

Lathyrism in South Central India: *Lathyrus sativus* Cultivation and its Consumption

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Abstract

A survey of 59 villages with a total population of 89,913 on the banks of the river manjira in medak district of Andhra Pradesh and Bidar district of Karnataka in south India revealed 29 cases of Lathyrism spread over 21 villages. The disease occurred sporadically between 1964 and 1990. Dietary history of the affected respondents was recorded which showed that their lathyrus in take was between 2.4 and 6.8 g/cu/day (Group1) compared to an intake of 1.2 - 10.8 g/cu/day in non-Lathyrism (group all) families. (TABLE1) The cultivation and consumption of lathyrus decreased during the last two decades as a consequence of a ban on sale of *L. sativus* under the prevention of food adulteration Act (PFAA).

Keywords: Lathyrism; Kesari dal; Paraplegia; Myospasm

Introduction

Lathyrism is an incurable neurological disorder clinically manifested by paralysis of the lower limbs. It progresses slowly the spastic paraplegia involving degeneration of the upper part of spinal cord causing stiffness and paralysis of muscle of the lower extremities. During the last two decades, the outbreaks of Lathyrism have been reported from the Indian state of Andhra Pradesh, Karnataka, Madhya Pradesh and Maharashtra [1,2,3]. Besides India, case occurred in China, Bangladesh, Ethiopia, Nepal, Israel and Spain.

Lathyrism is known to occur in India particularly in the states of Madhya Pradesh, Uttar Pradesh, West Bengal, Bihar and Maharashtra [4,5]. Besides India, cases of Lathyrism occurred in Bangladesh, Nepal, China, Spain and Ethiopia. This disease has been attributed to consumption of the pulse lathyrus sativus.

An unusual highly toxic amino acid / 3-N-oxalylamino-L-alanine has been isolated from *Lathyrus sativus* seed, characterized and proved to be responsible for causing neurological manifestations in a variety of experimental animals including primates.

The western countries have got rid of the disease by stopping the production of lathyrus sativus. Howbeit, in India, considering the fact that lathyrus sativus finds a placed in the cropping pattern, only the sale of the very seed has been banned under the provisions of PFA act [6]. The government of Maharastra has been implementing these provisions. During the last few years, a view has been expressed in certain quarters that the ban imposed on the sale of lathyrus sativus be lifted and through the medium of vernacular press, a propaganda on the safeness of the seed was launched. In view of these conflicting signals, the Maharashtra government constituted an expert committee under the chairmanship of Dr S R Sengupta for Haffkine Institute, Bombay to consider the feasibility of lifting the ban on the sale of lathyrus in the state. The committee submitted its report in 1992 concluding that the ban may not be lifted until the state government has more conclusion that the circumstances as prevalent in the state do not warrant a continuance of the ban.

During the last few years, isolated efforts were made to look for cases of Lathyrism in Nagpur, Bhandara and adjacent districts. A few of the hospitals such as General Hospital, Nagpur, PHC Ghodpoth, Rural Hospital, Bhadrawati, BGW Hospital, Gondia, issues certificates claiming that no case of the disease were treated either as an inpatient or in OPD during the last few years.

In the past, there were no authentic reports on Lathyrism disease outbreak in south India, although there was hospital based reports on “Lathyrism” in south India without Lathyrus consumption [7]. The present study was carried out to find out the current status of *Lathyrus* crop cultivation, consumption and occurrence of Lathyrism in south India.

The major thrust was to identify classical cases of Lathyrism to serve as index cases in a few villages in each district and show them to the local health officials. This would, enable the district health officials to initiate a survey to find out the cases of Lathyrism in the district.

Methods and Materials

A survey was carried out in the districts of Medak in Andhra Pradesh and adjoining Bidar in Karnataka. Clinical examination was carried out during the survey and the diagnosis of Lathyrism was established according to the specific criteria mentioned by Dwivedi and Prasad [8] and Haimanot, *et al.* [9]. The specific criteria included leg weakness or myospasm of calf muscles, lumbago and history of Lathyrus consumption prior to and the onset of the disease. The disability was classified into the following stages.

Stage I: Mild spastic gait (jerky) without stick, increased stiffness, exaggerated deep tendon reflexes (DTR), unstained ankle clonus present and Babinski sign absent.

Stage II: Spastic gait with use of one stick, increased stiffness, crossing of gait (scissored), exaggerated DTR, unstained ankle clonus and Babinski sign present.

Two cases of clinical Lathyrism were tested for Human T Lymphotropic Virus _ I (HTLV-I) by Acuspot confirmation test to rule out Tropical Spastic Paraplegia (TSP). Dietary history of consumption of cassava roots containing cyanide was also carried out to rule Epidemic Spastic Paraplegia. Individual intake of Lathyrus sativus was assessed through a dietary survey in 7 villages of Medak district, namely Borancha, Devunur, Paladgu, Bhutkur, Sirur, Daultabad and Erraram, with oral questionnaire method using standardised cups [10,11]. For this survey households with cases of Lathyrism (Group I) and households without cases of Lathyrism (Group II) were included.

Results and Discussion

During the survey it was found that the cultivation of *L sativus* was restricted to the river banks of the Manjira. Among all the villages surveyed, it was found that there was no large scale cultivation of *L sativus*. According to the villagers, there was large scale cultivation prior to 1975. The crop was cultivated singly or as mixed crop along with sorghum. The cultivation by individual farmers was limited to less than an acre and production was just sufficient to meet their own household consumption throughout the year or for feeding to drought cattle. No open sale of *Lathyrus* in village market or shops was seen due to ban on sale. However, in selected towns like Narayankhed in the weekly Sunday market, clandestine sale of *Lathyrus* was noticed. *L sativus* is consumed as dal, snacks and khadi (Burda).

During the survey, 18 frank cases of Lathyrism were found in 34 villages (total population of 51,833) surveyed in Medak district and 11 cases in 25 villages (total population of 38,000) surveyed in Bidar district. There were more cases of stage II (58.6%) than stage I (41.4%) and 27 out of 29 cases were males (Table 1). All the affected patients were agricultural labourers with annual income of less than Rs 6,000/-. Most of them belong to scheduled caste (60%).

Out of the two female patients, one was affected before puberty, early menarche and the other was affected after menopause. All patients taken together, the earliest age of onset was 15 years while the oldest case was 60 years old. The duration of the illness ranged from 3 to 30 years.

The consumption of Lathyrus in South India is mostly restricted to certain seasons and festive occasions. In the Group I (households, with cases of Lathyrism), 4 households out of 7 were consuming weekly once, the intake being 2.4 - 6.8 g/Cu/day. In Group II (households, without cases of Lathyrism), 12 households of 21 consumed once a month, the intake was 1.2 - 10.8 g/Cu/day.

Group (g/cu/day)	Male		Female		Total		Average Lathyrus Intake
	n	%	n	%	n	%	
I (Lathyrism):							
No stick stage	10	37	2	100	12	41.4	
One stick stage	17	63	0	-	17	58.6	2.4 - 6.8*
Total	27	100	2	-	21	100	
II (No Lathyrism):							
	-	-	-	-	-	-	1.2 - 10.8**

Table 1: Average Lathyrus intake in group I (Lathyrism) and group II (no Lathyrism) cases.

* Age group from 7 to 17 years, low intake due to cases in families

** Age group from 1 to 17 years

The data in group II showed thirteen males and two females consuming Kesari dhal. The survey was conducted in 08 villages across three districts of Vidarbha region of Maharashtra state in India.

The present survey clearly indicates the occurrence of frank cases of Lathyrism in parts of the state of Andhra Pradesh and Karnataka in South India where *L sativus* is grown and consumed. Lathyrism occurred among the patients who were definitely known to have consumed *L sativus*, confirming that wherever the pulse is grown and consumed, the outbreak occurred.

S. No	Year	District	No of Villages Covered	Total no of House holds	No of households consuming Lathyrus	Method (Weight/ Oral)	Dietary Intake (g.cu/day)
1	1977 (Jan - March)	Chandrapur- Code - 14	17	110	2 11	W O	55.7 - 67.1 20.7 - 28.6
2	1979 (Oct - Dec)	Bhandara Code - 25	17	125	11 33	W O	28 - 113 10 - 117.5
3	1989 (Oct - Dec)	Bhandara Code - 25	12	185	11	W	9.8 - 47.62
4	(1997 - 98)	Chandrapur Code - 14	17	411	12	W	2 - 119

Table 2: Dietary Intake of Lathyrus Sativus in Vidarbha Region.

A survey of the current consumption pattern revealed that people of the area continue to consume *L sativus* but in reduced quantities for varying periods ranging from once in a month to daily, at least during the post-harvest season.

The reduction in cultivation and consumption of Lathyrus attributed to prevailing ban on sale of *L sativus* in the two states of South India (Andhra Pradesh and Karnataka) under the provision of Food Adulteration Act, 1954. The present study emphasises the need to enforce such a ban by the government in order to prevent the recurrence of the disease in the near future.

District	1980 - 1981 An in 00 hact	1980 - 1981 P 00 ton	1988 - 1989 An in 00 hact	1988 - 1989 P in 00 ton	1991 - 1992 An in 00 hact	1991 -1992 P 00 ton
Nagpur	30	5	20	20	13	2
Bhandara	287	44	87	44	26	5
Chandrapur	236	32	159	80	87	21
Gadchirolli	-	-	87	44	60	12
Total Nagpur Division	554	81	353	178	186	40
Maharashtra	596	88	418	209	194	42

Table 3: Cultivation and Production of *Lathyrus Sativus* in Vidarbha Region.

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