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# Comparative Study of Efficacy of Various Topical Treatment Modalities for Psoriasis

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**Abstract:** ***Aim of the study*** *: To compare the efficacy and tolerability of various topical therapies like short contact Lipsomal dithranol ointment, 0.1% Betamethasone valerate ointment and liquid paraffin for psoriasis.* ***Materials and Methods****: This study was conducted in dermatology department of a tertiary hospital and a total of sixty patients who attended the Psoriasis clinic were randomly allocated to 3 groups ( 20 patients each) to receive short contact liposomal dithranol ointment, 0.1% Betamethasone valerate ointment and liquid paraffin after the diagnosis of psoriasis was made on clinical grounds and histopathological examination.* ***Results****: Among the sixty patients included in the study the mean age in our study was 37.43 with males outnumbering the females in each of the three groups. The mean duration of psoriasis was 41.24 months. The clinical types of Psoriasis in our study was plaque type (42) followed by palmoplantar (11) and guttate type (7). Family history was present among 3% of the total patients. Nail changes was present in 28 patients. Joint involvement was present in 6 patients. The mean baseline PASI scores in the lipsomal Dithranol ointment, 0.1% Betamethasone valerate ointment and liquid paraffin were 5.36, 4.82 and 4.23. At the end of 4 weeks the PASI scoring has reduced to 1.97 (64%) , 1.76 (65/%) and 3.97 (4%) and by the end of 8 weeks the PASI scoring has reduced to 0.97 (83%), 0.93 (83%) and 3.94 (6%) respectively for the above mentioned groups. At the end of 12 weeks the liposomal Dithranol and Betamenthasone groups showed a sustained reduction in PASI score to 0.91 (84%) and 0.78 (85%) respectively and no reduction in PASI 3.92 (6%) for liquid paraffin group.* ***Conclusion****: Among the three modalities compared in the study the effectiveness of topical lipsomal dithranol is equivalent to the of betamenthasone valerate in plaque type of psoriasis. Liposomal dithranol produces only moderate results in the treatment of Palmoplantar psoriasis when compared to betamethasone valerate. Topical betamethasone group had frequent exacerbations when compared to Liposomal dithranol group. The adverse effects like irritation and staining were minimal with liposomal dithranol preparation and was rapidly reversible. The liquid paraffin group was the least effective with neither adverse effects nor exacerbation and remissions.*

**Keywords:** Psoriasis, Lipsomal Dithranol, 0.1% Betamethasone valerate, liquid paraffin, PASI reduction

## 1. Introduction

Psoriasis is a chronic, genetically determined, inflammatory and proliferative disease of the skin presenting clinically with the characteristic lesions consisting of sharply demarcated, dull red, scaly plaques, distributed predominantly in the extensor prominences and in the scalp[1]. Various forms of treatment like topical , systemic, phototherapy and biologicals which substantially differ in chemistry, route of administration, mechanism of action and adverse effects have been developed thus far. The various topical modalities available are coal tar, Anthralin, topical Glucocorticoids, salicyclic acid, Vit-D analogues, tazarotene and topical cytostatic therapies like 5% flurouracil, Methotrexate to name a few. Psoriasis is a chronic disease that requires a long term maintenance strategy with an agent that has potent activity without any long term adverse effects. Liposomal dithranol and potent topical steroids are the mainstays in the topical treatment of psoriasis. Dithranol which is an excellent therapeutic option in the treatment of psoriasis in its novel therapeutic formulation namely liposomal dithranol lacks potent side effects like staining and irritation but retains its effective antiproliferative activity with improved availability of the drug[2]. Topical steroids play an important role in the treatment of psoriasis due to their vasoconstrictive, antiproliferative, immunosuppressive and anti-inflammatory effects[3]. They are used as a short term therapy[4], occlusive therapy[5], sequential therapy[6] and in combination therapies. The unwanted effects of topical steroids like topical side effects and systemic side effects are directly linked to their potencies[7]. They also show diminished response on continuous use due to tachyphylaxis and more incidence of recurrence[8]. This study is conducted to compare the efficacy of various topical therapies like short contact liposomal dithranol, topical 0.1% Betamethasone valerate ointment and liquid paraffin in the treatment of psoriasis.

## 2. Materials and Methods

This study was conducted at the department of dermatology in a tertiary hospital. A total of sixty patients who attended the Psoriasis clinic were randomly allocated to 3 groups ( 20 patients each) to receive short contact liposomal dithranol ointment, 0.1% Betamethasone valerate ointment and liquid paraffin after the diagnosis of psoriasis was made on clinical grounds and histopathological examination. The inclusion criteria was Adult patients of both sexes, Involvement of less than 20% of body surface area, Stable in severity and extent for atleast 2 weeks prior to inclusion, willingness to follow up and adherence to protocol. The exclusion criteria was Administration of systemic therapy or topical therapy or intralesional therapy or UV radiation for psoriasis for at least 2 months prior to inclusion in the study, patients with psoriatic lesions on the face and scalp, pregnancy and lactating women and extensive psoriasis involving more than 20% body surface area. A detailed history was taken which included age, sex, presenting complaints, duration, history of trauma, history of drug intake, past history of similar lesions, presence of similar lesions in the family and exacerbation factors if any was noted. Complete clinical examination was carried out in each patient with emphasis

on the morphological features of psoriasis and Nail changes of psoriasis. Koebners phenomenon and Auspitz sign were looked for. Focal sepsis in the ear, nose and throat and dental sepsis was screened and was treated if present before the onset of the therapy. The diagnosis in most cases was clinical and routine investigations including baseline haemogram, biochemical investigations, urine analysis, venereal disease research laboratory and enzyme linked immunosorbent assay for HIV was done in all cases. Skin biopsy was done only in atypical cases.

## 3. Results

### 3.1 Age Distribution

The mean age in our study was 37.43. The range was from 13 to 68 years. We had age matched groups between all the3 groups (20 patients each) of liposomal dithranol ointment, 0.1% Betamethasone valerate ointment and liquid paraffin. [Table -1].

**Table 1:** Mean Age of the patients.

| | Liposomal Dithranol | | Betamethasone | | Liquid Paraffin | | Mean difference | Student 't' test p value |
|---|---|---|---|---|---|---|---|---|
| | Mean | Standard Deviation | Mean | Standard Deviation | Mean | Standard Deviation | | |
| AGE | 37.40 | 10.743 | 37.45 | 9.865 | 37.43 | 10.326 | -0.050 | 0.988 |

Comments: The subjects who received liposomal dithranol ointment, 0.1% Betamethasone valerate ointment and liquid paraffin topical therapy have similar mean age and the small difference in mean age was not statistically significant. Hence all the three groups are comparable.

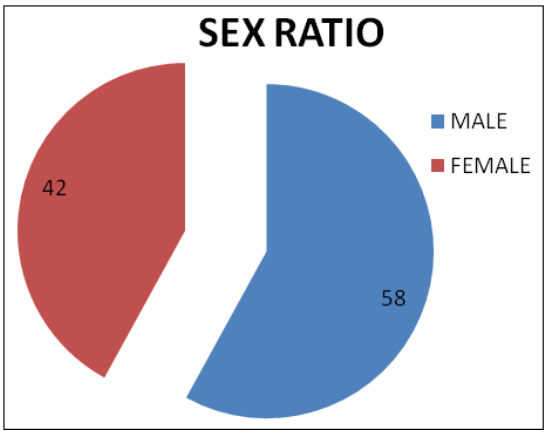
### 3.2 Sex Distribution

Males outnumbered females in each of the three groups. The overall male to female ratio was observed to be 58:42. [Table-2]

**Table 2:** Sex Distribution of Patients

| SEX | Liposomal Dithranol | | Betamethasone | | Liquid Paraffin | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Male | 11 | 55% | 12 | 60% | 12 | 60% |
| Female | 9 | 45% | 8 | 40% | 8 | 40% |
| Total | 20 | 100.0% | 20 | 100.0% | 20 | 100.0% |

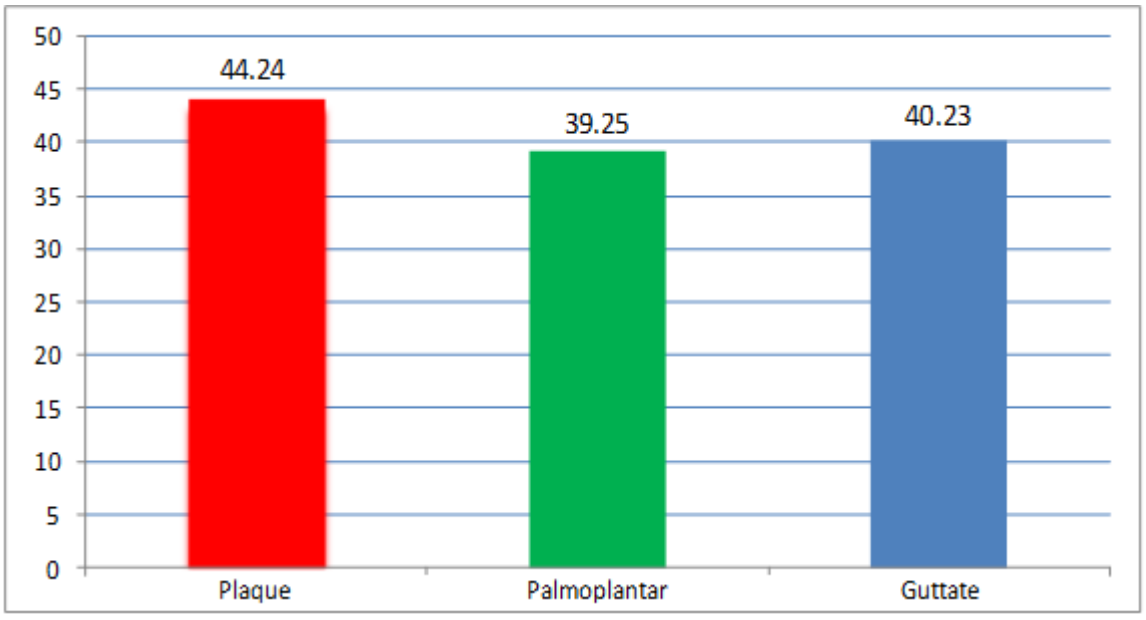
Comments: There was no statistically significant difference in the sex distribution of the 3 groups. (Chi-square value: 0.000, df =1,p value= 1.000)




### 3.3 Duration of Illness

The mean duration of illness was range between 43.23 and 24.76 months. There was no statistically significant difference in duration among all groups (p>0 .05). The maximum duration of illness was 224 months in Group 1 and Group 2 and minimum was 1 month in Group 2 and Group 3.

Duration of Illness (in months)

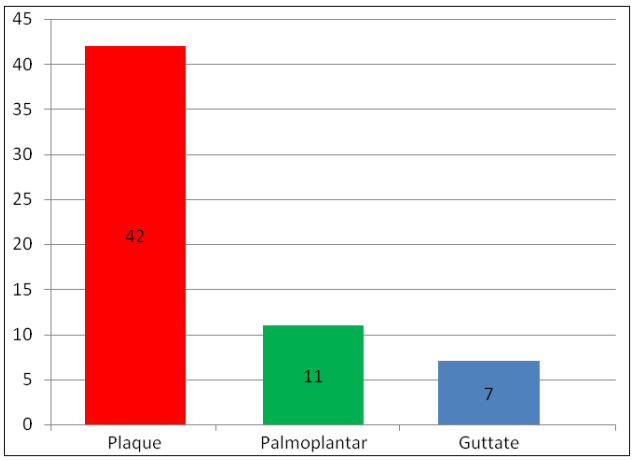


### 3.4 Clinical Types of Psoriasis

The most common type of psoriasis in our study was plaque type (42), followed by palmoplantar (11) and guttate (7). There was no statistically significant difference in the clinical type observed in the three groups ( Ω = 0.3, p>0.05) [Table – 3]

**Table 3:** Clinical Types of Psoriasis in Patients

| *Types* | *Liposomal Dithranol* | *Betamethasone* | *Liquid Paraffin* |
|---|---|---|---|
| Plaque | 14 | 14 | 14 |
| Palmoplantar | 5 | 3 | 3 |
| Guttate | 1 | 3 | 3 |




### 3.5 Family History

Distribution of the study population according to family history of Psoriasis (n=60) [Table-4]

**Table 4:** Family History in Patients

| Family history | Frequency | Percent |
|---|---|---|
| Present | 2 | 3.0 |
| Absent | 58 | 97.0 |
| Total | 60 | 100.0 |

Comments: Only 3% of the study subjects had family history of Psoriasis in our study, one from liposomal dithranol group and one from betamethasone group. (p>0.05)

### 3.6 Focal Sepsis

13% had evidence of focal sepsis in the ear, nose and throat and dental sepsis in the form of gingivitis, which was treated before the onset of therapy. There was no statistically significant difference in the three groups. (t = 0.3, p>0.05).[Table-5]

**Table 5:** Focal Sepsis in Patients

| Focal sepsis | Liposomal Dithranol | Betamethasone | Liquid Paraffin |
|---|---|---|---|
| Present | 02 | 03 | 03 |
| Absent | 18 | 17 | 17 |

### 3.7 Nail Changes

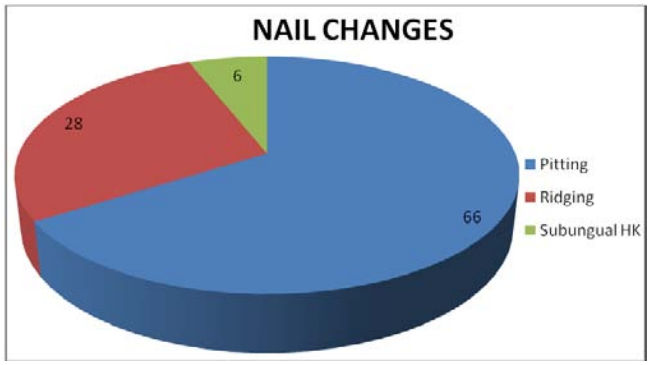
Distribution of the study population according to nail changes of psoriasis (n=60) [Table-6]

Comments: About 53.3 % of the study subjects had no nail changes. Nail changes was observed in 28 patients.

The most common change was pitting (66%), then ridging (28%) and subungual hyperkeratosis (6%).

**Table 6:** Nail Changes In Psoriasis Patients

| *Nail changes* | *Frequency* | *Percent* |
|---|---|---|
| Present | 28 | 46.6 |
| Absent | 32 | 53.3 |
| Total | 60 | 100.0 |




### 3.8 Joint Involvement

Only 6 of our patients, 3 in Dithranol group, 2 in Betamethasone group and 1 in liquid paraffin group had involvement of the joint in the form of asymmetrical oligoathritis

**Distribution of the study population according to joint involvement in psoriasis (n=60)[Table-7]**

**Table 7:** Join Involvement In Psoriasis Patients

| Arthritis | Frequency | Percent |
|---|---|---|
| Present | 6 | 10.0 |
| Absent | 54 | 90.0 |
| Total | 60 | 100.0 |

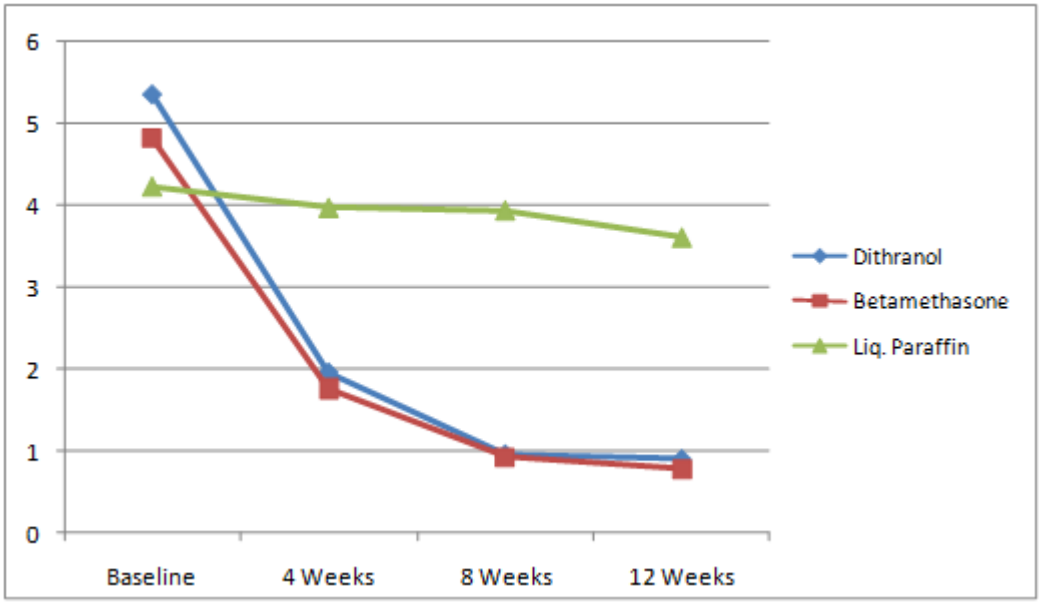
Comments: Only 10% of the study subjects had psoriatic arthritis.

### 3.9 Pasi Reduction

The following table and graph shows the PASI at baseline, 4 weeks, 8 weeks and 12 weeks of Liposomal Dithranol, Betamethasone and liquid paraffin groups. [Table-8]

**Table 8**

| Duration | Liposomal Dithranol | Betamethasone | Liquid Paraffin |
|---|---|---|---|
| Base line | 5.36 | 4.82 | 4.23 |
| 4 weeks | 1.968 | 1.76 | 3.97 |
| 8 weeks | 0.97 | 0.93 | 3.94 |
| 12 weeks | 0.91 | 0.78 | 3.92 |

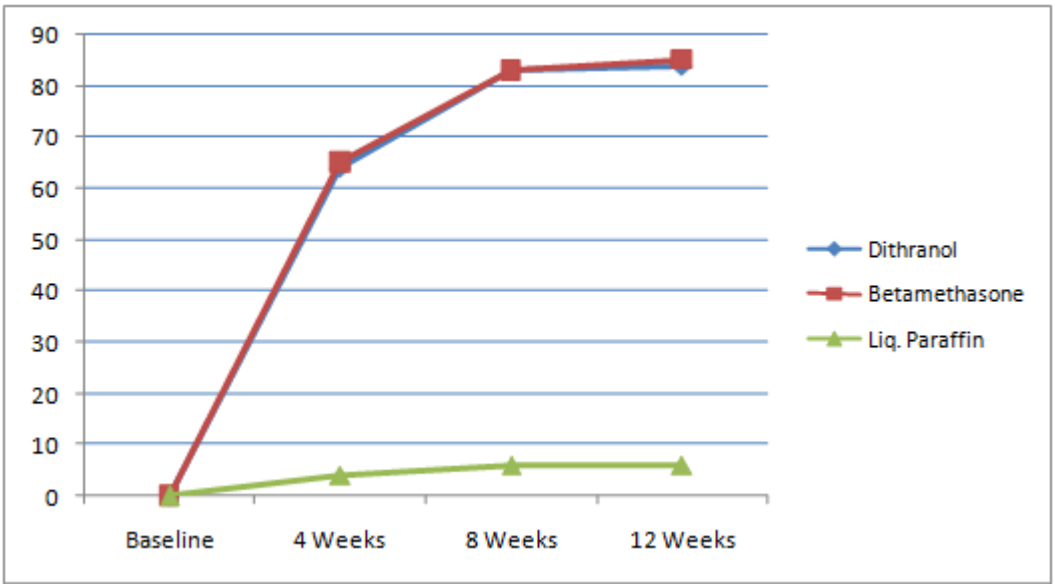



### 3.9.1 Percentage of Pasi Reduction

The following table and graph shows the PASI in percentages at baseline, 4 weeks, 8 weeks and 12 weeks of Liposomal Dithranol, Betamethasone and liquid paraffin groups. [Table – 9]

**Table 9**

| Duration | Liposomal Dithranol | Betamethasone | Liquid Paraffin |
|---|---|---|---|
| Base line | 0 | 0 | 0 |
| 4 weeks | 64 % | 65 % | 4 % |
| 8 weeks | 83 % | 83 % | 6 % |
| 12 weeks | 84 % | 85 % | 6 % |




We can see that the baseline PASI Scores for Liquid paraffin and liposomal Dithranol are 4.23 and 5.36. There is no statistically significant difference ($p>0.05$) among liquid paraffin and liposomal dithranol groups. At 4 weeks, PASI scoring has reduced to 3.97 and 1.968 respectively for the above mentioned groups. Thus there is more than 50% reduction (64%) in the liposomal dithranol group whereas only 4% reduction in the liquid paraffin group. There is a further fall in PASI scoring at 8 weeks to 3.94 and 0.97 in Liquid paraffin and Liposomal dithranol groups which correspond to reduction in percentages of 6% and 83% respectively. A further reduction in PASI scores is observed at 12 weeks when PASI score of liposomal dithranol has fallen to 0.91 (84%) and liquid paraffin group showing a marginal fall to 3.92 (6%). There is a significant statistical difference in PASI ($p<0.01$) between the Liquid paraffin and Lipsomal dithranol group at 4, 8 and 12 weeks.

The baseline PASI scores for Lipsomal dithranol and Btamethasone groups are 5.36 and 4.82. There is no statistically significant difference ($p>0.05\%$). There is a steady fall in PASI scores at 4,8 and 12 weeks to 1.968, 0.97, 0.91 and 1.76, 0.93 and 0.78 with respect to Lipsomal dithranol and Betamethasone groups. This corresponds to a percentage reduction to 64% , 83% and 84% in liposomal dithranol and 65% , 83% and 85% in Betamethasone group. Here there is no statistically significant difference in PASI at 4, 8 , 12 weeks ($p>0.05\%$).

### 3.10 Adverse Effects

**Distribution of the study subjects according to adverse effects and group of treatment (n=60).[Table – 10]**

**Table 10:** Adverse Effects in Psoriasis Patients

| *Adverse effects* | *Liposomal Dithranol* | | *Betamethasone* | | *Liquid Paraffin* | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Present | 4 | 20.0% | 2 | 10.0% | 0 | 0.0% |
| Absent | 16 | 8.0% | 18 | 90.0% | 20 | 10.00% |
| Total | 20 | 100.0% | 20 | 100.0% | 20 | 100.0% |

Comments: The subjects who received Lipsomal dithranol therapy had almost similar proportion of adverse effects in comparison to subjects who received Betamethasone therapy and the small difference in proportion of adverse effects between the 2 groups was not statistically significant. Chi-square value: 0.784 df =1 p value= 0.376. Perilesional staining (10%), erythema(5%) and irritation (5%) was seen in 20% of patients receiving liposomal dithranol. The light brown staining and Erythema faded rapidly towards the end of treatment period. The irritation seen in 5% of the individuals also disappeared on continuous usage. 10% of the patients receiving betamethasone showed exacerbation in the form of erythema. The liquid paraffin group did not show evidence of adverse effects.

## 4. Discussion

The study has shown the mean age of the patients was 37.43 ranging from 13 to 68 years. The sex ratio was 58% male and 42% female. The basic demographic data among the three groups were not statistically significant ($p>0.05$). Topical therapies like short contact liposomal dithranol, 0.1% Betamethasone valerate and liquid paraffin were used and reduction in PASI was assessed at every $4^{th}$ , $6^{th}$ and 12 weeks.

## 5. Liposomal Dithranol Group

The mean baseline PASI for the patients in this group was 5.36.( Figure 1)(Figure 3). This showed rapid fall and at the end of 4 weeks there was a reduction of PASI score to d 11.968 (64%). The reduction was further progressive as the patients were followed up at 8 weeks and 12 weeks of treatment, with PASI scores being 0.97 (83%) and 0.91 (84%) respectively.(Figure 2)(Figure 4). The previous study conducted with liposomal dithranol also showed similar results[9]. There was good compliance in this group with no defaulters, however some adverse effects in the form of erythema, irritation and pigmentation were seen. This too occurred with previous trials[9]. However when the contact period was reduced to 10 minutes the adverse effects reduced significantly. The plaque type of lesions showed the maximum reduction (89%), where as palmoplantar lesions showed 42% reduction. This shows liposomal dithranol would be a better option in treatment of plaque type of psoriasis[10].

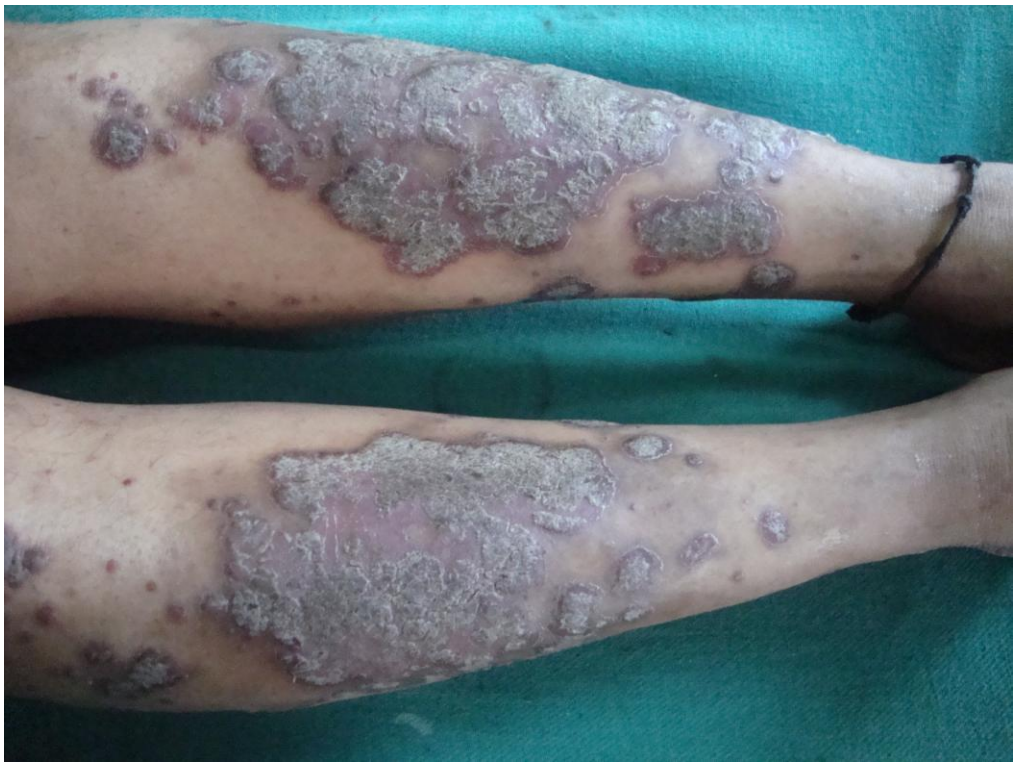


**Figure 1:** Lipsomal Dithranol Group – Before Treatment

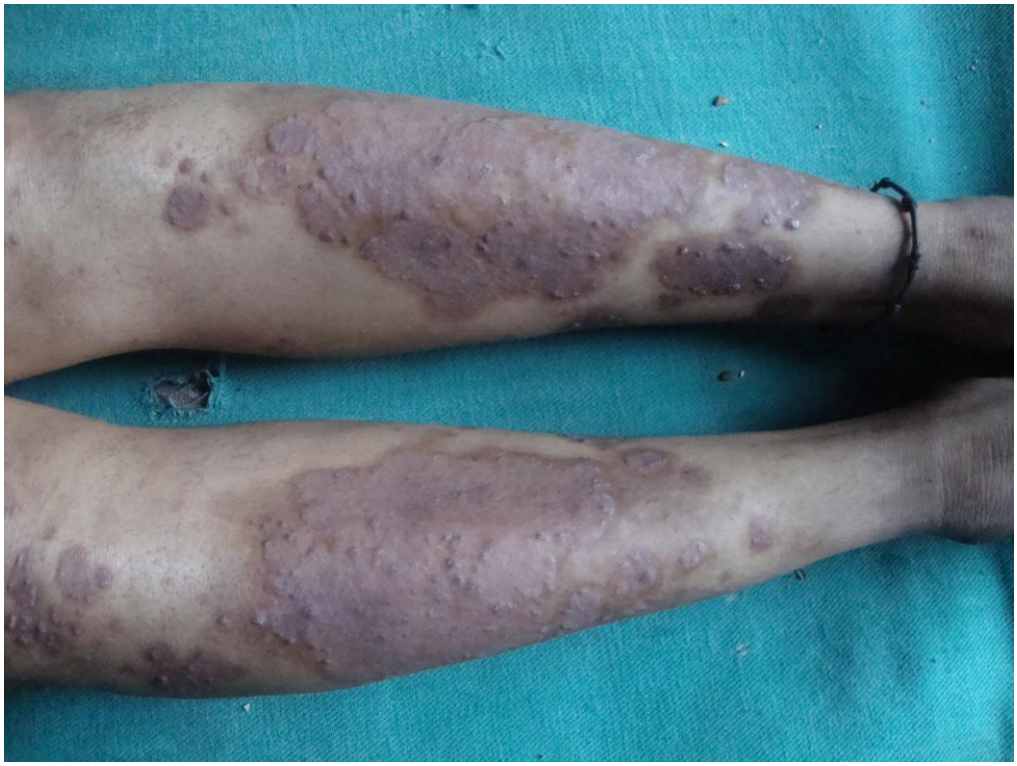


**Figure 2:** Lipsomal Dithranol Group – After 12 weeks of Treatment

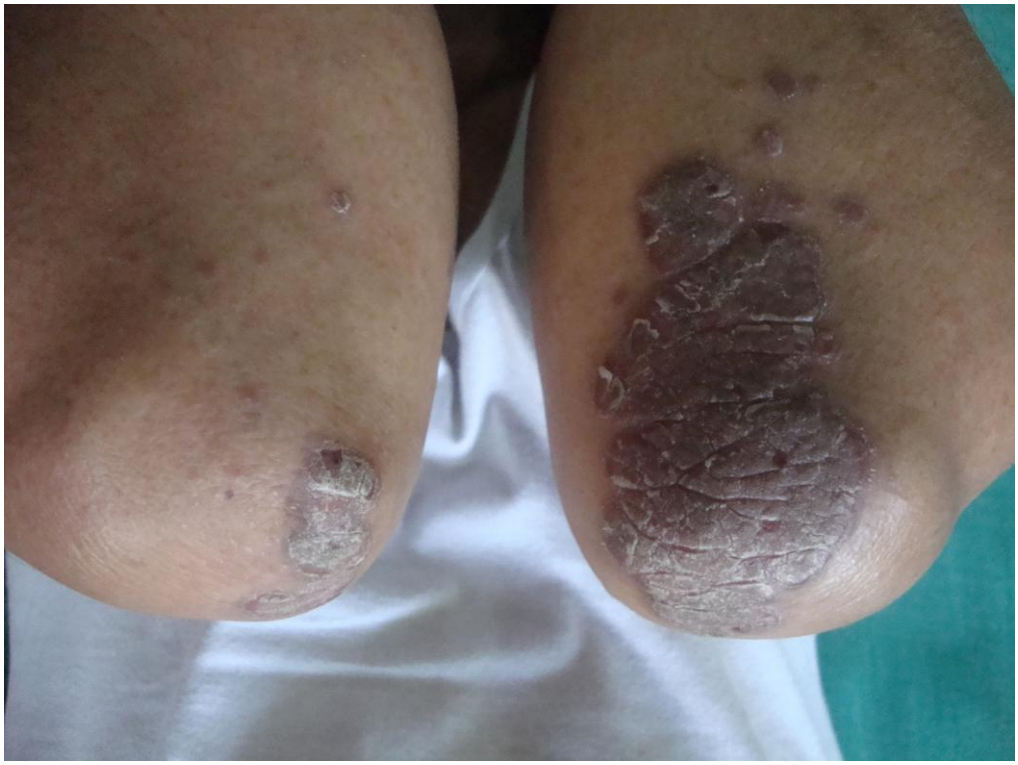


**Figure 3:** Lipsomal Dithranol Group – Before Treatment

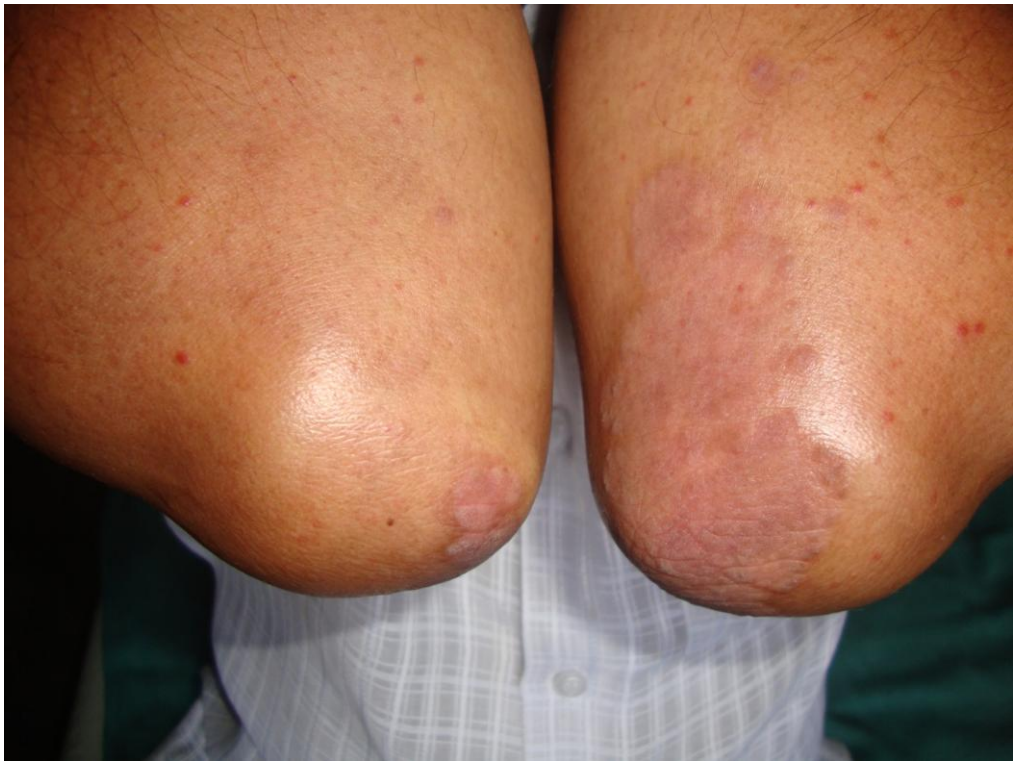


**Figure 4:** Lipsomal Dithranol Group – After 12 weeks of Treatment

## 6. Betamethasone Valerate Group

In this group, results obtained were similar to that of Liposomal dithranol group. Here also there was a rapid fall in PASI scores at 4 weeks to 1.76 (65%), and a progressive fall at 8 weeks and 12 weeks to 0.93 (83%) and 0.78 (85%) (Figure 6) from a baseline value of 4.82.(Figure 5). There was good compliance among the patients with no defaulters. Few side effects like erythema and exacerbation were observed in some patients. The guttate lesions showed maximum response (91%) followed by the plaque type (86%) and palmoplantar psoriasis (67%) at the end of treatment. We hereby infer that palmoplantar psoriasis responds better to betamethasone valerate when compared to liposomal dithranol. These results are identical to the results obtained when conventional short contact dithranol and topical steroids are compared[11].However trials involving larger group of patients are required to ascertain the above facts.

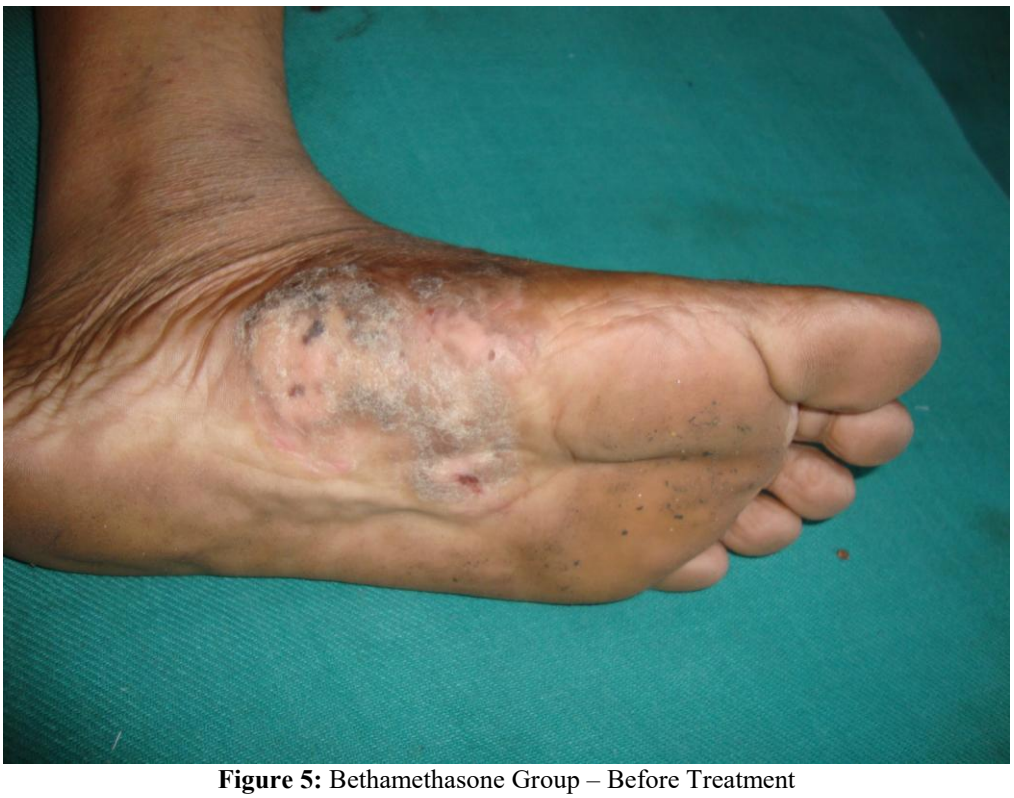


**Figure 5:** Bethamethasone Group – Before Treatment

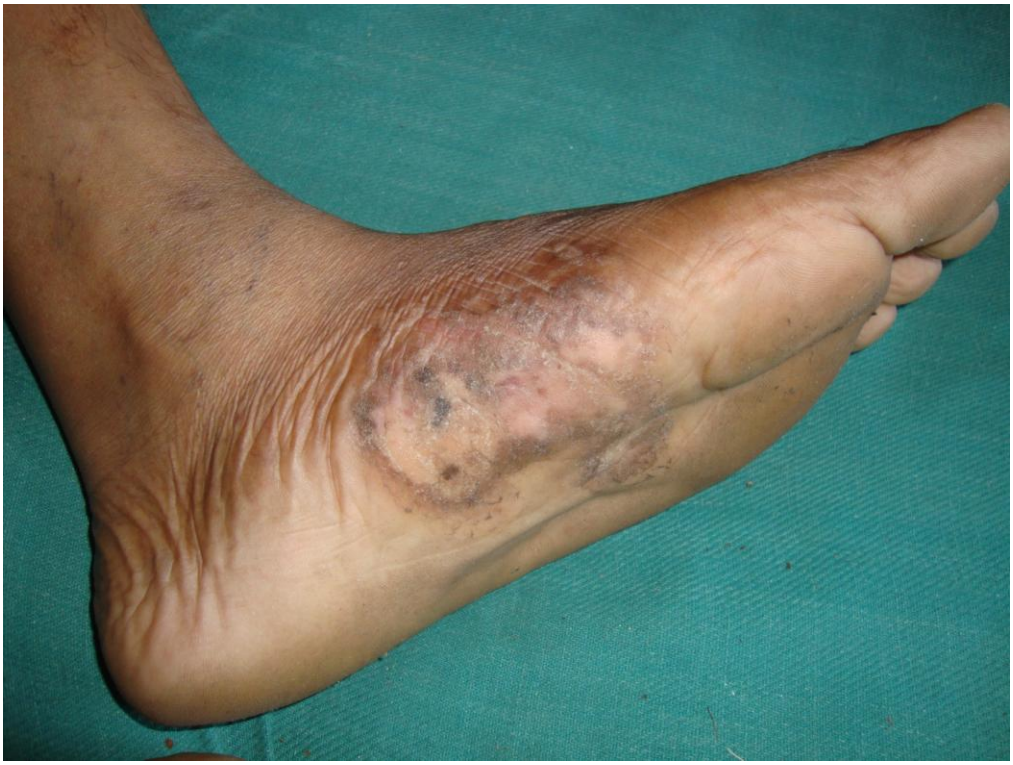


**Figure 6:** Betamethosone Group – After 12 weeks of Treatment

**Liquid Paraffin Group**

In this group application of liquid paraffin showed 6% reduction of PASI at the end of 12 weeks.(Figure 7&8) There was good compliance among this group with no defaulters and no adverse effects. Previous studies have shown that use of liquid paraffin in palmoplantar psoriasis relieved feeling of dryness and pruritus[12]. There was no improvement or deterioration of the disease.

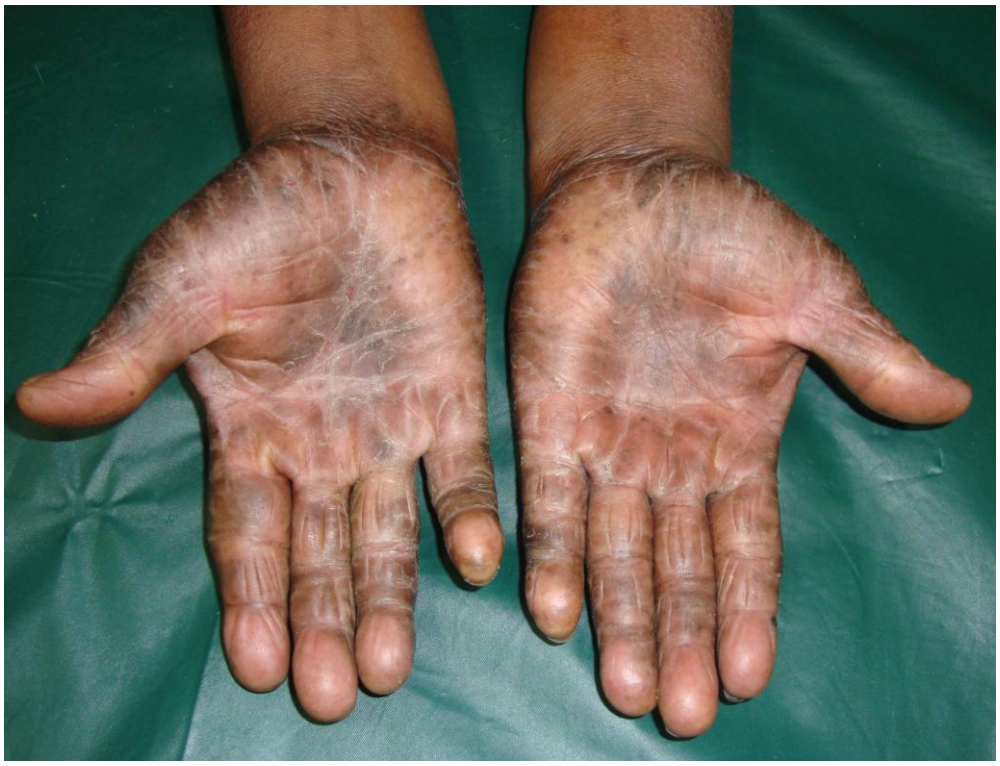


**Figure 7:** Liquid Paraffin Group – Before Treatment

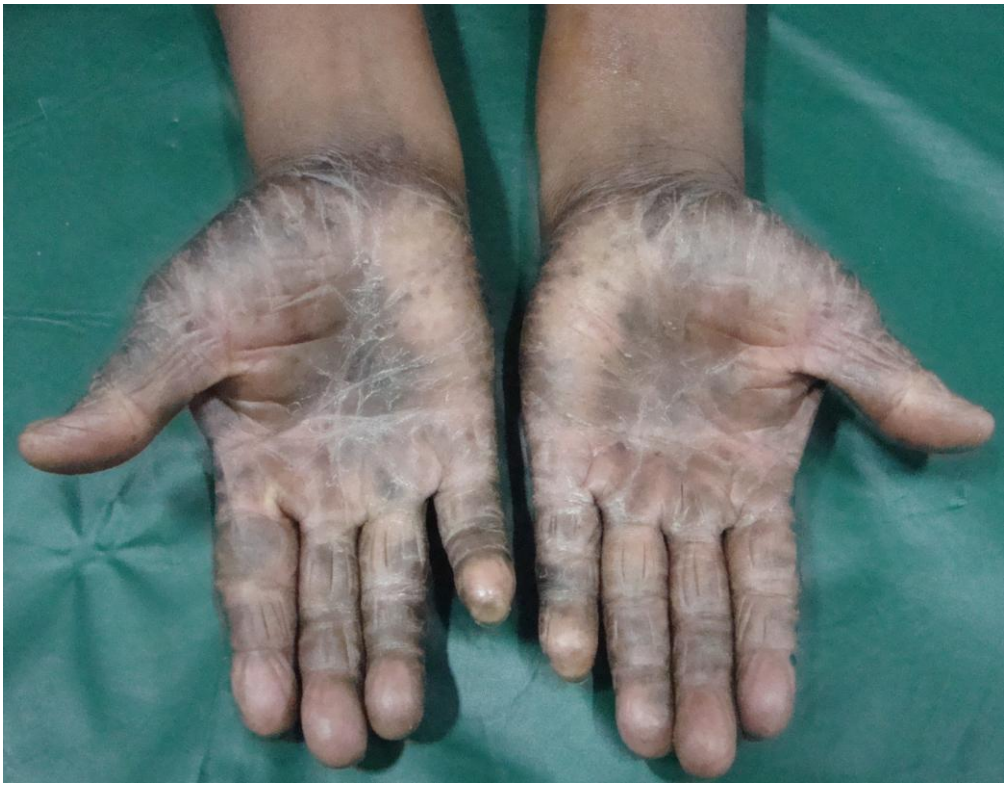


**Figure 8:** Liquid Paraffin Group – After 12 weeks of Treatment

Thus there seems to be a statistically significant difference ($p < 0.01$) when PASI was compared between liquid paraffin and liposomal dithranol at the end of the treatment. It was also found that there was no statistically significant difference ($p > 0.05$) when PASI between liposomal dithranol and betamethasone valerate when compared at the end of 12 weeks. These results were identical to the results obtained when short contact dithranol (devoid of liposomal formulation) and topical steroid are compared.

Betamethasone valerate has given a very good response in our trial, in accordance with the previous trials, but is associated with the development of tachyphylaxis and rebound phenomenon once withdrawn. In addition its prolonged use leads to long term side effects like striae, atrophy and suppression of pituitary axis.

Liposomal dithranol shows therapeutic efficacy similar to that of betamethasone but the later shows long term side effects mentioned above. The side effects of liposomal dithranol are definitely minimal and reversible in contrast to the irritation seen in 72% of patients with short contact anthralin.

## 7. Conclusion

Liposomal dithranol is an effective topical modality of treatment in plaque type of psoriasis vulgaris. The effectiveness of liposomal dithranol is equivalent to the efficacy of betamethasone valerate in plaque type of psoriasis. But liposomal dithranol produces only moderate response in the treatment of palmoplantar psoriasis when compared to betamethasone valerate, however trials involving larger groups are need to be conducted. The adverse effects like staining and irritation are minimal with liposomal preparation of dithranol and are rapidly reversible. Topical 0.1% Betamethasone valerate was moderately effective with frequent exacerbations. Liquid paraffin was the least effective with no adverse effects, no exacerbation and remissions. However it can be used as an adjunct with other topical therapies.

## References

[1] Camp R.D.R., Psoriasis – Text book of Dermatology, Edited by Champion.R.H., Burton J.L, Burns D.A and Breathnatch S.M.; VI Edition (1998); Vol 2; 1589-1649.
[2] Agarwal R, Katarae O.P, Vyas S.P. Preparation and in vitro evaluation of Lipsomal / niosomal : delivery systems for Antipsoriatic drug dithranol. Int J Pharamaceutics 2001; 228 :43-52.
[3] Michael Warner; Charles Camisa, Topical corticosteroids. Comprehensive dermatologic drug therapy. Edby Stephen E. Wplverton. 548-577.
[4] Pavithran K. Disorders of Keratinisation. IADVL Text Book and Atlas of dermatology. II Edition (2001) Vol 2: 812-834.
[5] Lawrence E. Gibson, Harold O. Perry. Papulosquamous eruptions and exfoliative dermatitis. Moschella's Dermatology; III Edition (1992) Vol 1: 618-619.
[6] John Koo. Sequential therapy for psoriasis. Experted from how and why to use sequential therapy for psoriasis. Skin & Aging 6(10): 42-44, 46, 1998 (Skin Sight) Issue 3. 2-5
[7] Roger C. Cornell; Richard B. Stoughton. The use of topical steroids in Psoriasis. Dermatologic clinics,1984 July; Vol 2(3); 397 – 409.
[8] Smita Amin, Howard J. Maibach, Roger C. Connel, Richard B. Stoughton. Topical corticosteroids. Psoriasis III Edition (1998); 453-467.
[9] Ravindra Agarwal, Abir Saraswat, Inderjeet kumar, Omprakash katarae and Bushan kumar. A novel

liposomal formulation of dithranol for psoriasis; Preliminary results. The journal of dermatology 2002; vol 29:529-532.
[10] Kar PK, Jha PK, Snchips Anthralin , Short contact therapy in psoriasis IJDVL 1990:56 (193-195)
[11] Lowen N.J, Ashton R.E, Koudsi H, Vershoore M, Shaefer A. Anthralin for psoriasis: short contact anthralin therapy compared with topical steroids and conventional anthralin. J Am Acad Dermatology. 1984 Jan 10(1) 69-72.
[12] Siddappa k. Dry skin conditions, emollient in their management. IJDVL (2003), page 69-75.Vol-69 issue.