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EVALUTION OF CLINICAL SPECTRUM AND FREQUENCY OF PHOTODERMATOSES IN A SKIN SPECIALITY HOSPITAL

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ABSTRACT

In an attempt to study the frequency and clinical spectrum of photodermatoses in varied populations of rural and urban areas at a tertiary referral centre in BHAVYA Skin speciality hospital located in Rajamahendravaram town of Andhra Pradesh. The study was conducted from January 2016 - June 2016. We aim to find out the occurrence of photodermatoses by population based study, a total of 120 random participants; both male and female were included in the study with selection criteria. Patients of all age groups, Patients who were diagnosed with positive photo dermatoses, Patients who were willing to participate in the study, the type of photo dermatoses involved and most commonest one identified by Prospective, cross- sectional observation study in the Out-patient department of dermatology and venerology. The Research study begins with standard questionnaire for collecting patient's demographic details, diagnosis of the presenting disease condition assesses the duration of exposure. The case study was reported for a period of six months and the data obtained from the questionnaires was analyzed in Microsoft excel 2013. The people with age group of 68 years were prone to photodermatoses at the rate of 57% of total cases and ages of 52(43%) of cases. In our study we found that dark skinned individuals are most affected with photodermatoses than fair- skinned individuals. The gender analysis in study reported that females are more affected than males with 58% and 42% respectively. In conclusion we represent that incidence of disease was more in the mid summer i.e. in the month of may, housewives were more affected with photodermatoses than others and mainly affected sites are face and neck (42%) followed by upper limbs (26%). Papule (50%) was the most common rash observed in many of patients followed by Macule (17%) and plaque (15%) the majority of the lesions were erythematous. Polymorphic light eruption (PMLE) was the commonest photodermatoses noticed in many of the individuals followed by actinic purigo and chronic actinic dermatitis.

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INTRODUCTION

Many diseases are directly or indirectly provoked or exacerbated by sunlight. Sunlight induces a wide variety of dermatoses, acute reactions, such as sunburn, which are induced by excessive UV radiation, must be differentiated from abnormal reactions to sunlight. However, prolonged and therefore cumulative high doses of UV also prematurely age the skin and lead to damage such as skin cancer.^[1, 2] They are divided into phototoxic and photo allergic reactions to known photosensitizers and idiopathic photodermatoses, in which the photo sensitizer is unknown. However, prolonged and therefore cumulative high doses of UV also prematurely age the skin and lead to damage such as skin cancer. These changes are predominantly caused by medium wavelengths (UV-B, 290–320 NM) and can occur in anyone with sufficiently high levels of UV exposure. Abnormal reactions to UV, however, are predominantly triggered by UV-A radiation (320–400 NM) and do not affect everyone.

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Classification of Primary Photodermatoses

- polymorphous light eruption.
- Solar urticaria.
- Hydroavacciniforme.
- actinic prurigo.
- chronic actinic dermatitis.
- Phototoxic reaction.
- Photocontact allergy.
- Systemic photo allergy.

Classification of Secondary Photodermatoses

- Xerodermapigmentosum.
- Cockayne syndrome.
- Trichothiodystrophy.
- Lupus erythematosus.
- Dermatomyositis.
- Porphyrias.
- Pellagra.
- Darier's disease.
- Autoimmune bullous dermatoses

Clinical Features

Pruritus is characteristic and significant. Commonly, lesions are symmetrically distributed on sun-exposed skin. Occasionally, mild scarring may be present. The eruption is symmetric, exhibiting erythematous macules that progress to tender papules, vesicles, and crusts. Lesions are associated with pruritus or a burning sensation. Some types heal with scarring. In rare cases, patients may also experience malaise, fever, or headaches during flares.^[34,35,36]

Pathogenesis

The pathogenesis of altered skin reactions to light exposure remains unclear. For example, it is not known which chromophore or chromophores are activated and which in turn lead to inflammatory reactions. However, it has been established that UVA is primarily responsible for most types of photodermatoses.^[37]

- Progress has recently been made in understanding of the pathogenesis of PLE. The evidence suggests that the disease involves UV-induced neo-antigen formation, possibly as a consequence of DNA damage, with a simultaneous impairment of physiologically UV-induced immune suppression resulting in the skin rash caused by an immune reaction to alterations in the skin.^[38,39]
- However, PLE patients show disturbed levels of immunologically important cytokines and chemokines that normalize upon photohardening.^[40]
- These abnormalities may be responsible for the impaired neutrophil responsiveness to chemoattractants in PLE, which is crucial in its pathogenesis.⁸ PLE patients may also have low vitamin D levels, possibly linked to an immunological malfunction and Contributing To Disease Pathophysiology.^[41,42]

General approach to Diagnosis

Given that the clinical features of photodermatoses vary widely, the diagnosis of primary photodermatoses can be challenging.^[37] Suspicion should be aroused when skin eruptions occur in UV-exposed sites after sun exposure.^[43] It is important to conduct a systematic evaluation including an assessment of the patient's history as well as photodiagnostic procedures.^[37] List of following information that should be gathered and evaluated when determining a photodermatoses diagnosis.

Management of the photosensitive patient

Management of these disorders can be quite challenging and relies heavily on patient education and photo protection. Photodermatoses should be explained thoroughly to the patient. Affected individuals should be counseled to wear protective clothing (e.g. a long-sleeve shirt, hat, umbrella) and to use sunscreens that cover the action spectrum of the dermatoses (for example, a sunscreen that has UVA protection for patients with photo toxicity and one with protection against visible light for patients with solar urticaria). When necessary, patients may have to consider lifestyle changes (e.g. avoiding the sun during peak times of the day) or even changes in occupation for those who are required to work outside. If an external drug or agent is identified, avoidance of that drug is obviously required.^[43]

Information to assess while evaluating photosensitive patients. From Bylaite *etal.*³

History

1. Age of onset
2. Interval between sun exposure and subsequent skin eruptions
3. Duration of lesions
4. Systemic symptoms
5. Seasonal variations
6. Exposure to oral and/or topical photo sensitizers
7. Effect of window glass
8. History of connective tissue diseases
9. Occupational history and history of hobbies
10. Family history of photosensitivity

Materials and methods

Type of study

Prospective, cross- sectional observation study.

Study site

The study was conducted at Bhavya skin clinic, Rajamahendravaram.

Department

Out-patient department of dermatology and venerology in Bhavya skin clinic.

Study period

The study was conducted from january 2016 - june 2016.

Study population

A total of 120 random participants, both male and female were included in the study.

Aims and objectives

To evaluate the frequency and clinical spectrum of photodermatoses presenting to skin care clinic in south India.

- To find out the occurrence of photodermatoses by population based study
- Occupational comparison of patients with photodermatoses.
- Appearance and colour comparison of lesions.
- Seasonal and environmental comparison of occurrence of photodermatoses.
- Type of photodermatoses involved and which is the most commonest one.

Study criteria

Inclusion Criteria

- Patients of all age groups were included in this study.
- Patients who were diagnosed with positive photodermatoses.
- Patients who were willing to participate in the study

Exclusion criteria

- Patients suffering with other than photodermatoses.
- Patients not willing to participate in the study were taken under exclusion criteria.

Questionnaire Design

A standard questionnaire for collecting patients demographic details was designed which included all the data of the patient (name, age, gender, educational and employment status Etc.). The questionnaire also included the diagnosis of the presenting disease condition. Along with these details few other questions were also included to assess the status of the patients, previous medical history, family history and duration of exposure.

Data collection

All the patients were directly interviewed by the researchers. Initially the patient was explained about the type and need of study and the details were collected as per the patients will. The demographic details were collected by asking open ended questions in local language.

Data analysis

The data obtained from the questionnaires was analyzed in Microsoft excel 2013 (Microsoft Corporation).

RESULTS

Gender analysis

A total of 120 patients attending primary dermatology care clinic were interviewed in the study among whom the majority were females who constituted a count of 58% (n=69) and males constituted 42% (n=51).

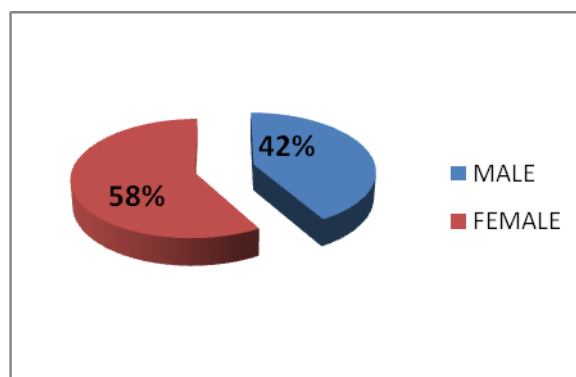


Fig no-1: Gender distribution in study population.

Age group analysis

According to the study, the age group distribution 21-30 years constituting 31% (n=37) were more affected, followed by 11-20 years constituting 21% (n=25) followed by the rest of the age groups. Here, in the following table are cited by age group distribution relatively presenting to the dermatology clinic.

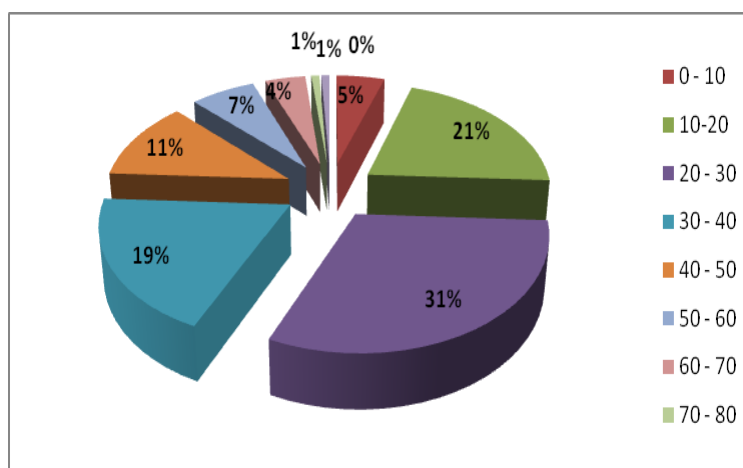


Fig no-2: Age group distribution in study population.

Environment analysis

According to the environmental analysis conducted the majority of population affected were found in Rural 66% (n=79), where as urban is 34% (n=41).

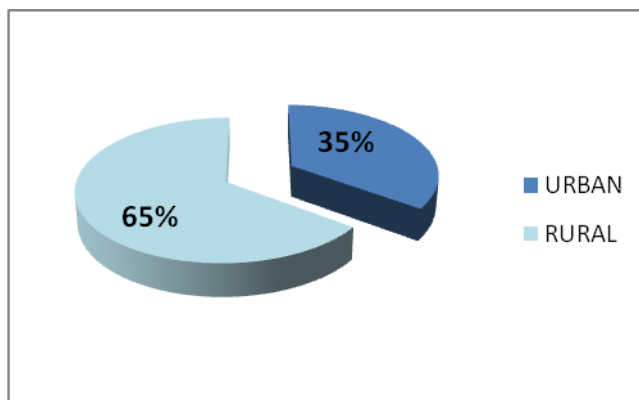


Fig no-3: Environment of origin of study population.

Based on education

From an educational perspective the highest percentage of them attending the clinic were literates constituting 53% (n=63) followed by illiterates 47% (n=57). Literates mainly affected are students and house wives where as illiterates are daily wage workers.

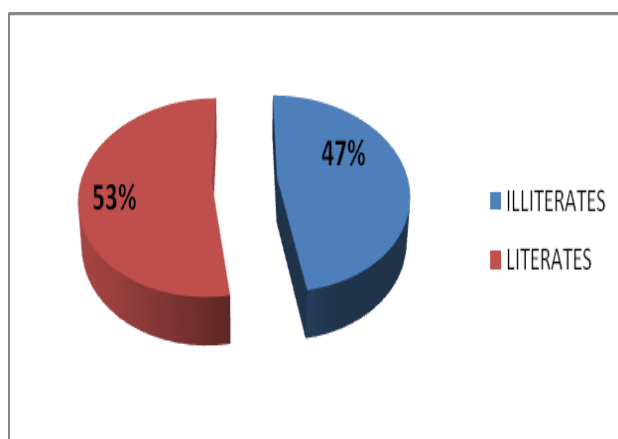


Fig no-4 Education distribution in study population.

Based on Professional Status

From a professional prospective the highest percentage of them affected with photodermatoses were house wives 33% (n=40) followed by students and job holders 25% and 21% respectively followed by others such as daily wage, unemployed, homemaker and retired. Females who were unmarried and were care takers in home were considered as homemakers. Here in the following table are cited the distribution of the study population as patients professional data.

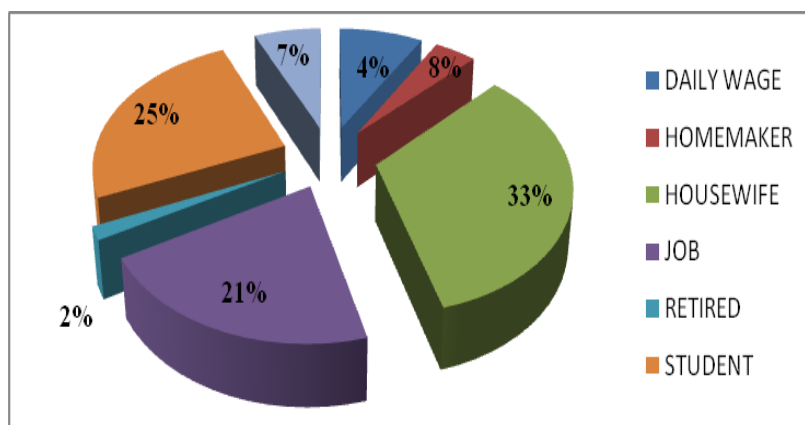


Fig no-5 Analysis of professional status of study population.

Based on duration of exposure

As per the study, many are affected even with the minutes 62% (n=74) of exposure to sun followed by hours 34% (n=41) and days 4% (n=5).

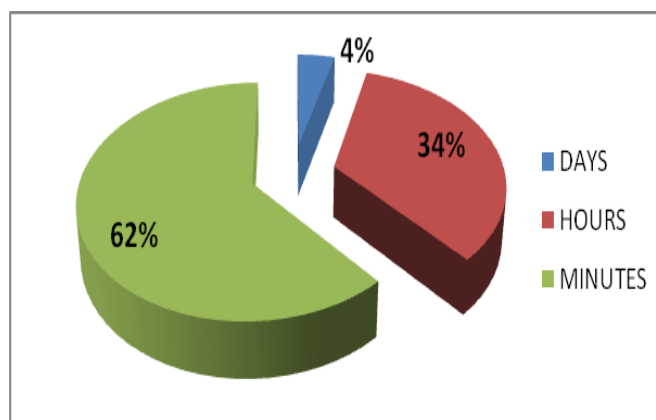


Fig no -6 Based on duration of exposure in study population.

Based on sites involved

As per our study, the main sites involved are face & neck 42% (n=51) followed by upper limbs 26% (n=31), where as dorsum of feet 12% (n=14) and total body 12% (n=14) are almost uniform with a count and other areas involved are 8% (n=10).

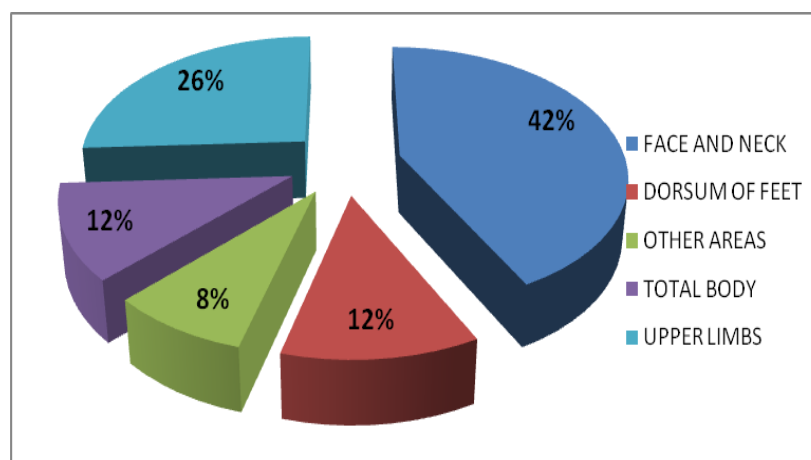


Fig no -7 Based on sites involved in study population.

Based on distribution of lesions

Information about the distribution of lesions on the body at different areas was taken from the population and it was found that <2 lesions 42% (n=50) are found in majority of the population where as 2-5 lesions are found in 39% (n=47) and greater than 10 lesions 19% (n=23) are found in smallest population.

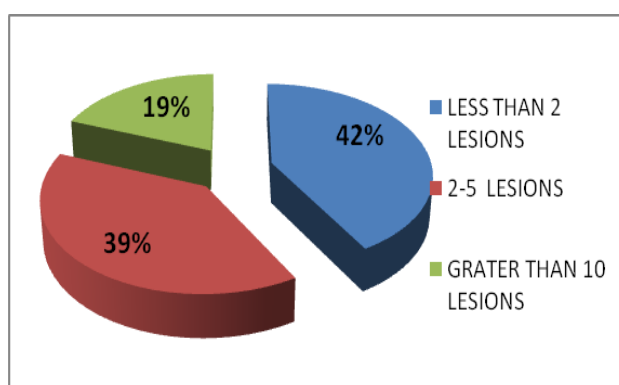


Fig no -8 Based on distribution of lesion in study population.

Based on month of onset

Data was also collected based on month of onset. The onset of photodermatoses was in the months of May 37% (n=45) and June 17% (n=20) are higher recorded when compared to the other months.

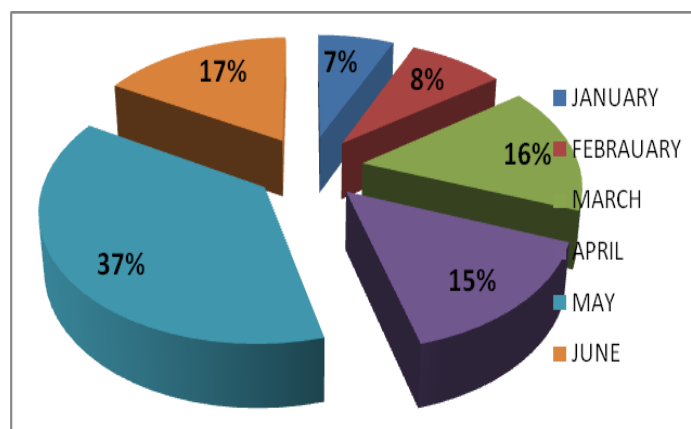


Fig no -9 Based on month of onset in study population.

Based on type of lesion

Around 7 different types of lesions were noticed in the due course of the study. Among all the types, papule was noted in higher patients with 50% (n=60) and next Macule 17% (n=20) and followed by the other types of lesions.

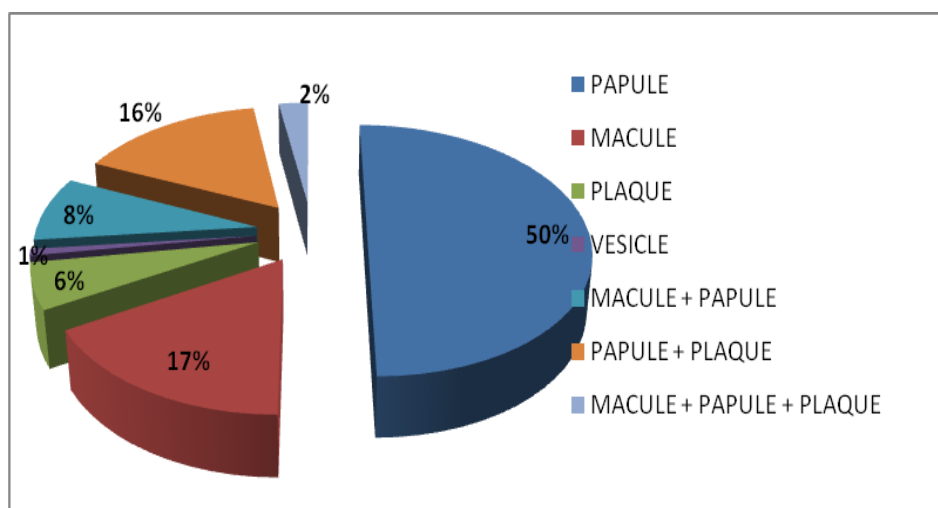


Fig no -10 Based on type of lesion in study population.

Colour of the lesion

According to the study conducted the majority of the lesions colour was found as Erythematous 32% (n=39) followed by hypopigmented 17% (n=20) and erythematous+ hyperpigmented 17% (n=20) were both are almost similar in occurrence and followed by the rest of the colours of lesions.

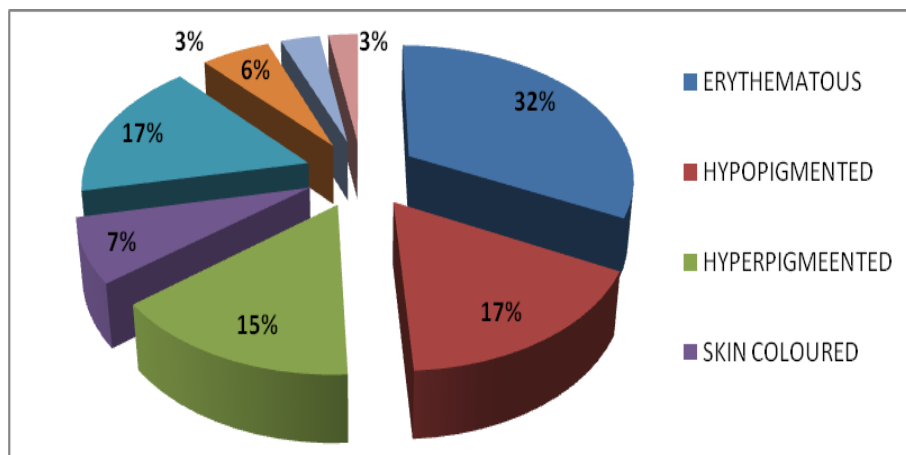


Fig no -11 Based on colour of lesion in study population.

Based type of photodermatoses involved

A total of 120 patients attending primary dermatology care clinic were diagnosed by physical appearance of the lesions. Among which the majority were diagnosed with Polymorphic light eruption 68% (n=81) followed by Actinic purigo 15% (n=18), Chronic actinic dermatitis 10% (n=12) followed by other types.

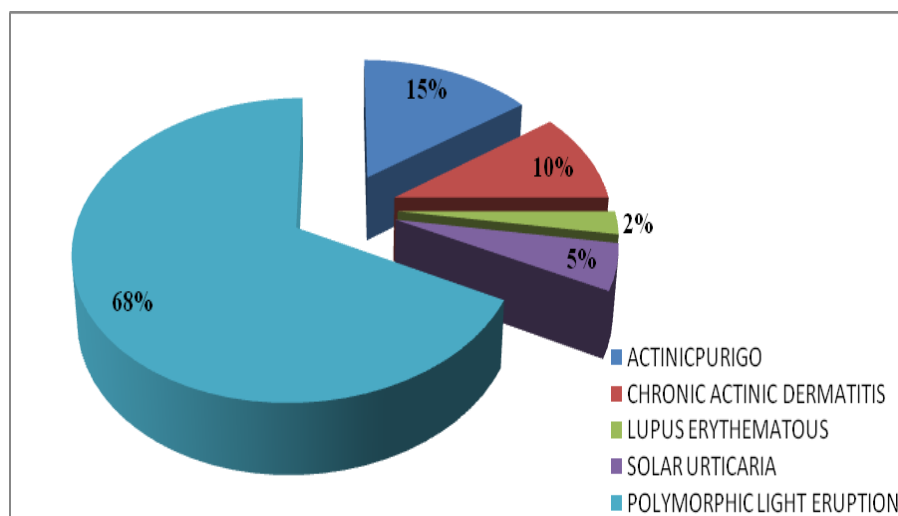


Fig no -12 Based on type of Photodermatoses in study population.

DISCUSSION

According to the author Basnet A *et al*^[3], Photodermatoses is considered to be a disease of fair-skinned individuals with skin types I to IV. It is less common in very dark skinned individuals in America, India and Pakistan. But in our study we found that dark skinned individuals are most affected with photodermatoses than fair-skinned individuals. In gender analysis, as per our study we found females are more affected than males with 58% and 42% respectively which is almost similar to other studies reported by V.K Sharma *et al*^[53], Latha Sharma *et al*^[58] and Ros AM *et al*^[57] who concluded that prevalence of photodermatoses was mostly seen in females than in males.

The ages of 68(57%) cases were < 30 years and ages of 52(43%) cases were >30 years. These results are similar to the illustration given by authors Latha Sharma *et al*^[58] and Ros AM *et al*^[57] as per their study stating that age groups < 30 years are more prone to photodermatoses than other age groups.

As per the study of author Basnet A *et al*^[3], Eighty one cases were housewives, 67 were students 39 were office persons, 22 were farmers, 6 businessmen and 5 were unemployed in total of 220 patients. Comparing our results with his conclusion we too found that housewives are getting more affected with photodermatoses than others.

Many individuals in our study are affected within minutes of daily exposure. According to the author Latha Sharma *et al*^[58], observed that 7-10 days of maximum exposure caused photodermatoses and 30 minutes of exposure found in 65 cases and greater than 30 minutes in 20 cases in total of 220 patients.

Based on sites of exposure, mainly affected sites are face and neck (42%) followed by upper limbs (26%) which was same in many other studies. Less than 2 lesions were found in many individuals affected with photodermatoses as it is only mild photodermatoses in India, same results were seen the article written by Basnet *et al*^[3].

Papule (50%) was the most common rash observed in many number of patients followed by macule (17%) and plaque (15%) similar to the study of V. K. Sharma *et al*^[53]. And majority of the lesions were erythematous.

According to the study conducted by author Basnet A *et al*^[3], A study conducted in north India, Onset of disease was mostly occurred in the months of February and August where as in our study the prevalence of photodermatoses was mostly seen in May and June months with 37% and 17% respectively. In our study the incidence of disease was more in the mid summer i.e. in the month of May where as in the study conducted by Basnet A *et al*^[3], the incidence was more in month of March which is beginning of summer.

Polymorphic light eruption was the commonest photodermatoses noticed in many of the individuals followed by actinic purigo and chronic actinic dermatitis. where as in other studies reported by authors V.K. Sharma *et al*^[53] second commonest photodermatoses is chronic actinic dermatitis, as per S.W. Khoo *et al*^[54] second commonest photodermatoses is systemic drug photosensitivity, according to Ros AM *et al*^[57], and Alexander J Stratigos *et al*^[55] next to polymorphic light eruption, the commonest photodermatoses is solar urticaria.

Comparing our results with the study conducted by Latha Sharma and Basnet A in north India especially in Varanasi, Uttar Pradesh, we found that the pattern of photodermatoses in north Indian population is same as in south Indian population. We didn't find any difference in our study compared with these two studies. So as per our studies pattern of photodermatoses is almost same throughout the India.

CONCLUSION

The study accounts to the conclusion that is similar to many other studies conducted on clinical spectrum of photodermatoses. In India, the incidence of photodermatoses is common in view of the tropical weather, lack of knowledge regarding sun protection. Identification of the cause and avoidance of triggering factors will help in reducing the incidence of photodermatoses.

The study period we identified 120 patients who were diagnosed as photodermatoses were included in our project. Polymorphic light eruption (PMLE) was the commonest photodermatoses seen, affecting 68% of patients, followed by Actinic purigo (15%), chronic actinic dermatitis (10%), solar urticaria (4%) and lupus erythematosus (3%). The females (58%) formed the majority of population affected with photodermatoses to that of males (42%). As per our study rural population are affected to photodermatoses than urban population. The major age group of presenting population who are mostly getting affected with photodermatoses was 21-30 years. Both illiterates and literates were equally affected most of them were housewives in whom exposure to sunlight was intermittent and for a short period followed by students, office workers, business men, unemployed.

The onset of Photodermatoses was in the months of May and June in 37% and 17% of the cases, respectively. This is high when compared to the other months. During these months, this is the time when the sun shines on the equator and the days and nights are of almost equal length.

The external aspect of the face & neck (44%) and upper limbs (25%) were involved in most of the cases possibly because face and neck are placed vertically while sitting or travelling and walking and receive the maximum exposure. On the other hand, the position of the upper limbs is horizontal while working and it is more exposed to sun. The exposure of covered areas in the summer months makes them vulnerable to this photodermatoses. The clothing used in this locality will give full exposure to the neck, arms and forearms. The type of lesion was Papule in most of the cases with the percentage of 50% followed by Macule (17%) and Plaque+ Papule (16%) are almost similar in occurrence. The rash was papular in most of the case. The majority of the lesions were erythematous (32%) followed by hypopigmented (17%) and erythematous + hyperpigmented (17%) are almost similar in occurrence.

The occurrence of lesions on body were only less than 2 or 2-5 lesions noticed. As it is a mild photodermatoses in India, many patients were not aware of its occurrence. Photo protection is the mainstay of treatment in all photodermatoses. Patients are advised to use protective clothing, such as a long-sleeved shirt and a hat, and to avoid the midday sun. Use of sunscreen is also recommended, unless this is the aggravating agent. Identification and avoidance of phototoxic agents are essential. Photo induced hardening with UVB and PUVA can be considered second-line in some disorders.

High-potency topical corticosteroids or short courses of oral prednisolone are used in symptomatic relief of acute phototoxic episodes and contact dermatitis. Complicated cases should be referred to secondary care. Photodermatoses are not life-threatening but can cause considerable suffering. Prevention is just as important as treatment.

Everyday application of sunscreen can slow or temporarily prevent the development of wrinkles and sagging skin. For best protection, experts recommend using a minimum SPF sunscreen of 15, applying the proper amount (2mg/cm² of skin, or about one ounce for full body coverage), and reapplying every 2 hours. Most people under-apply sunscreens, using ¼ to ½ the amount required. Using half the required amount of sunscreen only provides the square root of the SPF.

Finally the authors conclude that exposure to high temperature during Noon time has to be avoided and further research work can be enhanced by comparing the disease prevalence over a group of population in various zones of state and geographic conditions.

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Conflict Of Interest

The authors do not have any conflicts of interest.

List of Abbreviations

SPF	- Sun Protection Factor,
PLE	- Poly Morphic Light Eruption,
CAD	- Chronic Actinic Dermatitis,
EPP	- Erythropoietic Protoporphyrin,
UVA	-Ultraviolet-A UVB- Ultra Violet-B

REFERENCE

1. Lehmann P: Photodermatoses diagnosis and treatment. Dtsch Med Wochenschr 2004; 129: 259–66.
2. Gambichler T; Immunologically mediated Photodermatoses. Am J ClinDermatol 2009; 10: 169–80.
3. Lata Sharma; A Basnet A clinicoepidemiological study of polymorphic light eruption, Department of Dermatology and Venereology, Year: 2008 Volume: 74; Issue: 1; Page: 15-17.
4. R. Bissonnette, prevention of Polymorphous Light Eruption and Solar Urticaria.FRCPC Division of Dermatology.
5. Poblete-Gutierrez CP, Hereditäre Photodermatoses, Der Hautarzt, December 2006, Volume 57, Issue 12, pp 1067–1082.
6. Lehmann P: Diagnostic approach to photodermatoses; J DtschDermatol Ges; 2006 Nov;4(11):965-75.
7. Botto NC, Solar urticarial; J Am AcadDermatol 2008;59: 909–20.
8. Ohtsuka T, Hydroavacciniformewith latent Epstein-Barr virus infection. Br J Dermatol 2001;145: 509-10.
9. Gupta G, Hydroavacciniforme: A clinical follow up of 17 Cases. J Am AcadDermatol 2000; 42: 208–13.
10. Hojyo-Tomoka MT: Diagnosis andTreatment of actinic prurigo. DermatoTher 2003; 16: 40–4.
11. Lippert U, Schauder S, Neumann C: Actinic prurigo. Hautarzt 2000;51: 597–603.
12. Milde P, Hölzle E, Neumann N, Lehmann P, Trautvetter U, Plewig G:Chronic actinic dermatitis. Concept and case examples.Hautarzt 1991; 42: 617–22.
13. Hawk JL, Lim HW: Chronic actinic dermatitis. In: Lim HW, HönigsmannH, Hawk JL (eds.): Photodermatology;Informa Healthcare USA 2007;169–83.
14. Schauder S: PhototoxischeReaktionen der Haut durchMedikamente. DtschArztebl 2005; 102: A 2314–9.
15. Neumann NJ, Hölzle E, Plewig G, Schwarz T, Panizzon RG, BreitR, Ruzicka T, Lehmann P: Photopatch testing: the 12-year experience of the German, Austrian, and Swiss photopatch test group;J Am Acad Dermatol 2000; 42: 183–92.
16. Hojyo-Tomoka MT, Vega-Memije ME, Cortes-Franco R: Diagnosis and Treatment of actinic prurigo; DermatoTher 2003; 16: 40–4.
17. Lim WH, Epstein J. Photosensitivity diseases. J AmAcadDermatol 1997;36: 84-90.
18. Inamadar AC, Palit A. Photosensitivity in children:an approach to diagnosis and management. Indian JDermatolVenereolLepr 2005; 71: 73-79.
19. Kraemer KH, Lee MM, Scotto J. Xerodermapigmentosum: cutaneous, ocular, and neurologicabnormalities in 830 published cases. ArchDermatol 1987; 123: 241-250.
20. Galadari E, Hadi S, Sabarinath K. Hartnup disease.Int J Dermatol 1993; 32: 904.
21. Nance MA, Berry SA. Cockayne syndrome: reviewof 140 cases. Am J Med Genet 1992; 42: 68-84.
22. Sabitha KM, Rahiman KP, Majeed PA. Cockaynesyndrome. J Assoc Physicians India 2002; 50: 1455.

23. Itin PH, Sarasin A, Pittelkow MR. Trichothiodystrophy: update on the sulfurddeficient brittle hair syndromes. *J Am AcadDermatol.* 2001;44:891–920
24. Ruenger TM, DiGiovanna JJ, Kraemer KH. Hereditary Diseases of genome instability and DNA repair. In: Wolff K, Goldsmith LA, Katz SI, Gilchrist BA, Paller AS, Leffell DJ, editors. *Fitzpatrick's dermatology in general medicine.* 7 ed McGraw Hill; New York: 2008. pp. 1311–25.
25. Abu-Shakra M, Ehrenfeld M, Shoenfeld Y. Systemic lupus erythematosus and cancer: Associated or not? *Lupus.* 2002; 11:137–144.
26. Cervera R, Khamashta MA, Font J, Hughes GRV on behalf of the European Working Party on Systemic Lupus Erythematosus. European Working Party on Systemic Lupus Erythematosus: A 10 year report. *Lupus.*2001; 10:892–894.
27. Dalakas MC (1991) Polymyositis, dermatomyositis, and inclusion-body myositis. *N Engl J Med* 325:1487–1498,
28. SontheimerRDPphotoimmunology of lupus erythematosus and dermatomyositis: aspeculative review. *PhotochemPhotobiol* (1996) 63:583–594.
29. Murphy GM The cutaneous porphyrias: a review.The British Photodermatology Group.The British Journal of Dermatology [1999, 140(4):573-581]
30. SpivakJL, Pellagra: an analysis of 18 patients and a review of the literature. *The Johns Hopkins Medical Journal* [1977, 140(6):295-309].
31. Wan P,Pellagra: a review with emphasis on photosensitivity,Br J Dermatol. 2011 Jun;164(6):1188-200.
31. Photodermatoses - an overview; Primary Care Dermatology Society, 2014.
32. Elena Iedo m.d, photodermatoses. part ii: chemical photodermatoses and dermatoses that can be exacerbated, precipitated, or provoked by light, July 1993,Volume 32, Issue 7July 1993 Pages 480–492.
33. Lear JT, Smith AG. Multiple blisters in a young boy. Linear IgA disease of childhood (LADC).(Chronic bullous dermatosis of childhood). *Arch Dermatol* 1998;134:625,628.
34. Jeng BH, Margolis TP, Chandra NS, McCalmont TH. Ocular findings as a presenting sign of hydroavacciniforme. *Br J Ophthalmol* 2004; 88:1478.
35. Bennion SD, Johnson C, Weston WL. Hydroavacciniforme with inflammatory keratitis and secondary anterior uveitis.*PediatrDermatol* 1987; 4:320.
36. Wisuthsarewong W, Leenutaphong V, Viravan S. Hydroavacciniforme with ocular involvement. *J Med Assoc Thai* 1998; 81:807.
37. Bylaite M, Grigaitiene J, Lapinskaite GS. Photodermatoses: classification, evaluation and management. *British Journal of Dermatology.* 2009. 161 Suppl 3. 61-8.
38. Wolf P, Byrne S N, Gruber-Wackernagel A. New insights into the mechanisms of polymorphic light eruption: resistance to ultraviolet radiation-induced immune suppression as an aetiological factor. *ExpDermatol.* 2009. 18. 350- 356.
39. Wolf P, Gruber-Wackernagel A, Rinner B, et al. Phototherapeutic hardening modulates systemic cytokine levels in patients with polymorphic light eruption. *Photochemical &Photobiological Sciences.* 2012.
40. Gruber-Wackernagel A, Heinemann A, Konya V, et al. Photohardening restores the impaired neutrophil responsiveness to chemoattractants leukotriene B4 and formyl-methionyl-leucyl-phenylalanin in patients with polymorphic light eruption. *ExpDermatol.* 2011. 20. 473-476.
41. Murphy GM. Diseases associated with photosensitivity. *Journal of Photochemistry and Photobiology B, Biology.* 2001. 64. 93-8.
42. Gruber-Wackernagel A, Obermayer-Pietsch B, Byrne S N, Wolf P. Patients with polymorphic light eruption have decreased serum levels of 25-hydroxyvitamin-D(3) that increase upon 311 nm UVB photohardening. *Photochemical &Photobiological Sciences.* 2012. Issue 12, 1831-1836.
43. Lehmann P. Diagnostic approach to photodermatoses. *Journal der DeutschenDermatologischenGesellschaft.* 2006. 4. 965-75.
44. Kanavy HE, Gerstenblith MR (December 2011). "Ultraviolet radiation and melanoma".*SeminCutan Med Surg.*2011, 30 (4): 222–8.
45. World Cancer Report;World Health Organization. 2014. pp. Chapter 5.14.
46. Azoury, SC; Lange, JR (October 2014). "Epidemiology, risk factors, prevention, and early detection of melanoma. "The Surgical clinics of North America.2014.07.013; 94 (5): 945–62.
47. Burnett M.E.; Wang S.Q; "Current sunscreen controversies: a critical review". *Photodermatology, Photoimmunology & Photomedicine.* (April 2011). 27 (2): 58–67.
48. Kütting B, Drexler H. "UV-induced skin cancer at workplace and evidence-based prevention". *Int Arch Occup Environ Health.*(December 2010) 83 (8): 843–54.
49. Hughes, MCB; Williams, GM; Baker, P; Green, AC;"Sunscreen and Prevention of Skin Aging". *Annals of Internal Medicine.*(June 4, 2013). 158 (11): 781–790.
50. Dresbach S.H.; Brown W. "Ultraviolet Radiation" (PDF).*Ohioline Fact Sheet Series.* Ohio State University Extension.2008
51. Sunblock. UCSF.School of Medicine.Dept of Dermatology.
52. "Sunscreen FAQs". American Academy of Dermatology.Retrieved July 22, 2014.
53. V.K.Sharma, M.Ramam, A.R.Wadhwani, B.K.Khaitan; clinical study of the Spectrum of photodermatoses in dark-skinned populations; *Clinical dermatology;* December 2013 Volume 38, Issue 8 Pages 823–829.
54. Khoo SW, Tay YK, Tham SN; Photodermatoses in a Singapore skin referral centre; *Clin Exp Dermatol.* 1996 Jul;21(4):263-8.
55. Alexander J. Stratigos, Antoniou.C, Papathanakou E; Spectrum of idiopathic photodermatoses in a Mediterranean country; *International journal of dermatology;* June 2003; Volume,42,Issue,6,Pages 449–454.

56. Morison WL, Stern RS; Polymorphous light eruption: a common reaction uncommonly recognized; Acta Derm Venereol. 1982;62(3):237.
57. A M Ros, Wennersten G; Current aspects of polymorphous light eruption in Sweden; Photo-dermatology; November 1986,3 (5):298-302.
58. Bernhard Ortel; Polymorphous light eruption: Action spectrum and photoprotection; Journal of the American Academy of Dermatology June 1986 14(5 Pt 1):748-53.
59. Latha Sharma; A clinicoepidemiological study of polymorphic light eruption, Department of Dermatology and Venereology, Year: 2008 |Volume: 74, Issue: 1, Page: 15-17.
60. Tzu-lin Hsiao, Chia-Yu Chu; Chronic actinic dermatitis: A clinical study of 15 cases in northern Taiwan, Dermatologica Sinica, year: 2014 Volume 32, Issue 2, Pages: 82–86.
61. Henry W Lim. Lim, MD; Classification and evaluation of photodermatoses; Dermatologic Therapy February 2003 16(1):1-7.
62. Norris PG Pao C, Corbett M, Hawk JL; Polymorphic light eruption: an immunopathological study of evolving lesions; Br J Dermatol. 1989 Feb; 120(2):173-83.



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