International Journal of Research in Dermatology
Chacko E et al. Int J Res Dermatol. 2017 Mar;3(1):113-119
http://www.ijord.com

DOI: http://dx.doi.org/10.18203/issn.2455-4529.IntJResDermatol20170798

Original Research Article

A clinico-epidemiological study of polymorphic light eruption in a tertiary care centre in Salem: a region of South India

Eby Chacko*, Seethalakshmi Ganga Vellaisamy, Kannan Gopalan, Govindarajan Nanjappachetty

Department of Skin and STD, Vinayaka Missions Kirupananda Variyar Medical College, Salem, Tamil Nadu – 636308, India

Received: 02 December 2016
Accepted: 31 January 2017

***Correspondence:**
Dr. Eby Chacko,
E-mail: drebychacko@gmail.com

ABSTRACT

Background: Polymorphic light eruption (PMLE) is an acquired photodermatosis characterized by a polymorphic eruption ranging from papulovesicular lesions to large plaques. The prevalence of PMLE varies from 5% to 15% in various studies across the world and in India it is 0.56%. The present study was conducted to study the clinical pattern and to assess the epidemiological aspects of polymorphic light eruption.
Methods: A cross sectional prospective study was conducted in Dermatology OPD between July 2015 and June 2016. A total of 100 patients with symptoms and signs of PMLE were included in the study. Data were coded and analyzed.
Results: Majority of the cases in our study were in the age group of 21 - 30 years (36%). It was more common in females (82%) when compared with males (18%). Occupation of most of the patients (29%) was farmers in our study population. Positive family history of PMLE was seen in 11% of the study population. The commonest form was the papular type (46%) and the second most common type was plaque type (17%). Regarding the distribution of lesions, about 51% of our study subjects had polymorphic lesions confined to only one area of their body mostly forearm (25%) followed by face (12%).
Conclusions: The prevalence of PMLE was 1.34% in our study population. Pruritus was the presenting complaint in most of the cases and the rash was mainly seen in areas exposed to sunlight.

Keywords: Polymorphic light eruption, Clinico-epidemiological study, Photodermatosis, South India

INTRODUCTION

Polymorphic light eruption (PMLE) is an acquired photodermatosis characterized by polymorphic eruption ranging from papulovesicular lesions to large plaques. It is the most common type of idiopathic photodermatoses, affecting individuals of all races and skin colour. The eruption is generally most severe in the spring and early summer, usually disappearing completely in the winter.

The etiology is not known and is likely to be multi factorial. It has a polygenic mode of inheritance. The eruption of PMLE is induced by ultraviolet radiation (UVR) and perhaps rarely by visible radiation, either by sunlight or by artificial sources including sun beds. PMLE appears to be an immunologically mediated response possibly a delayed hypersensitivity phenomenon to a photo antigen induced or up regulated in the skin after sun exposure.[1]

The prevalence in the general population is inversely related to latitude, being highest in Scandinavia (21%), high in the United Kingdom and Northern United States (10-15%) and low in Australia (5%) and equatorial Singapore (around 1%).[2-5] The prevalence of PMLE in India is 0.56%.[6] This is probably due to the development of UVR induced immunologic tolerance, sometimes referred to as "hardening", secondary to constant solar exposure in sunny climate.

The prevalence of PMLE varies from 5% to 15% in various studies across the world.[4] Even though the exposure to sunlight is high in our country, we are not having enough studies regarding the clinico-epidemiologic profile of PMLE. This study is in the direction to throw light on the clinico-epidemiologic profile of PMLE.

The objective of the study was to study the clinical pattern and to assess the epidemiological aspects of polymorphic light eruption.

METHODS

This was a prospective cross sectional study conducted in our Dermatology outpatient department (OPD) during the period of July 2015-June 2016 after getting approval from ethical committee of our institution. All patients with history of photosensitivity or with clinical manifestations related to photosensitivity who visited our Dermatology OPD during that period were included in the study. Thus 100 cases of PMLE were registered during that stipulated period. All other patients who had photo aggravated dermatoses, genetic and metabolic photosensitivity disorders were excluded from the study.

After getting informed written consent, patient details were recorded in the pre-designed proforma which includes month, age of onset of symptoms, severity, nature, aggravating factors, constitutional symptoms, and any change in the severity of symptoms. Family history, patient's occupation, duration of exposure to sunlight during outdoor activities including travel, type of clothing, usage of cosmetics and sunscreens, as well as types of previous treatments were noted.

Findings of the clinical examination were recorded including the skin type of cases as classified by the Fitzpatricks skin phototype scale.[7] Details of the skin lesions with site, size, shape, colour, type, and secondary changes were noted. Data thus obtained was compiled, tabulated, and statistically summarized using SPSS version 16 [SPSS, Inc., Chicago, IL, USA].

RESULTS

Out of the total 7,462 patients who attended the Dermatology OPD during the stipulated study period, 100 patients had PMLE. The prevalence of PMLE was thus calculated to be 1.34%. In our study 82 patients were females while only 18 patients were males. The male:female sex ratio was 1:4.5. Of the 100 patients, majority of the study subjects (36%) were in the age group of 21-30 years that is, in 3rd decade. There was only one patient with the onset in the first decade of the life, 14% of the study population were in 2nd decade, 25% in 4th decade, 14% in 5th decade, 8% in 6th decade and only 2% in 7th decade (Figure 1). The age of subjects varied from 10 years to 65 years and mean age of the study population was 32.80+/-12.62 years.

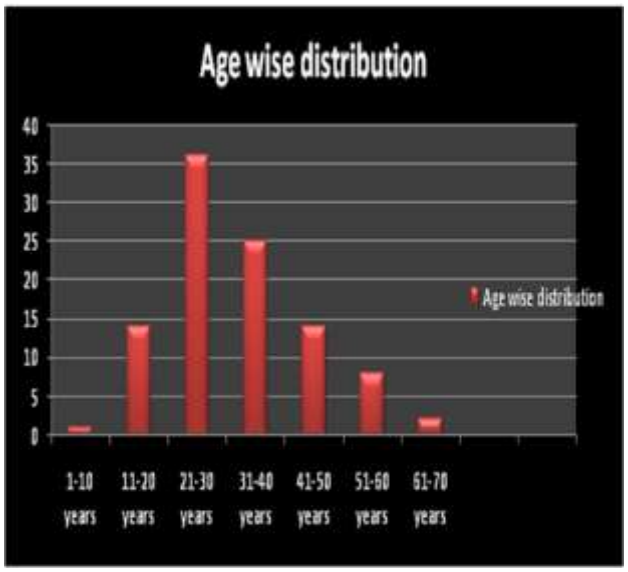

Figure 1: Age wise distribution of study population.

In our study, out of the 100 patients, 29% were farmers, 26% were house wives, 22% were students, 14% were doing clerical job and 9% constituted professionals. Among the study subjects, 11% had a family history of PMLE. Remaining 89% of patients did not have any contributory family history. Fourteen patients gave a history of usage of cosmetics whereas remaining 86 patients did not use any cosmetics. In our study, 99% of patients did not give any history of using sunscreens whereas only one percent of the study population gave history of usage of sunscreens. The material of clothing used was of polyester in 80% of cases and cotton in only 19% of our study population. Skin types of the patients were examined visually and they were classified as per Fitzpatricks skin type. Among the 100 patients, 88% had Type V and 12% had Type IV skin type.

Around 43% of the patients were asymptomatic in our study whereas 30% of the patients presented with itching as presenting complaint. In 18% of patients, burning sensation was the main symptom, both itching and burning sensation was present in 9% of the study population (Table 1). The duration of the disease was less than one month in 31% of patients, one to two months in 20%, two to three months in 18% and more than three months in 31 % of study population. Regarding nature of the PMLE lesions, it was transient in 48%, persistent in 16% and recurrent in 36% of the study population.

Table 1: Symptoms at the time of presentation.

Symptoms	No. of patients	Percentage
Itching	30	30.0
Burning sensation	18	18.0
Itching + burning sensation	9	9.0
No symptoms	43	43.0
Total	100	100.0

The minimum duration of sun exposure for the onset of symptoms determined for each subject. It was in the range of less than one hour to more than six hours. The duration of exposure was one to two hours in 26% followed by three to four hours in 18% of the individuals (Table 2). Regarding morphology of the skin lesions, papules, plaques, and papules-plaques formed the majority of lesions with 46%, 17% and 15% of the subjects respectively. We did not observe any vesicular lesions in our study population. 3% of the study population had crusted scaly plaques and papules (Table 3).

Table 2: Duration of exposure to sunlight.

Duration of exposure	No. of patients	Percentage
< 1 hour	6	6.0
1 - 2 hours	26	26.0
2 - 3 hours	17	17.0
3 - 4 hours	18	18.0
4 - 5 hours	6	6.0
5 - 6 hours	10	10.0
> 6 hours	17	17.0
Total	100	100.0

Table 3: Morphological type of the lesions.

Type of lesion	No. of patients	Percentage
Macule	2	2.0
Papule	46	46.0
Plaque	17	17.0
Patches	6	6.0
Papule + plaque	15	15.0
Papule + patch	8	8.0
Plaque + patch	3	3.0
Papule + plaque + scaling+crusting	3	3.0
Total	100	100.0

About 51% of the study subjects had polymorphic lesions confined to only one area of the body mostly forearm or upper back. As many as 34% of patients had involvement of two areas whereas 10% had involvement of three areas and 5% had multiple areas of involvement (Table 4). In majority of the study subjects that is in 43%, hypopigmented lesion was the main feature, whereas it was hyperpigmented in 24%, skin colored in 22% and erythematous in 11% of the study population (Table 5).

Table 4: Area of involvement.

Extend of involvement	No. of patients	Percentage
Single area (Face-12,Neck-4, Forearm-25, Arm- 2 Back-8)	51	51.0
>1 area of involvement	34	34.0
>2areas of involvement	10	10.0
> 3 areas of involvement	5	5.0
Total	100	100.0

Table 5: Colour of skin lesion.

Colour of lesion	No. of patients	Percentage
Erythematous	11	11.0
Hyperpigmentation	24	24.0
Hypopigmentation	43	43.0
Skin coloured	22	22.0
Hyperpigmentation + skin colour	1	1.0
Total	100	100.0

DISCUSSION

Prevalence of PMLE was found to be 1.34% in our study which is in concordance with other studies done in India. In a study done by Sharma et al in Varanasi, the prevalence was 0.56% and in another study by Prasad et al the prevalence was 0.49%.[6,8] PMLE is considered to be a disease of fair skinned individuals.[2] So the western population showed a higher prevalence.[3] The latitude of Salem city is 11.6 degree north and longitude of 78.14 degree east.

PMLE is less common in countries like India because the skin type belongs to mostly of Type IV, V and Type VI that is dark skinned individuals. In our study also, the patients were mainly of skin Type V (88%) and the remaining 12% of the study population were of skin Type IV. This explains the low prevalence of PMLE in this study.

Gender distribution

In our study, PMLE was more common in females (82%) when compared with males (18%). Male to female ratio in our study was 1:4.5. This preponderance of females is in line with other studies. In Jansen et al study 52% of cases were females and in Boonstra et al study 68% of the patients were females.[9,10] In Sharma et al study

62.73% were females and in Prasad et al study 63% were females.[6,8] Women were more frequently affected than men. Female preponderance could be attributed to the recent demonstration of a female hormone 17-β estradiol which prevents UVR induced suppression of the contact hypersensitivity response caused by the release of immunosuppressive cytokines (IL-10) from keratinocytes.[11] Women may also be more cognizant of their skin symptoms than men, which could result in an over-representation of women in clinical studies.[12]

Similar observations were also seen in a study by Tutrone et al, in which females were affected two to three times more than males.[13] According to the Dermatologic Disease Database-2006, male to female ratio was 1:2.[14] Female preponderance was also seen in studies by Morrison et al (M:F ratio 1:3) and by Sophie Shirin et al., where females were affected three times more than males.[15-17]

Age of onset distribution

Majority of cases in our study were in the age group of 21 - 30 years (36%) which was consistent with earlier observations.[11] Mean age of the population in our study was 32.8+/-12.62. These results are in line with that of Hawk and Norris in which most patients have their onset in the second or third decades.[17] According to Morrison, the age of onset varied between 20-40 years and according to Naleway, mean age at onset of the disease ranged from 26 to 37 years.[15,18] From these studies, it was clear that the age of onset varies considerably, although there seems to be a definite tendency for this disorder to be common in 2nd to 3rd decade which is seen in our study.

Occupation of the study population

Majority of the patients (29%) were farmers in our study population because these people are exposed to sun light everyday when compared to other occupations. The second most common people who are more affected (26%) apart from farmers in our study were house wives. This is mainly attributed to the heat of an open fire while cooking food. About 22% of the patients were students and it is explained by the fact that they were used to engage themselves in outdoor sports activities. In Sharma et al study, housewives (37%) were most commonly involved followed by students (31%) and office persons (18%). Farmers (10%) were less commonly affected in their study.[6] In Prasad et al study, 60% were manual laborers and 19% were students.[8]

Family history

In our study, 11% of patients had a positive family history of PMLE which is in line with the study done by Sharma et al where it was 10%.[6] Several authors have speculated that PMLE is inherited as an autosomal dominant gene with reduced penetrance but recent studies have shown a polygenic inheritance.[19-21] The heritability of PMLE varied between 6.25% - 12% in the studies conducted by Ross and Millard.[2,21] Orr and Brit observed family history of photosensitivity, suggesting an autosomal dominant trait with incomplete penetrance.[22]

But in Prasad et al study, family history was seen in 4% of patients and they are explaining it by the following facts.[8] As it is only a disease with minimal symptoms, many patients were not aware of similar symptoms in family members. In addition, the members of family work in different atmospheres and varying degree of sun exposure which could be responsible for the low familial incidence in their report.

Type of clothing used

The material of clothing used was of polyester in 80% of cases and cotton in only 19% of our study population. Unexposed areas were not affected in our study. Covered areas were not affected irrespective of the type of clothing or weave tightness which suggests that it is probably preventable by all types of clothing.[23]

Symptoms at the time of presentation

Pruritus was the most common symptom in our study which was seen in 30% of the study population. About 43% of patients were asymptomatic in our study. Like our study, pruritus was the common presenting symptom in both Sharma et al. and Prasad et al study, which was 68.63% and 54% respectively.[6,8] Fever, malaise and headache were seen in 6.8% of the study population in Sharma et al's study and 6% in Prasad et al's study where as none of our patients presented with constitutional symptoms which can be explained by the fact that the disease was milder in our area.

Duration of disease

The duration of the disease was of less than one month in 31% of patients, one to two months in 20%, two to three months in 18% and more than three months in 31% of study population. The mean duration of the disease was 3.2 months (10 days - 8 months) in Prasad et al study.[8] Boonstra and Mastalier observed the mean duration as 9.2 and 6.5 years respectively.[10,24] Boonstra and Mastalier included all cases of PMLE whereas we excluded patients on treatment which could partly explain the shorter duration of the disease in our study population.[10,24]

Nature of disease

Regarding the nature of PMLE lesions in our study, it was transient in 48%, persistent in 16% and recurrent in 36% of study population. In Sharma et al study, the rash was recurrent in 45% of study population and persistent in 11% individuals.[6]

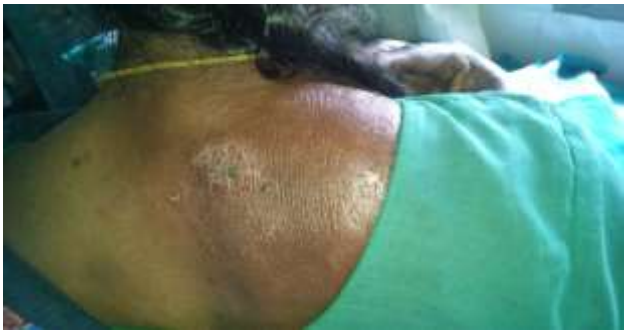

Figure 2: Plaque type PMLE over the back.

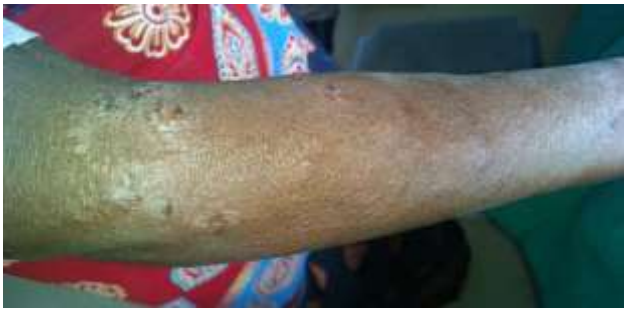

Figure 3: Plaque with erosion and crusting over right forearm.

Duration of exposure

Duration of sun exposure required to elicit skin-response ranged from few minutes to seven hours in our study which is in line with Ros et al study.[2] This duration of sun exposure can be increased by increasing the working hours per day which may be due to hardening effect. Majority of the patients (26%) in our study were exposed to sunlight for a period of 60-120 minutes before the development of PMLE lesions where as in Prasad et al study the rash developed within 60 minutes in majority of the patients (26%).[8] In Sharma et al study, the interval being slightly less than 30 minutes in 29.55% of cases, more than 30 minutes in 9.09%, but 52.27% were not aware of this.[6] In our study it may be due to hardening effect that majority (26%) of the patients develop lesions in 60-120 minutes.

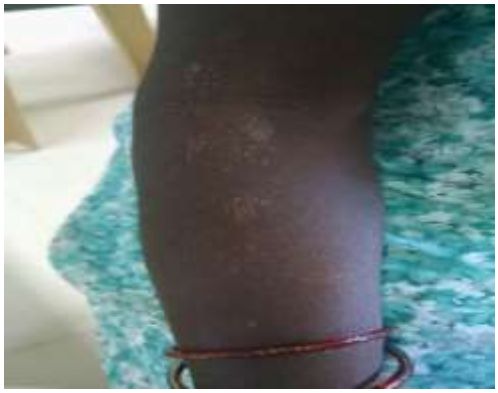

Figure 4: Papular type of PMLE over right forearm.

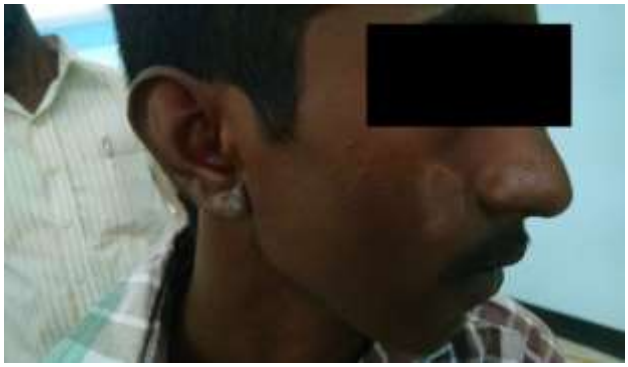

Figure 5: Plaque type PMLE over the face.

Morphology of the lesions

John et al classified PMLE into clinical types, such as papular, papulo-vesicular, plaque, vesiculo-bullous, urticarial, haemorrhagic and eczematous.[25] Insect bite-like, prurigo like and erythema multiforme like variants have also been described.[26] In our study, papular type was seen in 46% of patients, plaque type in 17% of patients and papules-plaques in 15% of patients. The commonest form was the papular type and the second most common type was plaque type. This presentation was more or less similar to other Indian studies.[6,8] In Prasad et al study, papules (41%) were the predominant lesion followed by plaques (34%) which is similar to our study.[8] In Sharma et al study, papules (54.09%) were the predominant lesion followed by macules (19.55%) and papules-plaque in 15% of patients, which is similar to our study. Boonstra observed papules as the common presentation and Mastalier observed papulo vesicular lesions.[10,24]

According to Reinhard et al, papular and papulo-vesicular eruptions were the most common.[27] Lamb et al have observed plaque to be the most common while Kontus et al found papular type to be very common.[28,29] In a study by Guarrera et al, papules (72.4%) were the commonest lesions followed by vesicles (8.5%).[30] Like all the studies which we have mentioned above, papules were the commonest presentation in our study. But vesicles were not found in any of our patients.

Distribution of lesion

Regarding the distribution of lesions, about 51% of our study subjects had polymorphic lesions confined to only one area of their body mostly forearm (25%) followed by face (12%). As many as 34% of patients had involvement of two areas whereas 10% had involvement of three areas of their body and 5% had multiple areas of involvement. This is explained by the fact that during sitting or travelling, the extensor aspect of forearm receives maximal exposure of sunlight as these parts are placed horizontally. Facial involvement is less when compared to forearms and it is explained by the following reasons. Either the face may be protected by some sort of headgear while travelling or the position of the face is

vertical while walking or working or it may not even be exposed to the sun if the person is bending forward.

Our study is in concordance with Prasad et al study where forearm (50%) was the commonest site involved in their study population.[8] In a study by Gonzalez et al., neck was the commonest site followed by extensor aspect of forearm.[31] It was also observed that the face is less likely to be involved. In Sharma et al study, neck (61.82%) was the common site involved followed by arms (55%) and forearms (47.73%).[6]

CONCLUSION

The prevalence of PMLE was 1.34% in our study population. In our study, majority of the patients were of mainly skin Type V. This explains the low prevalence of PMLE in this study. PMLE is more common in females when compared with males. Majority of the cases in our study were in the age group of 21 - 30 years. Occupation of most of the patients was farmers in our study population followed by house wives and students. Type of clothing is not having any significant effect in PMLE.

Majority of the patients in our study was exposed to sunlight for a period of 60-120 minutes before the development of PMLE lesions. Pruritus was the most common symptom in our study seen in 30% of the study population. Papular type was the most common type of lesion in our study. Regarding the distribution of lesions, majority of the study subjects had polymorphic lesions confined to only one area of their body mostly forearm followed by face.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Norris PG, Barker JN, Allen MH, et al. Adhesion molecule expression in polumorphic light eruption. J Invest Dermatol. 1992;99(4):504-8.
2. Ros AM, Wennersten G. Current aspects of polymorphous light eruption in Sweden. Photodermatology. 1986;3(5):298–302.
3. Pao C, Norris PG, Corbett M, Hawk JL. Polymorphic light eruption: prevalence in Australia and England. Br J Dermatol. 1994;130(1):62–4.
4. Morison WL, Stern RS. Polymorphous light eruption: a common reaction uncommonly recognized. Acta Derm Venereol (Stockh). 1982;62(3):237–40.
5. Khoo SW, Tay YK, Tham SN. Photodermatoses in a Singapore skin referral center. Clin Exp Dermatol. 1996;21(4):263–8.
6. Sharma L, Basnet A. A clinic epidemiological study of PMLE. Indian J Dermatol Venerol Leprol. 2008;74:15-7.
7. Fitzpatrick TB. The validity and practicality of sun reactive skin type I through VI. Arch Dermatol. 1988;124:869.
8. Prasad P, Kaviarasan PK, Udhay S. A Clinico-pathological Study of PMLE. Journal of Cosmetics, Dermatological Sciences and Applications. 2012;2:219-23.
9. Jansen CT, Darvonen J. Polymorphous light eruption. A seven year follow up evaluation of 114 patients. Arch Dermatol. 1984;120:862.
10. Boonstra HE, van Weelden H, Toonstra J, van Vloten WA. Polymorphous light eruption: a clinical, photobiologic, and follow-up study of 110 patients. J Am Acad Dermatol. 2000;42:199–207.
11. Aubin F. Why Is Polymorphous Light Eruption so Common in Young Women. Archives of Dermatological Research. 2004;296(5):240-1.
12. Berg M. Epidemiological Studies of the Influence of Sun Light on the Skin. Photo-dermatology. 1989;6(2):80-5.
13. Tutrone WD, Spann CT, Scheinfeld N, Delevo VA. Dermatologic therapy. 2003;16(1):28-39.
14. Dermatologic Disease Database: Polymorphic light eruption: http://www.aocd.org/skin/dermatologic-disease/polymorphous-lighteruption.htm. Accessed 15 November 2016.
15. Morrison et al. The New England J Med. 2004;350(11):1111.
16. Sophie Shirin et al. Global Dermatology – Polymorphous light eruption. Sept 27, 2005. P 1. www.emedicine.com/derm/topic342.htm. Accessed 15 November 2016.
17. Hawk JLM, Norris PG. Abnormal response to ultraviolet radiation: idiopathic. In: Irwin MF et al. Eds. Fitzpatrick's Dermatology in General Medicine. 5th edition. New York: Mc-Graw Hill; 1999: 1573-1589.
18. Naleway AL. Polymorphous light eruption. Int J Dermatol. 2002;41:377–83.
19. Bansal I, Kerr H, Janiga JJ, Quershi MS. Pin-point Papular Variant of Polymorphous Light Eruption: Clinical and Pathological Correlation. Journal of the European Academy of Dermatology and Venereology. 2006;20(4):406-11.
20. McGregor JM, Grabezynska S, Vaughan R. Genetic Modeling of Abnormal Photo Sensivity in Families with Polymorphic Light Eruption and Actinic Prurigo. Journal of Investigative Dermatology. 2000;115:471-6.
21. Millard TP, Bataille V, Snieder H. The Heritabil-ity of Polymorphic Light Eruption. Journal of Investiga-tive Dermatology. 2000;115:467-70.
22. Orr PH, Birt AR. Hereditary polymorphic light eruption in Canadian unit. Int J Dermatol. 1984;23(7):472-5.
23. Jansen CT. The natural history of polymorphous light eruptions. Arch Dermatol. 1979;115(2):165–9.
24. Mastalier U, Kerl H, Wolf P. Clinical, laboratory, phototest and phototherapy findings in polymorphic

light eruptions: a retrospective study of 133 patients. Eur J Dermatol. 1998;8:554–9.
25. John LM, Hawk. The photosensitivity disorders. 8th edition.1997; 305-310.
26. John LM, Hawk. Abnormal responses to ultraviolet radiation: Idiopathic, probably immunologic and photo exacerbated. In: Irwin MF et al. Eds. Fitzpatrick's Dermatology in General Medicine 6th Edn. New York: Mc-Graw Hill; 2003: 1283.
27. Reinhard. Clinical and therapeutic aspects of polymorphous light eruption. Dept of Dermatology, University Hospital, Zurich, Switzerland. Dermatology. 2003;207:93-5.
28. Lamb et al. Solar Dermatitis. Arch Derm. 1957; 75: 171-180.
29. Kontos AP, Cusack CA, Chaffins M, Lim HW. Polymorphous light eruption in African Americans: Pinpoint popular variant. Photodermatol Photoimmunol Photomed. 2002;18(6):303-6.
30. Guarrera M, Micallizi C, Rebora A. Heterogeneity of polymorphic light eruption: A study of 105 patients. Arch Dermatol. 1993;129:1060-2.
31. Gonzalez E, Gonzalez S. Drug photosensitivity, idiopathic photodermatosis and sunscreens. J Am Acad Dermatol. 1996;35:871-85.

Cite this article as: Chacko E, Vellaisamy SG, Gopalan K, Nanjappachetty G. A clinico-epidemiological study of polymorphic light eruption in a tertiary care centre in Salem: a region of South India. Int J Res Dermatol 2017;3:113-9.