

# Fortified Food Consumption and Awareness in Indian Market

DAS ARTI RANI<sup>1</sup>, PAUL VIRGINIA<sup>2</sup>, AFREEN SANA<sup>3</sup>

Research Scholar<sup>1,3</sup>, Professor<sup>2</sup>, Department of Food Nutrition and Public Health,

Ethelind College of Home Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, U.P-211007, India.

---

## ABSTRACT

Food fortification is a scientifically proven, cost effective, and highly scalable process that lowers the high burden of micronutrient malnourishment. India is home to one in three of the world's malnourished children and has the second highest level of wasting among children globally. Women in India also have the highest prevalence of anaemia globally. These high levels of malnourishment are due in part to poor food quality that lacks important micronutrients such as iron, zinc, vitamins, and folate that are necessary for growth and development. Over 70% of the Indian population consumes less than half the daily recommended dietary allowance of micronutrients a day. These deficiencies affect all population groups in India – urban, rural, rich, poor, old, and young – but women and children are significantly more affected. Global Alliance for Improved Nutrition (GAIN) is supporting large-scale, voluntary, staple food fortification in Rajasthan and Madhya Pradesh because of the high burden of malnutrition, availability of industries capable of and willing to introduce fortified staples, consumption patterns of target foods and a conducive and enabling environment. High extraction wheat flour from roller flour mills, edible soybean oil and milk from dairy cooperatives were chosen as the vehicles for fortification. Micronutrients and levels of fortification were selected based on vehicle characteristics and consumption levels.

**Keywords:** food fortification, knowledge, attitude, Micronutrients, Micronutrient Deficiency, practice.

---

Date of Submission: 28-04-2022

Date of acceptance: 09-05-2022

---

## I. INTRODUCTION

According to WHO, Food fortification OR Food Enrichment is the “Process” whereby nutrients are added to foods (in relatively small quantities) to maintain or improve the quality of the diet of a group, a community or a population. It is recognised as being the most efficient and most cost-efficient measure of eliminating micronutrient deficiencies and has been successfully used as a tool to fight these deficiencies in many developed countries. It eliminates hidden hunger and marginal deficiencies among large population. Pellagra in the US was successfully combated through breads enriched with a combination of vitamin B complex and Iron. It is the safest way to deliver necessary amounts of micronutrients to the majority of a population in effective manner. Micronutrients are required in small amounts but play an important role in proper in the human body. They also help in the proper functioning of the brain and the immune system. Micronutrient deficiencies are related to many health conditions like stunting, wasting, nutritional anaemia, neural tube defect in new-born babies. Good nutrition is a prerequisite for human health and labour productivity (Caballero, 2003). Food quality is often conceptualized in the context of food energy or calorie intake. However, it is increasingly recognized that a large segment of the world's population especially in developing countries, consume food that is deficient in some micronutrients (WHO, 2007). Micronutrients (vitamins and minerals) are responsible for regulating various metabolic pathways and strengthen bones and teeth (FAO, 2002). Micronutrient malnutrition is a widespread and serious problem, especially in developing countries, resulting in high economic and human costs (WHO, 2008). This is primarily caused by insufficient vitamin and mineral intake among the poor, whose diets are often dominated by starchy staple foods like maize or rice, and lack diversity due to low purchasing power or awareness (Kimenju *et al.*, 2005). According to World health organization (WHO) report, approximately more than 2 billion people are suffering from micronutrient deficiency diseases [MNDs]. MNDs is prevalent in both developed & developing nations. Iron, iodine, folate, vitamin A, and zinc deficiencies are the most widespread MNDs. Women of child bearing age and children are at higher risk of developing micronutrient deficiency than any other age group. According to WHO 1.9 million pregnant women and 190 million pre-schoolers were having vitamin A deficiency globally. Iron deficiency is prevalent around the world 42% of pregnant women and 47% of pre-schooler are anaemic. In India, the prevalence of anaemia is high, according to National Family Health Survey-4 [NFHS-4] data showed that 55.3%

of women were found to be anaemic. Also, 69.4% of children of age group 6-59 months were found to be anaemic. A study done in 2015 in Udepur district of Gujarat, found a high prevalence of vitamin A and iron deficiency in that area. A similar study done in 2013 found a high prevalence of anaemia in pregnant women in a rural area of Kashmir. Food fortification is one of the effective strategies to prevent micronutrient deficiency around the world from centuries. Food fortification is known as increasing the content of one or more essential micronutrients to commonly consumed foods to provide public health benefits. In India, food items fortified with vitamins and minerals are milk & milk products, oil and recently salt is double fortified with iron and iodine. The Food Safety and Standards Authority of India (FSSAI) with support from TATA TRUSTS launched Food Fortification Resource Centre. As per as Food Safety and Standards Regulation 2018, every packaged fortified food shall carry the '+F' logo on the label. The Ministry of Women and Child Development in 2018 has made it mandatory for the use of fortified wheat flour, edible oils, double fortified salt in Integrated Child Development Services (ICDS) and mid-day meal schemes. There are limited studies that are assessing the knowledge and awareness about fortified food among consumers in India. A Study conducted in Jaipur, Rajasthan found that only 53.3 % rural and 65.3 % urban women were aware of Targeted fortified food. In another study conducted in Mumbai city among female and male of 18 to 60 years also found poor awareness and consumption of fortified food. The micronutrient status of people could be improved by the use of fortified food. Therefore, the current study was conducted to assess the knowledge, attitude and practice towards use of fortified food among women residing in Delhi. Fortification defined by the Codex Alimentarius Principles for the Addition of Essential Nutrients to Foods defines "fortification", or synonymously "enrichment", as "the addition of one or more essential nutrients to a food, whether or not it is normally contained in the food, for the purpose of preventing or correcting a demonstrated deficiency of one or more nutrients in the population or specific population groups". Food fortification has a long history of use in industrialized countries for the successful control of deficiencies of Vitamin A and D, several B vitamins (thiamine, riboflavin and niacin), iodine and iron. The concentration of just one micronutrient might be increased in a single foodstuff (e.g., the iodization of salt), or, at the other end of the scale, there might be a whole range of food-micronutrient combinations. The public health impact of food fortification depends on a number of parameters, but predominantly the level of fortification, the bioavailability of the fortificants and the amount of fortified food consumed. Compared with other interventions, food fortification may be cost-effective and, if fortified foods are regularly consumed, has the advantage of maintaining steady body stores. In targeted food fortification programmes, foods aimed at specific subgroups which include complementary foods for infants and young children, foods developed for school feeding programmes, special biscuits for children and pregnant women, and rations (blended foods) for emergency feeding and displaced persons. The majority of blended foods for feeding refugees and displaced persons are managed by the World Food Programme (WFP) and guidelines covering their fortification (including wheat soy blends and corn soy blends) are already available. Market-driven fortification is applied to situations whereby a food manufacturer takes a business-oriented initiative to add specific amounts of one or more micronutrients to processed foods. It plays a positive role in public health by contributing to meeting nutrient requirements and thereby reducing the risk of micronutrient deficiency. In the European Union, fortified processed foods have been shown to be a substantial source of micronutrients such as iron, and vitamins A and D. In western and northern regions prevalence of Vitamin A would be reduced by fortifying vegetable oil and sugar with Vitamin A.

#### **Selection of micronutrients for fortification:**

The burden of micronutrient deficiencies in India is high. Iron, vitamin A and iodine deficiency disorders are particularly high. 3 The National Family Health Survey - 3 (NFHS-3) report shows that seventy percent of children aged 6-59 months are anaemic. Also, 55% percent of women and 24 percent of men were found to be anaemic. Although there are state differences, high prevalence of anaemia is found in every state. In addition, the intake of the foods rich in essential nutrients is low. India has a national program that provides vitamin A supplementation (200,000 IU every six months) to children 12-59 months through the Integrated Child Services program (ICDS). NFHS-3 reports that the coverage is low, with just one-quarter of children below 5 years receiving vitamin A supplements in the six months before the survey. Coverage of iron supplementation is also extremely low with just about 5% of 6-59-month-old children receiving an iron supplement from ICDS as per the NFHS-3 report.

#### **Selection of food vehicles for fortification:**

The selection of food vehicles for fortification was based on the consumption pattern of staple foods that lend themselves to fortification, ease of fortification, incremental costs of fortification and the capacity and the willingness of the food industry to initiate fortification. As per the 66 th Round of Household Consumer Expenditure Survey Report, 2011, 9 Rajasthan and MP have a fairly high consumption of wheat across population groups. The per capita consumption of wheat, oil and milk is higher than the national average in Madhya Pradesh (MP) and Rajasthan The per capita expenditure on milk and milk products in these two states

is relatively high and penetration of edible oil is almost universal. The survey also showed that the expenditure on fruits, vegetables and eggs, fish and meat, which are the major sources of micronutrients, is quite low in both states. High levels of consumption of wheat and near universal penetration of edible oil and wheat helped select these food vehicles for fortification. Milk fortification would have limited geographical reach, but was still pursued as it requires little additional effort. A quick survey of the wheat, oil and milk industry revealed that the two States have a large industry of wheat, oil and milk. Legal provisions exist for fortification of wheat flour, oil and milk, although these are not mandatory.

#### **Awareness of Food Fortification: -**

There were a study focuses on the knowledge of males in Mumbai regarding food fortification, in which six questions were asked about definition of food fortification, labelling of fortified foods, food fortification compulsory in India, fortified food products in India, according to them which other mineral should be added in food. When subjects were asked about the definition of food fortification 59 (58.40%) subjects responded addition or enrichment of food product, 19 (18.80%) subjects responded supplementation of food ingredients, 9 (8.90%) subjects were unsure, 7 (6.90%) subjects opted for good source of particular vitamins/minerals, 6 (5.90%) subjects responded addition of an additive and only 1 (1.00%) subject gave mixed response. These differences were highly significant ( $\chi^2 = 1.37$ ,  $p < 0.01^{**}$ ). Majority of the participants were aware about the definition of food fortification. When subjects were questioned on which part of the food product pack fortification details are mentioned, 38 (37.60%) responded front side of the pack, 26 (25.70%) nutrition information panel, 14 (13.90%) backside of the pack, 10 (9.90%) all of the above option, 8 (7.90%) they don't know and 5 (5.00%) ingredient list. These differences were highly significant ( $\chi^2 = 47.81$ ,  $p < 0.01^{**}$ ). Participants of the study majorly responded front side of the pack for reading fortified food label.

## **II. CONCLUSIONS**

The present study findings indicate low levels of knowledge about micronutrient deficiencies and the availability of fortified staple foods. Tailored public awareness for micronutrient deficiencies is imperative. This type of study should be conducted on a large population sample along with the fortification of the food campaign. In study conducted in Mumbai city among female and male of 18 to 60 years found poor awareness and consumption of fortified food. But the awareness of fortified foods was high in majority of male subjects in Mumbai city. They gained the awareness through family members, peers, internet and media. Consumption pattern of the fortified foods was also good and the main reason cited was health benefits of these foods. There is an increasing trend in the consumption of fortified foods in the modern societies. A Study conducted in Jaipur, Rajasthan found that only 53.3 % rural and 65.3 % urban women were aware of Targeted fortified food.

## **REFERENCES**

- [1]. **Bhagwat, S., Gulati, Sachdeva, R. and Sankar, R. (2014)**, Food fortification as a complementary strategy for the elimination of micronutrient deficiencies: case studies of large-scale food fortification in two Indian States, *Asia Pacific Journal of Clinical Nutrition*,23(8): S4-S11
- [2]. **Sirohi, A., Pundhir, A. and Ghosh, S. (2018)**. Food Fortification: A Nutritional Management Strategy in India, *Innovare Journal of food Science*,6(2): 1-8
- [3]. **Battalwar, R. and Chavan, A.P. (2017)**, A Study on awareness and Consumption on fortified foods among male adults of Mumbai, *International Journal of Advanced Research*,5(11):403-413.
- [4]. **Caballero, B., (2003)**. Original Communication, Fortification, Supplementation, and Nutrient Balance. *European Journal of Clinical Nutrition*, 57(1): 76-78
- [5]. **FAO, (2002)**. The State of food insecurity in the World. *Food Insecurity: When people must live with hunger and fear starvation*. Food and Agricultural Organization of the United Nations, Rome
- [6]. **Kimenju, S., Ulrich C. and De Groot, H. (2005)**. Comparing Contingent Valuation method, Choice Experiment and Experimental Auctions in soliciting consumer preference for maize in Western Kenya: Preliminary results
- [7]. **WHO, (2007)**. Preventing and controlling micronutrient deficiencies in populations affected by an emergency. World Health Organization, Geneva.
- [8]. [https://www.journalijar.com/uploads/818\\_IJAR-20372.pdf](https://www.journalijar.com/uploads/818_IJAR-20372.pdf)
- [9]. <https://dalberg.com/our-ideas/fortifying-india-challenges-and-opportunities-for-large-scale-food-fortification-in-india/>