

Monitoring of Malnutrition in Weaning Tribal Infants by Introducing Cassava Made Indigenous Semisolid Diet

by

Nagesh S. Tekale

Nutritional Research Lab, Bandodkar College of Science, India

Received 07 December, 2008.
Accepted 01 February, 2009.

Abstract

Early marriages of girls, inadequate breast feeding to new born and shifting children directly on plane solid diet are the regular traditional practices in the tribal belt of western India, which leads to an early triggering of grade IV malnutrition and mortality of the infants. The interventions were carried out to introduce cassava-made semisolid diet for weaning children for six months before shifting them to solid diet. Results show complete eradication of malnutrition and control over the diarrhea.

Introduction

Inhabitants of tribal belts are the indigenous people constituting about 8% of Indian population. Their habitat is in hilly areas surrounded by forests which are usually inaccessible to various nutritional programs and health facilities offered by the Government. Disturbance in biodiversity, dependence on forest and its produce, low or no intake of oil and milk products due to taboos, non-availability of animal flesh when desired, high intake of fiber and low traditional agricultural produces rich in anti-nutritional factors has triggered micronutrient deficiencies, specifically vitamin A, zinc and iron. The main sufferers are expectants, lactating mothers and growing five-year old or younger children. Although there are more than 300 tribal groups in India, many of them are socio-economically and nutritionally backwards carrying disease burden on them. Early marriages of girls, inadequate breast feeding to new born and then shifting children directly on plane solid diet are often the traditional practices in tribes inhabiting western India that lead to early triggering of grade IV malnutrition and terminate into diarrhea-prone mortality of one-year old or younger children.

Tribal people are fond of underground modifications of roots and stems. Although forests in western India are still rich in varieties of corms, tubers and rhizomes, cassava appears to be critically endangered because of earlier heavy exploitation of this crop for its edible starchy tuber. The general project objectives were to introduce cassava-made semisolid food as a substitute to dry bread for weaning babies –especially those deprived of the right of breast feed at early stage, reduce the malnutrition and diarrhea among weaning

children, educate the mothers on the importance of semisolid diet after discontinuation of breast feeding and role of nutrient-rich cassava, support and sustainability for traditional low productive agricultural practices in tribal belt by promoting large scale genetically improved cassava cultivars, and a conservation strategy for cassava in endangered areas.

Materials and Methods

The nutritional survey was undertaken between May 2004 and December 2004 in two hamlets located in the interior, inaccessible tribal belt of western India, where there was prevalence of grade III and IV malnutrition and frequent occurrence of diarrhea. Two group of weaning subjects constituting control and experimental between the six-month and one-year old were selected. The pre-weaning weights and malnutrition status of each baby was recorded using Gomez' classification by weight per age. The pooled data are given in Table 1.

Table 1. Prevalence of malnutrition and diarrhea in weaning tribal infants between six-month to one-year old (N = 95)

Nutritional Status	Grade (%)	Diarrhea cases (%)
Grade I (moderate malnutrition)	10	15
Grade II (noticeable malnutrition)	46	28
Grade III (severe malnutrition)	36	60
Grade IV (total malnutrition)	8	100

From the onset of the weaning process, the indigenous cassava based semisolid diet -including all six nutrient parameters and providing 1800 cal per day, was given to each of the children thrice a day under perfect hygienic conditions for six months until they were shifted on traditional cereal based solid diet. The health and malnutrition status of children were monitored regularly. The results were compared with a control group.

Results

The introduction of cassava-based weaning food made from boiled tuberous roots supplemented with green leafy powder as a source of beta carotene had decreased the malnutrition and malnutrition-linked infectious diseases significantly: up to 92% compare to control, in which all the children were malnourished with diarrhea infections (Table 2).

Table 2. Comparison of groups given cassava tuber diet in semi-solid form with control after six-month trial (N = 20)

Nutritional status	Experimental Group		Control Group	
	Grade (%)	Diarrhea (%)	Grade (%)	Diarrhea (%)
Normal	85	—	—	—
Grade I (moderate malnutrition)	15	30	—	—
Grade II (noticeable malnutrition)	—	—	65	40
Grade III (severe malnutrition)	—	—	30	85
Grade IV (total malnutrition)	—	—	5	100

In experimental group we noticed increase in body weight and height with MAC. Children were seen in active by giving response to scientific toys, which were used to enhance their learning abilities.

Discussion

The introduction for the first time in this tribal belt of India of 80% of pre-boiled cassava tuberous roots

meshed with flour of black gram as a source of protein, and appropriate amount of green leafy vegetable powder, as a source of micronutrient, in weaning food form helped to reduce malnutrition-linked mortality in tribal infants. This concept was totally missing in this area because of which every year thousands of malnourished tribal infants were true victims of diarrhea. Tribes' love and affection for under ground starchy food helped us to popularize this indigenous zero-cost supplementary baby food in tribal belt. The weaning baby food prepared from cassava appears to be a very promising source of nutrition to the children to eradicate the root cause of malnutrition. The results of this experiment were observed and confirmed by many lactating tribal mothers on the experimental site. This experiment gave a boost to the community nutritional program of the Government and charity organization which are actively participating in eradicating malnutrition and diarrhea in this tribal belt of western India.

Cassava is an endangered crop in this tribal belt. Hence, there is an urgent need to introduce large scale cultivation of genetically improved cassava in this nutritionally affected belt to make this nutritional program sustainable. Such action will definitely support the traditional agricultural cropping system opening the gates for a permanent solution to eradicate child malnutrition in this tribal belt by giving their population a balanced nutritious diet.

Acknowledgment

The author thanks "Sankalp", an organization of Indian students at Iowa State University (USA) for funding this research project.

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