

Accepted : May, 2010

Food fortification and micronutrient malnutrition

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ABSTRACT

Food fortification is the addition of vitamins and minerals to a staple food or condiment consumed in fairly consistent and huge amounts. Pre-determined quantities of vitamins and minerals beneficial to the health and well-being of the population are added at the processing stage. The decision regarding which additive to use is based on the severity of the vitamin and mineral deficiencies in the consuming population, the added cost of delivering these nutrients and the compatibility of the food vehicle to their acceptance. Fortification of common food staples and condiments with micronutrients is one of the key strategies to control micronutrient malnutrition and should be done judiciously to maximize its benefits for the people. International Association of Infant Food Manufacturers (IFM) is also developing its new strategies and research and development to explore the opportunities in Asian and African countries in order to increase their reach for the healthy society with vast range of fortified food products including salt, sugar, flour, chocolates, milk, etc. Still there is a vast gap to be filled up in fortification and micronutrient malnutrition with the joint efforts from industry players, public and private partners, Social institutions, Financial institutions, Government, and most important the consumers.

Key words : Malnutrition, Food fortification, Anaemia, Goitre, Micronutrient, Macronutrient

INTRODUCTION

Food fortification is the addition of vitamins and minerals to a staple food or condiment consumed in fairly consistent and huge amounts. Pre-determined quantities of vitamins and minerals beneficial to the health and well-being of the population are added at the processing stage. The decision regarding which additive to use is based on the severity of the vitamin and mineral deficiencies in the consuming population, the added cost of delivering these nutrients and the compatibility of the food vehicle to their acceptance. Fortification of common food staples and condiments with micronutrients is one of the key strategies to control micronutrient malnutrition and should be done judiciously to maximize its benefits for the people. Fortificants used to enrich food are antioxidants, bioactive peptides, micronutrients- vitamins and minerals and macronutrients -proteins.

WHO (World Health Organization) and ILSI (International Life Science Institute) say that the major disorders due to micronutrient malnutrition are goitre,

anaemia, blindness and other mental disorders. Fortification of staple foods like rice, wheat, biscuits, milk, etc. are the simple process to fight malnutrition.

The government had given very attractive break-up of costing and taxation for the food processing industry. The company going for fortification will be enjoying tax benefits and their costing would be up to 0.5 to 1 % where as company not going for this will be bearing cost up to 5-7% without tax benefits. Now we can see many MNC (Multinational Corporation) like General Mills, Olam International, etc. are into fortification of various categories.

Global Alliance for Improved Nutrition (GAIN) , ICDS, Take home rations (THR), Supplementary nutrition programme (SNP), Mid day meals, etc. have been designed and introduced so that child malnutrition and other allied diseases can be eradicated.

Effective nutrition interventions are available to prevent MND (Micronutrient deficiency) and their consequences. Short-term strategies such as nutrient supplementation (giving a large dose of the micronutrient

as a medicinal supplement) have been effective in providing immediate relief in several countries, but there is concern that this approach is not sustainable in the long term. Food fortification is a more cost-effective and sustainable solution. It plays a major role in improving the diet and meeting the micronutrient needs of the population. This must be viewed as part of an integrated food-based strategy; others include dietary diversification, homestead production and improved food processing and storage.

Food fortification has several advantages over other interventions as it does not necessitate a change in dietary patterns of the population, can deliver a significant proportion of the recommended dietary allowances for a number of micronutrients on a continuous basis, and does not call for individual compliance. It could often be dovetailed into the existing food production and distribution system, and therefore, can be sustained over a long period of time.

MATERIALS AND METHODS

Slum areas of Gandhigram and Kalawad road were selected for the study because they are very old slums and we get good number of respondents. The research tools were set of questionnaire and personal interviews at

their residence so that we can easily find out the loopholes in their cooking, storing and consuming methods.

RESULTS AND DISCUSSION

Inference can be drawn from Table 2.

- Majority of mothers' served tea to their children
 - Only 75% of mothers gave imbalanced diet due to lack of income and nutrition education.
 - They should be made aware about the government plans regarding nutritional diet so that they can live healthy life.
 - And if given adequate awareness to mothers regarding balanced diet then the problems related to the deficiency can be eliminated.
- It is clear from Table 3 that :
- 40% of mothers gave buttermilk and curd to their children but the amount of curd was less and water was more
 - 35% of mothers gave flour/ Atta daily in the form of chapatis
 - 20% of mothers cooked vegetables daily and very less people bought fruits for their children.
 - The consumption of Junk/fried food in the form of biscuits, Puff, etc. was common in the poor localities

Table 1 : Total sample size and no. of children (Backward area and slums at Gandhigram area and Kalawad road of Rajkot City)

	1-2 Children		3-4 Children		More than 4	
	Boys	Girls	Boys	Girls	Boys	Girls
No. of mothers	10		6		4	
No. of children	9	6	12	9	13	8

- Total sample size = 20 Mothers
- Total children = 57 (Boys-34 , Girls-23)
- 50% of mothers' having 1-2 children

Table 2 : Regular diet and their intake of foodstuffs per day

No. of mother	Breakfast		Lunch		Dinner	
	Tea	Milk	Balanced	Imbalanced	Light	Others
	18	2	5	15	17	3

Table 3 : Food habits of the children in backward area and slums

Sr. No.	Food products	Daily	Twice a week	Once a week	Rarely	Total
1.	Buttermilk/Curd/Tea	8	6	4	2	20
2.	Flour/Atta	7	6	4	3	20
3.	Vegetables/Fruits	4	8	6	2	20
4.	Fried/Junk food	2	10	4	4	20
5.	Chocolate/Toffees	14	2	3	1	20
6.	Coldrink/Ice cream	10	5	3	2	20
7.	Pulses	7	6	4	3	20
8.	Rice	5	8	5	2	20

Table 4 : Awareness of nutrition value

Sr. No.	Awareness/Information	Yes	No	Total
1.	Knowledge about nutrition	4	16	20
2.	Washing vegetables before cooking	12	8	20
3.	Salads used in daily diet	7	13	20
4.	Home made breakfast	2	18	20
5.	Proper storage of food (lid)	8	12	20

- 70% of mothers provided their children with chocolates and toffees.
- 35% mothers cooked pulses or dal daily.
- 50% subjects consumed aerated soft drinks and cold drinks on daily basis.
- 25% mothers cooked rice daily.

They can be educated about the importance of fortified food and flour so that they can get that under ICDS (Integrated Child Development Schemes and Services) by the Govt. of Gujarat in the form of Fortified Atta, Nutrient candy (chocolates), and Extruded fortified blended food (EFBF). This would lead to the consumption of healthy and nutritious foodstuffs with zero cost or less cost which would make them healthy and with very little variations and substitutions in their regular diet.

Table 4 clearly indicates that :

- 80% people didn't have knowledge and education about nutrition
- 40% people did not wash the vegetables or fruits before consuming it
- 35% people consumed salad (onion and tomato).

List and example of food which can be fortified

Sr. No.	Foodstuffs which can be fortified	Fortification/ Nutrient component
1.	Cereals	Vitamin- B
2.	Salt	Iodine
3.	Bread	Folic acid/ Vitamin B
4.	Milk/Soy Milk	Calcium
5.	Yogurt, Margarine, cheese, granola bars, orange juice, chocolate	Sterols and Stanols (Natural substance in plant and animal cell)

- 90% people ate unhealthy and oily foodstuffs (biscuits, fried foodstuffs).
- 60% people didn't know about the proper storage of food, covering, washing, etc.

The authors had a discussion with ICDS Supervisor and CDPO about the wastage of the fortified atta which the people don't give value because it is provided free by the government and fed it to cows and goats. So, to stop

that they should make people aware about the nutritional aspect in fortified atta and its positive impact on children's growth and development through puppet show and street plays.

Conclusion:

- Majority of the people didn't know about the benefits of nutrition and didn't have basic knowledge of nutrition just because of lack of education.

- Almost more than 55% of people need to substitute some items of their diet by fortified foodstuffs.

- Government of Gujarat has taken a very good initiative by commencing ICDS and providing Fortified and EFBF foodstuffs to the backward people but still majority of the people cannot take its advantage because of their less reach and unawareness.

- NGOs and other institutes and PHC (Primary Health Centre) need to spread awareness by word of mouth and by educating the people/target group by role plays and small seminars and media.

- By doing these activities and promoting fortified food we can fight against Anaemia, malnutrition, and many other deficiency diseases.

- Biofortification and fortification would lead India to be Healthy India and it would be good food processing industry which would again contribute in the Indian GDP (Gross domestic product).

- In India, a collaboration of the National Federation of Cooperative Sugar Factories (NFCSF) and the Micronutrient Initiative (MI) established the stability of vitamin A fortified sugar under local conditions; the Indian government and sugar industry are collaborating to establish its industrial feasibility and efficacy.

- Fortification will improve the quality of the product, but the flipside is the increased cost. Whether it is salt, sugar or any fortified food, when faced with choosing between a fortified product and a cheaper alternative, consumers will choose the latter. Consumers should be educated about the benefits of the fortified products and to accept a slightly higher price for that product.

In Rajkot, the people affected from malnutrition suffers from deficiency of iron and proteins so we can provide them such fortified atta (flour), nutrient candy, etc. in the age groups of 6 months- 3 years, 3 years - 6 years, lactating mothers, adolescent girls to eradicate anaemia, protein deficiency disorders, undernourishment disorder.

Discussion with the worker:

- The people and the target segment for which the ICDS scheme has been introduced and developed are not

using and taking its benefits because they are not well versed with the recipes of its preparations in many cases.

– They give that flour (atta) to cow, buffalos, etc just because they are not educated with the preparations and various recipes and its multiple uses.

– Government of Gujarat must take it to next level by not only freely distributing it but also by educating the poor people its uses and recipes, then only mass would be able to take maximum out of it.

– There are few upcoming private food processing units in few states like Karnataka, Rajasthan, Gujarat, Andhra Pradesh, etc are also into exploring new horizons in fortification like fortified salt, biscuits, chocolates, etc.

– Public Private Partnership model is also successful up to noticeable mark because they serve to masses and below poverty line people.

– Success in food fortification requires active collaboration between several sectors including the scientific community, government agencies, private industry, consumer groups and international organizations.

– There are a number of factors that constrain private investment in developing markets for fortified foods. Technologies of fortification may be new and product development or start-up costs relatively high.

– Lack of public awareness of micronutrient malnutrition and low consumer demand for fortified products is perhaps the most important factor.

– Sharing expertise and resources during product development is a key strategy to reduce barriers.

It offers a unique opportunity for the industry to simultaneously expand its market and profitability while

playing a key role in improving health and nutritional status of the population.

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