Case Report

# Pellagra - An Underrated Disease in Modern Practice

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**ABSTRACT**

Pellagra is a nutritional disorder of niacin or its precursor tryptophan deficiency. It is a historically old but certainly not completely eradicated disease. Deficiency of niacin (Vitamin B3) leads to pellagra with constellation of symptoms affecting skin, gut and nervous system. We present a case of 37 year-old male presented with photodermatitis and neuropsychiatric symptoms, diagnosed clinically as pellagra and was treated successfully with niacin and vitamin B complex supplementation

**Keywords:** Pellagra, Niacin Deficiency, Photodermatitis, Nutritional Deficiency Disorders

## INTRODUCTION

The term pellagra derived from *pelleagra* (Italian for *rough skin*) was first used by Frappoli in 1771 due to its dermatological manifestations[1]. Pellagra, once known as Austrian leprosy, is a chronic disease affecting the skin, nervous system and gastrointestinal tract due to the deficiency of niacin (Vitamin B3) or its precursor tryptophan[2]. It is classically known as the disease of 4 D's- dermatitis, dementia, diarrhoea and death. Dermatitis associated with pellagra is usually seen over photo-exposed sites with associated photosensitivity.

Niacin is found in whole grains and is enriched in bread products, nuts, dairy products, mushroom, dried beans, liver and animal meat.Pellagra is mostly found in parts of India, China and Africa where corn or maize are the staple food[3].

## CASE REPORT

A 37 year old chronic alcoholic farmer from Udaipur, Rajasthan presented with complaints of well-demarcated, dark, scaly lesions associated with moderate itching over the sun-exposed parts of the body since 10 days. The lesions began over the dorsum of hands and neck as dull reddish, itchy raised lesions and were associated with severe photosensitivity which, with time, spread to the face and feet.The patient was lethargic and complained of loss of appetite.The family members also gave history of apathy, irritability, disorientation in aspects of time of the day and place. He was also aloof and less talkative which hinted for depression. There was no history of seizures, flushing, fever, diarrhoea or abnormal passing stool. There was no history suggestive of pulmonary tuberculosis or any other chronic illness. There was no history of any preceding drug intake.

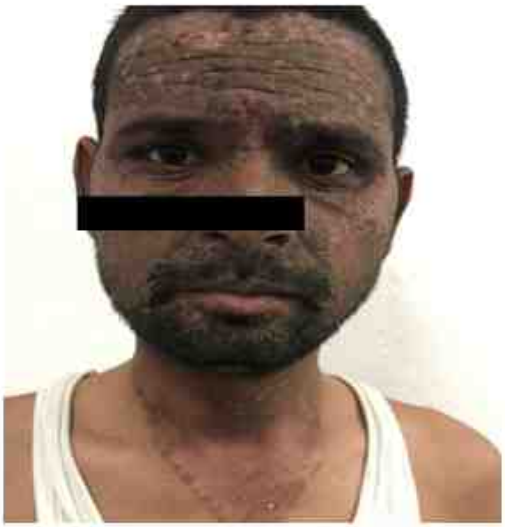
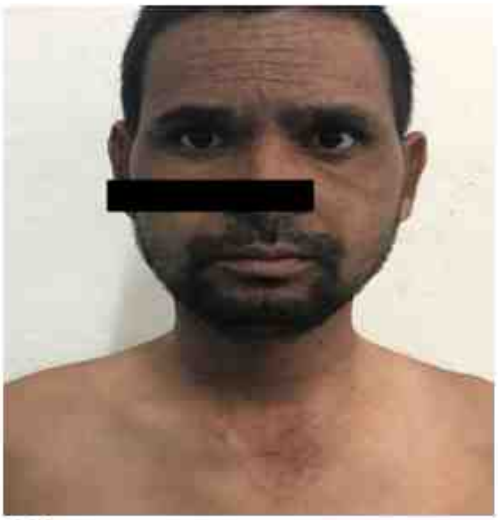
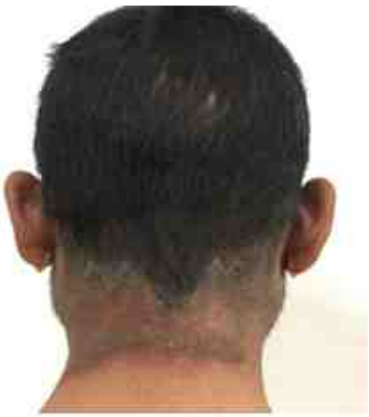
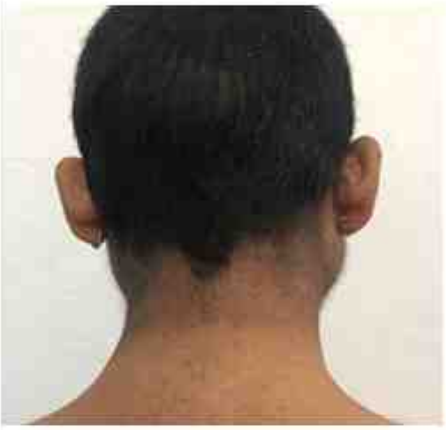
The patient was a chronic alcoholic since 11 years. He was an occasional non-vegetarian with staple diet mainly being maizeand rice. He used to take less green leafy vegetables with less dairy products (<100 ml of milk/day) in his daily diet.

On physical examination, the patient was moderately built and poorly nourished. Body mass index was 17.8 kg/m$^2$(low BMI). Vitals were stable. Dehydration and pallor were observed. The cutaneous

examination revealed commissural cheilitis and glossitis. There was diffuse greasy fine scaling on the central face and scalp. There were symmetrical well demarcated hyperpigmented crusted plaques over the v-zone and around back of the neck [fig 1(a), 1(b)], dorsa of the hands, wrist and forearms [fig 1(c)] and dorsum of feet [fig 1(d)]. The cutaneous lesions showed clear demarcation on sun-exposed from sun-covered skin. The systemic examination, particularly neurological examination revealed no abnormalities and was unremarkable.

The patient was diagnosed clinically as having pellagra and was admitted for further evaluation. Laboratory investigation showed mild elevation of total white blood cell count (11300/$mm^3$), ESR (39mm/hr) and slightly elevated SGOT (73.2u/l). The remaining of the routine laboratory tests, including glucose, electrolytes and TSH, were found within normal range. The CT/MRI was not done in view of financial constraints.

Intravenous fluids and high-caloric nutrition was administered. Serological and urinary assays confirming niacin deficiency were unavailable in our hospital. Treatment with nicotinamide 500 mg/day orally with vitamin B complex supplementation was started. The patient was also advised topical application of sunscreen and emollients. Within 7 days of starting treatment, the patient showed marked improvement. The borders of the lesions became less well-defined, there was decrease in erythema and scaling [fig 2 (a-d)]. The patient was continued on niacin (250 mg twice a day) for 2 weeks along with daily vitamin B complex supplementation.

| Before-Day 1 | After- Day 7 |
|---|---|
|  Fig: 1(a) |  Fig: 2(a) |
|  Fig: 1(b) |  Fig: 2(b) |

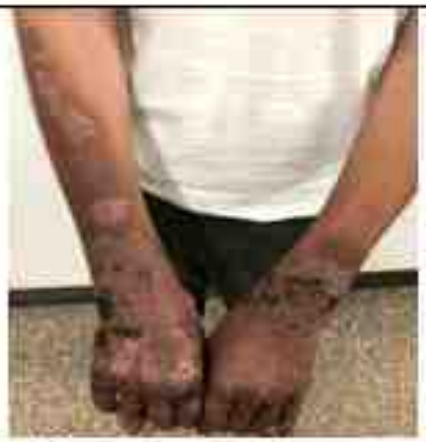


Fig: 1(c)

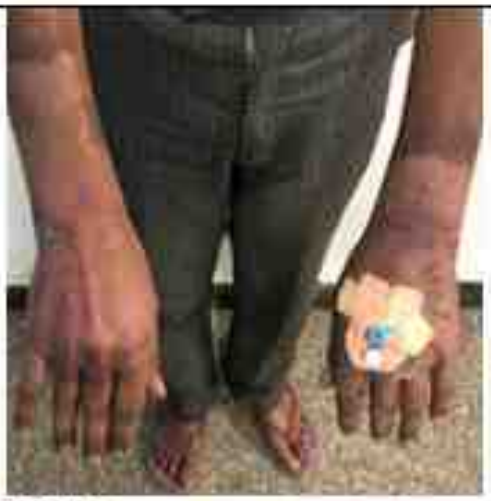


Fig:2 (c)

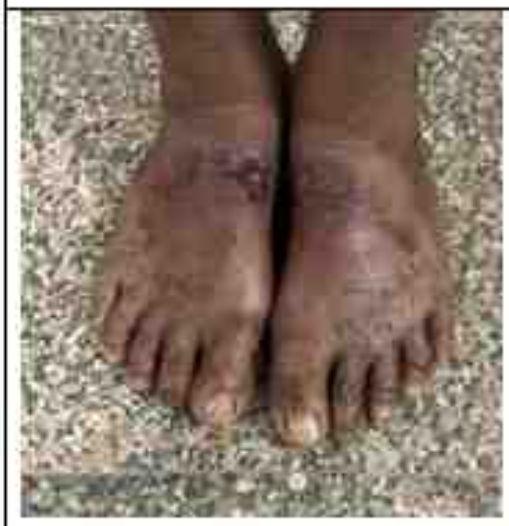


Fig: 1(d)

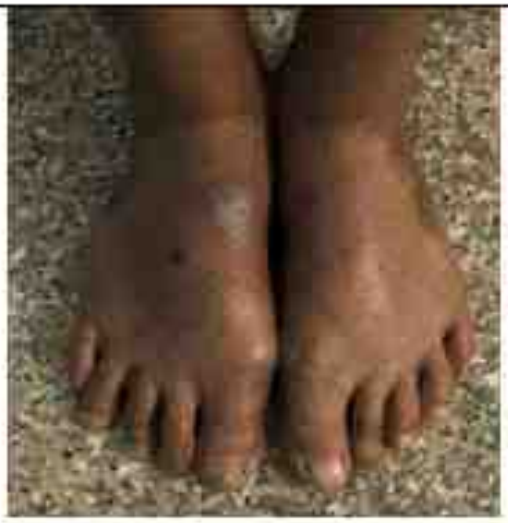


Fig: 2(d)

Fig: 1(e)

Fig: 2(e)

## DISCUSSION

Pellagra is caused by deficiency of niacin. Niacin is a vitamin cofactor that can be obtained from diet or synthesized endogenously from essential amino acid tryptophan. Dietary niacin exists primarily in the form of nicotinamide adenine dinucleotide (NAD) and nicotinamide adenine dinucleotide phosphate (NADP). NAD and NADP are hydrolysed in the intestinal lumen to form nicotinamide. Nicotinamide can be converted by intestinal bacteria into nicotinic acid to be absorbed into plasma. Nicotinic acid and nicotinamide then pass through liver, enterocytes and kidney where they are converted back to NAD and NADP.

Pellagra can be divided into primaryand secondary disease. Primary pellagra is due to dietary deficiency or in population where staple food is jowar, corn or maize. Jowar contain high levels of niacin but high leucine content in it preventsthe conversion of tryptophan to niacin, leading to deficiency of niacin. Maize contains bound niacin, so without alkaline hydrolysis to release the niacin, it is unavailable for absorption. Secondary pellagra is due to defective absorption or metabolism of niacin/ tryptophan (causes include chronic alcoholism; Hartnup disease; drugs such as antituberculosis medications- isoniazid, pyrazinamide;[6] mercaptopurine, phenobarbital; carcinoid syndrome; anorexia nervosa and Crohn's disease). Vitamin B6 deficiency also potentiates the niacin deficiency[4]. Tuberculosis patients can present with pellagra-like skin manifestations; when started on ATT containing isoniazid (pyridoxine-inactivating drugs); which can be confused with drug reaction.

The primary manifestations classically referred to as "the 4 D's:"- dermatitis, diarrhoea, and dementia, leading to death[4, 5]. Pellagra may initially present with loss of appetite, fatigue, irritability, vomiting and pain abdomen. Photosensitive pigmented dermatitis soon follows. Dermatitis presents with symmetrical lesions affecting sun-exposed areas such as face (butterfly distribution), around the neck (Casal necklace/ Casal collar), dorsa of hands ('gauntlet'), and dorsa of the feet ('gaiter'). Gastrointestinal involvement may lead to intractable diarrhoea (which is found in 50% of the cases), nausea, vomiting, abdominal pain, anorexia. Neuropsychiatric symptoms include dementia or encephalopathy termed pellagrous encephalopathy, presenting with apathy, insomnia, nervousness, impaired memory, disorientation, depression or altered consciousness and death if left untreated. It is important to note that classical manifestations will not be seen in all patients as was noted with our patient[6, 7]. In our case, the primary cause was chronic alcoholism and maize being the staple diet which leads to dietary deficiency of niacin. The clinical features were photo-exposed dermatitis involving face, v-zone and back of the neck, dorsa of hands and feet; and there was history of minimal neurological involvement, without any abdominal symptoms.

Differential diagnosis of pellagra includes severe zinc deficiency, carcinoid syndrome, Hartnup disease, other vitamin deficiencies such as pyridoxinedeficiency, riboflavin deficiency, and dermatological conditions such as photodermatitisand actinic dermatitis. Zinc deficiency was ruled out as there is plenty of zinc in the local area. Carcinoid syndrome was ruled out on the basis of absence offlushing symptom, difficulty in breathing or diarrhoea; features suggesting hartnup disease like intermittent ataxia, nystagmus, and tremor, gross aminoaciduria were also absent. The patient had low BMI, was chronic alcoholic with poor nutrition; thus it was likely that patient had multiple water soluble vitamin deficiencies. However, niacin deficiency was prominent in view of classical photodermatitisand neuropsychiatric symptoms.

Treatment includes alleviation of any predisposing factors such as alcohol or drugs and avoidance of diet containing corn or maize solely. The administration of niacin has a dramatic curative impact on pellagra. The daily recommended dose is 300 mg of nicotinamide in divided doses, and treatment should continue for 3-4 weeks. The neuropsychiatric symptoms usually remit after 24-48 hours of treatment, but dermatitis may take 3-4 weeks to resolve. It is also recommended to administer vitamin B complex preparations since patients with pellagra, very often have a deficiency of other B vitamin compounds (7-9).

In our case treatment with tablet nicotinamide 250 mg twice daily with multivitamin supplementation improved the cutaneous manifestation within 7 days.

## CONCLUSION

Pellagra is a nutritional disorder of niacin deficiency and is a historically old but certainly not completely eradicated disease. The classical 4D presentation may not be present in all patients. The characteristic-though not pathognomonic, cutaneous manifestations support its clinical diagnosis. Pellagra responds remarkably with niacin supplementation but can be fatal if untreated.

**Declaration of Patient Consent:**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

**Conflicts of Interest:**

There are no conflicts of interest.

## REFERENCES

1. Oldham MA, Ivkovic A. Pellagrous encephalopathy presenting as alcohol withdrawal delirium: a case series and literature review. Addict SciClinPract 2012;7: 12
2. Wan P, Moat S, Anstey A. Pellagra: A review with emphasis on photosensitivity. Br J Dermatol 2011;164:1188-200.
3. Russel RM. Vitamin and trace mineral deficiency and excess. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J, editors. Harrison's Principles of Internal Medicine. 19th ed. New York: McGraw-Hill; 2015. p. 96e-4.

4. Harsha NS, Suraj BM, Kanakavidu SS, Kodali R. Pellagra: A forgotten ailment in current clinical practice. Med J DY PatilVidyapeeth 2019;12:78-80

5. Savvidou S. Pellagra: a non-eradicated old disease. ClinPract. 2014;4(1):637. Published 2014 Apr 28. doi:10.4081/cp.2014.637

6. Norton SA, Ruze P. Kava dermopathy. J Am AcadDermatol1994;31:89-97.

7. Arif, Tasleem&Adil, Mohammad. (2018). Pellagra: An uncommon disease in the modern era-A case report. Journal of Pakistan Association of Dermatologists. 28. 360-363.

8. Garg G, Khopkar U. Ethionamide induced pellagroid dermatitis resembling lichen simplex chronicus: A report of two cases. Indian J DermatolVenereolLeprol. 2011;77:534.

9. Soni BP, McLaren DS, Sherertz MF. Cutaneous changes in nutritional disease. In: Freedberg IM, Eisen AZ, Wolf K, Austen KF, Goldsmith LA, Katz SL, editors. Dermatology in General Medicine. 5 th ed. New York: McGraw-Hill; 1999. p. 1725-37.