

The Present Scenario of Lathyrism Regarding Public Health in 2021

Mishra Y¹, Srivastava NK², Singh V², Nidhi K², Mishra VN^{1,2}

¹Department of Psychology, Faculty of Social Sciences, Banaras Hindu University (BHU) and

²Department of Neurology, Institute of Medical Sciences (IMS), Banaras Hindu University (BHU), Varanasi-221005(UP), INDIA

Corresponding Author: Mishra VN, Professor and Head, Department of Neurology, Banaras Hindu University (BHU), Varanasi-221005(UP), INDIA. Tel: 9839914134, Email: vnmishraneuro@bhu.ac.in, vnmishra_2000@yahoo.com

Citation: Mishra Y, Srivastava NK, Singh V, Nidhi K, Mishra VN (2022) The Present Scenario of Lathyrism Regarding Public Health in 2021. J Neurol Neurol Disord 8(1): 104

Received Date: April 26, 2022 **Accepted Date:** May 12, 2022 **Published Date:** May 16, 2022

Abstract

Backgrounds: Neurolathyrism is a disease, which is linked with the consumption of *Lathyrus sativus* (*L. sativus*) pulse that contain the neurotoxin-beta-N-oxalyl-L-alpha-beta-diamino propionic acid (beta-ODAP). Patients with Lathyrism suffer with gradual enhancement in spasticity and bony changes, which are responsible for appearing the crippling condition throughout life.

Objective: The present study has been done as to establish the present situation of *L. Sativus* consumption and Lathyrism.

Materials and Methods: We performed the survey in the village of Mohammadabad Block of Gazipur district in Eastern Uttar Pradesh (a state with maximum population in India) which have population of million, and *L. sativus* is the main pulse of the year, which sustains the economy of these populations.

Results: Out of 21,234 subjects *L. sativus* eating population for more than 10 years, none had Lathyrism. On contrary, to popular belief, this population enjoys various dishes made by *L. sativus* pulse which in popular are local delicacy.

Conclusions: There is no evidence of *L. sativus* causing Lathyrism in 2021. On contrary, *L. sativus* pulses have become an inheriting part of the food habits in these populations.

Keywords: Lathyrus Sativus, ODAP, Lathyrus Ban, ODAP Toxicity.

Abbreviations: *L. sativus*-*Lathyrus sativus*, ODAP, β -N-oxalyl-L-alpha-beta-diamino propionic acid.

Introduction

Lathyrus sativus (*L. sativus*) have been concerned as an etiologic mediator of Lathyrism. The rationale behind such inference was having been BOAA. Gradually increasing spastic paraparesis with usual neuroimaging of spinal cord and brain, with other causes of non-compressive myelopathies (as described for Indian context), being ruled out and with specific history of *L. sativus* pulse ingestion the diagnosis in Indian patient will be Lathyrism [1, 2].

L. sativus is a common edible pulse in northern India. Millions of people are reliant on this pulse as a source of protein, as its seeds hold higher protein compared to other legumes. Nevertheless, owing to sustained forbid on Khesari pulse in Uttar Pradesh due to neuro-lathyrism risk, fright of punishment among farmers cultivating *L. sativus* forever constructs the complicated perception. The recent existing population of Gazipur investigated by us in the present study has also had an identical narrative in the other hundred thousand of villages in the Gangetic plain. Our study population had elevated literacy rate and had broad age spectrum, making it an excellent study group on the whole. Under the Neurology training in India, almost the entire the post-graduate residents in medicine and postdoctoral candidates in Neurology since 1960's beyond up till now have been grown up with this information. At current scenario in eastern Uttar Pradesh, where I am working in tertiary care hospital, I also have the similar thinking clinical pattern of and which has been altered as I understood that 4% of Indian population is usually taking *L. sativus* as their chief pulse [3, 4].

By consideration these reports in the scientific research papers and newspapers showed that "*L. sativus* is not the barely reason for spastic paraparesis", but there is some other etiopathogenesis also involved in the development of the disease, group of farmers came to our department of Neurology, stating us that we belong from the land of Khesari (*L. sativus*) were the only pulse we know is *L. sativus*, but we cannot sell the pulse as people have been arrested by local police for selling Khesari pulse. With this background knowledge of Khesari cultivation, we investigated the truth behind the human use of *L. sativus* pulses [5].

Methods

We systematic designed longitudinal observational study in Gazipur district of Eastern Uttar Pradesh (most populous state in India and land of utmost population density in World) for demographic profile data collection of the population, to recognize the areas / paddy fields of the *L. Sativus*, to register the data about the individuals who are recurrently taking Khesari pulse and no other pulse, investigative these individuals for any neurological abnormality. A group of 5-trained Volunteer and 2 neurologists performed the investigation. Performa include the particulars of individual who is on *L. Sativus* ingestion were registered and analyzed. A total of 21,234 participants regularly consuming Khesari pulse were investigated. Literate participants were asked to fill the three-page proforma and were indiscriminately reviewed by investigators and team members. Investigators individually recorded the statements for illiterate participants. All the participants included in the presented study were asked and physically examined, if needed, for the observation of any difficulty in walking or sign(s) of motor system disorders.

Results

In all these 21,234 subjects, 44.45% were below the age of 50, 34.5 were below the age of 51-75 years and 21.05% were above the age of 75 years. In all these subjects, 68.44% are vegetarian and 31.56% were having non-vegetarian food habit. All these subjects (21,234; 100%), who were participated in the present study, were consumed Khesari daal in regular diet.

In all these participated subjects, 34% (7219 individuals) were having habit of eating *L. sativus* for 10-20 years of duration, 46% (9767 individuals) were having habit of eating *L. sativus* for 20-50 years of duration and around 20% (4247 individuals) were having habit of eating *L. sativus* for more than 50 years.

In all these participated subjects (21,234 individuals), only 178 (0.8%) individuals were having difficulty in walking, which was due to osteoarthritis, stroke, diabetic polyneuropathy, GB syndrome, multiple systemic atrophy, parkinson's disease, FSHD. 21 individuals having difficulty in holding objects the causes of which were Hensen's Disease, Traumatic brachial plexus injury, Alcoholic tremors. 376 individuals (All without any spasticity) were using stick for walking. 23 individuals (COPD, Bronchial asthma, Post MI, Cardiomyopathy, Lung fibrosis) were having breathlessness while walking. 7 individuals (Post MI) were having Chest pain / chest tightness. All these individuals were consuming *L. sativus* in the form soup/daal, fritter, porridge, snacks, and biscuits (Table. 1).

Characteristics	Subject (% Questioned)
For 21,234 subjects	From Gazipur (Surveyed between January 2018 – November 2021)
Age	<50 Years 9438 51 – 75 Years 7329 >75 Years 4467
Feeding habits	Vegetarian 14534 Veg+NonVeg 6700
Do you eat Khesari dal?	Yes (100%)
Since how long you have been using it?	11-20 Years – 34% 20-50 Years – 46% >50 Years – 20%
Any difficulty in walking?	178 (Osteoarthritis, Stroke, Diabetic Polyneuropathy, GB Syndrome, Multiple systemic Atrophy, Parkinson's disease, FSHD)
Any difficulty in holding objects?	21 (Hensen's Disease, Traumatic brachial plexus injury, Alcoholic tremors)
Do you use sticks for walking?	376 (All without any spasticity) single stick walkers
Do you have breathlessness while walking?	23 (COPD, Bronchial asthma, Post-MI, Cardiomyopathy, Lung fibrosis)
Do you have Chest pain / chest tightness?	7 (Post MI)
In what form Lathyrus is being eaten?	Soup / Daal, Fritter, Porridge, Snacks, Biscuits

Table 1: Study population-baseline characteristics (n=21,234)

Discussion

In the present study, our prime objective was to recognize if the consumption of *L. sativus* have any effect on the individuals who regularly consumed it and outcome in Lathyrism disease onset. In all these 21,234 subjects, 44.45% individuals were under 50 years of age, 34.5 individuals were under the age of 51-75 years of age and 21.05% individuals were more than 75 years of age. In this region of the total population 68.44% individuals are vegetarian and 31.56% individuals were having non-vegetarian food habit. So, of these large vegetarian populations, who are regularly consumed it no one is reported any kind of walking difficulty. All of the participant in this study (21,234; 100%) were having eating habit of Khesari daal.

In all these subjects, 34% (7219 individuals) were having habit of eating *L. sativus* sativa for 10-20 years of duration, 46% (9767 individuals) were having habit of eating *L. sativus* for 20-50 years of duration and around 20% (4247 individuals) were having habit of eating *L. sativus* for more than 50 years. Present study indicated that Lathyrism has no impact whether they have either prolonged or very short period of eating habit of *L. sativus*.

In all these subjects (total 21,234 individuals) only 178 (0.8%) individuals were having difficulty while walking the causes due to osteoarthritis, stroke, diabetic polyneuropathy, GB syndrome, multiple systemic atrophy, Parkinson's disease, FSHD but not due to *L. sativus* intake. 21 individuals having difficulty in holding objects the causes of which are Hensen's Disease, Traumatic brachial plexus injury, alcoholic tremors but not *L. sativus* intake. 376 individuals were using stick for walking but no one has spasticity. 23 individuals were having breathlessness while walking. 7 individuals (Post MI) were having Chest pain / chest tightness. All these individuals were using *L. sativus* in the form soup/daal, fritter, porridge, snacks, and biscuits.

Now, question arises that, if such large population is eating Khesari, without any signs of spastic paraparesis since their birth and consumption for larger longer duration, than why to ban the production of Khesari, which have quality to be grown in less watery condition, easy cultivation, fast to produce pulse. There seems to be no reasons for restricting the productivity of a useful and cheap pulse in developing country like India.

The observations of this study indicates the total subjects of 21,234 were used to eat *L. sativus* pulse in the form of pulse, snacks, biscuits, numbers, porridge, daal and soup as of other grains [6]. Now, the question arises, that what makes *L. sativus* illegal for either cultivation or for human use, when no rise of spastic population exist [7]. As such there is no ban on cultivation and use in few states of India (Bihar, Madhya Pradesh and West Bengal) but it is banned in Uttar Pradesh province of India, where these studies have been conducted [8]. Several villagers were arrested for selling the Khesari pulse. There is a need of multi-centric trial with chemical analysis of these pulses and scientific data should be acquired to find out the neurotoxic agent, if any exists in the seeds of *L. sativus*, now and future researches are also required to find out the neuro-toxic chemicals in pulses and other food in drought conditions, as the known epidemics of Lathyrism have been noted during famines and not in normal conditions. Moreover, neuro-lathyrism has almost disappeared from Indian region in the past few decades. In addition, β -ODAP has been recently granted by USA and Chinese patents for its therapeutic applications as neuroprotective and hemostatic properties [9].

Conclusion

The present study highlights the current situation of *L. sativus* consumption and Lathyrism in the population of Gazipur district, Uttar Pradesh regarding Khesari pulse (*L. sativus*). It is the need of the hour that national bodies such as ICMR come up with acceptable safe limits for consuming this legume as a part of a normal balanced diet. In addition, it comes with the fact that *L. sativus* consumption will not affect the *L. sativus* ingesting population and hence lift existing ban from *L. sativus* intake. The availability of this rich source of protein as a part of balanced diet would benefit the marginal classes immensely and is thus of paramount importance with reference to the Indian context.

Acknowledgements

Authors wish to thank intramural funding of BHU, Varanasi, India, for their generous financial support. Authors sincerely thank to staff of neurology department, BHU for help in collecting the data. Authors also sincerely thank to all those subjects, who participated in this study.

Author Contribution

All authors wrote, read, revised, and approved the final manuscript.

Conflict of Interest

The authors have no conflicts of interest to declare.

Ethical Approval and Consent for Participation

Ethical approval and consent for participation has been taken from each participant.

References

1. Prabhakar S, Syal P, Singh P, Lal V, Khandelwal N, Das C P (1999) Non-compressive myelopathy: clinical and radiological study. *Neurol India*. 47:294.
2. Zanicovic V (2001) Similarities between tropical spastic paraparesis (TSP) and neurolathyrism. *Lathyrus Lathyrism Newsletter*. 2:11-4.
3. Mishra VN, Tripathi C B, A Kumar, V Nandmer, A Z Ansari et al. (2014) Lathyrism. Has the scenario changed in 2013? *Neurological Research*. 36:38-40.
4. Haimanot RT, Feleke A, Lambein F (2005) Is lathyrism still endemic in northern Ethiopia? *Ethiop.J. Health Dev*. 19: 230-236.
5. Miles M (2005) Resilience of South Asian disabling conditions: a glimpse of lathyrism among comparative histories. *Lathyrus Lathyrism Newsletter*. 4: 18-21.
6. Ain-i-Akbari AF, transl. HS Jarrett (1891) Calcutta: Asiatic Society of Bengal. II: 151.
7. Wujastyk D (1998) *The Roots of Ayurveda*. New Delhi: Penguin. 15: 169.
8. Buchanan F (n.d.) *An Account of the Districts of Bihar and Patna in Patna: Bihar & Orissa Research Society*, 274:1811-1812.
9. Lambein F, Travella S, Kuo YH. et al. (2019) Grass pea (*Lathyrus sativus* L.): orphan crop, nutraceutical or just plain food? *Planta*. 250: 821-838.

Submit your next manuscript to Annex Publishers and benefit from:

- ▶ Easy online submission process
- ▶ Rapid peer review process
- ▶ Online article availability soon after acceptance for Publication
- ▶ Open access: articles available free online
- ▶ More accessibility of the articles to the readers/researchers within the field
- ▶ Better discount on subsequent article submission

Submit your manuscript at
<http://www.annepublishers.com/paper-submission.php>