

# PELLAGRA ASSOCIATED WITH PSYCHIATRIC ILLNESSES IN AREAS NEAR GORAKHPUR

Dr Prabhat Kumar Agrawal<sup>1\*</sup>

*1. Assistant Professor, Department of Psychiatry, B.R.D Gorakhpur, U.P*

**\*Corresponding author - Dr Prabhat Kumar Agrawal**

Email id – [drpandyaderma@gmail.com](mailto:drpandyaderma@gmail.com)

Received:10/11/2019

Revised:12/12/2019

Accepted:21/12/2019

## ABSTRACT

**Background:** Pellagra characterized by triad of diarrhea, dermatitis, and dementia but other common manifestations includes neuropsychiatric involvement including depression, delusions and hallucinations and others are decreased muscle strength and peripheral neuropathy. **Material & Methods:** In the present study total number of 200 people were enrolled from two equal groups, Chotanagpur group and Gorakhpur group respectively. Every index person was examined by both the investigators from each centre. Socio-demographic data were recorded and clinical examination was done. In Chotanagpur group only those were included who were eating maize only and Gorakhpurones who were eating wheat or rice. The Chotanagpur group and Gorakhpur group were matched in terms of demographic data. **Results:** Among the two study groups niacin deficiency was reported only from Chotanagpur group in 22% of study subjects. SCL 90-R depression subscale shows significant finding with mean value of  $1.23 \pm 0.17$  ( $p < 0.001$ ). Similarly SCL 90-R anxiety, SCL 90-R somatization and SCL 90-R Global Symptom Index subscales shows significant finding with mean value of  $1.21 \pm 0.53$ ,  $1.28 \pm 0.39$  and  $1.26 \pm 0.21$  respectively ( $p < 0.001$ ). **Conclusion:** Patients with pellagra were mainly vegetarian and especially from low socioeconomic group. Diet pattern including untreated maize, jowar (*Sorghum vulgare*) and food faddism responsible for niacin deficiency along with alcoholism, malabsorption states and tuberculosis treatment also account for disease. A very strong statistically positive correlation was reported between the following SCL 90-R subscales.

**Keywords:** pellagra, niacin deficiency, psychiatric illness.

## INTRODUCTION

Pellagra is a disease caused by low levels or deficiency of vitamin B3 (niacin or nicotinic acid or nicotinamide) and often associated with deficiency of other B vitamins (1). Gaspar Casal first explained about the disease in 1972, it was reported that patients with pellagra were mainly vegetarian and especially from low socioeconomic group (2). A constant low frequency of cases is present worldwide and observed with dependent diet pattern including untreated maize, jowar (*Sorghum vulgare*) and food faddism. Other than

dietary factors alcoholism, malabsorption states and tuberculosis treatment also account for disease (3).

Pellagra characterized by triad of diarrhea, dermatitis, and dementia but other common manifestations includes neuropsychiatric involvement including depression, delusions and hallucinations and others are decreased muscle strength and peripheral neuropathy (4). Nicotinic acid is derived from tryptophan amino acid, hence deficiency of niacin directly affects the

synthesis of serotonin (5). These chain processes decrease the neural transmission and cause the psychiatric and neurological manifestations (6). Although, patients do not come in outpatient departments presenting the cardinal triad symptoms simultaneously so they tend to seek medical attention in multiple medical departments for ex. Patients visit gastroenterology OPD for diarrhea and dermatology OPD for skin desquamation and for psychiatry illness they visit psychiatry departments.

Symptoms generally depend upon the reserves of niacin and before the psychosis there are vast symptoms of widespread neuroses seen in the form of depression, anxiety, hypochondriasis, personality deviations and obsessive compulsive states (7). It was well documented in various researches that we only remain healthy as long as we intake daily required amount of niacin in the diet. Hence, it was of high probability that maximum number of population had pellagra in latent stage. Therefore, we conduct the present study to know the spectrum of disease in the study population.

## MATERIALS & METHODS

The present case-control study was conducted among two segregated groups living in nearby areas of Jamnagar. They had come there to earn their living. One group comprised of Chotanagpur Plateau in the Latehar district of Jharkhand, India and another group from Gorakhpur region of Uttar Pradesh. Random survey of 100 people of each group was done. Every index person was examined by both the investigators. Socio-demographic data were recorded and clinical examination was done. In Chotanagpur group only those were included who were eating maize only. and Gorakhpur ones who were eating wheat or rice. Institutional Ethics Committee Clearance was taken before start of study and written informed consent for the study purpose was obtained from all the participants. Detailed history was taken from patients of both the groups. Patients who had previously diagnosed neurological, medical and psychiatric diseases, alcohol or other substance abusers, patients with comorbidities, had other major physical illness or any disability and patients on medications which can

cause neuropsychiatric adverse effects were excluded from the study.

This psychiatric screening tool was used in present study to measure the levels of psychiatric symptoms and also the negative stress reactions. It comes with no time limitation and it comprises of 90 items that are evaluated on Likert scale (0=none, 1=Very Little, 2=Moderate, 3=Much, and 4=Very Much). Three total scores separately can be calculated. The Global Symptom Index (GSI) represents general mean score which is proportional with reflection of discomfort felt by the psychiatric illness. It ranges from 0 to 4 points. The cut-off score generally considered at 1.0. The Symptom Checklist 90-Revised (SCL 90-R) was formulated by Derogatis (1977) (8). The data were analyzed using MS Excel 2010, Epi Info v7 and SPSS v22.

## RESULTS

In the present study total number of 200 people were enrolled from two equal groups, Chotanagpur group and Gorakhpur group respectively. Every index person was examined by both the investigators from each centres. Socio-demographic data were recorded and clinical examination was done. In Chotanagpur group only those were included who were eating maize only and Gorakhpur ones who were eating wheat or rice. The Chotanagpur group and Gorakhpur group were matched in terms of demographic data.

The mean age of Chotanagpur group was  $32.56 \pm 4.65$  years and for the Gorakhpur group it was  $31.23 \pm 4.73$  years.

Niacin deficiency was reported among 11 individuals of Chotanagpur group, whereas there was no niacin deficiency reported among individuals of Gorakhpur group. Educational level was  $10.08 \pm 2.43$  years for the Chotanagpur group and  $12.48 \pm 1.64$  years for the Gorakhpur group. Seventy-four subjects from the Chotanagpur group were married and 26 were single among the Chotanagpur group, whereas Eighty one subjects from the Chotanagpur group were married and 19 were single among the Gorakhpur group (Table 1).

**Table 1: Socio-demographic and clinical data of groups**

<b>Parameters</b>	<b>Chotanagpur group</b>	<b>Gorakhpur group</b>
<b>Age (years)</b>	32.56±4.65	31.23±4.73
<b>Education (years)</b>	10.08±2.43	12.48±1.64
<b>Male</b>	72	78
<b>Female</b>	28	22
<b>Married</b>	74	81
<b>Single</b>	26	19
<b>Niacin deficiency</b>	22	00

**Table 2: The statistics comparison of groups after psychological evaluation according to their symptom check list-90 scores**

	<b>Case group</b> <b>(mean± standard)</b>	<b>Control group</b> <b>(mean ± standard)</b>	<b>P value</b>
<b>SCL 90-R depression</b>	<b>1.23±0.17</b>	<b>0.28±0.63</b>	<b>&lt;0.001</b>
<b>SCL 90-R anxiety</b>	<b>1.21±0.53</b>	<b>0.31±0.78</b>	<b>&lt;0.001</b>
<b>SCL 90-R somatization</b>	<b>1.28±0.39</b>	<b>0.24±0.57</b>	<b>&lt;0.001</b>
<b>SCL 90-R Global Symptom Index</b>	<b>1.26±0.21</b>	<b>0.22±0.44</b>	<b>&lt;0.001</b>

Among the two study groups niacin deficiency was reported only from Chotanagpur group in 22% of study subjects. Hence we further sub-grouped our

study subjects in cases and controls on the basis of niacin deficiency status. The neuropsychological evaluation was done among case and control groups. SCL 90-R depression subscale shows significant finding with mean value of 1.23±0.17 ( $p < 0.001$ ). Similarly SCL 90-R anxiety subscale shows significant finding with mean value of 1.21±0.53 ( $p < 0.001$ ). Similarly SCL 90-R somatization subscale shows significant finding with mean value of 1.28±0.39 ( $p < 0.001$ ). SCL 90-R Global Symptom Index subscale also shows significant finding with mean value of 1.26±0.21 ( $p < 0.001$ ).

## DISCUSSION

In the present study 100 study subjects were enrolled from each of groups, Chotanagpur group and Gorakhpur group with total of 200 study participants. In Chotanagpur group only those were included who were eating maize only and Gorakhpur ones who were eating wheat or rice. Every study participant was examined by both the investigators from each center on the basis of demographic data and clinical examination. Niacin deficiency was reported among 22 individuals of Chotanagpur group, whereas there was no niacin deficiency reported among individuals of Gorakhpur group. The mean age of Chotanagpur group was 32.56±4.65 years and for the Gorakhpur group it was 31.23±4.73 years. Similar results were reported by a study conducted in postwar Angola by Seal AJ et al and found that confirmed pellagra was reported in 10 of 11 new patients. Reports were collected which includes 723 females aged 15-49 years along with 690 children aged 6-59 months. Excretion of niacin metabolites in urine was found low in 30% of the female group and around 6.0% of the children group. Study also reported that the creatinine concentrations were significantly low in the females than in the children group ( $P$  value  $< 0.001$ ). Among the children group niacin deficiency status was found significantly associated with the household consumption of peanuts ( $P$  value = 0.001) and eggs ( $P$  value = 0.012) but not associated with socioeconomic status ( $P$  value  $> 0.05$ ) (9).

In the present study a very strong statistically positive correlation was reported between the niacin deficiency

and following SCL 90-R subscales: GSI, somatization, depression, and anxiety. In addition, there was a moderately strong statistically positive correlation also observed between scores on those subscales in both the patient and control groups. Similar results were seen in a study reported by Wei W and Bo L on mental disorder induced by niacin deficiency and found that patient present with behavior disorders along with cardinal signs of pellagra (10). Another study conducted by Hoffer A on Pellagra and Schizophrenia reported that there was a significant association of pellagra with depression, anxiety, obsessive compulsive states and Schizophrenia. There were also changes in thought content and process of thinking along with the early changes in perception also reported (11).

A study conducted by W. F. Lorenz on mental manifestations of Pellagra reported that psychosis that was associated with pellagra patients had the characteristics of developing the toxic psychoses in approximate 90 per cent of the nontoxic patients which were admitted to the institution. It had nearly similar characteristics to the patients of acute alcoholic psychoses. Study stated the fact that when pellagra progresses in a patient than already present mental illness tends to aggravate or some other manifestations like mental confusion, delirium and physical manifestation may be added to the pre-existing psychosis (12).

A study conducted by Shabbir Amanullah on niacin deficiency resulting in neuropsychiatric symptoms and reported that there was increasing prevalence of dementia, especially Alzheimers seen with patients of niacin deficiency which were revert with appropriate supplementation with vitamin b complex supplementation which was also improves the cognitive functions. Neuropsychiatric symptoms which include confusion, memory loss, depression, and psychosis reported in the later stages of niacin deficiency and which can be masks the more characteristic features of dementias for example Alzheimer similarly also same with vascular dementia (13). Although Pellagra had insidious onset likewise other nutritional deficiencies and represent more common features first and before the emergence of

other neuropsychiatric symptoms. However, despite of all these pellagra is a reversible disease and all complications can be treated safely and inexpensively with complete remission.

## CONCLUSION

We concluded from the present study that patients with pellagra were mainly vegetarian and especially from low socioeconomic group. Diet pattern including untreated maize, jowar (*Sorgum vulgare*) and food faddism responsible for niacin deficiency along with alcoholism, malabsorption states and tuberculosis treatment also account for disease. A very strong statistically positive correlation was reported between the following SCL 90-R subscales: GSI, somatization, depression, and anxiety. In addition, there was a moderately strong statistically positive correlation also observed between scores on those subscales in both the patient and control groups.

## REFERENCES

1. World Health Organization. Pellagra and its prevention and control in major emergencies. World Heal Organ [Internet]. 2000; Available from: <http://www.unhcr.org/4cbeefad9.pdf>
2. Rajakumar K. Pellagra in the United States: A Historical Perspective. South Med J [Internet]. 2000;93(3):272–7. Available from: <http://www.jmcgowan.com/pellagra.pdf>
3. Shah GM, Shah RG, Veillette H, Kirkland JB, Pasieka JL, Warner RRP. Biochemical assessment of niacin deficiency among carcinoid cancer patients. Am J Gastroenterol. 2005;100(10):2307–14.
4. Geschwind MD, Haman A, Miller BL. Rapidly progressive dementia. Neurol Clin [Internet]. 2007 Aug;25(3):783–807, vii. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17659190>
5. Hegyi J, Schwartz RA, Hegyi V. Pellagra: dermatitis, dementia, and diarrhea. Int J Dermatol [Internet]. 2004 Jan;43(1):1–5. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14693013>
6. Fukuwatari T, Shibata K. Nutritional aspect of tryptophan metabolism. Int J Tryptophan Res

[Internet]. 2013;6(Suppl 1):3–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23922498>

7. Richard DM, Dawes MA, Mathias CW, Acheson A, Hill-Kapturczak N, Dougherty DM. L-Tryptophan: Basic Metabolic Functions, Behavioral Research and Therapeutic Indications. *Int J Tryptophan Res* [Internet]. 2009 Mar 23;2:45–60. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20651948>

8. Gül Aİ, Çölgeçen E. Personality traits and common psychiatric conditions in adult patients with acne vulgaris. *Ann Dermatol* [Internet]. 2015;27(1):48–52. Available from: <http://synapse.koreamed.org/search.php>

9. Seal AJ, Creeke PI, Dibari F, Cheung E, Kyroussis E, Semedo P, et al. Low and deficient niacin status and pellagra are endemic in postwar Angola. *Am J Clin Nutr* [Internet]. 2007 Jan 1;85(1):218–24. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17209199>

10. Wang W, Liang B. mental disorder induced by niacin deficiency. *Shanghai Arch psychiatry* [Internet]. 2012;24(6):352–4. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25324641>

11. Hoffer A. Pellagra and Schizophrenia. *Psychosomatics*. 1970;11(5):522–5.

12. Lorentz W. Mental Manifestations of Pellagra. *Public Health Rep*. 1916;31(5):221–46.

13. Shabbir Amanullah. Niacin deficiency resulting in neuropsychiatric symptoms. *Clin Neuropsychiatry* [Internet]. 2010;7(1):292–6. Available from: <https://www.researchgate.net/publication/265274182>

**How to cite this article:** Agrawal P.K., Pellagra associated with psychiatric illnesses in areas near Gorakhpur. *Int. J. Med. Sci. Educ* 2019; 6(4):145-149