Correlation of Venous Clinical Severity Score and Venous Disability Score with Dermatology Life Quality Index in Chronic Venous Insufficiency

Subhadeep Mallick, Tanusree Sarkar¹, Tirthankar Gayen, Biswanath Naskar, Adrijta Datta, Somenath Sarkar²

Abstract

Background: Chronic venous insufficiency (CVI) is an underestimated public health problem involving the lower limbs. It exerts a significant impact on patient’s quality of life (QoL). The severity of the disease was measured by venous clinical severity score (VCSS) and venous disability score (VDS). Aims: The aim of the study was to evaluate VCSS, VDS, and dermatology life quality index (DLQI) among the patients of CVI and to evaluate the correlation among DLQI with VCSS, VDS, and leg ulcer. Materials and Methods: In this institution-based cross-sectional study, clinically and sonographically confirmed cases of CVI were included. Clinical severity of the disease and disability were assessed by using VCSS and VDS, respectively. QoL was assessed by a validated DLQI questionnaire. Correlation between DLQI with VCSS and VDS was analyzed. The association between DLQI with different characteristics of the ulcer was also evaluated. Results: Mean VCSS, VDS, and DLQI in the study population were 11 ± 4.96, 1.47 ± 0.67, and 6.94 ± 3.87, respectively. Both VCSS and VDS had a strong positive correlation with DLQI. The number of active ulcers, size of the ulcer, and duration of the ulcer had a strong positive correlation, whereas the age of onset of the disease had a negative correlation and duration of the disease had poor correlation with DLQI. Pain (P = 0.03) and edema (P = 0.04) had significant association with VDS. Conclusion: VCSS and VDS are important tools for measuring severity and disability in CVI, respectively. CVI had a strong impact on patients QoL more than it was thought hitherto.

Key Words: Chronic venous insufficiency, dermatology life quality index, venous clinical severity score, venous disability score

Introduction

Chronic venous insufficiency (CVI) develops due to inadequate functioning of venous wall and/or valves in lower limb veins resulting in excessive pooling of blood and venous hypertension. Venous hypertension causes reflux in the superficial venous compartment from deep venous compartment.¹ The prevalence of CVI is 9.4% in men and 6.6% in women.² It is clinically characterized by pain, brawny edema around ankle mainly in the evening, acute/subacute dermatitis, etc. Prolong persistent venous hypertension may lead to purpuric or brown spots (due to hemosiderin deposition), induration, varicosity, leg ulceration, atrophy blanche, and lipodermatosclerosis. Approximately, 1% to 2.7% patients of CVI develop stasis ulcer.³

To standardize the diverse clinical manifestations of CVI, clinical, etiological, anatomical, and pathological (CEAP) classification was developed by American Venous Forum at the sixth annual meeting in 1994.⁴ It lacks the ability to assess disease severity. An Ad hoc Committee of the American Venous Forum on Venous Outcome Assessment proposed venous clinical severity score (VCSS) and venous disability score (VDS), on March 2000.⁵ VCSS is a dynamic scoring system, which avoids static elements of CEAP classification, with the ability to reflect changes after treatment over a short period of time (months). This scoring system was reliable with acceptable inter- and intraobserver variability.⁶ VDS is a simpler system that classifies patient’s ability to carry out usual activities with or without compressive therapy and/or limb elevation. It was modified in recognition of many patients of CVI who do or do not ordinarily work an 8 h in a day (e.g., housewives, retirees, students, etc.).

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Mallick S, Sarkar T, Gayen T, Naskar B, Datta A, Sarkar S. Correlation of venous clinical severity score and venous disability score with dermatology life quality index in chronic venous insufficiency. Indian J Dermatol 2020;65:489-94.

Received: May, 2020. Accepted: July, 2020.
CVI can hamper the quality of life (QoL). It is modified due to changes in functional capacity, mobility, and social and employment limitations. A better understanding of the QoL enables us to provide a more humanized therapeutic intervention closer to patients’ need. Hence, its assessment is important in the context of chronic diseases. Dermatology life quality index (DLQI) is the first dermatology-specific QoL questionnaire published in 1994, to assess the impact of skin disease on adults and to choose treatment options. DLQI covers six domains of QoL, including symptoms and feelings, daily activities, leisure work, work and school, personal relationship and treatment. Previously a lot of studies were done to assess the QoL in chronic venous ulcer and varicosity. However, there was a lack of studies to assess the DLQI of the patient having CVI in terms of clinical severity and disability produced by the disease. Hence, the present study aimed to find out the VCSS, VDS, and DLQI among the patients of CVI, to evaluate the correlation among them.

Materials and Methods
This cross-sectional study was done over a period of one year from January 2019 to December 2019 in a tertiary care center in eastern India. After obtaining institutional ethics committee approval and consent from the patients, clinically and Doppler confirmed cases of CVI were enrolled in this study. Patients having age <18 years were not included in the study. Patients having pigmented purpuric dermatoses, pigmentary changes due to different endocrinial disorders and medications, and leg ulceration due to arterial, neurological, hematological, infective causes were excluded.

A thorough history was taken and clinical examinations were done; VCSS [Table 1] and VDS [Table 2] were evaluated. The DLQI questionnaire (comprised of 10 open-ended questions) was handed over to the patients. It was provided in English, Bengali, and Hindi languages (validated versions) as per mother tongue of the patients. Patients were asked to fill this questionnaire by themselves or with the help of their family members accompanying with them. Each response was scored on a four-point scale from 0–3 (0 = not at all, 1 = a little, 2 = a lot, and 3 = very much) and interpreted accordingly [Table 3].

All the data were collected in a prestructured case datasheet and were analyzed by using SPSS V.20. Fischer’s exact test was used to assess the association of pain, edema with VDS. Correlation between VCSS, VDS, and characteristics of ulcer with DLQI was assessed by Pearson’s correlation coefficient (r) [r = +1 denotes a perfect uphill (positive) linear relationship and − 1 denotes a perfect downhill relationship].

Results
A total of 53 patients were included in this study. Ages of the patients ranged from 29 to 74 years with a mean of 48.34 ± 11.66 years. Most of the patients (50.94%) were between 31 and 50 years of age and a mean duration of disease was 41.13 ± 28.99 months. The sample had a higher proportion of male (50) than female (3). Almost all patients gave a history of prolonged standing in their working place. By profession, shop employees (37.7%) were predominantly involved, followed by businessmen (17%), barber (13.2%), and others [Table 4]. Among the ten attributes of VCSS, varicosity and skin pigmentation were present in all patients. In the study population, moderate varicosity (39.6%) was the commonest followed by severe varicosity (32.07%). Moderate skin pigmentation [Figure 1] was noticed among 69.81% patients. Mild pain was complained by 43.39% cases, while moderate pain was noted among 41.5% cases. Almost all patients had lower limb edema and induration. Mild edema (45.3%) and moderate induration (64.15%) were the common observations. Active leg ulceration [Figures 1] was present in 33.96% patients. Single, double, and multiple ulcerations were observed in 22.64%, 7.54%, and 3.77% cases, respectively. Persisting ulcer for more than 1 year was seen in 6 (11.32%) cases. In this study, 24.52% patients had ulcer with largest dimension of 2–6 cm. Compliance with compressive therapy and/or limb elevation was very poor in this study. Different attributes of VCSS were summarized in Table 5. VCSS of the patients ranged from 3 to 25 with a mean of 11 ± 4.96 and 95% CI was 9.6303 to 12.3697. Among the study subjects, VDS of grade 1 (43.39%) and grade 2 (41.56%) disabilities were common. Mean, range, and 95% CI of VDS were 1.47 ± 0.67, 0 to 3, and 1.29 to 1.66, respectively. There was significant relationship between severity of pain and edema with VDS (Fisher’s exact test P=0.03, 0.04 respectively), CVI exerts small (47.16%) to moderate (51.46%) effect on patient’s QoL, on previous week as per DLQI. The mean DLQI was 6.94 ± 3.87 with 95% CI of 5.88 to 8.01. A strong positive correlation was found between DLQI and VCSS (r = 0.962) [Figure 2a], VDS (r = 0.799) [Figure 2b], number of active leg ulcer (r = 0.873) [Figure 3a], duration of the leg ulcers (r = 0.853) [Figure 3b], and the size of the ulcer (r = 0.789) [Figure 3c]. Duration of the disease and DLQI (r = 0.042) had a poor positive correlation. But a weak negative correlation was found between DLQI and the age of onset of the disease (r = −0.059) [Figure 3d].

Discussion
VCSS was developed to assess objectively an individual patient’s response to treatment and its outcome. This scoring system was quantitative rather than qualitative. VDS was simply a modification of the existing CEAP...
disability score. It classifies patients’ ability to carry out usual activities with or without compressive therapy and/or limb elevation. It is simple and probably has a strong relation with QoL. The study conducted by Perrin et al. found that VCSS and VDS were easy to rate, relevant, comprised of instruments whose measurement varies with the severity of the disease, and were intended to evaluate the efficacy of treatment of chronic venous disease. Meissner and his colleagues attempted to validate the VCSS by assessing its reproducibility with the same and different observers. Three different observers prospectively scored 64 patients of CVI twice (on day 1 and in between 7 and 28 days). They had shown that intraobserver variation was very low, with mean score differing only by 0.8, resulting in a reliability coefficient of 0.6. The difference of mean VCSS among three different observers on day 1 was very small but statistically significant (P = 0.02). Hence, VCSS was a validated, highly reliable, and reproducible tool in assessing the CVI. In this study, the mean age of the patients was 48.34 ± 11.66 years which was much lower than the study done by Meissner.

**Table 1: Venous clinical severity score (VCSS)**

| Attributes | Absent=0 | Mild=1 | Moderate=2 | Severe=3 |
|------------|---------|--------|------------|----------|
| Pain       | None    | Occasional, not restricting activities or requiring analgesics | Daily, moderate activities limitation, occasional analgesics | Daily, severe activities limitation or requiring regular use of analgesics |
| Varicose veins | None | Few, scattered: Branched varicose veins | Multiple: GS* varicose vein continued to calf or thigh | Extensive: Thigh and calf or GS* and LS** distribution |
| Venous edema | None | Evening ankle edema only | Afternoon edema, above ankle | Morning edema above ankle and requiring activities change, elevation |
| Skin pigmentation | None or focal, low intensity (tan) | Diffuse, but limited in area and old (brown) | Diffuse over most of gaiter distribution (lower ½) or recent pigmentation (purple) | Wider distribution (above lower ½) and recent pigmentation |
| Inflammation | None | Mild cellulitis, limited to marginal area around ulcer | Moderate cellulitis, involves most of gaiter area (lower ½) | Severe cellulitis (lower ½ and above) or significant venous eczema |
| Induration | None | Focal, circummalleolar (<5 cm) | Media or lateral, less than lower third of leg | Entire lower third of leg or more |
| No of active ulcer | 0 | 1 | 2 | >2 |
| Active ulcer duration | None | <3 months | >3 months, <1 year | Not healed >1 year |
| Active ulcer size | None | <2 cm diameter | 2 to 6 cm diameter | >6 cm diameter |
| Compressive therapy | Not used or not compliant | Intermittent use of stockings | Wear elastic stockings most days | Full compliance: Stockings+elevation |

*GS: Great saphenous; **LS: Lesser saphenous

**Table 2: Venous disability score**

| Score | Definition |
|-------|------------|
| 0     | Asymptomatic |
| 1     | Symptomatic but able to carry out usual activities* without compressive therapy |
| 2     | Can carry out usual activities* only with compression and/or limb elevation |
| 3     | Unable to carry out usual activities* even with compression and/or limb elevation |

*Usual activity in VDS denotes patient activities before onset of disability from venous disease

**Table 3: Interpretation of dermatology quality life index (DLQI) scores**

| DLQI | Interpretation |
|------|----------------|
| 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 |

Score 0= no impact, score 30= maximum impact

**Figure 1:** Edema, pigmentation with large ulceration in CVI
et al.,[4] Masud et al.,[11] Gillet et al.,[12] except the study of Ricci et al.[13] Pain and venous edema were the most common presenting symptoms in this study, which was corroborative of previous studies.[11,14] Varicosity, skin pigmentation, induration, and inflammation were the commonly observed findings in the study done by Lullove and Alvarez,[14] whereas inflammation of the affected limb was almost absent in this study. In our study, the presence of active venous ulcer was found in 33.96% cases; amongst them, ulcers with largest dimension of 2–6 cm and nonhealing ulcer persisting for <3 months were found in maximum patients. But, the study done by Vasquez and colleagues[15] found active ulcer only in 8% cases, and small ulcers (<2cm) and large ulcers (2–6 cm) were equally common, and nonhealing ulcer for 3–12 months was frequently observed finding. The presence of active venous ulceration was much higher in the study done by Masud et al. (46.25%).[11] The use of compression therapy and/or limb elevation was very much low (18.87%) in our study than Vasquez et al. (98.9%).[15] Overall, mean VCSS in this study was 11 ± 4.96 which was similar to the score of Meissner et al.[6] but much higher than the VCSS of others.[11,12,15,16] Mean VDS in this study was corroborative with the findings of the study done by Gillet et al.[12] and Hartung et al.[16] There was a significant relation between pain (Fisher’s exact test; \( P = 0.03 \)) magnitude and edema (Fisher’s exact test; \( P = 0.04 \)) with VDS which was also highlighted by Gillet and his colleagues.[12] In this study, compliance with compression therapy and limb elevation practice was very poor. Only one patient with VDS 3 had full compliance with compression stocking and limb elevation. Hence, we hypothesize that disability even cannot change the practice behavior, which confirmed the findings of previous study.[12]

Table 4: Distribution of occupation

| Occupation        | No of patient (n=53) | Percentage |
|-------------------|----------------------|------------|
| Barber            | 7                    | 13.2       |
| Businessman       | 9                    | 17         |
| Former businessman| 1                    | 1.9        |
| Hotel employee    | 5                    | 9.4        |
| Housewife         | 2                    | 3.8        |
| Office clerk      | 1                    | 1.9        |
| Rickshaw puller   | 2                    | 3.8        |
| Security guard    | 5                    | 9.4        |
| Shop employee     | 20                   | 37.7       |
| Storekeeper       | 1                    | 1.9        |

Skin lesions of CVI do not constitute a direct threat to life, but it may lead to a more distressing condition for the patients. Literature data suggested that chronic dermatological conditions usually deteriorate QoL, by changing patient’s outward appearance, enhancing sensitivity of the skin, depressing the mood, and limiting professional, social, and familial relationships.[17–20] Findings of the study done by Kaplan and his colleagues[20] using SF-36 as a QoL assessment tool suggested that the functional aspects of QoL were affected more than the emotional components. Chronic venous disease was described as a comorbid condition rather than a cosmetic one in their study. Kahn et al.[21] measured generic and disease specific QoL by using SF-36, VEINES-QOL, and VEINES-QOL. The study showed that higher CEAP class had poorer SF-36 Physical Component Summary (SF-36 PCS), VEINES-QOL, and VEINES-Sym scores, but SF-36 Mental Component Summary (SF-36 MCS) scores were not affected. Kurz et al.[22] also used SF-36 and VEINES-QOL to measure QoL and showed that impairment in physical QoL was associated with concomitant venous diseases, though there was impairment of mental QoL in women. Biemans et al. in their study suggested that disease specific QoL instrument such as the CIVIQ or AVVQ may provide more specifically the physical aspects better than the mental aspect of the impact of varicose veins.[23] All the above-mentioned studies deal either with the generic QoL (SF-36) instrument or disease specific Health-related QoL instrument like VEINES-QOL, VEINES-sym, CIVIQ, and AVVQ. In the present study we used dermatology specific

Table 5: Distribution of different attributes of VCSS (n=53)

| Attribute                  | Absent=0 | Mild=1 | Moderate=2 | Severe=3 |
|----------------------------|----------|--------|------------|----------|
| Pain                       | 5 (9.43%)| 23 (43.39%)| 22 (41.5%)| 3 (5.66%)|
| Varicose vein              | 0 (0%)   | 15 (28.30%)| 21 (39.62%)| 17 (32.07%)|
| Venus Edema                | 3 (5.66%)| 24 (45.28%)| 18 (33.96%)| 8 (15.09%)|
| Inflammation               | 50 (94.33%)| 0 (0%)   | 1 (1.88%)  | 2 (3.77%) |
| Skin pigmentation          | 0 (0%)   | 11 (20.75%)| 37 (69.81%)| 5 (9.43%) |
| Induration                 | 1 (1.88%)| 12 (22.64%)| 34 (64.15%)| 6 (11.32%)|
| No of active ulcer         | 35 (66.03%)| 12 (22.64%)| 4 (7.54%)  | 2 (3.77%) |
| Duration of ulcer (months) | 35 (66.03%)| 8 (15.09%) | 4 (7.54%)  | 6 (11.32%)|
| Size of ulcer (cm)         | 35 (66.03%)| 4 (7.54%)  | 5 (9.43%)  | 1 (1.88%) |
| Compression therapy        | 43 (81.13%)| 4 (7.54%)  | 5 (9.43%)  | 1 (1.88%) |
QoL (DLQI) instrument to gauge the severity of the disease in terms of VCSS and VDS.

This study confirms a strong positive correlation \((r = 0.962)\) between VCSS (which was a disease severity score of CVI) and DLQI. But in a study of hand eczema, Charan et al. showed that there was no significant correlation between hand eczema severity index (HECSI) and DLQI. The mean DLQI score was 9.54 in that study.\(^{[24]}\) In a study of hand and/or foot eczema, the mean DLQI score of \((12.83 \pm 6.35)\) foot eczema was significantly lower than the score of \((16.33 \pm 6.44)\) hand eczema.\(^{[25]}\) A study from south India demonstrates that psoriasis area severity index (PASI) positively correlated with physical disability index (PDI) and the psoriasis life stress inventory (PLSI) score (a scale of measurement of stress).\(^{[26]}\) In the present study, a strong positive correlation \((r = 0.799)\) was found between VDS and DLQI. Likewise, a study of psoriasis from Brazil showed no correlation between the PASI and DLQI before and after treatment with patient specific characteristics like age of onset of disease, disease duration, gender, education, marital status, and occupation.\(^{[27]}\) Similarly in this study, DLQI with duration of the disease \((r = 0.042)\) had a poor positive correlation. However, the DLQI with the age of onset of the disease \((r = -0.059)\) had a negative correlation. “Quality of life” is a multidimensional index of different social, behavioral, and cultural factors. Different tools were developed for measuring QoL focusing on different conditions and diseases. DLQI was used in this study focusing on the wide range of cutaneous manifestation of CVI and to assess the severity and disability related to the disease.

**Conclusion**

CVI hampers the QoL. VCSS and VDS positively correlated with DLQI. The number and size of active ulcers and duration of ulcer at presentation positively correlated with DLQI, while the age of onset of disease negatively correlated with DLQI and duration of the disease at presentation.
presentation poorly correlated with DLQI. Pain magnitude and edema were found to be significantly associated with VDS.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. Eberhardt RT, Raffetto JD. Chronic venous insufficiency. Circulation 2005;111:2398-409.
2. Ruckley CV, Evans CJ, Allan PL, Lee AJ, Fowkes FGR. Chronic venous insufficiency: Clinical and duplex correlations. The Edinburgh vein study of venous disorders in the general population. J Vasc Surg 2002;36:520-5.
3. Patel SK, Surowiec SM. Venous insufficiency. StatPearls. Treasure Island (FL): StatPearls Publishing; 2020.
4. Eklof B, Rutherford RB, Bergan JJ, Carpentier PH, Gloviczki P, Kistner RL, et al. Revision of the CEAP classification for chronic venous disorders: Consensus statement. J Vasc Surg 2004;40:1248-52.
5. Rutherford RB, Padberg FT Jr, Comerota AJ, Kistner RL, Meissner MH, Moneta GL. Venous severity scoring: An adjunct to venous outcome assessment. J Vasc Surg 2000;31:1307-12.
6. Meissner MH, Natiello C, Nicholls SC. Performance characteristics of the venous clinical severity score. J Vasc Surg 2002;36:899-5.
7. Abbade LPF. Diagnósticos diferenciais de úlceras crônicas dos membros inferiores. In: Malagutti W, Kakihara CT, editors. Curativos, Estomias e Dermatologia: Uma Abordagem Multiprofissional. 2ª ed. São Paulo: Martinari; 2010. p. 77-93.
8. Finlay AY, Khan GK. Dermatology life quality index (DLQI)-A simple practical measure for routine clinical use. Clin Exp Dermatol 1994;19:210-6.
9. Kakkos SK, Rivera MA, Matsagas MI, Lazarides MK, Robless P, Belcaro G, et al. Validation of the new venous severity scoring system in varicose vein surgery. J Vasc Surg 2003;38:224-8.
10. Perrin M, Dedieu F, Jessent V, Blanc MP. Evaluation of the new severity scoring system in varicose vein surgery of the lower limbs: An observational study conducted by French angiologists. Phlebology 2006;11:3-16.
11. Masuda EM, Kessler DM, Lurie F, Puggioni A, Kistner RL, Eklof B. The effect of ultrasound-guided sclerotherapy of incompetent perforator veins on venous clinical severity and disability scores. J Vasc Surg 2006;43:551-6.
12. Gillet JL, Perrin MR, Allaert FA. Clinical presentation and venous severity scoring of patients with extended deep axial venous reflux. J Vasc Surg 2006;44:588-94.
13. Ricci MA, Emmerich J, Callas PW, Rosendaal FR, Stanley AC, Naud S, et al. Evaluating chronic venous disease with a new venous severity scoring system. J Vasc Surg 2003;38:909-15.
14. Lullove E, Alvarez OM. Improvement in clinical outcomes, physical function, and bodily pain following a 12 week course of intermittent pneumatic compression therapy in patients with chronic venous ulcers: Results of an observational longitudinal retrospective study. Cureus 2014;6:e175.
15. Vasquez MA, Wang J, Mahathanaruk M, Buczkowski G, Sprehe E, Dosluoglu HH. The utility of the venous clinical severity score in 682 limbs treated by radiofrequency saphenous vein ablation. J Vasc Surg 2007;45:1008-15.
16. Hartung O, Otero A, Boufi M, De Caridi G, Barthelemy P, Juhan C, et al. Mid-term results of endovascular treatment for symptomatic chronic nonmalignant iliocaval venous occlusive disease. J Vasc Surg 2005;42:1138-44.
17. Kowalewska B, Krajewska-Kulak E, Wroniska I, Niczyporuk W, Sobolewski M, Niczyporuk W, Sobolewski M. Self-evaluation of quality of life by patients with skin problems. Dermatol Klin 2010;12:106-13.
18. Potocka A, Turcyn-Jablońska K, Kiec-Swierczyńska M. Self-image and quality of life of dermatology patients. Int J Occup Med Environ Health 2008;21:309-17.
19. Świnoga M, Klos M, Miniszewska Z, Zalewska-Janowska A. Health-related quality of life in dermatological and allergo-dermatological patients. Postep Derm Alergor 2012;29:69-73.
20. Kaplan RM, Criqui MH, Denenberg JO, Bergan J, Fronek A. Quality of life in patients with chronic venous disease: San Diego population study. J Vasc Surg 2003;37:1047-53.
21. Kahn SR, M’lan CE, Lamping DL, Kurz X, Bérard A, Abenhaim LA, VEINES Study Group. Relationship between clinical classification of chronic venous disease and patient-reported quality of life: Results from an international cohort study. J Vasc Surg 2004;39:823-8.
22. Kurz X, Lamping DL, Kahn SR, Baccaglini U, Zuccarello F, Spreafico G, et al. Do varicose veins affect quality of life? Results of an international population-based study. J Vasc Surg 2001;34:641-8.
23. Biemans AAM, van der Velden SK, Bruijinckx CMA, Buth J, Nijsten T. Validation of the chronic venous insufficiency quality of life questionnaire in Dutch patients treated for varicose veins. Eur J Vasc Endovasc Surg 2011;42:246-53.
24. Charan UP, Dincy Peter CV, Pulimood SA. Impact of hand eczema severity on quality of life. Indian Dermatol Online J 2013;4:102-5.
25. Agrawal PV, Kumar A, Sharma YK, Deora M, Ranipariya RH. Comparative analysis of epidemiological data as well as quality of life in patient having hand eczema vis-a-vis foot eczema. Indian Dermatol Online J 2010;1:106-13.
26. Rahesh SV, D’Souza M, Sahai A. Quality of life in psoriasis: A study from south India. Indian J Dermatol Venereol Leprol 2008;74:600-6.
27. da Silva MFP, Fortes MRP, Miot LDB, Marques SA. Psoriasis: Correlation between severity index (PSI) and quality of life index (DLQI) in patients assessed before and after systemic treatment. An Bras Dermatol 2013;88:760-3.