

## Current Scenario and Future Draft for Healthy Indian School Canteen

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### Abstract:

A healthy life is possible with the inclusion of healthy food in the diet. In today's world, healthy food has replaced with unhealthy junk food in the diet of growing young children, and due to that, many health problems are prominent among the children. This can lead to several physical as well as mental health issues, created at a young age, or sometimes faced in later age. The school canteen is an excellent platform for work in this sector. The formulation and implementation of a good and healthy canteen policy is the main requirement for this. Numerous Indian schools do not have healthy canteen policies, and therefore, these schools need to formulate effective school canteen policies to help improve the health of children. The absence of a canteen policy provides an opportunity for poor quality food services to go unchecked.

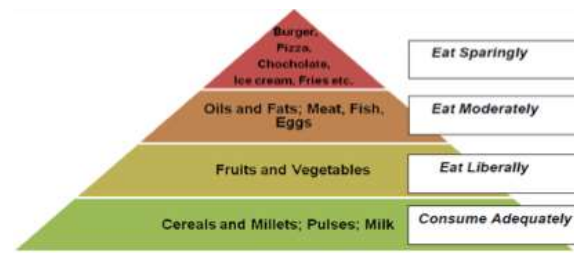
**Keywords:** *Canteen; Healthy diet; HFSS; FSSAI*

### Introduction:

The balance and nutritious diet have a major contribution in healthy life. As per "Dietary Guidelines for Indians, 2011", given by the National Institute of Nutrition (NIN), a balanced diet is one that provides all nutrients in required amounts and proper proportions. It should provide around 50-60% of total calories from carbohydrates, preferably from complex carbohydrates, about 10-15% from proteins and 20-30% from both visible and invisible fat. In addition, it should provide other non-nutrients such as dietary fiber, antioxidants, which provide positive health benefits. The guidelines depict the importance of different kinds of foods through a "Food Pyramid" (Figure 1). A balanced diet is recommended through a blend of four basic food groups such as cereals, millets and pulses; vegetables and fruits; oils, fats and nuts; milk and animal foods. Notably, food items such as burgers, pizzas, fries, chocolates, ice creams, jams etc. are not considered to be the right choice to meet nutrient needs, and

therefore, they must be eaten sparingly (Manual NIN, 2011).

**Figure 1:** Food Pyramid by NIN (Source:



Dietary Guidelines for Indians, NIN; Reproduction of the figure mentioned)

Internationally, obesity has been identified as a major public health crisis (WHO, 2013). Recent epidemiological evidence from the Indian subcontinent confirms the widespread occurrence of obesity among Indian adolescents (Ranjani et al. 2016), particularly in urban areas (Subashini et al. 2015). A boost in obesity from 16.3% (2001-05) to 19.3% (after 2010) in Indian children was found in a study of Ranjani et al.

(2016). The health problems associated with obesity can be insulin resistance (Bhardwaj et al. 2008), elevated blood pressure (Sorof & Daniels, 2002); increased total cholesterol, triglycerides, and low-density lipoprotein (LDL) cholesterol; suppressed high-density lipoprotein (HDL) cholesterol (Lloyd et al. 2012) and psychosocial problem such as depression (Daniels, 2006). Therefore, great attention is immediately required to improve the health of adolescents. One contribution to the enhancement of adolescent health is through the provision of healthy food in school canteens. Environmental influences including the availability and accessibility of foods in the school canteen can play a crucial role in determining adolescent food choices (Story et al. 2002). Indian private school children either consume home-prepared food during lunch breaks or purchase products from the school canteens (Rathi et al. 2017), a custom commonly practiced in Australia and New Zealand (Worsley, 2008). However, Indian public schools (Ali & Akbar, 2015) share a close resemblance with European schools (Tikkanen, 2009) as these schools provide free cooked meals to their students. In contradiction, the Indian Government does not impose any mandatory rules and regulations on private or public schools regarding nutrition and health promotion (Kaur et al. 2012). Globally, schools have been identified as powerful platforms for supporting physical and psychological well-being as well as social and academic development in young people (Rathi et al. 2016). However, Indian schools have been criticised for inculcating unhealthy eating habits among pupils (Rathi et al. 2017; Mehan et al. 2012). Various studies have reported that most of the Indian school canteens supply a range of energy-dense, nutrient-poor foods including potato chips, confectionery and sugar-sweetened beverages (Lawlis et al. 2016; Vepsalainen et al. 2015). The easy and increased availability of these unhealthy food options tends to promote poor eating habits among adolescents, contributing to

the burden of adolescent obesity and adult obesity (Larson & Story, 2010). In contrast, the availability of nutritionally adequate foods like fruits and vegetables has been limited to relatively very few school canteens in the developing as well as developed market economies (Porto et al. 2015). Healthier food choices available in the school canteens tend to be more expensive than high fat and high sugar food choices (Woods et al. 2014). School canteens are often criticised for being profit-driven (Drummond & Sheppard, 2011). This profit-motivated nature is evident in schools fund-raising efforts, involving the intense marketing of high fat and sugar based foods (Rani & Sathiyasekaran, 2013). Fried foods such as french fries and samosas (fried pastry with savory fillings, such as spiced potatoes) dominate in Indian school canteen menus (Mehan et al. 2012; Rani & Sathiyasekaran, 2013). Most of these fried foods are often prepared using trans fats and saturated fats (Kaushik et al. 2011), raising questions regarding the healthiness of these foods. These unhealthy practices of the Indian school canteens are in contradiction to healthy eating habits.

Since adolescent dietary patterns are significant determinants of health and nutritional status in adulthood (Croll et al. 2001), it is important to develop and implement strategies that support healthy eating from an early age. As numerous Indian schools do not have healthy canteen policies (Kaur et al. 2012), therefore Indian schools need to put into practice effective school canteen policies to encourage young people to eat healthily. A school canteen policy is a written document that identifies rules and regulations for school canteens to support and sustain healthy changes made to the school food environment (WHO, 2014a). The absence of a canteen policy provides an opportunity for poor quality food services to go unchecked. World Health Organization's popular school-based program, the 'Health Promoting School' program (HPS), is not widely implemented in

India (Kaur et al. 2012). This highlights the importance of designing and implementing healthy school food policies for Indian schools to support healthy eating among students. Healthy school food policies should be an integral part of the school food environment (Hawkes, 2015). The establishment of healthy school food environment can result in multiple benefits, including improved physical and mental health and academic achievement (Langford et al. 2014). The increased availability of nutrient deficient foods, limited availability of healthy foods, low standards of food safety, quality and sanitation, and lack of healthy eating policies emerged as key findings during this qualitative exploration (Rathi et al. 2017a). The Indian government has drafted the guideline for making available wholesome and nutritious food to children in schools (FSSAI, 2018). The foods that are high in fat, salt and sugar are commonly termed as HFSS food. The foods high in salt, sugar, fat (saturated fatty acid and trans fat) and caffeine cause various health problems for the human.

As per WHO document titled “Marketing of Foods High in Fat, Salt and Sugar to Children Update 2012-2013”, foods that are high in fat, salt and sugar are commonly termed as HFSS (FSSAI, 2018). The common HFSS standardised foods are fried chips, sugar-sweetened carbonated beverages, sugar-sweetened non-carbonated beverages, ready-to-eat noodles, pizzas, burgers, potato fries and confectionery items. These identified foods are based on an evaluation done out of similar foods available in India. They are considered unhealthy due to an imbalance in nutrients, i.e., high in fat, sugar, salt and/or low in proteins, fibers and nuts. Besides the above-mentioned food items, another food category is of non-standardised foods like deep fried foods such as samosa, chhola bhatura, etc.

**Sugar:** Sugar provides only calories with no additional beneficial effect and there is no secure level of its ingestion. Various studies have

reported that high sugar causes obesity, diabetes and metabolic syndrome (Malik et al. 2010).

**Salt:** Salt is added for preservation and enhancing the taste of food. High salt content in the diet can result in high blood pressure and other associated cardiovascular diseases (Misra & Khurana, 2007). Different findings suggest that high salt intake increases the mass of left ventricle, stiffens and narrows arteries, including coronary and renal arteries. It increases the probability of strokes, the severity of cardiac failure and a tendency for platelets to aggregate (Wardener & MacGregor, 2002). As per WHO, cutting down on the dietary salt intake to a recommended 5 g per day has a major impact on reducing blood pressure and cardiovascular diseases.

**Fat:**

**Saturated Fatty Acid (SFA):** SFAs are widely used in packaged foods including cookies, crackers, and snack chips. When consumed in excess of the recommended amount (limit less than 10% of total calorie intake), SFAs can clog arteries and increase the risk of heart attacks and strokes.

**Trans Fatty Acid (TFA):** TFAs are formed during the process of hydrogenation of vegetable oils and these have an adverse impact on blood lipid levels as they reduce the amount of good cholesterol (HDL) and increase bad cholesterol (LDL). Their consumption increases insulin resistance and promotes obesity. WHO recommends less than 1% of calories from TFAs.

**Caffeine:** The caffeine used in carbonated beverages and energy drinks is an addictive stimulant, which, if consumed in excess, can lead to impaired muscle and nerve functions, dehydration and a host of other disorders (Seifert et al. 2011). Consumption of caffeine, particularly among school children, is a matter of concern and needs to be strictly regulated in compliance with the Food Safety and Standards Act, 2006 and Regulations made thereunder.

## **HFSS Foods and burden of Non-Communicable Diseases (NCDs):**

Unhealthy diet leads to metabolic changes and conditions such as overweight, high blood pressure, raised blood glucose and cholesterol, which are among the leading causes of NCD deaths in India (WHO, 2011). Unhealthy diets, especially the excessive consumption of calories, salt, saturated fat and sugar cause at least 40% of all deaths from NCDs, and approximately one quarter of all deaths globally. In India, as of 2008, about 53% of all deaths were due to NCDs. The disease burden of NCDs is expected to reach 57% by 2020 as compared to 29% in 1990 (WHO, 2010). According to WHO, an unhealthy diet is associated with four major NCDs, which are described below:

### **Childhood obesity**

Childhood obesity is one of the most serious public health challenges. As per WHO, about 44% of the diabetes burden and 23% of the CVD burden is attributable to overweight and obesity. Overweight children are more likely than non-overweight children to develop insulin resistance, hyperinsulinemia, diabetes and cardiovascular diseases at a younger age, which in turn are associated with a higher chance of premature death and disability (Biro & Wien, 2010). Various studies done among Indian school children show that the prevalence of overweight/obesity is high and on the rise.

### **Hypertension**

Hypertension is strongly associated with high Body Mass Index (BMI) and salt intake. Several studies suggest that overweight can cause the occurrence of hypertension (Sunder et al. 2013). As per WHO, the amount of dietary salt consumed is an important determinant of blood pressure levels and overall cardiovascular risk. World Heart Federation says that a universal reduction in the dietary intake of about 3 gm. of salt would lead to a 50% reduction in

the number of people needing treatment for hypertension.

### **Diabetes and pediatric metabolic syndrome**

Type 2 Diabetes, which is very common in adults, is now increasingly being reported in children. The leading risk factor for kids is being overweight, often connected with an unhealthy diet and lack of physical activity. According to the previous study on post-pubertal Indian children, 67% males with high BMI were found to have insulin resistance while overall prevalence was about 22% in males and 36% in females (Misra et al. 2004). As per the Diabetes Atlas 2006, published by the International Diabetes Federation, the number of people with diabetes in India is around 40.9 million and it is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken (IDF, 2017).

### **Coronary Heart Disease (CHD)**

CHD affects Indians with greater frequency and at a younger age than counterparts (Sunder et al. 2013).

### **HFSS food replacing a balanced diet is a key issue**

As per NIN dietary guidelines, "the shift from traditional to 'modern' foods, changing cooking practices, increased intake intensive promotion of HFSS foods and beverages have affected people's perception of foods as well as their dietary behavior. Irrational preference for energy-dense foods and those with high sugar and salt content pose a serious health risk to the people, especially children. The increasing number of overweight and obese people in the community and the resulting burden of chronic non-communicable diseases necessitate systematic nutrition educational interventions on a massive scale."

### **HFSS food consumption in India**

Consumption of 'HFSS Food' is sharply increasing both in rural and urban areas because of easy; good taste, low cost, aggressive marketing, and advertisements make them

popular with children. A study on the eating habits of HFSS Food by the school children in India found that 60-70% of children in different age groups consume chips at least 2-3 times a week (FSSAI, 2018). In a different study, it was found that the daily intake of energy is 110%

should be eaten sparingly can be the Yellow category, and the most common HFSS Foods can come under the Red category. It is recommended that at least 80% of the food available in schools should be of Green category. The policy should be applicable to all types of schools such as

Colour Code	Availability	Examples
Green	Always on the menu (at least 80% of available food items)	Vegetables and legumes, fruits, grain (cereal pulses) foods, preferably wholegrain and/or high in fibre, lean meat, egg, fish, low fat milk, curd, paneer etc.
Yellow	Select carefully Approach should be greening, small portion size and reduced frequency	Baked vegetable based snacks, ice creams, milk-based ices and dairy desserts etc
Red	Restrict / Limit Availability in Schools	HFSS Foods as per Table 2

higher than the Recommended Daily Allowance (RDA) and the fat intake was almost double of the RDA. The most common (60.4%) effect was due to the consumption of foods such as potato chips, chocolate and carbonated drinks (Goel et al. 2013).

**Develop a Canteen Policy to provide Nutritious, Wholesome and Healthy Food in Schools: (FSSAI Draft, 2018)**

Canteens in schools should be used to motivate children to consume healthy and hygienic food and they should not be treated as commercial outlets. They carry a social responsibility towards inculcating healthy eating behaviors. Canteen policies based on nutrition criteria have been developed in many other countries. A suitable canteen policy that enables nutritious, wholesome and healthy foods to children should be developed, and as per the draft of FSSAI, it should be based on the below mentioned criteria:

•The school canteen policy should consider, for the sake of easy understanding, introducing the concept of colour coding (Table 1) to categorise the foods, for instance, foods that should be eaten most can be the Green category, foods that

primary, secondary, daycare, boarding etc. Depending upon the place and region, the policy should include foods that are to be promoted as well as discouraged for consumption by children. The policy should also take into consideration non-standardised foods that are sold in canteens and may extend to foods that are brought by children from home. Regarding foods that are to be discouraged, suitable measures such as decreasing the frequency and portion size can be suggested. With a major outcome, a balanced diet menu should be available in the schools.

**Table:1 Colour coding (Source FSSAI draft, 2018)**

- A "School Health Team" or similar unit could be set up in each school comprising teachers, parents, students and school canteen operators, who will coordinate, implement and monitor the canteen policy to make available quality and nutritious food to students in schools. This Team will also monitor the checklist given in this Guideline.

- A well-structured curriculum on a balanced diet and its health impacts should be introduced. The curriculum needs to take into account the level of students and detail out as the children migrate from one class to another.
- Schools should also promote nutrition education and awareness among children through various tools such as posters. If required, a provision for funds from the Department of School Education and Literacy should be made.

### **Regulate Promotion of 'HFSS Food' among School Children**

There is a substantial increase in advertising of foods high in fat, sugar, and salt, across the world. Children are especially vulnerable to advertising because they cannot fully understand the disguised persuasive techniques of the advertisements and judge critically. The impact is exponential, as proved by several studies. The objective is to regulate the exposure and power of advertisements and promotional activities that target children.

### **Scientific Criteria followed to explain the identification of HFSS Foods:**

#### **A "cut-off" criterion based on RDA of nutrients by NIN, India (NIN, 2011)**

The criterion is based on RDA of nutrients provided by NIN, India. Most of these are in line with those recommended by WHO. NIN guidelines have adapted to suit the Indian population.

**Methodology for setting "cut-off" limit:** RDA of calories and individual nutrients (refer 1 below) is apportioned across meals and snacks throughout the day (refer 2 below). It is compared with an actual amount of calories and respective nutrients that are present in foods.

Foods with higher than the set 'cut-off' limit of one or more parameters are considered unhealthy. Breakfast and/or mid-morning snack is considered for children in schools.

### **1. RDA of nutrients considered for children (based on 2100 Kcal for 10-12 years)**

**Salt/sodium:** Total RDA for salt is 5 g /day, sodium 2 g/day as per NIN dietary guidelines.

**Total fats:** Total fat intake should not be >30% E per day (WHO recommendation adopted by NIN)

**Trans fatty acids (TFAs):** Total RDA is <1% E per day (WHO recommendation adopted by NIN)

**Added sugar:** Total RDA 30 g sugar /day as per NIN dietary guidelines

**Saturated fatty acid (SFAs):** Total RDA is up to 8% E (WHO recommendation adopted by NIN)

### **2. Meal break-up considered (% total calories)**

Breakfast 25%

Mid-morning snack 10%

Lunch 25%

Evening snack 10%

Dinner 25%

Bedtime 5%

*\* Calculation illustration:*

Kcal: 10% of 2100=210 Kcal; 25% of 2100=525 Kcal

Total fat: 30% E of 210 for snack = 63 Kcal and  $63/9$  (Kcal/gm of fat) = 7 g; similarly its 17.5 g for meal

SFAs: 8% E of 210 snack = 16.8 Kcal and  $16.8/9$  (Kcal/gm of fat) = 1.86; similarly its 4.65 g for meal

TFAs: 1% E of 210 snack =21 Kcal and  $21/9$  (Kcal/gm of fat) = 0.23 g; similarly its 0.57 g for meal

Sugar: 10% of 30 g (RDA) for a snack = 3g; similarly its 6.25 g for meal

Salt/Sodium: 10% of 5 g of salt (RDA) and 2 g of sodium (RDA) for a snack = 0.5 g of salt and

0.2 g of sodium; similarly its 1.25 g of salt and 0.5 g of sodium per meal Based on the cut-off values, various snack foods available in India are evaluated.

### Conclusion:

This review is not only significant for India, but also for other developing countries in their attempts to combat over-nutrition as it can

inform the development of healthy school canteen policies, which can facilitate the promotion of healthy eating among adolescents. Steps should be initiated to develop a nationwide programme for the identification of further foods based on the above criterion and inform schools accordingly. This would lead to a framework to categorise such foods and propose criterion based on nutrition and wholesomeness.

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