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Original Article

The Influence of Treatment Modalities on the Quality of Life of Psoriasis Patients

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Abstract

Background: We aimed to identify the quality of life (QoL) of patients with psoriasis, to determine the possible differences depending on the therapeutic modalities (biologic, conventional treatment and phototherapy), and to examine other variables that could affect the success of the treatment.

Methods: This research was a non-experimental, quantitative, observational study that included 183 psoriasis patients. The study was conducted from November 2021 to December 2022 at the University Clinical Center Kragujevac, Serbia. The following instruments were used: Dermatology Life Quality Index (DLQI), Psoriasis Area and Severity Index (PASI), as well as a general questionnaire that contained a set of questions which referred to sociodemographic data.

Results: There was a statistically significant difference in the average values of the DLQI score concerning the application of different therapeutic modalities ($P<0.001$). Biologic treatment was the modality with the lowest impairments in the QoL domain (average value of DLQI score 10.6±7.3), followed by patients on conventional treatment (average value of DLQI score 12.9±7.9), and the highest levels of impaired QoL were in patients who received phototherapy (average value of the DLQI score 13.7±9.3).

Conclusion: Patients on biological therapy at all four time points individually (baseline, 4, 12 and 16 weeks) had the lowest average values of the DLQI score, i.e. the best QoL compared to subjects who received other therapy.

Keywords: Quality of life; Psoriasis; Biologics; Phototherapy; Conventional treatment

Introduction

Psoriasis is an incurable chronic, inflammatory dermatosis that, due to its nature, significantly negatively affects the patient's quality of life (QoL), more so than any other dermatological disease (1). The goal of the treatment is to minimize unfavorable effects through adequate and timely application of therapy, prevention of comorbidity, through the implementation of healthier lifestyle habits, and personalized approaches to treatment (2).

Therapeutic modality selection guidelines vary globally with no universally agreed approach. Proper assessment of disease severity, comorbidities, and contraindications is essential before initiating treatment for optimal outcomes (3). Success is determined after 16 weeks, specifically the induction phase, requiring a 75% improvement in the PASI score or a 50% improvement in both the PASI and DLQI scores (3).

Moderate-to-severe psoriasis (PASI≥10) commonly involves phototherapy, conventional systemic treatment, and biologic treatment, which can be combined for maximum effectiveness. The patient's self-assessment and QoL significantly influence treatment strategies (2, 3).

Conventional systemic treatment (4, 5) and phototherapy (6, 7) are effective. New molecularly targeted therapies not only alleviate skin lesions and symptoms but also improve QoL and treatment outcomes (8, 9). Sociodemographic factors like gender, age, residence, and education level can predict impaired QoL in psoriasis patients (10).

We aimed to gather real-world evidence on the quality of life in psoriasis patients, comparing different therapeutic modalities (biological, phototherapy, conventional therapy) at various time points. We explored whether demographic and socio-economic characteristics could predict treatment effectiveness as well. This research was the first of its kind in the region and provided valuable insights into the challenges and outcomes of psoriasis treatment.

Methods

Study design

The study, a non-experimental quantitative observation, aimed to assess psoriasis patients' QoL and potential variations based on real-world therapeutic approaches. Ethical approval (No. 01.21-375, date: October 28, 2021) was granted by the Ethics Committee of the University Clinical Center Kragujevac, adhering to the Declaration of Helsinki (11) principles.

Data collection

Questionnaires were used to collect data on sociodemographics and QoL of psoriasis patients. Data were gathered from November 2021 to December 2022 at four time points: baseline, 4, 12, and 16 weeks into therapy (3). The study included University Clinical Center Kragujevac, Serbia patients, aged over 18, receiving phototherapy, conventional systemic therapy, or biological therapy with PASI scores above 10.

Measurements

The Dermatology Life Quality Index (DLQI) (12) is widely used to quantify health-related QoL in psoriasis patients. It assesses symptoms, activities, leisure, work/school, relationships, and treatment effects.

The PASI (13) measures skin involvement and clinical severity, rating erythema, desquamation, and infiltration across four body regions. A PASI score of 10 or above indicates moderate to severe psoriasis.

PASI75 is the key measure of treatment effectiveness, with PASI90 or even PASI100 becoming sought-after with advanced therapies (14).

The general questionnaire covers sociodemographics: gender, age, marital status, residency, education, property, and employment.

Statistical analysis

All pertinent data were analyzed using suitable statistical methods based on data type. The Chi-square test assessed differences in categorical variable frequencies. Independent Samples Test and ANOVA compared mean DLQI scores among diverse groups. Statistical processing occurred using SPSS, version 23.0 (IBM Corp., Armonk, NY, USA).

Results

Overall, 183 patients with a confirmed diagnosis of psoriasis participated, 108 (59%) were men and 75 (41%) were women. The average age of all subjects was 47.5±14.9 years (Table 1).

Table 1: Demographic and socio-economic characteristics of respondents in total and by gender

Variable	***Total***		***Gender***				***P****
			Male		Female		
	n	%	n	%	n	%	
Age (Mean/SD)	47.5±14.9		46.4±13.9		49.1±16.2		*P*=0.256
Age group (yr)							
19-29	27	14.8	17	15.7	10	13.3	*P*=0.061
30-39	37	20.2	22	20.4	15	20.0	
40-49	36	19.7	21	19.4	15	20.0	
50-59	36	197	26	24.1	10	13.3	
60-69	36	19.7	20	18.5	16	21.3	
70-79	11	6.0	2	1.9	9	12.0	
Marital status							
Married	119	65.0	77	71.3	42	56.0	*P*=0.001
Not married	31	16.9	19	17.6	12	16.0	
Divorced	16	8.7	10	9.3	6	8.0	
Widowed	17	9.3	2	1.9	15	20.0	
Residence							
Rural	54	29.5	32	29.6	22	29.3	*P*=0.850
Suburban	45	24.6	25	23.1	20	26.7	
Urban	84	45.9	51	47.2	33	44.0	
Education level							
Primary	12	6.6	3	2.8	9	12.0	*P*=0.43
Secondary	111	60.7	67	62.0	44	58.7	
Tertiary/University	60	32.8	38	35.2	22	29.3	
Income							
Low	22	12.0	13	22.0	9	12.0	
Average	67	36.6	39	36.1	28	37.3	*P*=0.985
Good	94	51.4	56	51.9	38	50.7	
Employment status							
Employed	108	59.0	73	67.6	35	46.7	*P*=0.018
Unemployed	51	27.9	24	22.2	27	36.0	
Retiree	24	13.1	11	10.2	13	17.3	
Total	183	100	108	59.0	75	41.0	

*Chi-square test

Psoriasis appeared on average at the age of 34.5±13.7 years. The average duration of the disease from the moment of diagnosis was 12.9±10.3 years. The duration of the disease was from 1 to 45 years. The average PASI score was 23.1±6.5, indicating that 97.8% of patients had severe psoriasis. No significant difference was found in the PASI scores between men (23.3±6.9) and women (22.9±5.9).

Based on the total DLQI score, 52.5% of patients reported a very large impact of psoriasis on their QoL, 43.2% reported a large impact, and only 0.5% reported a small impact. Significant differences were observed in the average DLQI scores among different treatment modalities ($P<0.001$). Patients on biological therapy had the best QoL (DLQI score: 10.6±7.3), followed by those on conventional systemic therapy (DLQI score: 12.9±7.9), and phototherapy (DLQI score: 13.7±9.3).

Repeated measures analysis revealed a significant improvement in QoL over time for all three therapies. Patients on biological therapy consistently showed the lowest DLQI scores at all-time points, indicating better QoL compared to conventional treatment and phototherapy. However, this difference was statistically significant only in the 4th week of therapy application (Table 2).

Table 2: Description of the DLQI score concerning the type of treatment at the observed time points

DLQI	*Biologics*	*Conventional*	*Phototherapy*	*P***
	Mean±SD	Mean±SD	Mean±SD	
0	18.3±6.7	20.8±5.0	22.7±4.7	0.001
4	11.2±5.3	16.3±4.7	18.3±5.1	0.001
12	6.3±4.8	8.2±5.3	8.4±6.9	0.111
16	5.3±4.5	6.6±6.5	6.7±6.1	0.715
*P**	0.001	0.001	0.001	

*A one-way repeated measures ANOVA
**ANOVA

When comparing DLQI results between patients who received biological and conventional systemic therapy, subjects who received biological therapy had statistically significantly lower values, i.e., better QoL, in the 4th and 12th weeks of therapy.

We compared the subjects who received biologics and phototherapy, and noticed that the subjects on biologics achieved better QoL, i.e., lower values of the DLQI score in all weeks, but the difference between the mean values of the DLQI score was statistically significant in the 4th week of therapy application ($P<0,001$).

By comparing subjects who received conventional systemic therapeutics with those who received phototherapy, subjects who received conventional therapy had a better QoL in the 4th week of therapy application. At the other time points of observation, there were no significant differences in the average values of the DLQI score in relation to the type of therapy that the subjects received (Table 3).

Table 3: Differences in QoL between different treatment

DLQI	*Biologics /Conventional*		*Biologics /Phototherapy*		*Conventional /Phototherapy*	
	t	*P*	*t*	*P*	*t*	*P**
0	-2.344	0.021	-4.286	0.001	-2.225	0.028
4	-5.511	0.001	-7.206	0.001	-2.084	0.039
12	-1.989	0.049	-1.777	0.079	-0.128	0.898
16	-0.238	0.812	0.594	0.554	0.721	0.472

* Independent Samples t Test

There was a significant influence of the time of application of all three types of treatments within all five dimensions of QoL, there are statistically significant changes in mean score values at the observed time points within each domain individually. With the passage of time and the application of therapy, the average DLQI results decreased and the reduced QoL in each dimension stabilized (*P*<0.001) (Table 4).

Table 4: Description of DLQI scores for dimensions of QoL in observed time points of therapy application

DLQI	***Symptoms and feelings***	***Daily activities***	***Leisure***	***Work and school***	***Personal relationships***	***Treatment***
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
0	4.9±1.2	4.6±1.4	3.6±1.6	2.6±1.1	2.6±1.6	2.5±1.6
4	3.5±1.2	3.4±1.5	2.7±1.5	1.7±1.3	1.8±1.2	1.9±0.8
12	1.9±1.2	1.6±1.4	1.2±1.2	0.9±1.2	0.7±1.0	1.1±0.8
16	1.0±1.4	0.9±1.4	0.7±1.1	0.7±1.2	0.5±0.9	0.6±0.8
P	0.001	0.001	0.001	0.001	0.001	0.001

*A one-way repeated measures ANOVA

Subjects who received biologics achieved the lowest results within each dimension of QoL. This difference was statistically significant in all dimensions of QoL in the 4th week (except in the domains of work and school) and in the 16th week of therapy for all dimensions of QoL (Table 5).

Table 5: Description of DLQI score values for QoL dimensions of psoriasis patients concerning the type of treatment

DLQI		***Symptoms and feelings***	***Daily activities***	***Leisure***	***Work and school***	***Personal relationships***	***Treatment***
Week	Treatment	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
0	Biologics	4.2±1.3	3.9±1.6	3.2±16	2.2±1.1	2.4±1.7	2.1±0.7
	Conventional	5.1±1.1	4.7±1.2	3.5±1.4	1.9±1.3	2.8±1.6	2.5±0.5
	Phototherapy	5.4±0.9	5.2±1.1	3.9±1.7	2.6±0.9	2.6±1.5	2.8±0.3
	P	0.001	0.001	0.065	0.004	0.442	0.001
4	Biologics	2.7±1.1	2.3±1.2	2.0±1.3	1.5±1.3	1.3±1.0	1.4±0.8
	Conventional	3.7±1.2	3.7±1.3	2.8±1.3	1.8±1.3	2.1±1.2	2.1±0.7
	Phototherapy	4.1±1.1	4.2±1.3	3.4±1.5	1.8±1.4	2.1±1.3	2.4±0.5
	P	0.001	0.001	0.001	0.368	0.001	0.001
12	Biologics	1.7±1.1	1.3±1.1	1.1±1.1	0.8±1.2	0.5±0.8	0.7±0.7
	Conventional	2.0±1.1	1.7±1.4	1.3±1.0	0.9±1.2	0.9±1.1	1.2±0.7
	Phototherapy	2.1±1.5	1.8±1.7	1.2±1.0	1.0±1.3	0.6±1.1	1.4±0.9
	P	0.180	0.064	0.638	0.714	0.091	0.001
16	Biologics	0.5±0.9	0.4±0.9	0.3±0.7	0.4±1.0	0.1±0.4	0.2±0.5
	Conventional	1.2±1.6	1.3±1.6	1.2±1.1	1.0±1.1	1.0±1.0	0.8±0.8
	Phototherapy	1.2±1.6	1.2±1.5	0.8±1.3	0.9±1.4	0.4±1.0	1.0±0.8
	P	0.011	0.002	0.001	0.004	0.001	0.001

*A one-way repeated measures ANOVA

Observed in relation to gender, at the level of the entire sample, women had a significantly lower level of QoL measured by the DLQI questionnaire, i.e., the average value of the DLQI score in men was 11.8±8.2, and in women 13.2±8.4 (t=-2.192, *P*=0.029). Observed in relation to the type of therapy that the subjects received, no differences were observed between the DLQI results according to gender in subjects on biological (t=-0.292, *P*=0.771), conventional systemic (t=-1.163, *P*=0.246), and phototherapy (t=-0.633, *P*=0.527). The correlation analysis revealed a positive linear relationship between the total DLQI score and the age of the subjects, indicating that QoL decreased with age (r=0.100, *P*=0.007). Younger respondents (aged 19-29), highly educated individuals from urban areas, and those with a positive financial status had statistically lower DLQI scores, reflecting better QoL. Patients on biological therapy generally achieved better QoL across observed demographic and socio-economic variables, except for patients aged 70-79, where those receiving phototherapy had the best QoL, although not statistically significant (Table 6).

Table 6: Description of the DLQI score concerning the demographic and socio-economic of the subjects and the type of treatment

Variable	*Biologics*	*Conventional*	*Phototherapy*	*Total*	*P***
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Age group (yr)					
19-29	9.5±5.3	11.8±8.9	12.5±10.1	11.4±8.5	0.199
30-39	9.5±7.4	11.9±9.1	12.9±10.1	11.5±9.0	0.174
40-49	11.3±7.7	12.5±8.4	16.7±10.2	13.2±8.9	0.014
50-59	9.3±7.2	13.0±7.5	14.3±8.4	12.1±7.9	0.007
60-69	11.8±7.6	14.8±6.2	14.4±7.3	13.5±7.1	0.065
70-79	15.6±6.0	13.0±5.9	10.7±7.2	12.3±6.8	0.195
*P**	0.093	0.517	0.187	0.213	
Education level					
Primary	9.2±8.0	12.4±6.7	12.1±10.2	10.9±7.0	0.432
Secondary	11.2±7.2	14.7±7.2	15.2±8.6	13.4±7.8	0.001
Tertiary/University	8.9±7.0	10.6±8.6	10.3±6.7	9.7±8.9	0.109
*P**	0.089	0.001	0.018	0.001	
Residence					
Rural	10.9±8.2	14.6±7.2	14.3±7.8	13.4±7.9	0.013
Suburban	11.7±6.3	12.3±7.6	15.1±9.3	13.3±8.3	0.057
Urban	10.3±7.0	12.1±8.6	11.9±10.1	11.1±8.3	0.125
*P**	0.587	0.096	0.096	0.002	
Employment status					
Unemployed	9.7±6.8	14.2±6.8	15.7±7.8	13.4±7.4	0.001
Employed	10.1±7.3	12.1±8.6	13.5±10.2	11.8±8.8	0.003
Retiree	13.5±7.3	0.0	12.3±7.5	12.8±7.4	0.443
*P**	0.015	0.043	0.174	0.065	
Marital status					
Widowed	13.5±6.8	11.4±5.5	13.8±6.6	12.7±6.2	0.343
Divorced	7.5±6.7	12.6±7.5	21.7±9.0	13.7±9.6	0.001
Married	10.5±7.2	13.7±8.1	12.4±8.8	11.9±8.1	0.001
Not married	0.0±0.0	11.9±8.8	13.7±9.6	12.9±9.3	0.277
*P**	0.016	0.358	0.001	0.291	
Income					
Low	12.6±7.9	15.1±5.9	19.6±7.5	15.5±7.5	0.002
Average	11.1±7.7	13.1±7.6	14.0±9.2	12.1±8.6	0.001
Good	9.8±6.7	12.3±8.6	12.6±9.2	11.7±7.8	0.346
*P**	0.123	0.186	0.003	0.001	

*A one-way repeated measures ANOVA
**ANOVA

A correlation analysis was used to examine the relationship between the disease severity (PASI score) and QoL (DLQ score) in patients with psoriasis. There was a significant positive correlation between the examined characteristics (r=0.812, $P<0.001$) at the level of the entire sample. Patients who had a higher PASI score, i.e., a more severe clinical picture, also had a higher DLQI score, i.e., a worse QoL. Correlation analysis of PASI and DLQI scores was performed for all four time points of therapy application, where a significant positive correlation was also determined in week 4 (r=0.812, $P<0.001$), week 12 (r=0.812, $P<0.001$) and 16 weeks (r=0.812, $P<0.001$) between the observed features.

Discussion

In our research, the QoL of patients with psoriasis was examined in relation to the applied therapeutic modality as well as other variables that could negatively affect the QoL.

According to our data, the reduction of impaired QoL for all treatments modalities was statistically significantly correlated in a positive way with time during the induction period for all tested treatments and in all tested domains of QoL. We must point out that only subjects who regularly received therapy participated in our research and the results did not take into account all those who gave up at any time or whose treatment was excluded due to impaired health. In the baseline visit, as many as 52.5% of respondents believed that psoriasis had a very large impact on the QoL, 43.2% believed that it had a large impact, and only 0.5% believed that psoriasis had a small impact, which is significantly more in comparison with other works on the impaired QoL of patients with psoriasis (15). This can be explained by the fact that the research we did only included participants who had PASI scores greater than 10, i.e., only severe manifestations of the disease were examined. But in a cross-sectional study examining only at moderate to severe psoriasis, very similar results were obtained as in our study, the authors found that the DLQI score had a mean±SD of 18.3±7.3, and 90% of subjects had a very large and large impact of the disease on the QoL (16).

After the 16th week and induction phase, patients on biological therapy showed the greatest QoL improvement, followed by those on conventional systemic therapy. Patients on phototherapy experienced a slightly more negative impact on QoL compared to conventional therapy. Similar data from various studies support the superiority of biological agents (5, 8, 17, 18). Norris et al. also found significant progress in both QoL and disease severity among patients receiving biologics (19). Meanwhile, the study of Flytström et al., comparing cyclosporine and methotrexate, reported no statistically significant difference in QoL measured by the DLQI questionnaire, although both agents met the basic parameters of therapy success (4).

Similar data on QoL can be found in a clinical study by Gahalaut et al. (7), which dealt with the effects of phototherapy on the DLQI and PASI scores. A significantly good therapeutic effect of phototherapy was shown, where the DLQI score in 12 weeks was 9.40±6.52 compared to the results of our study, where it was 8.4±6.9. Similarly, both their study and ours observed minimal improvement in the "work or school" subscale, which may be linked to socio-demographic factors. It's worth noting that the questionnaire provided "not relevant" as an option for this subscale. Respondents like retirees or the unemployed likely maintained the same response from the outset to the 12th week. With 41% of our sample selecting this option, it's reasonable to assume this scenario. Certain authors have even suggested specialized scoring methods for such responses to achieve a more accurate assessment of QoL (20). The DLQI questionnaire is useful, but we suggest using additional specific QoL questionnaires for more precise assessment. Studies combining the DLQI with specific questionnaires show significant differences in QoL domains (4). In our study, patients on biologics demonstrated a statistically significant improvement in QoL at week 16, particularly in domains like leisure, personal relationships, and treatment effects. These findings align somewhat with Houghton et al.'s study, where improvements were prominent in symptom and feeling domains, daily activities, and leisure (21).

It is essential to note that the population we examined had severe forms of psoriasis, causing disability in everyday life. Consequently, their primary focus was a quick return to normal life. Our research consistently showed lower DLQI scores in patients treated with biologics at all time points. This is attributed to the faster mechanisms of action of biological treatments compared to conventional systemic agents and phototherapy (2, 19).

In our study, focused on severe forms of psoriasis, we observed a more positive picture of QoL during therapy, with less damage in these areas compared to other works (7). We attribute these results to the potential impact of the COVID-19 pandemic, suggesting that patients experienced less social pressure and improved QoL. This observation aligns with research by Boch et al., who also reported a paradoxical improvement in DLQI during social restrictions caused by the pandemic (22).

Regarding socio-demographic factors, our entire sample showed a significant contribution to QoL deterioration. Gender differences were not significant in relation to the type of therapy, but women experienced greater damage in QoL, consistent with previous studies (1, 18). Our results partly align with a Madagascar study, which linked patients' QoL to factors like age, education level, and psoriasis severity, but found no gender correlation (23). Factors indicating a better QoL were higher education, urban residence, and positive financial self-assessment. Unemployment and low income have also been linked to lower QoL in other studies (1, 15). Decean et al. confirm these findings, highlighting that lower education levels generally correspond to poorer QoL compared to higher education levels (24).

In our study, age was identified as a predictor of impaired QoL in all patients. With increasing age, QoL tends to decrease due to overall health decline, comorbidities, limited therapy information, and coping challenges (1, 10).

Lopez-Mejia et al. found a significant correlation between psoriasis severity and patients' QoL (25). Similar studies also reported higher DLQI scores associated with higher PASI scores (18, 24, 26). Our study demonstrated a positive correlation between these parameters across all therapies and time points, although not our primary focus. However, some studies suggest that QoL in psoriasis patients might be independent of disease severity, possibly due to the emotional and psychological burden of psoriasis, irrespective of clinical manifestations (27, 28, 29).

Prignano et al.'s survey found physicians often underestimate patients' QoL, leading to patient dissatisfaction with treatment effects. Additionally, many respondents had not filled out QoL questionnaires (30).

These findings underscore the need for more research on real-world QoL in psoriasis, encouraging studies on treatment outcomes, well-being, and QoL in psoriasis patients in the future.

Conclusion

All therapies meet the treatment success criteria, but also that there were differences in the examined dimensions of the QoL of patients with psoriasis in relation to the type of therapy applied. The use of biological drugs, followed by conventional systemic treatments, was proven to be the most effective, and the slightest effect was seen in subjects undergoing phototherapy. Also, biological therapy showed a more significant impact on improving the QoL during the induction phase at all-time points examined. In addition to the type of therapy, the QoL was significantly influenced by sociodemographic factors such as gender, age, and financial status. It is necessary to continue conducting research that would help in choosing the optimal methods of treatment, taking into account the QoL and the well-being of patients, and to encourage dermatologists to approach the impaired QoL holistically and to adopt the concepts of QoL as close as possible to their work with patients.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of Interest

The authors declare that there is no conflict of interests.

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