CORRELATION ANALYSIS OF QUALITY OF LIFE (QoL) AND AREA IN PSORIATIC PATIENTS

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Abstract

Psoriasis is a chronic inflammatory disorder, involving TH17 cells. The disease is characterized by patches of scaly skin associated with itching. The patients are influenced psychologically and emotionally upon the appearance of symptoms which differs in respect to area and severity. Consequently, the present study was designed to evaluate correlation between area severity and its effect on life quality of patients. The area severity is measured by Psoriasis Area and Severity Index (PASI) and the quality of life of the patients is determined by the Dermatology Life Quality Index (DLQI). A total of 164 patients and 164 controls were enrolled for this purpose. The Pearson-Chi square value of PASI and DLQI score is 0.002 indicating an association amongst both. A significant difference was present among the DLQI values of cases and controls with the controls showing low score and higher values scored by patients. In addition, Psoriatic patients are observed to have a high body mass index, occurring usually in late teens and the early fifties. Females are observed to carry high DLQI scores without being influenced by age. Thus, the study found out associations amongst patient life quality, the severity of psoriasis in an individual along with additional parameters such as age, BMI and gender. The significance of the study is attributed to a dearth of research carried out for psoriatic patients based on a statistical nature**.**

Keywords

1. Introduction

Psoriasis is an inflammatory skin disease accompanied by signs of thick scaling red plaques on the skin, associated with excessive pruritus (itching) in the affected area (He *et al.,* 2013). The prevalent disease variant is plaque

psoriasis also called as psoriasis vulgaris, usually appearing on the scalp, extensor surfaces and trunk (Hawkes). The skin involvement may vary from person to person and may lead to higher mortality and morbidity rates in severe cases (Cargill *et al.,* 2007).

Around 3% of the world's population is affected by Psoriasis which is a chronic disease (Zachariae *et al.,* 2001). Patients are observed to report skin sensory symptoms that include itching, soreness, hurting, pain, discomfort, burning, stinging, irritation, and sensitivity of the skin (Ljosaa *et al.,* 2013). Prominent symptoms include well distinguished silvery white scales with visible alteration in finger and toenails. (Guttman, 2018).

Psoriasis has a significant negative impact on patients' health-related quality of life (HRQoL) along with alterations in their daily activities such as changed dressing habits. Feelings of shame, embarrassment and hopelessness in addition to suicidal ideation are prevalent among the individuals (Bhosle *et al.,* 2006).

Factors that adversely affect the symptoms are environmental factors, such as stress, infections, some drugs, alcohol intake and smoking. The patient suffering from the disease may see a recovery in the symptoms while at other times the conditions may worsen (REiCh *et al.,* 2007). Many instruments to determine Quality of Life (QoL) of such patients have been developed. DLQI is one such useful instrument for obtaining information about the impact of dermatologic disease on a person's QOL. It's a

10-question based instrument that is efficient to use and is easy to complete. The questions are based on work, leisure, daily activities, personal relationships, and treatments. Patients usually are at an ease to fill out the form (Hahn *et al.,* 2001). The patients are recorded to take 1-3 minutes to complete the text version of DLQI that is 124 seconds mean time for text only form of DLQI (Lewis & Finlay 2004).

In addition to life quality, area severity is also an important factor which may be quantified by many tools, one of which is Psoriasis Area and Severity Index (PASI). It is a widely used tool that evaluates psoriasis area with respect to erythema (redness), desquamation (scaling) and induration (thickness). The quantification is done in score form with the PASI score ranging from 0 to 72 (Schäfer *et al.,* 2010). In order to measure the response of any therapeutic regimen or treatment upon psoriasis, the Psoriasis Area and Severity Index may be used (Rashmi *et al.,* 2012). PASI is associated with general bodily pain with improvement in pain correlated to improvement in PASI (Ljosaa *et al.,* 2013).

Additionally, psoriasis patients are prone to a number of comorbid conditions. Such co-morbidities include, cardiometabolic diseases, stroke, higher blood pressures, increased BMI, metabolic syndrome namely hypertension, diabetes mellitus, increased BMI and dyslipidemia i.e. abnormal blood levels of lipids such as cholesterol high density lipoprotein cholesterol (HDL) and triacylglycerol (Hawkes). Oral lesions may also be present in psoriatic

patients leading to increased unrest and the condition aggravating in smokers (Darwazeh *et al.,* 2012).

Based on the pathogenic role of T lymphocytes, psoriasis is referred to be an autoimmune disease. This is, additionally, supported by the fact that psoriasis is seen to improve in patients following treatment with immunosuppressive drugs and transplantation of bone marrow (Hawkes). Selective blocking of Interleukin-23 (IL-23) or Interleukin-17 (IL-17) is observed to yield positive results when treating psoriatic lesions (Reich).

At genetic level, psoriasis is associated with Interleukin-12 (IL-12) and interleukin-23 (IL-23) which is a heterodimer receptor and its p40 subunit is crucial as it binds to the transmembrane IL12R of immune cells to bring about a biological activity (Kauffman *et al.,* 2004). Caspase recruitment domain (CARD) proteins are also believed to be involved in the psoriasis pathway. CARD proteins activate the NF-kB pathway by interacting with the CARD domain of BCL10 (Bertin *et al.,* 2001)

Over expression of IL-12 is found in the skin having lesional psoriasis. In addition to this IL-17 causes inflammatory responses and its abundant prevalence is found in psoriatic arthritis. Other interleukins found in excess in psoriatic skin are found to be IL-13Rα1, IL-17, IL-20Rα and IL-20Rβ. IL-10 and IL-11, however, are observed to be in low proportion in psoriatic skin. (Cancino-Díaz *et al.,* 2002, Hijnen *et al.,* 2013). The serum of psoriasis

patients also contain increased levels of tumor necrosis factor α and T-cell activity which leads to excess keratinocyte proliferation (Dubois & Pouliot 2013).

The presence of one autoimmune disease leads to the occurrence of others. Therefore, with the onset of psoriasis, there is a possibility that the individual may be affected by other autoimmune diseases (Ejaz et al. 2009). Moreover, nails are also affected in psoriasis with pitting and the nail may detach from the nail bed and the condition has chances of improving with pulse dye laser (Busch *et al.,* 2012). In addition, scalp psoriasis greatly affects the hair growth and hair density (Kasumagić-Halilović et al. 2010).

Many different treatments are designed to relieve patients of the symptoms. Current treatments available for psoriasis are only able to relieve the symptoms as long as the medications are used. However, no drug can completely eliminate this disease. More attention is being paid to biological drugs that would target pathways that are involved in the occurrence of psoriasis (Dubois & Pouliot 2013).

Topical therapies include corticosteroids, keratolytics, tars, emollients, and topical vitamin D analogues. Differences in the combination of drug therapies may vary in different individuals and according to the disease severity. For instance, German doctors advise the use of topical steroids along with salicylic acid whereas in USA individual use of steroids is suggested (Uva *et al.,* 2012). PUVA (Psoralen- ultraviolet A) therapy is considered a successful treatment

therapy for psoriasis vulgaris (Elghandour *et al.,* 2013).

The significance of such studies in Pakistan stem from the fact that there is a huge dearth of research data related to psoriasis. This is mainly due to the fact that the disease is usually not reported due to lack of awareness. Any available data comprises of small-scale study that is only limited to certain clinics. (Ejaz *et al.,* 2016).

2. Methodology

2.1 Problem Identification and Literature Survey

Psoriasis is a common problem prevalent among Asian population including Pakistani population. Genetic factors in association with poor health and adverse life quality lead to the onset of the disease. At times co-morbidities are observed to occur such as obesity, hypertension, dyslipidemia, diabetes mellitus and other immune mediated diseases. This survey was carried out to find out association between psoriasis area severity and life quality in concordance with body mass index, gender and age.

2.2 Questionnaire

The current survey was carried out with the help of two questionnaires i.e. "Dermatology life quality index" (DLQI) (APPENDIX I) and "Psoriasis area and severity index" (PASI) (APPENDIX II).

Psoriasis Area and Severity Index (PASI) (Fredriksson & Pettersson 1978) is an instrument which measures the body area affected in psoriasis. According to the mentioned instrument, affected body surface area (BSA) is evaluated in percentage (0-100%) by dividing body into four parts i.e. head, upper limbs, trunk and lower limbs. The evaluation is undertaken in assistance with erythema (redness), induration (thickness) and desquamation (scaling) on a 0-4 scale.

Dermatology Life Quality Index (DLQI) [5] was used to determine the quality of life (QoL) of patients. It is a one page index, in which patient concerns are formulated into a 10 question instrument that includes work, leisure, daily activities, personal relationships, and treatments. Each question has 5 possible answers: "very much," "a lot," "a little," "not at all," or "not relevant". Score aggregation indicates life quality with 0 score denoting no impact and 30 score indicating maximum impact on QoL. The patients were assisted in completing the DLQI and the PASI.

Open ended questions asking age, weight, height, BMI, medications (if any), age of onset and socio-economic status were also added.

2.3 Questionnaire Conduction

The hospitals visited for questionnaire conduction are Services Hospital, Lahore; Gangaram Hospital, Lahore and Allied Hospital, Faisalabad. 164 psoriasis patients were enrolled in the study from different socio-economic background and ages. Questionnaires were self-administered after informed consent of the participants. Patients took on average 7 minutes to fill in the questionnaires.

2.4 Data Analysis and Interpretation

The data obtained was analyzed using statistical software SPSS (Statistical Package for the Social Sciences) version 20. SPSS is a window based program which can be used for entering data and performing a variety of tests to analyze the data entered. Crosstabulations amongst two variables was found out. For categorical variables, percentage component bar chart was made. Chi-square analysis was performed for bivariate analysis to determine association between two variables.

3. Results

3.1 Patient Identification

Questionnaires were filled by 164 patients and a similar number of controls were used when comparing the DLQI score in both cases and controls. The Dermatology Life Quality Index used for the current study is shown under Appendix I. Psoriasis Area and Severity Index is shown under Appendix II

3.2 PASI (Psoriasis Area And Severity Index) Score

Mean and median value of PASI score of the patients was calculated using univariate analysis. This is a continuous variable so standard deviation was also calculated. Average PASI score of all the patients was about 13.7. The median or middle value of PASI score is 10.6 as shown in table 3.1

Table 3.1: Mean and Median PASI Score of Psoriasis Patients

PASI Score	Patients
Mean	13.673
Median	10.6
Std. Deviation	10.59

3.3 DLQI (Dermatology Life Quality Index) Score

The mean and median value of DLQI score of the patients and controls was found out by univariate analysis. Since this is a continuous variable, the standard deviation was also calculated. The mean or average DLQI score of patients and controls were 7.13 and 3.04 respectively while the median or middle value of the patients and controls were 6 and 2 respectively as shown in table 3.2

Table 3.2: Mean and Median DLQI Score of Cases and Controls

DLQI Score	Cases	Controls
Mean	7.13	3.04
Median	6.00	2.00
Std. Deviation	5.06	3.344

In order to investigate presence of any association between patient PASI and DLQI score chi-square test was performed and Pearson chi-square value was calculated and explained in the tables 3.3 and 3.4.

Table 3.3: Crosstab Table of PASI And DLQI Score In Cases

PASI Score Ranges	DLQI Score Ranges				
	0-1= no effect at all on patient's life	2-5= small effect on patient's life	6-10= moderate effect on patient's life	11-20= very large effect on patient's life	21-30= extremely large effect on patient's life
0-12	9	48	28	9	0
12.1-24	1	15	12	14	1
24.1-36	0	5	5	8	0
36.1-48	0	0	0	2	0
48.1-60	0	0	3	4	0

Table 3.4: Pearson Chi-Square Value of PASI and DLQI Score In Cases

PASI and DLQI score	
Pearson Chi-square	Significant value (2-sided) = 0.002

According to crosstab table 3.3 there are 9 patients having no effect on life quality, 48 patients having small effect on life quality, 28 patients having moderate effect on life quality, 9 patients having very large effect on life quality and 0 patients with extremely large effect on life quality in the 0-12 PASI score range; 1 patient having no effect on life quality, 15 patients having small effect on life quality, 12 patients having moderate effect on life quality, 14 patients having very large effect on life quality and 1 patient with extremely large effect on life quality in the 12.1-24 PASI score range; 0 patients having no effect and extremely large effect on life quality, 5 patients having small effect on life quality, 5 patients having moderate effect on life quality, 8 patients having very large effect on life quality in the 24.1-36 PASI score range;

0 patients having no effect, small effect, moderate effect and extremely large effect on life quality and 2 patients having very large effect on life quality in the 36.1-48 PASI score range; 0 patients having no effect, small effect and extremely large effect on life quality, 3 patients having moderate effect on life quality

and 4 patients having very large effect on life quality in the 48.1-60 PASI score range.

Note in the table 3.3, the PASI score range 60.1-72 is non-existent. This occurs due to the fact that none of the patients of this study carried area severity to such high extents.

As shown in table 3.4, p-value of Pearson Chi-square (0.002) is less than α (0.05) so area severity and life quality are associated.

Table 3.5: Paired Sample T-Test of DLQI Score in Cases and DLQI Score in Controls

DLQI scores: Cases VS Controls	
Paired sample t-test	Significant value (2-sided) = 0.000
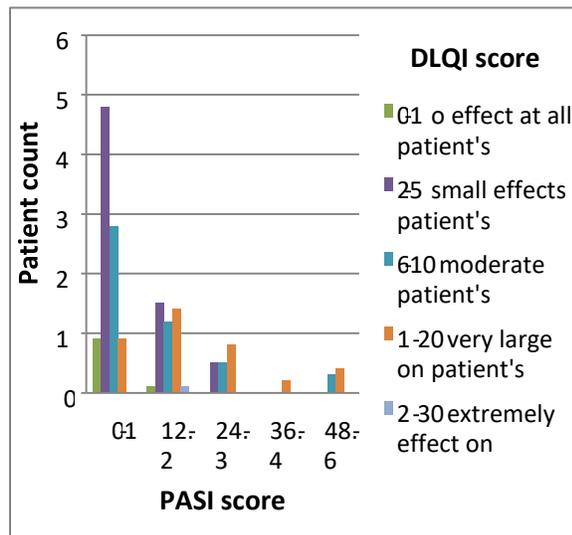
Figure 3.1: Bar Chart Showing PASI and DLQI Score Association with Respect to Patient Count

According to Figure 3.1, greater patient count has a small effect on their life quality and they carry a PASI score in the 0-12 score range. The chart shows a regular pattern whereby a higher PASI score is carried by patients having significant effects on their life quality. However, those having extreme effect on their life quality lie in the 12.1-24 PASI score range.

Table 3.5 shows p-value of Paired samples test (0.000) is less than α (0.05) thus indicating a significant difference between the life quality scores of cases and controls.

3.4 BMI and PASI Score

The crosstab in table 3.6 indicates 1 underweight case has PASI score in the 0-12 range and 2 underweight cases have PASI score in the 48.1-60 range. Amongst moderate BMI patients, 31 have PASI score in the 0-12 range, 9 have PASI score in the 12.1-24 range, 3 have PASI score in the 24.1-36 range and 1 have PASI score in the 36.1-48 range. Amongst overweight patients, 41 have PASI score in the 0-12 range, 17 have PASI score in the 12.1-24 range, 8 have PASI score in the 24.1-36 range, 1 have PASI score in the 36.1-48 range and 2 have PASI score in the 48.1-60 range. Amongst obese patients, 13 have PASI score in the 0-12 range, 5 have PASI score in the 12.1-24 range and 6 have PASI score in the 24.1-36 range.

Table 3.6: Crosstab Table of BMI and PASI

BMI ranges	PASI score ranges				
	0-12	12.1-24	24.1-36	36.1-48	48.1-60
Underweight	1	0	0	0	2
Moderate	31	9	3	1	0
Overweight	41	17	8	1	2
Obese	13	5	6	0	0

Table 3.7: Pearson Chi-Square Value Of BMI And PASI Score In Cases

BMI and PASI score	
Pearson Chi-square	Significant value (2-sided) = 0.000

As per table 3.7, p-value of Pearson Chi-square (0.000) is less than α (0.05), thus BMI and body area severity are associated.
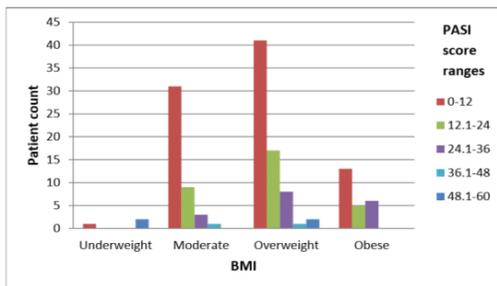
Figure 3.2: Bar chart showing BMI and PASI score association with respect to patient count

In the bar chart of Figure 3.2, approximately a close count of patients enlisted as underweight carry PASI score 0-12 and 48.1-60. Those enlisted as having a moderate BMI carry PASI score in the ranges 0-12, 12.1-24, 24.1-36 and 36.1-48 with the highest count of patients in the 0-12 PASI score range. None of these lie in the 48.1-60 score range. Overweight patients carry PASI score in all 5 grouped scores mentioned above with the highest count of patients in the 0-12 PASI score range. Obese patients carry PASI score in the ranges 012, 12.1-24 and 24.1-36 with the highest count of patients in the 0-12 PASI score range.

3.5 BMI and DLQI

According to the crosstab in table 3.8, amongst underweight patients, 1 has small effect on life quality, 1 has moderate effect on life quality and 1 has very large effect on life quality.

Table 3.8: Crosstab Table of BMI And DLQI

BMI ranges	DLQI Score Range				
	0-1= no effect at all on patient's life	2-5= small effect on patient's life	6-10= moderate effect on patient's life	11-20= very large effect on patient's life	21-30= extremely large effect on patient's life
Underweight	0	1	1	1	0
Moderate	4	22	11	7	0
Overweight	5	26	20	17	1
Obese	0	8	9	7	0

Table 3.9: Pearson Chi-Square Value of BMI and DLQI Score In Cases

BMI and DLQI score	
Pearson Chi-square	Significant value (2-sided) = 0.844

Amongst moderate BMI patients, 4 have no effect on life quality, 22 have small effect on life quality, 11 have moderate effect on life quality and 7 have very large effect on life quality. Amongst overweight patients, 5 have no effect on life quality, 26 have small effect on life quality, 20 have moderate effect on life quality,17 have very large effect on life quality and 1 has extremely large effect on life quality. Amongst obese patients, 8 have small effect on life quality, 9 have moderate effect on life quality and 7 have very large effect on life quality.

The p-value of Pearson Chi-square (0.844) is greater than α (0.05), in the table 3.9, thus BMI and DLQI are not associated.
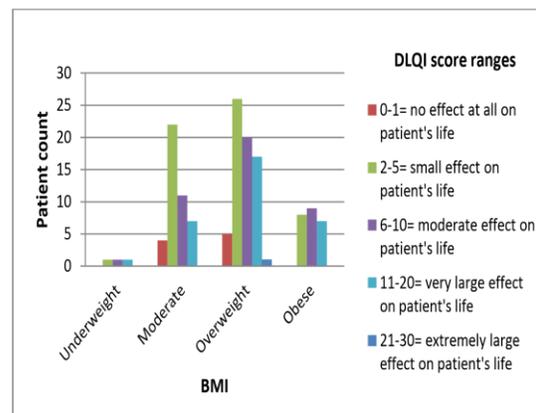
Figure 3.3: Bar chart showing BMI and DLQI score association with respect to patient count

Figure 3.3 shows an equal number of underweight patients carry small, moderate and very large effects on their life quality, respectively. Patients who carry a moderate and overweight BMI both have large patient counts having small effects on their life quality. Those having extremely large effects on their life quality, lie only in the overweight BMI range.

Table 3.10: Crosstab Table of Gender and PASI

Gender	PASI score ranges				
	0-12	12.1-24	24.1-36	36.1-48	48.1-60
Male	40	20	8	2	1
Female	54	23	10	0	6

3.6 Gender and PASI Score

The crosstab in the table 3.10 indicates that amongst males, 40 carry PASI score in the 0-12 range, 20 carry PASI score in the 12.1-24 range, 8 carry PASI score in the 24.1-36 range, 2 carry PASI score in the 36.1-48 range and 1 carries PASI score in the 48.1-60 range. Amongst females, 54 carry PASI score in the 0-12 range, 23 carry PASI score in the 12.1-24 range, 10 carry PASI score in the 24.1-36 range, and 6 carry PASI score in the 48.1-60 range.

Table 3.11 shows p-value of Pearson Chi-square (0.844) is greater than α (0.05), Gender and PASI are not associated.
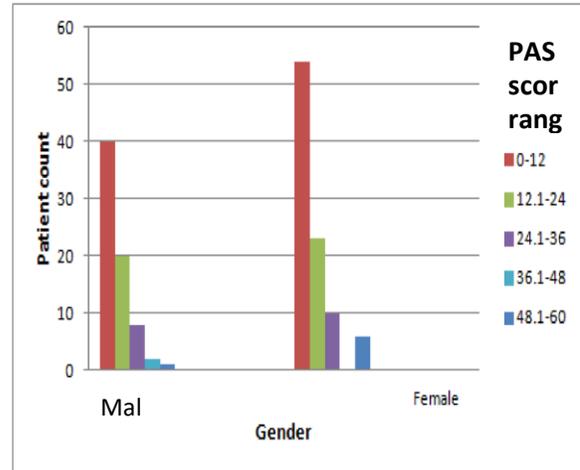
Figure 3.4: Bar chart showing gender and PASI score association with respect to patient count

According to Figure 3.4, majority of the males and females carry PASI score in the 0-12 and 12.1-24 range. However, no female carries the PASI score in the 36.1-48 range while scores in this range are present in males. Moreover, a greater count of females carry PASI score in the 48.1-60 score range contrary to males which are less in count in the same score range.

**Table 3.11:** Pearson Chi-Square Value Of Gender And PASI Score In Cases

Gender and PASI score	
Pearson Chi-square	Significant value (2-sided) = 0.844

3.7 Gender and DLQI Score

According to the crosstab in table 3.12, amongst males, 6 have no effect on life quality, 32 have a small effect on life quality, 19 have moderate effect on life quality and 15 have very large effect on life quality. Amongst females, 4 have no effect on life quality, 37 have a small effect

on life quality, 29 have moderate effect on life quality, 22 have very large effect on life quality and 1 has extremely large effect on life quality.

As table 3.13 p-value of Pearson Chi-square (0.657) is greater than α (0.05), Gender and DLQI are not associated.
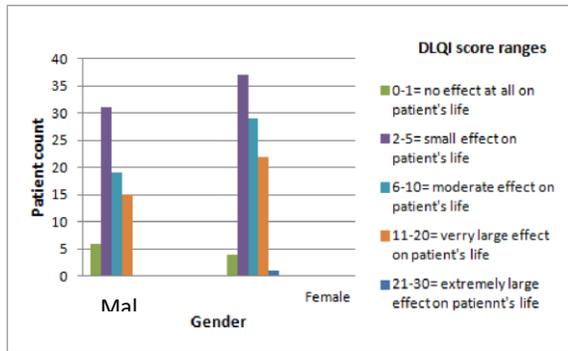
Figure 3.5: Bar chart showing gender and DLQI score association with respect to patient count

According to Figure 3.5, in males the majority have moderate effect on life quality, a lesser count having small effect on life quality and a very small patient count having very large effect on patient's life. In females the occurrence of moderate effect on life quality is in majority of the cases. An equal patient count carries small and very large effect on life quality.

Table 3.12: Crosstab Table of Gender and DLQI

Gender	DLQI score ranges				
	0-1= no effect at all on patient's life	2-5= small effect on patient's life	6-10= moderate effect on patient's life	11-20= very large effect on patient's life	21-30= extremely large effect on patient's life
Male	6	31	19	15	0
Female	4	37	29	22	1

Table 3.13: Pearson Chi-Square Value of Gender and DLQI Score in Cases

Gender and DLQI score	
Pearson Chi-square	Significant value (2-sided) = 0.657

Table 3.14: Crosstab Table of Age and PASI

Age	PASI Score				
	0-12	12.1-24	24.1-36	36.1-48	48.1-60
Infancy 0-1 years	1	0	0	0	1
Preadolescence 2-21 years	2	1	0	0	0
Adolescence 13-19 years	13	3	1	0	1

|					
Young adults 20-40 years	45	17	6	1	4
Middle adults 41-60 years	28	14	7	1	1
Old age 60 years and above	4	7	4	0	0

3.8 Age and PASI Score

According to the crosstab table 3.14 above, amongst infants, 1 carries PASI score in the 0-12 range and 1 carries PASI score in the 48.1-60 range. Amongst preadolescents, 2 carry PASI score in the 0-12 range and 1 carries PASI score in the 12.1-24 range. Amongst adolescents, 13 carry PASI score in the 0-12 range, 3 carry PASI score in the 12.1-24 range, 1 carries PASI score in the 24.1-36 range and 1 carries PASI score in the 48.1-60 range. Amongst young adults, 45 carry PASI score in the 0-12 range, 17 carry PASI score in the 12.1-24 range, 6 carry PASI score in the 24.1-36 range and 1 carries PASI score in the 36.1-48 range and 4 carry PASI score in the 48.1-60 range. Amongst middle adults, 28 carry PASI score in the 0-12 range, 14 carry PASI score in the 12.1-24 range, 7 carry PASI score in the 24.1-36 range and 1 carries PASI score in the 36.1-48 range and 1 carries PASI score in the 48.1-60 range. Amongst old age, 4 carry PASI score in the 0-12 range, 7 carry PASI score in the 12.1-24 range and 4 carry PASI score in the 24.1-36 range

Table 3.15: Pearson Chi-Square Value of Age and PASI Score In Cases

Age and PASI Score	
Pearson Chi-square	Significant value (2-sided) = 0.214

Table 3.15 As p-value of Pearson Chi-square (0.214) is less than α (0.05), age and PASI are associated.
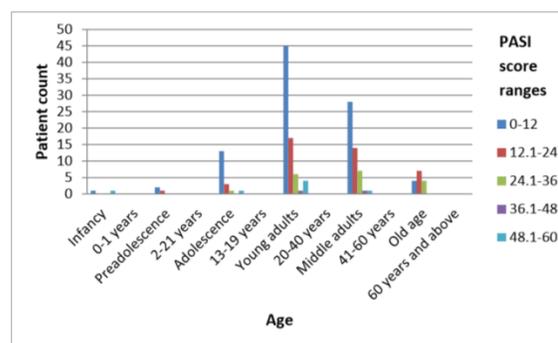
Figure 3.6: Bar chart showing age and PASI score association with respect to patient count

According to Figure 3.6, infant patients lie only in 0-12 and 48.1-60 PASI score range. Preadolescent patients lie in 0-12 and 12.1-24 score range. Adolescent patients carry no score in the 36.1-48 PASI score range. Both young adults and middle adult patients have a higher count in the 0-12 score range followed by 12.1-24 and 24.1-36 PASI score ranges respectively.

Old age patients, however, do not exhibit higher PASI score ranges of 36.1-48 and 48.1-60.
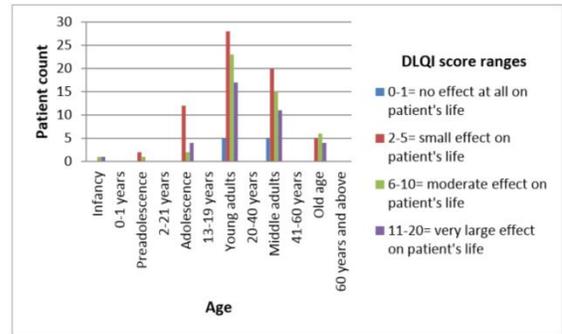
3.9 Age and DLQI Score

In the crosstab shown in Table 3.16, amongst infants, 1 has moderate effect on life quality and 1 has very large effect on life quality. Amongst preadolescents, 2 have small and 1 has moderate effect on life quality. Amongst adolescents, 12 have small, 2 have moderate and 4 have very large effect on life quality. Amongst young adults, 5 have no effect, 28 have small, 23 have moderate and 17 have very large effect on life quality. Amongst middle adults, 5 have no effect, 20 have small, 15 have moderate and 11 have very large effect on life quality. Amongst old age 5 have small, 6 have moderate and 4 have very large effect on life quality.

Table 3.17: Pearson Chi-Square Value of Age and DLQI Score in Cases

Age and DLQI score	
Pearson Chi-square	Significant value (2-sided) = 0.614

In Table 3.17, as p-value of Pearson Chi-square (0.614) is greater than α (0.05), age and DLQI are not associated.

Figure 3.7: Bar chart showing age and DLQI score association with respect to patient count

According to Figure 3.7, an equal count of infants have a moderate and a very large effect on their life quality, preadolescents have small and moderate effects on their life quality. Greater counts of adolescents have a small effect on their life quality than those adolescents having moderate and large effects on their life quality. Both young adults and middle adults show an equal pattern whereby greater patient counts have small effects on their life quality, followed by moderate and very large effects on life quality, respectively. The lowest count in these age groups is not affected at all. Old age patients carry small, moderate and a very large effect on the life quality.

Table 3.16: Crosstab Table of Age and DLQI

	DLQI score			
Age	0-1= no effect at all on patient's life	2-5= small effect on patient's life	6-10= moderate effect on patient's life	11-20= very large effect on patient's life
Infancy 0-1 years	0	0	1	1
Preadolescence 2-21 years	0	2	1	0
Adolescence 13-19 years	0	12	2	4
Young adults 20-40 years	5	28	23	17
Middle adults 41-60 years	5	20	15	11
Old age 60 years and above	0	5	6	4

Table 3.18: Crosstab Table of Gender and BMI

Gender	BMI Ranges			
	Under Weight	Moderate	Over Weight	Obese
Male	0	23	39	3
Female	3	21	30	21

3.10 Gender and BMI

The crosstab in Table 3.18 present varying BMI amongst both genders. Of the males, 23 are of moderate BMI, 39 are overweight and 3 are obese. Amongst females, 3 are underweight, 21 are of moderate BMI, 30 are overweight and 21 are obese. The p-value of Pearson Chi-square (0.001) is greater than α (0.05), as shown in Table 3.19, thus Gender and BMI are associated.

Table 3.19: Pearson Chi-Square Value of Gender and BMI Score in Cases

Gender and BMI	
Pearson Chi-square	Significant value (2-sided) = 0.001
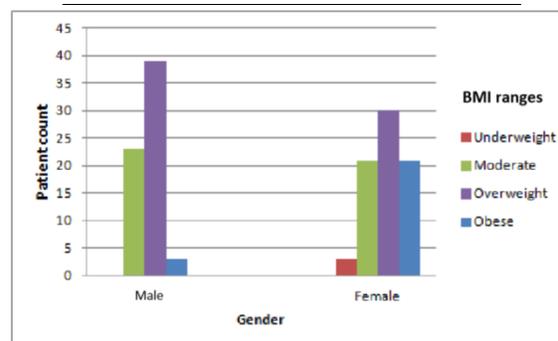
Figure 3.8: Bar chart showing gender and BMI score association with respect to patient count

According to Figure 3.8, none of the males are underweight with a majority being overweight. More than half of patient count of males carries a moderate BMI and only limited being obese. Comparatively, a greater count of female are overweight followed by a slightly lower but an equal count falling in both moderate and obese category while a small proportion are underweight.

4. Discussion

Psoriasis is an inflammatory skin disease associated with itching and scaly patches. Many severe disease carriers may also suffer by other immune mediated disease which leads to co-morbidities. Thus the symptoms and the associated co-morbidities lead to hindrance in daily activities depending on the severity. The resultant impact on the PASI and DLQI scores and their variation and concordance with respect to age, gender and BMI were analyzed in the current study.

At lower PASI scores, DLQI scores are present from all ranges. However, higher PASI scores are observed to occur in concordance with higher DLQI scores. This is explained by the fact that the greater the area severity is, it creates problems in daily life such as being emotionally overwhelmed, wearing certain cloth stuff and a lack of attention to daily activities. All these factors constitute the DLQI questionnaire and carry scores which upon aggregation gives higher DLQI scores. This explains how improvement in psoriasis symptoms benefits QoL scores (Mattei *et al.,* 2014).

Higher DLQI scores are also observed to be carried by controls. However, a greater proportion of psoriatic patients carry higher DLQI scores. This occurs because daily activities are directly affected by psoriasis symptoms.

It is generally observed that psoriasis patients generally are carriers of higher BMI (Mazlin *et al.,* 2012). While this may not be always true, higher BMI tends to occur as co-morbidity along with psoriasis. Those with severe psoriasis have an incidence of higher BMI. Although no possible explanation for the occurrence exists, there may be a possibility that the sufferers hesitate to indulge in outdoor activities thus contributing to elevated BMI.

In this study, no association is observed between BMI and DLQI score. This can be explained with the fact that the DLQI does not take into account weight and height statistics. It is related more to emotional outcome and daily activities (Dufour *et al.,* 2014).

Psoriasis generally is inflicted with an equal probability in both males and females (Lin *et al.,* 2011). The current study shows a higher percentage of females with high PASI scores. This may be attributed to the fact that men and women were questioned on a random basis and a chance occurrence of a higher female probability lead to increased percentage of females.

The study does not show an association between gender and DLQI. This occurs due to the fact that DLQI is related to questions of daily activities, emotions, relations and treatment

which on a general basis differ in person to person. So any one gender may not be associated to DLQI.

Age is observed to be associated with PASI score with an increase in patient age observing a PASI score increase. In a similar finding, ages from 18-45 experienced more symptomatic problems (GUPTA & Gupta 1995).The young ones such as those below 19 years of age carry PASI score in the 0-12 score range

Age is not associated with DLQI score because all age groups react differently to the area severity of the disease (Takahashi *et al.,* 2006). Youth is believed to be psychologically and emotionally greatly disturbed by disease onset, whereby similar behavioral pattern is present amongst females that are young adults. Moreover, adult males too face issues that constitute factors in DLQI questionnaire such as type of clothing, itch factor and problem at work.

Gender is observed to be associated to BMI with a greater proportion of male patients carrying higher BMI scores than female patients. This is supported by previous findings whereby men generally have higher height values and increased weights so bearing increased BMI values (Ljosaa *et al.,* 2013).

Dissatisfaction amongst the patients is prevalent when using the current topical and systemic treatments. Topical treatments for the skin and scalp include corticosteroids, tars, salicylic acid, emollients, and topical vitamin D analogues.

These are alternated when a certain type stops being effective (Uva *et al.,* 2012).

UVB is also being used to cure certain severe psoriatic patients, and the results are satisfactory (Elghandour *et al.,* 2013). However, the treatments on a general pattern are observed to carry on till the prevalence of the disease and symptoms. There is always a higher probability of the re-occurrence of the disease and symptoms. Any environmental factors such as harsh weather conditions and stress may lead to the occurrence of the symptoms again.

Thus the hypothetical inter-dependence of PASI and DLQI score is supported through the study. An increase in the area affected is related to consciousness amongst the patients. A lack in the awareness regarding the disease is found among the patients and the controls. There is a need to acquaint the natives with psoriasis and its symptoms to help those inflicted to cope up with the disease.

There is a huge scarcity of such a statistical approach to studying psoriasis and its impact on patient lives in Pakistan. Thus there is a dire need for increased research on psoriasis, its cause, impacts and treatment with respect to the demography of the Pakistani population. Not only would it help raise awareness regarding the disease, it would also pave way for efficient and promising indigenous treatments.

5. References

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