

Original Research Article

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Supplementation of Low Cost Alternative Foods to Combat Vitamin C Deficiencies among Children

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ABSTRACT

An On farm testing on supplementation of Vitamin C rich foods to combat Vitamin C deficiencies among school children was carried out in Raichur taluka during the year 2013-14. The aim of this testing was to supplement low cost alternative to combat vitamin 'C' deficiency among and children. Forty five children from three Government Primary schools of Raichur taluka were selected purposively for this study. The diagnostic features of vitamin deficiency were gum bleeding, delayed wound healing, infections and split hair. The foods which are rich in vitamin C and dose as recommended by NIN Hyderabad were supplemented. The nutrition supplementation was carried out for three months during January to March 2014. The checklist was administered before and after the supplementation. Qualitative observations on the deficiency symptoms of vitamin C and the perception about health status were also recorded. Though all the foods were accepted by the children, amla was most effective in reducing the symptoms of vitamin c deficiency. But the availability of amla and quantity to be consumed were the constraints faced by the researcher. On the other hand, lime juice and guava were most relished by all the children.

Keywords

Vitamin, Supplementation, On farm testing, Collagen, Health status

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Introduction

Vitamin C or ascorbic acid is an essential dietary nutrient for a variety of biological functions which found in many of fresh fruits and vegetables. It helps the body to make collagen, an important protein used to make skin, cartilage, tendons, ligaments and blood vessels. Vitamin C is needed for healing of wounds and repairing and maintaining bones and teeth. Vitamin C certainly places an important role in immune function and it removes free radical intermediates that initiate

damaging cell reactions (Andea and Brakhuis, 2012). Deficiency of vitamin C may cause inflammation of gums, bleeding of gums, decreased wound healing rate, decreased ability to ward off infection and splitting of hair.

Though most animals are able to synthesize endogenously but humans do not have capability to synthesize vitamin C, however requirement of vitamin C is satisfied by consumption of natural sources i.e fruits and vegetables. In this regard an OFT (On Farm

Testing) on supplementation of vitamin C rich foods to combat vitamin C deficiency among school children was conducted.

Materials and Methods

Present study was conducted in three different school of Raichur District during the year 2013 – 14. Purposive sampling was made to select 15 children studying in 6-9th standard from each school, which possessed one or more vitamin C deficiency symptoms were identified. Thus total sample was 45. Care was also taken to match the socio-economic status of the children in different treatments.

Locally available three vitamin C rich foods were selected *viz.*, Amla, Guava and Lime to supplement selected children. Each type of fruit was provided to each school children. The dosage was followed as per the recommendations of NIN (National Institute of Nutrition), Hyderabad

T₁ - Amla fruits, 20g/day/head

T₂ - Guava fruits, 50g/day/head

T₃ - Lime juice, 30g lime and 15g sugar/day/head

These supplementations were given for selected children over a period of 3 months, *i.e* January to March. The pre-structured questionnaire was administered to the respondents before and after supplementation of vitamin C rich foods. Qualitative observations were made on the deficiency of symptoms of Vitamin C and perception about health status was also recorded.

Results and Discussion

After the supplementation of vitamin C rich foods for a period of three months, following observations were recorded by comparing

with control group of children and also their opinion before and after supplementation.

Among the selected foods Amla contain higher amount of Vitamin C (600mg) followed by guava (212mg) and lime (63mg). Similarly the quantity of fruits supplemented were only 20g of Amla, 50 g of Guava and 30g of lime. It can be observed that cent per cent RDA was met in case of Amla and Guava whereas, 40 per cent met by lime as depicted in Table 1.

Values in the parenthesis indicate percentages

It is inferred from the Table 2 that, diagnostic feature of Vitamin C deficiency shows about 73-80 per cent of children were suffering from the incidence of bleeding of gums before supplementation, whereas children supplemented with amla showed better recovery (13.33 %) followed by the children supplemented with Guava (26.66 %) and Lime juice (54.54 %).

This may be due to the reason that amla contain higher proportion of vitamin C compared to Guava and Lime. With regard to incidence of infection, it was noticed that lesser per cent of children showed infections in selected children *i.e.*, around 13 to 26 percent before supplementation,

However, after supplementation there was no infection was observed in children supplemented with Amla and negligible per cent of children expressed infection in case of children supplemented with Guava (6.66%) and Lime (6.66%). Anti-bacterial as well as astringent characteristics of Indian gooseberries safeguard the entire body from infections and increases body's immune reaction. Amla fruit has antiviral properties and also functions as an anti-bacterial and anti-fungal agent (Srivasuki, 2012).

Table.1 RDA for Vitamin C for children (10-14yrs) and vitamin C composition in selected foods

Selected fruits	Vitamin C (mg/100 g)	RDA for Vit C (10-14yr children)	Supplemented qty (g)	% of Vitamin C requirement met
Amla	600	45mg/day	20 g	100
Guava	212	45mg/day	50 g	100
Lime	63	45mg/day	30 g +15g sugar	40

Table.2 Qualitative observations before and after supplementation

Children groups	Incidence of gum bleeding		Incidence of infection	
	Pre test	Post test	Pre test	Post test
Amla group	11 (73.33)	2 (13.33)	2 (13.33)	0
Guava group	12 (80.00)	4 (26.66)	4 (26.66)	1 (6.66)
Lime group	11 (73.33)	6 (54.54)	4 (26.66)	1 (6.66)

Table.3 Cost of fruits selected for supplementation/day

Selected fruits	Supplemented Qty (g)	Cost of fruits (Rs/kg)	Per head/day expenditure (Rs)
Amla	20	60	1.20
Guava	50	62	3.72
Lime	30	40	1.8

Cost of selected fruits for supplementation to children depicts that amla was found to be low cost with good out come in posttest followed by lime juice, however cost of guava fruit found to be comparatively little higher as shown in Table 3.

Inclusion of Vitamin C rich foods in regular diet may greatly help to reduce the deficiency symptoms of Vitamin C viz., bleeding of gums and infections which in turn help to develop natural immunity and better iron absorption. Though all the foods were accepted by children, amla was most effective, however availability of amla and quantity to be consumed were the constraints faced by the researcher. On the other hand lime juice was most relished by all the children and even guava too. With this study we can recommend vitamin C rich foods especially amla in mid-day meal programme

either as fresh or processed to reduce infections which are very much common for children. Even schools can plan to have nutrition gardens in the school premises which fetches no cost for supplementation.

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