score and positive for lesion localisation site **(table 5)**.

Multiple logistic regression analyses were used to recognise affecting factors with self-esteem only found psychological stress was negative effect on self-esteem (β=-0.278, t=2.040, p= 0.045) **(Table 6).**

Table 1: Relation between Dermatology life quality index (DLQI) and demographic data

Demographic data	Dermatology life quality index (DLQI)		Test of Sig	p
	Min. – Max.	**Mean ± SD.**		
Sex				
Male	1.0 – 28.0	13.68 ± 8.82	t=1.448	0.151
Female	0.0 – 27.0	11.0 ± 8.46		
Age				
16 – 20	13.0 – 14.0	13.50 ± 0.58		
21 – 30	0.0 – 27.0	14.53 ± 9.22		
31 – 40	0.0 – 27.0	8.38 ± 7.56	F=2.417	0.055
41–50	2.0 – 28.0	11.44 ± 9.26		
51–60	9.0 – 20.0	16.33 ± 5.68		
Marital status				
Single	0.0 – 24.0	10.33 ± 6.64	F= 12.044[*]	<0.001[*]
Married	0.0 – 28.0	11.50 ± 8.65		
Divorced	27.0 – 27.0	27.0 ± 0.0		
Occupation				
Student	6.0 – 23.0	12.43 ± 5.14		
Housewife	7.0 – 27.0	17.50 ± 8.49		
professional	1.0 – 24.0	14.50 ± 7.47	F=2.126	0.085
Manual work	2.0 – 2.0	2.0 ± 0.0		
Employee	0.0 – 28.0	10.83 ± 9.51		
BMI				
Underweight <18.5	20.0[#]			
Normal 18.5-<25	0.0 – 28.0	12.13 ± 8.04		
Overweight 25-<30	0.0 – 28.0	10.55 ± 7.84	F=1.046	0.356
Obese ≥30	0.0 – 27.0	13.96 ± 10.37		

Educational level				
Read and write	7.0 – 27.0	13.63 ± 6.50		
primary	0.0 – 24.0	9.11 ± 7.97	F=5.449*	0.002*
intermediate	0.0 – 28.0	12.27 ± 8.28		
College	3.0 – 27.0	19.67 ± 9.78		
Income				
Not enough	1.0 – 27.0	15.65 ± 8.61	t=3.144*	0.002*
Enough	0.0 – 28.0	9.96 ± 8.03		

Table 2: Relation between Dermatology life quality index (DLQI) and clinical factors with vitiligo

clinical factors	Dermatology life quality index (DLQI)		Test of Sig	p
	Min. – Max.	Mean ± SD.		
duration of disease				
Less than 1 year	1.0 - 28.0	10.67±10.71		
1-5	6.0 – 24.0	11.83±6.31	F= 1.594	0.197
6-10	0.0 – 27.0	11.0±7.83		
11-20	0.0 – 27.0	15.80±9.87		
Lesion Localisation Site				
Head /neck	1.0 – 28.0	12.97±8.89		
Extremities	0.0 – 27.0	12.52±8.68	F= 5.935*	0.001*
Genitals	0.0 – 27.0	13.0±10.81		
Trunk	20.0 – 20.0	25.0±2.91		
Percentage of involvement				
Less than 10%	1.0 – 20.0	7.50±5.14		
10 – 25 %	3.0 – 20.0	14.78±8.49		
25 – 50 %	0.0 – 27.0	11.83±8.97	F=5.369*	0.001*
50 – 75 %	1.0 – 27.0	18.25±9.67		
75 – 100 %	2.0 – 11.0	8.0±4.65		
Cause of vitiligo according patient perceived				
Psychological stress	0.0 – 28.0	10.52±7.46		
Physical injuries	0.0 – 23.0	10.57±9.16		
Pregnancy or childbirth	27.0 – 27.0	27.0±0.0	F= 3.494*	0.011*
A side effect of a treatment	3.0 – 20.0	11.50±9.81		
Hereditary	2.0 – 27.0	16.44±9.36		
Family history				
No	1.0 – 28.0	10.71±7.95	t = 1.505	0.136
Yes	0.0 – 27.0	13.48±9.17		

Table 3: Relation between Rosenberg self-esteem scale and demographic data

Demographic data	Rosenberg Self-Esteem Scale		Test of Sig	p
	Min. – Max.	Mean ± SD.		
Sex				
Male	18.0 – 35.0	25.03 ± 3.82	t=0.279	0.781
Female	18.0 – 35.0	24.78 ± 4.31		
Age				
16 – 20	23.0 – 30.0	26.25 ± 3.30		
21 – 30	18.0 – 35.0	24.88 ± 4.67		
31 – 40	18.0 – 35.0	24.31 ± 3.73	F=0.293	0.882
41–50	18.0 – 35.0	25.33 ± 4.09		
51–60	21.0 – 30.0	25.17 ± 3.06		
Marital status				
Single	18.0 – 35.0	24.97 ± 4.08		
Married	18.0 – 35.0	24.90 ± 3.96	F=0.060	0.942
Divorced	18.0 – 35.0	24.33 ± 5.79		
Occupation				
Student	18.0 – 35.0	24.71 ± 3.73		
Housewife	18.0 – 35.0	25.25 ± 5.12		
professional	18.0 – 35.0	25.25 ± 4.09	F=0.386	0.818
Manual work	18.0 – 25.0	21.50 ± 4.95		
Employee	18.0 – 35.0	24.90 ± 4.09		
BMI				
Underweight <18.5	23.0			
Normal 18.5-<25	18.0 – 35.0	24.56 ± 4.41		
Overweight 25-<30	18.0 – 35.0	25.32 ± 4.02	F=0.271	0.763
Obese ≥30	18.0 – 35.0	24.83 ± 3.90		
Educational level				
primary	18.0 – 35.0	26.44 ± 4.15		
intermediate	18.0 – 35.0	24.47 ± 4.38	F=0.947	0.422
College	20.0 – 35.0	24.64 ± 3.33		
primary	18.0 – 35.0	24.58 ± 4.29		
Income				
Not enough	18.0 – 35.0	25.38 ± 4.97	t=0.832	0.409
Enough	18.0 – 35.0	24.57 ± 3.42		

Table 4: Relation between Rosenberg self-esteem scale and clinical factors with vitiligo

clinical factors	Rosenberg Self-Esteem Scale		Test of Sig	p
	Min. – Max.	Mean ± SD.		
Duration of disease				
< 1 year	18.0 – 25.0	22.75±2.80	F= 1.313	0.276
1-5	18.0 – 35.0	25.50±4.38		
6-10	18.0 – 35.0	25.11±4.18		
11-20	18.0 – 35.0	25.30±4.21		
Lesion Localisation Site				
Head /neck	18.0 – 35.0	24.18±4.13	F= 0.564	0.640
Extremities	18.0 – 35.0	25.39±4.30		
Genitals	18.0 – 35.0	24.78±4.05		
Trunk	18.0 – 35.0	24.70±4.85		
Percentage of involvement				
Less than 10%	18.0 – 35.0	24.88±3.80	F= 1.093	0.365
10 – 25 %	18.0 – 30.0	23.39±2.85		
25 – 50 %	18.0 – 35.0	25.83±4.96		
50 – 75 %	18.0 – 35.0	25.50±4.73		
75 – 100 %	23.0 – 25.0	24.0±1.10		
Cause of Vitiligo According Patient Perceived				
Psychological stress	18.0 – 35.0	24.50±3.91	F= 1.391	0.244
Physical injuries	21.0 – 35.0	26.50±5.16		
Pregnancy or childbirth	18.0 – 25.0	21.50±4.95		
A side effect of a treatment	24.0 – 30.0	27.25±3.20		
Hereditary	18.0 – 35.0	24.56±3.50		
Family History				
No	18.0 – 35.0	25.71±4.68	t = 1.815	0.074
Yes	18.0 – 35.0	24.13±3.33		

Table (5):   Multivariate linear regression analysis for factor affecting Dermatology life quality index (DLQI)

	B	Beta	t	p
Sex (1 = male / 2 female)	-3.969	-0.228	2.042[*]	0.045[*]
Age	-0.415	-0.069	0.603	0.549
Marital status (Divorced = 3)	6.552	0.440	2.976[*]	0.004[*]
Occupation	-1.103	-0.200	1.933	0.057
BMI	-0.181	-0.122	1.023	0.310
Educational level	0.501	0.054	0.486	0.629
Income	-2.912	-0.164	1.604	0.113
Duration of disease	0.508	0.055	0.523	0.602
Lesion Localisation Site				
Head /neck	-1.628	-0.091	0.575	0.567
Extremities	-3.759	-0.212	1.381	0.171
Genitals	-3.914	-0.183	1.261	0.211
Trunk	12.420	0.457	3.540[*]	0.001[*]
Percentage of involvement	0.320	0.046	0.420	0.675
Cause of Vitiligo According Patient Perceived (Psychological Stress)	-0.251	-0.047	0.414	0.680
Family history	2.836	0.164	1.609	0.112
$R^2 = 0.506$, F = 4.908[*], p<0.001				

Table 6: Multivariate linear regression analysis for factor affecting Rosenberg Self-Esteem Scale

	B	Beta	t	p
Sex (1 = male / 2 female)	0.012	0.001	0.010	0.992
Age	0.122	0.043	0.283	0.778
Marital status (Divorced = 3)	-0.165	-0.023	0.119	0.905
Occupation	-0.023	-0.009	-0.065	0.948
BMI	0.016	0.023	0.143	0.887
Educational level	-0.519	-0.119	0.800	0.426
Income	-0.130	-0.016	0.114	0.910
Duration of disease	0.528	0.122	0.867	0.389
Lesion Localization Site	-0.402	-0.048	0.226	0.822
Head /neck	1.310	0.157	0.767	0.445
Extremities	0.251	0.025	0.129	0.898
Genitals	-0.592	-0.046	0.269	0.789
Trunk	-0.105	-0.032	0.221	0.826
Percentage of involvement	0.253	0.100	0.664	0.509
Causes of disease (Psychological stress)	-2.256	-0.278	2.040[*]	0.045[*]
Family history	-0.402	-0.048	-0.226	0.822
$R^2 = 0.122$, F = 0.667, p = 0.808				

Discussion

According to the data gathered the results of our study displayed that in 34.1% of vitiligo patients there was a very large effect on the quality of life and total mean DLQI of 12.02. Similar results were also perceived in other studies (Zandi, et al., 2016). Other research confirmed these results when recording the DLQI mean score from a low of 4.82 to a high of 10.67 (Parsad etal. 2003, Aghaei etal. 2004). The DLQI average value in our analysis was 9.09, which suggested a moderate level among the research in contrast with Hammam et al., (2019) and Eltaher et al., (2015). But, Parsad et al., (2003) stated a great DLQI score of 10.67 between patients in India, and advanced mean DLQI scores were stated in Saudi Arabia, (Al-Robaee, 2007) of 14.7 and (Al-Mubarak et al., 2011) 17.1.

There was a statistically significant relation between DLQI score and marital status found merely in this study and not in further studies. 27.0%, of the divorced patients showed high

effect on DLQI score than single patients 10.33% with statistical significant . This result agrees with Dolatshahi et al., (2008) who found a relation between marital status and quality of life but the mean score of impairment was higher in married patients than social status.

In addition, college education was statistically significant with quality of life, in agreement with the results of a preceding study Bae etal., 2018 found that advanced educational level was associated with emotional. A study by Mishra et al., 2014 shown that significant negative correlation with DLQI score also proposed higher education can decline the load of vitiligo on quality of life or greater education allow patients with rational thinking about vitiligo.

In this study, it showed that patients with vitiligo in trunk had a poorer quality of life than other lesion localisation sites with a statistically significant relation between Dermatology life quality index (DLQI) and Lesion Localisation Site (p- 0.001). This finding is inconsistent with Hedayat et al., 2016, Sampogna et al., 2008) who found no significant relationship between quality of life and uncovered areas (hand, face, foot). Also, many other studies disagree with Dolatshahi et al., (2008) and Linthorst et al., (2009). However, several studies in the same line displayed that patients had greater scores of QoL while having problems on observable sites (Steele and Min, 2017, Bae et al., 2018). While, in some previous studies (Karelson et al., 2013, Kiprono et al., 2013, Mishra et al., 2014) it was illustrated that the degree of vitiligo across various cultural backgrounds has been consistently reported to be associated with reduced QoL

In this study, the patients with vitiligo displayed psychological stress as a precipitating factor, which agrees with Hammam et al., (2019), found that, 58 (28.6%) of the patients with vitiligo revealed stress as predisposing factor, also, Cucchi et al., (2000) shown that psychological stress rises level of neuroendocrine hormones, which disturb the immune system and impaire the level of neuropeptides. The rise in the level of neuropeptides can be the introducing occasion in pathogenesis of vitiligo. However, there is a significant relation between percentages of involvement. This is confirmed by the results described by Andrade et al., (2020). Also, past research investigating vitiligo 's effect on QoL has shown more than 25 percent of patients with body surface area have signs of self-confidence, difficulty with schoolwork and friendships (Silverberg,2014).

Multiple-factor logistic analysis presented that sex, marital status and lesion localisation site were the chief factors influencing the QoL. This result is consistent with Hammam et al., (2019), displayed that difference was highly statistically significant and indicated that the consequence of QOL in female patients with vitiligo was primarily predisposed than their male counterparts.. Also, there are many other studies which had described lesser QoL in females with vitiligo (Karelson etal., 2013, Mubarak et al., 2011, Sharath Kumar et al., 2013, Hedayat et al.,2016) and this is inconsistent with consequences stated by Zandi et al., (2010) and Mishra et al al., (2014) who reported that there was no statistically significant gap between women and men seen in DLQI. The greater effect on the quality of life of female patients could be due to

their appearance and possible effects on their marital status becoming more emotional and reactive. However, lesion localisation was a positive impact on a higher score of DLQI. This finding is in agreement with Gül et al., (2017) who found that localisation of body lesion was assessed as a possible influence to clarify the significantly higher DQoLI self-esteem scores detected in the controls compared to the patient group. But in the patients with vitiligo, DQoLI, self-esteem or body image scores were not significantly statistically different between the patients with or without extremity, trunk and head-neck lesions, and also between the patients with multiple-site or single-site lesions. The influence of vitiligo on QoL differs in patients with changed demographic and clinical characteristics. In the most of the prior studies, females displayed additional QoL impairment compared to males (Amer et al., 2016). While Bae et al., (2018) found that visible body parts and a wider region of the affected body were frequently correlated with QoL impairment.

Finally, Multiple logistic regression analyses were used to recognise affecting factors with self-esteem only found psychological stress was negative effect on self-esteem (β=-0.278, t=2.040, p= 0.045). while , Bonotis, et al., 2016 mentioned that Skin illnesses alter the body image with probable negatively effects on the psychosocial and health related quality of life of patients

Conclusions

In conclusion, vitiligo has profound effects on the self-esteem and quality of life of patients. Age, sex, marital status and lesion localisation site in the trunk are the most noticeable factora affecting the quality of life. Whereas, causes of disease (Psychological stress) is the only influencing factor on patient self-esteem. Therefore, the assessment of self-esteem and QL should be presented as a main indicator in care of patients and clinical practice.

Relevance to clinical practice

The findings of the current research will have consequences for our understanding of the role of psychological problems in vitiligo patients. When discussing skin disease patients, we must take into account the effect on the self-esteem and quality of life of a person and strive to develop treatments that resolve these factors. In both the prevention and identification of the affecting factors, focusing on vitiligo patients with increasing self-esteem and enhancing their quality of life should help.

Limitation

The DQL index evaluates the consequence of any dermatological disease throughout the previous 2 weeks and might not reveal the extensive period consequences of the disease.

Conflicts of Interest

Acknowledgment

REFERENCES

Aghaei S, Sodaifi M, Jafari P *et al*. DLQI scores in vitiligo (2004): reliability and validity of the Persian version. *BMC Dermatol*; 4: 8.

Al ARl, A. R. (2007): Assessment of quality of life in Saudi patients with vitiligo in a medical school in Qassim province, Saudi Arabia. Saudi medical journal, 28(9), 1414-1417.

Al-Mubarak, L., Al-Mohanna, H., Al-Issa, A., Jabak, M., & Mulekar, S. V. (2011): Quality of life in Saudi vitiligo patients. *Journal of cutaneous and aesthetic surgery*, *4*(1), 33.

Amer AAA, Gao X-H (2016): Quality of life in patients with vitiligo: an analysis of the dermatology life quality index outcome over the past two decades. Int J Dermatol.;55: 608–614. pmid:26749040

Andrade, G., Rangu, S., Provini, L., Putterman, E., Gauthier, A., & Castelo-Soccio, L. (2020). Childhood vitiligo impacts emotional health of parents: a prospective, cross-sectional study of quality of life for primary caregivers. *Journal of Patient-Reported Outcomes*, *4*(1), 1-5.

Bae, J. M., Lee, S. C., Kim, T. H., Yeom, S. D., Shin, J. H., Lee, W. J., ... & Park, C. J. (2018). Factors affecting quality of life in patients with vitiligo: a nationwide study. *British Journal of Dermatology*, *178*(1), 238-244. https://doi.org/10.1111/bjd.15560

Bellei, B., Papaccio, F., Filoni, A., Caputo, S., Lopez, G., Migliano, E., & Picardo, M. (2019). Extracellular fraction of adipose tissue as an innovative regenerative approach for vitiligo treatment. *Experimental dermatology*, *28*(6), 695-703. DOI: 10.1111/exd.13954

Böhm D, Stock Gissendanner S, Bangemann K, Snitjer I, Werfel T, Weyergraf A, Schulz W, Jäger B, Schmid-Ott G. (2013). Perceived relationships between severity of psoriasis symptoms, gender, stigmatization and quality of life. (*J Eur Acad Dermatol Venereol.*;27(2):220-206.

Bonotis, K., Pantelis, K., Karaoulanis, S., Katsimaglis, C., Papaliaga, M., Zafiriou, E., & Tsogas, P. (2016). Investigation of factors associated with health-related quality of life and psychological distress in vitiligo. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*, *14*(1), 45-48. https://doi.org/10.1111/ddg.12729.

Borimnejad, L., Yekta, Z. P., Nikbakht-Nasrabadi, A., & Firooz, A. (2006). Quality of life with vitiligo: comparison of male and female muslim patients in Iran. *Gender medicine*, *3*(2), 124-130. https://doi.org/10.1016/S1550-8579(06)80201-9

Chan, M. F., Chua, T. L., Goh, B. K., Aw, C. W. D., Thng, T. G. S., & Lee, S. M. (2012). Investigating factors associated with depression of vitiligo patients in Singapore. *Journal of clinical nursing*, *21*(11-12), 1614-1621.

Cucchi, M. L., Frattini, P., Santagostino, G., & Orecchia, G. (2000). Higher plasma catecholamine and metabolite levels in the early phase of nonsegmental vitiligo. *Pigment cell research*, *13*(1), 28-32.

Dolatshahi, M., Ghazi, P., Feizy, V., & Hemami, M. R. (2008). Life quality assessment among patients with vitiligo: comparison of married and single patients in Iran. *Indian Journal of Dermatology, Venereology, and Leprology*, *74*(6), 700

Etaher, S. M., & Araby, E. M. (2015). Health Related Quality Of Life In Patients With Vitiligo. *Egyptian Journal of Community Medicine*, *33*(2)

Finlay A. and Khan G. (1994). Dermatology Life Quality Index (DLQI): a simple practical measure for routine clinical use. Clin Exp Dermatol; 19: 210-216.

Finlay, A. Y. (2004). Quality of life indices. *Indian Journal of Dermatology, Venereology, and Leprology*, *70*(3), 143.

Grimes, P. E. (Ed.). (2008). *Aesthetics and cosmetic surgery for darker skin types*. Lippincott Williams & Wilkins.

Gül, F.. *, Kara H 2 , Nazik H3 , Kara D, Karaca B* (2017). Body image, self-esteem and quality of life in vitiligo patients who lives in eastern of Turkey. *Journal of Clinical and Experimental Investigations*, *8*(2), 52-57.

Gümüş AB, Çevik N, Hysuni SH, Biçen Ş, Keskin G, Malak AT. (2011) . Characteristics associated with self-e teem and body image in pregnancy. Anatol J Clin Invest , 5:7-14.

Hamidizadeh, N., Ranjbar, S., Ghanizadeh, A., Parvizi, M. M., Jafari, P., & Handjani, F. (2020). Evaluating prevalence of depression, anxiety and hopelessness in patients with Vitiligo on an Iranian population. *Health and Quality of Life Outcomes*, *18*(1), 20.

Hammam, M. A., Yasien, H. A., & Algharably, A. F. (2019). Effect of Vitiligo Area Scoring Index on the quality of life in patients with vitiligo. *Menoufia Medical Journal*, *32*(1), 244.

Harlow, D., Poyner, T., Finlay, A. Y., & Dykes, P. J. (2000). Impaired quality of life of adults with skin disease in primary care. *British Journal of Dermatology*, *143*(5), 979-982.

Hedayat, K., Karbakhsh, M., Ghiasi, M., Goodarzi, A., Fakour, Y., Akbari, Z., ... & Ghandi, N. (2016). Quality of life in patients with vitiligo: a cross-sectional study based on Vitiligo Quality of Life index (VitiQoL). *Health and quality of life outcomes*, *14*(1), 86. DOI 10.1186/s12955-016-0490-y

Holme, S. A., Beattie, P. E., & Fleming, C. J. (2002). Cosmetic camouflage advice improves quality of life. *British Journal of Dermatology*, *147*(5), 946-949.

HomanMW, Spuls PI, de Korte J, Bos JD, Sprangers MA, Van der Veen JP. The burden of vitiligo: patient characteristics associated with quality of life. Journal of the American Academy of Dermatology. 2009 Sep; 61(3): 411-20

Karelson M.; Silm H.; Kingo K. (2013). Quality of life and emotional state in vitiligo in an Estonian sample: comparison with psoriasis and healthy controls. *ActaDerm Venereol.* 6;93(4):446-50.

Khoury, L. R., Danielsen, P. L., & Skiveren, J. (2014). Body image altered by psoriasis. A study based on individual interviews and a model for body image. *Journal of dermatological treatment*, 25(1), 2-7.. 201 ;;4;5:2-7

Kiprono, S., Chaula, B., Makwaya, C., Naafs, B., & Masenga, J. (2013). Quality of life of patients with vitiligo attending the Regional Dermatology Training Center in Northern Tanzania. *International journal of dermatology*, 52(2), 191-194.

Lacerda, K. A. P., Silva, L. A., Mendonca, G. S., Guimarães, R. A., & Guilo, L. A. (2020). Association between quality of life and perceived stress in patients with vitiligo: case control study. *Bioscience Journal*, 36(3)

Mishra N.; Rastogi M.; Kahalaut P.; Agrawal S. (2014): Dermatology Specific Quality of Life in Vitiligo Patients and Its Relation with Various Variables: A Hospital Based Cross-sectional Study. *Journal of Clinical and Diagnostic Research* : JCDR, 8(6), YC01–YC03.

Moyakine, A. V., Spillekom-van Koulil, S., Kupers, E. M., & van der Vleuten, C. J. M. (2018). Influence of infantile hemangioma severity and activity on QoL of patients and their parents: A cross-sectional study. Pediatric Dermatology, 35(5), 628–634. https://doi.org/10.1111/pde.13599

Pahwa P, Mehta M, Khaitan BK, Sharma VK, Ramam M. The psychosocial impact of vitiligo in Indian patients. Indian J Dermatol Venereol Leprol. 2013; 79:679-85. doi: 10.4103/0378-6323.116737

Papadopoulos L, Bor R, Legg C. Coping with the disfiguring effects of vitiligo: a preliminary investigation into the effects of cognitive-behavioural therapy. *Br J Med Psychol* 1999; 72: 385-96.

Parsad D, Pardhi S, Dogry K, Kanswar G, Kumar M. Dermatology life quality index score in vitiligo and its impact on the treatment outcome. Br J Dermatol 2003; 148:373–374.

Pustisek, N., Vurnek Zivkovic, M., & Situm, M. (2016). Quality of life in families with children with atopic dermatitis. Pediatric Dermatology, 33(1), 28–32. https://doi.org/10.1111/pde.12698.

Rodrigues, M., Ezzedine, K., Hamzavi, I., et al. (2017). New discoveries in the pathogenesis and classifcation of vitiligo. Journal of the American Academy of Dermatology, 77(1), 1–13. https://doi.org/10.1016/j.jaad.2016.10.048.

Rosenberg, M. (1965). Society and the adolescent self-image. Princeton, NJ: Princeton

Sampogna F, Raskovic D, Guerra L, Pedicelli C, Tabolli S, Leoni L, et al. Identification of categories at risk for high quality of life impairment in patients with vitiligo. Br J

Dermatol. Blackwell Publishing Ltd;b2008; 159: 351–359. https://doi.org/10.1111/j.1365

Sarkar S, Sarkar T, Sarkar A, Das S. (2018):Vitiligo and psychiatric morbidity: A profile from a vitiligo clinic of a rural-based tertiary care center of eastern India. Indian J Dermatol 63:281-4. doi: 10.4103/ijd.IJD_142_18

Sharma, D., Mathur, D. M., Jeenger, J., Sharma, M., & Gupta, K. (2018). Quality of life and self-esteem in patients with psoriasis, vitiligo and healthy controls: A cross sectional study. *RSES*, *3*, 0-000.

Silverberg, J. I., & Silverberg, N. B. (2014). Quality of life impairment in children and adolescents with vitiligo. Pediatric Dermatology, 31(3), 309–318.

Silverberg, N. B.. The Epidemiology of Vitiligo. Current Dermatology Reports, Switzerland, v. 4, n. 1, p. 36-44, 2015. https://doi.org/10.1007/s13671-014-0098-6

Sindhu S.; Sindhu S.; Gopal M.; Ramesh M.; Nandini A.; Namrata C. (2013): Quality of life in male and female vitiligo patients. *Journal of Evolution of Medical and Dental Sciences*;2(48), Page: 9315-9322.

Taïeb A, Picardo M. The definition and assessment of vitiligo: a consensus report of the Vitiligo European Task Force. Pigment Cell Res 2007; 20:27–35.

University Press.

Wang K, Zing K, Zhann Z. Health-related life quality and marital quality of vitiligo in China. J Eur Acad Dermatol Venereol 2011; 25:429–435.

Wong SM, Min K, Lo A. Quality of life among Malaysian patients with vitiligo. J Assoc Inf Sci Technol. 2017; 63: 1079–1091. https://doi.org/10.1111/j.1365-4632.2011.04932.

Zandi S.; Farajzadeh S.; Saberi N. (2016): Effect of vitiligo on self reported quality of life in Southern part of Iran. *Journal of Pakistan Association of Dermatologists,* 21:4-9.

Zhang, Y., Cai, Y., Shi, M., Jiang, S., Cui, S., Wu, Y., ... & Chen, H. D. (2016). The prevalence of vitiligo: a meta-analysis. *PloS one*, *11*(9), e0163806.