Indian Academy of Pediatrics Guidelines on the Fast and Junk Foods, Sugar Sweetened Beverages, Fruit Juices, and Energy Drinks

PIYUSH GUPTA[1], DHEERAJ SHAH[1], PRAVEEN KUMAR[2], NIDHI BEDI[3], HEMA GUPTA MITTAL[4], KIRTISUDHA MISHRA[5], SUMAIRA KHALIL[6], KE ELIZABETH[7], RUPAL DALAL[8], REKHA HARISH[3], UPENDRA KINJAWADEKAR[9], KRISTIN INDUMATHI[10], SHEETAL S GANDHI[11], JP DADHICH[12], NIRANJAN MOHANTY[13], AJAY GAUR[14], AK RAWAT[15], SRIKANTA BASU[2], RAGHAVENDRA SINGH[16], R REMESH KUMAR[9], BAKUL JAYANT PAREKH[9], SANTOSH T SOANS[9], DIGANT SHASTRI[9], AND HPS SACHDEV[17]; FOR THE PEDIATRIC AND ADOLESCENT NUTRITION SOCIETY (NUTRITION CHAPTER) OF INDIAN ACADEMY OF PEDIATRICS

From Departments of Pediatrics, [1]University College of Medical Sciences and GTB Hospital, [2]Lady Hardinge Medical College, [3]Hamdard Institute of Medical Sciences and Research, [4]Ram Manohar Lohia Hospital, [5]Chacha Nehru Bal Chikitsalaya, and [6]Safdarjang Hospital, New Delhi; [7]Sree Mookambika Institute of Medical Sciences, Kanyakumari, Tamil Nadu; [8]Department of CTARA, IIT and Shrimati Malati Dahanukar Trust, Mumbai; [9]Indian Academy of Pediatrics, Mumbai; [10]SUT Hospital, Thiruvananthapuram, Kerala; [11]Consultant Pediatrician, Solapur, Maharashtra; [12]Breastfeeding Promotion Network of India, New Delhi [13]SCB Medical College, Urkal University, Bhubaneswar, Odisha; [14]Gajra Raje Medical College, Gwalior, MP; [15]Consultant Pediatrician, Bhopal, MP; [16]Maulana Azad Medical College, New Delhi; and [17]Department of Pediatrics and Clinical Epidemiology, Sitaram Bhartia Institute of Sciences and Research, New Delhi; India.

Correspondence to: Dr Piyush Gupta, Professor and Head, Department of Pediatrics, University College of Medical Sciences, Delhi 110 095, India. prof.piyush.gupta@gmail.com

Justification: In view of easy availability and increasing trend of consumption of fast foods and sugar sweetened beverages (fruit juices and drinks, carbonated drinks, energy drinks) in Indian children, and their association with increasing obesity and related non-communicable diseases, there is a need to develop guidelines related to consumption of foods and drinks that have the potential to increase this problem in children and adolescents. **Objectives:** To review the evidence and formulate consensus statements related to terminology, magnitude of problem and possible ill effects of junk foods, fast foods, sugar-sweetened beverages and carbonated drinks; and to formulate recommendations for limiting consumption of these foods and beverages in Indian children and adolescents. **Process:** A National Consultative group constituted by the Nutrition Chapter of the Indian Academy of Pediatrics (IAP), consisting of various stakeholders in private and public sector, reviewed the literature and existing guidelines and policy regulations. Detailed review of literature was circulated to the members, and the Group met on 11th March 2019 at New Delhi for a day-long deliberation on framing the guidelines. The consensus statements and recommendations formulated by the Group were circulated to the participants and a consensus document was finalized. **Conclusions**: The Group suggests a new acronym 'JUNCS' foods, to cover a wide variety of concepts related to unhealthy foods (Junk foods, Ultra-processed foods, Nutritionally inappropriate foods, Caffeinated/colored/carbonated foods/beverages, and Sugar-sweetened beverages). The Group concludes that consumption of these foods and beverages is associated with higher free sugar and energy intake; and is associated with higher body mass index (and possibly with adverse cardiometabolic consequences) in children and adolescents. Intake of caffeinated drinks may be associated with cardiac and sleep disturbances. The Group recommends avoiding consumption of the JUNCS by all children and adolescents as far as possible and limit their consumption to not more than one serving per week. The Group recommends intake of regional and seasonal whole fruits over fruit juices in children and adolescents, and advises no fruit juices/drinks to infants and young children (age <2 y), whereas for children aged 2-5 y and >5-18 y, their intake should be limited to 125 mL/day and 250 mL/day, respectively. The Group recommends that caffeinated energy drinks should not be consumed by children and adolescents. The Group supports recommendations of ban on sale of JUNCS foods in school canteens and in near vicinity, and suggests efforts to ensure availability and affordability of healthy snacks and foods. The Group supports traffic light coding of food available in school canteens and recommends legal ban of screen/print/digital advertisements of all the JUNCS foods for channels/magazines/websites/social media catering to children and adolescents. The Group further suggests communication, marketing and policy/taxation strategies to promote consumption of healthy foods, and limit availability and consumption of the JUNCS foods.

Keywords: *Energy drinks, Fast foods, Fruit juices, Obesity, Non-communicable Diseases, Prevention*.

Published online: August 10, 2019. PII:S097475591600133

Accompanying Editorial: Pages 821-22.

Over the last two decades there has been an increasing trend of consumption of fast foods and sugar sweetened beverages (fruit juices and drinks, carbonated drinks, energy drinks) in Indian children [1]. Easy availability, convenience, palatability, working parents, attractive presentation, catchy advertisements, low cost, and vigorous marketing strategies are considered the major factors for high consumption of these products [2]. On an average, fast food industry is expanding at the rate of 40% every year [3]. Similar booms have been reported from beverage industry as well [4]. A survey conducted by Centre for Science and Environment (CSE) on 13274 children aged between 9-14 years documented that 93% of children eat packaged food and 68% consume packaged sugar-sweetened beverages more than once a week; 53% consume these products at least once a day. Almost one-fourth of the schoolchildren consume ultraprocessed food high in fat, salt or sugar such as burger and pizza, from fast food outlets, more than once a week [5].

The major adverse effects related to intake of fruit juice and fast foods are obesity and its associated complications, dental caries, allergies, micro-organism contamination leading to infections, and risk of cancer due to carcinogenic and allergenic properties of some food additives [6]. As per National Family Health Survey 2015-16, the number of people with obesity has doubled over last 10 years in India; with an increasing trend of being overweight in children and adolescents [7]. Energy drinks also have added adverse effects due to their high caffeine content leading to neurological and psychiatric symptoms, and cardiac dysrhythmias [8]. To address the problem of obesity and related non-communicable diseases (NCDs), there is a need to develop guidelines related to consumption of foods and drinks that have the potential to increase this problem in children.

Globally, recommendations have been released by various countries on intake of fast food and sugar-sweetened beverages (fruit juices and energy drinks) in children and adolescents [9]. The present exercise was conducted by the Pediatric and Adolescent Nutrition Society (Nutrition Chapter of Indian Academy of Pediatrics) to formulate recommendations on consumption of fast food, fruit juices and energy drinks in children and adolescents in India.

OBJECTIVES

These guidelines have been drafted, primarily for the purpose of prevention of chronic NCDs, including obesity and metabolic syndrome; and are limited to dietary interventions. Exclusive breastfeeding is recommended in first 6 months of life [10]. These guidelines are therefore intended for children and adolescents aged 6 months through 18 years. The guidelines are meant for children with normal growth and nutritional status and may not be applicable to children with undernutrition or other chronic systemic illnesses. These guidelines do not pertain to commercial formula for infants and young children (age <2 y); and therapeutic diets (*e.g.*, F-75, F-100, and ready-to-use therapeutic foods (RUTF) for severe malnutrition; and special formulas for gastrointestinal disorders). The Group maintains that regular physical activity as per WHO recommendations [11] is essential along with healthy diet.

PROCESS

A National Consultative group was constituted by the Nutrition Chapter of the Indian Academy of Pediatrics, consisting of faculty from medical colleges, pediatric practitioners, office bearers of Indian Academy of Pediatrics, and representatives from the Ministry of Women and Child Development, World Health Organization, Unicef, Indian Council of Medical Research, and National Institute of Nutrition **(*Annexure* 1)**. Four sub-committees were constituted to conduct detailed narrative reviews on the following topics: (*i*) Definitions and magnitude of the problem in India. (*ii*) Harmful/adverse effects on child/adolescent health; (*iii*) Evidence for strategies to prevent consumption; and (*iv*) Global recommendations and guidelines.

The first draft of the review was prepared after a literature review and was circulated to the members of the National Consultative Group for suggestions, comments and modifications. Suggestions were incorporated in the second draft and final review document was circulated to the Consultative Group before the meeting to frame guidelines.

National Consultative Group met on 11th March, 2019 at New Delhi for a day-long deliberation on framing the guidelines. Based on the evidence generated from the review of literature, a set of guidelines and recommendations was formulated by the Group. The draft guidelines were circulated to the participants and a consensus document was prepared following discussions on e-mail. The final draft was approved by all the participants.

NEED TO DEFINE AND IDENTIFY UNDESIRABLE FOODS AND DRINKS

The Group agreed that for advocacy purpose, there is a need to club certain categories of foods and drinks under a common name/acronym: foods which are undesirable either in nutrient content (in terms of calories, saturated and trans-fats, sugar, or salt), or quality (in terms of processing,

packaging, preservation, preparation or storage); foods which have the potential to be consumed in large quantities because of their high palatability and flavors; and foods containing toxic substances such as caffeine, additives or colors. The terminology for such foods should be simple to understand, acceptable to lay population as well as pediatrician, and catchy to remember. The existing terminologies are discussed below:

Fast food: By definition, it includes foods that are "designed for ready availability, use, or consumption and with little consideration given to quality or significance" [12]. Though this term is well-known and acceptable, it does not always cover the whole category of unhealthy foods. Moreover, all fast foods (*e.g.*, cut fruits and salads) are not unhealthy. On the other hand, many unhealthy foods take longer time to be prepared. The Group felt that the definition should be more focused on content of food rather than time taken to prepare the meal.

Junk food: These foods are defined as "foods (packed or non-packed, processed or non-processed) which contains little or limited presence of proteins, vitamins, phytochemicals, minerals and dietary fiber but are rich in fat (saturated fatty acids), salt and sugar and high in energy (calories) that are known to have negative impact on health if consumed regularly or in high amounts" [13]. This definition covers a vast variety of foods undesirable in their nutritional content. This terminology is also well-known and accepted by general population; however, the group felt that some unhealthy foods and drinks, which may not be deficient in micronutrients and minerals because of being fortified, get excluded from this definition.

HFSS foods (foods high in fats, salts, or sugar): This nomenclature has been used by WHO and also proposed in the Ministry of Women and Child Development Report – 2015 [14]. This definition has focused on contents and includes both packaged and non-packaged foods. However, it does not include foods with harmful contents such as caffeine, food additives or colors or foods cooked in recycled oil. Also, this abbreviation is unlikely to be popular in lay public.

Ultra-processed foods: NOVA classification categorizes all foods and food products into four distinct groups based on type of processing underlying each group: Group 1 – Unprocessed or minimally processed foods; Group 2 – Processed culinary ingredients; Group 3 – Processed foods; and Group 4 – Ultra-processed foods. The fourth category – ultra-processed foods – includes formulations of ingredients, mostly of exclusive industrial use that result from a series of industrial processes, including fractioning of whole foods into substances (sugars, oils and fats, proteins, starches and fiber), hydrolysis or hydrogenation, food assembly, coloring and flavoring [15].This definition includes a large number of foods having undesirable nutrient content or/and toxins. It also introduces a new concept of obesogenic nature of these foods because of their hyperpalatibility, and also includes unhealthy foods that might not be deficient in micronutrients and mineral content (*e.g.*, powdered milk supplements commonly advertised for increasing the palatability or nutritional value). But once again the definition has a few pitfalls. It mainly caters to packaged foods and seems to focus on process of making/packaging foods rather than the content. As a result, home prepared or freshly prepared (as in restaurants) nutritionally inappropriate foods may be left out.

Other definitions including EDLN (energy dense low-nutrient density foods), EDNPFC (energy dense and nutrient poor foods for children), and FMNV (foods of minimal nutritional value) have not gained popularity due to their complex terminology.

THE JUNCS FOODS: A NEW TERMINOLOGY

The Group suggested a new acronym the 'JUNCS' foods to cover all the attributes discussed above; to be expanded as given in ***Box* 1**. The Group believes that this nomenclature includes almost all unhealthy foods in terms of their fat, sugar, salt content, or content of harmful non-nutritional substances, or having potential of high consumption such as ultra-processed foods. The group also believes that this term has the potential of being acceptable and well known to general public, because of it being closely linked to the popular word 'junk' in relation to unhealthy foods. The Group further discussed that there is a need to categorize various foods under this definition according to a traffic light coding system for the purpose of labeling.

BOX 1 THE JUNCS FOODS: A NEW TERMINOLOGY

J- Junk foods (foods high in fats, especially saturated and trans-fats, sugars and salts, and foods lacking in micronutrients/minerals) [14]

U- Ultra processed foods (as defined in the fourth category of NOVA classification) [15]

N- Nutritionally inappropriate foods. Home-made foods can also qualify to be nutritionally inappropriate if prepared in recycled oil, or contain high amount of sugar, fat or salt.

C- Caffeinated/colored/carbonated beverages [16,17]

S- Sugar sweetened beverages [18]

BURDEN OF THE PROBLEM

Global Data

Fast food consumption has increased globally. Data have shown a high household availability of ultraprocessed food in 19 European countries including Italy (13.4%), Germany (46.2%) and UK (50.4%) [19]. A multi-country study in 72,900 children (6-7 years) from 17 countries and 199,135 adolescents (13-14 years) from 36 countries reported prevalence of junk food consumption as 51.3%. The consumption in children was 22.6% (1-2/week) and 4.2% very frequently (≥3/week); and in adolescents 38.7% (frequent) and 12.6% (very frequent consumption) [20]. Only 29.4% of respondents in a survey from the United States reported eating fast food less than once per week [21]. Reports from other countries have also shown high consumption (36.4%) of unprocessed food in children, adolescents, and adults [22].

Consumption Patterns in Indian Studies

A recent pan Indian survey by CSE in 13,274 schoolchildren in the age group 9-17 years from 123 districts spread across 24 states and 1 union territory concluded that almost every child consumed packaged sugar-sweetened beverages (92.1%), salted packaged food (94.3%) and sweet packaged food (95.1%). Every other child (53%) consumed packaged food or beverages at least once a day [5]. Similarly, results of 21 studies from various regions of India conclude high prevalence of fast food consumption (30-100%) among school-children and college going undergraduates, both in government and private sector, rural and urban areas, and in both boys and girls [1,3,5,23-40]. The most common junk food items reportedly consumed are samosa, patties, burgers, manchurian, noodles, pizza, chips, chocolate, bakery products, soft drinks, sugar-sweetened beverages, and caffeinated drinks.

Industrial Surveys and Market Reports

Revenue of fast food restaurants has increased from US $ 6 billion in 1970 to $160 billion in 2014 [41]. The market was further reported to increase from 495 billion USD (2014) to 602.8 billion USD (2.7% increase at annualized rate of 2.3% [42]. In past, in US around three-fourths of the money used to buy food was spent to prepare meals at home but now half of the money used to buy food is spent at restaurants – mainly at fast food restaurants [43]. Similar trend is observed in India where the expected worth of fast food market in 2020 is estimated to be US$ 27.57 billion with compound annual growth rate (CAGR) of 18% [44-46]. The Indian food service industry is projected to have a volume 77 billion transactions in 2022, with an increase of 28.5% since 2017 [47].

Factors Favoring Increasing Consumption of JUNCS

As per Federation of Indian Chambers of Commerce and Industry (FICCI) report 2018 [48], following factors are major reasons for boost in sales and growth of fast food in India.

Favorable demographics: India has high percentage of young population (consumer market with 33% population < 15 years and 50% < 24 years) and largest working age (15-54 years) population which is further predicted to rise by 135 million by 2022 (20% of the world's working-age population).

Increasing urbanization: In 2015, India was 2nd largest urban community in the world after China (urban population- 430 million) and by 2020 is estimated to be 35%.

Increase in women workforce: There is increased proportion of working women leading to decline in home-cooked meals and increasing 'out of home' food trends.

Growing middle class: There is increase in households with annual earnings between USD 5,000 - 10,000 (CAGR of 17% over the last 5 years) and USD 10,000-50,000 (CAGR of 20%) over the last 5 years, leading to more spending capacity on outside food.

Nuclear family: As per 2011 census there is increase in urban households having d"5 members. Fall in the average household size coupled with rising disposable income will lead to a greater discretionary spending, including eating out of home.

Online delivery/digitalization: Online options on internet/ smartphones are easily available to order food from any restaurant and get it delivered too with no waste of time, traffic hassles or quality compromise. Platforms like Foodpanda with revenue of INR 37 crore (FY 2015-16) with 15 million users/ month and Swiggy with revenue of INR 24 crore (2014) are increasingly becoming popular.

Higher experimentation and changing consumer preferences: Increasing indulgence in smaller cities and eating-out as an experience, growth in chained retail, and increase in business potential in transit locations are other factors leading to growth of fast food industry in India.

HARMFUL EFFECTS OF JUNCS FOOD

Nutritional Quality of Diet

It has been observed from large, nationally representative databases, obtained by questionnaire based cross-sectional studies, that nearly half of the daily average

dietary energy in children comes from ultra-processed food [49-51]. As the contribution of ultra-processed foods to total energy intake increased, the dietary contents of carbohydrates, free sugars, total fats, saturated fats, and sodium increased; with free sugars and sodium intake increasing by 85% and 55%, respectively. Also, a linear inverse association was seen between the dietary contribution of ultra-processed foods and the dietary content of protein, fiber, potassium, minerals and vitamins [49,51].

Overweight/Obesity

A questionnaire-based study including 72,900 children (17 countries) showed that children having more frequent consumption of fast food had a significantly higher BMI [52]. This association was independent of the gender or affluence of the country. Studies in children have proven that regular consumers of sugar sweetened beverages (SSB) between meals had a higher risk of being overweight/obese compared to non-consumers [53,54]. This adverse outcome was reiterated by a systematic review showing that 8 out of 12 studies found higher consumption of soft drinks/sweetened beverages to be associated with higher levels of body fat [55].

Longitudinal studies have demonstrated that increased frequency of fast-food consumption during adolescence is associated with increased weight gain [56,57]. A recent longitudinal study of 307 children of low socioeconomic status, from Brazil, showed that ultra-processed food consumption at preschool age was a predictor of an increase in waist circumference from preschool to school age, with every 10% increase in energy intake from ultraprocessed foods, resulting in 0.7 cm increase in waist circumference [58]. In a systematic review by Costa, *et al.* [57], six longitudinal studies showed a positive association between higher consumption of ultra-processed foods and levels of body fat. Another systematic review from South Asian countries found a significant positive correlation between frequent consumption of these foods and the risk of overweight and obesity [59].

Cardiometabolic Risk

Studies have shown a positive association between ultra-processed diet and cardiometabolic alterations in children and adolescents. While a study from Spain identified an association of "Western" dietary pattern with a higher concentration of adiponectin and interleukin-6 [60], studies from Korea and China found "Western diet" to be associated with higher levels of LDL cholesterol, triglycerides and fasting glucose and lower concentrations of HDL [61,62]. A prospective study further established that the consumption of ultra-processed products at preschool age was a significant predictor of an increase in total and LDL cholesterol concentrations from preschool to school age [63]. Also, higher chances of insulin resistance with ''Western'' food patterns have been shown in another study from Mexico [64].

High Blood Pressure

Studies show inconsistent results regarding the association between fast food consumption and hypertension in children and adolescents. Data of 5267 children, selected by random sampling from 30 primary schools in China, showed a definite association between "Western" dietary pattern and systolic blood pressure [62], as also did the results of another cross-sectional study of students from Brazil [65]. In contrast, a large study from Iran, (CASPIAN-IV Study) involving 14,880 students, aged 6-18 years failed to show significant association between fast food intake and blood pressure [66]. Another study from China on 1626 students failed to demonstrate any association between fast food consumption and hypertension or obesity [67].

Behavioral Symptoms

Evidence shows that fast food consumers are prone to adverse psychological behavior. Among many studies, the one in Norwegian adolescents, showed that those with high scores on a 'junk/convenient' eating pattern were more likely to have hyperactivity-inattention disorders and those with high scores on a 'snacking' eating pattern were more likely to have symptoms of conduct/ oppositional disorders, compared to those with lower scores [68]. The latest nationwide cross-sectional sample survey from China, including 14,500 adolescents of grade 7-12, assessing psychological symptoms using Multi-dimensional Sub-health Questionnaire of Adolescents (MSQA) and eating habits found that fast foods pattern, sugar sweetened beverages pattern and the meats pattern were significantly associated with higher risk of psychological symptoms [69].

It is hypothesized that unhealthy diets affect mental state and brain function through oxidative stress processes, inflammation, and stress response systems [70]; while vitamins, antioxidants, beta-carotene, and minerals in fruits and vegetables are associated with lower levels of inflammation and oxidative stress markers [71].

Dental Caries

Though studies have shown association between SSB and dental caries, the same has not been seen with intake of

100% fruit juices [72]. Data from the 1999-2004 National Health and Nutrition Examination Survey of 2,290 children aged 2-5 years, failed to show an association between caries and consumption of 100 percent fruit juice even after covariate adjustment [73].

Adverse Effects from Caffeinated Energy Drinks

Besides the added effect of excessive calorie consumption on weight gain, the most dreaded complication of caffeine containing energy drinks (CCED) is its cardiovascular toxicity. Worldwide, there has been an increase in the number of presentations to emergencies due to complications of caffeine containing energy drinks, especially among adolescents and young adults [74]. Caffeine being structurally similar to adenosine, binds and thereby blocks its receptors, with an overdose resulting in tachycardia followed by arrhythmias – supraventricular or ventricular, hypotension and even death [75]. The common expectation of an "energy boost", making CCED very popular among vulnerable adolescents, leads to over-consumption, which affects sleep, causes negative psychological effects and thereby paradoxically potentiates further mental stress [76,77].

Based on available evidence, the Group has evolved the consensus statements summarizing the adverse effects of the JUNCS foods (***Box* 2)**, along with level of evidence (LOE) [78].

STRATEGIES TO REDUCE CONSUMPTION OF JUNCS FOODS

School-based Programs

Banning the sale of JUNCS foods in and around the vicinity of schools is seen as an effective intervention in reducing its consumption [79-81]. Government of Australia has developed policies in schools regulating healthy food options in school canteens; but many school canteen menus were found to be non-compliant and served banned foods [82,83]. Locatelli, *et al*. [84] from Brazil studied the impact of school meals on food consumption in 86,600 ninth grade students in public and private schools. They reported that regular consumption of school meals positively influenced the eating habits promoting a healthy diet; even though only 22.8% of enrolled children consumed school meals regularly. "Let's Move Salad Bars to School" as a part of the "Let's move" movement was launched in 2010 by Michelle Obama in the United States

BOX 2 CONSENSUS STATEMENT SUMMARIZING EVIDENCE FOR ADVERSE EFFECTS OF THE JUNCS FOOD

Foods

- Consumption of fast food/junk food/restaurant foods is associated with higher consumption of calories, free sugar and saturated fats (2b).
- Frequent (>2 times/week) consumption of fast foods is associated with higher BMI in children (2b); results are inconsistent in adolescents.
- It is unclear whether fast food consumption is associated with childhood hypertension (3b).
- Limited data indicate association of fast food consumption with adverse cardiometabolic markers and insulin resistance (3b).

Sugar Sweetened Beverages (SSBs)

- Consumption of SSBs is associated with higher consumption of free sugar, often exceeding the recommended 5% intake (3b).
- Regular (4-6/wk) consumption of SSBs is associated with obesity in children (2b).
- Sugar-sweetened beverages, but not fruit juice, consumption is associated with dental caries (3b).

Caffeinated Drinks

- Consumption of high amount of caffeine through energy drinks may cause cardiac arrythmias (4).
- Regular (>4/wk) consumption of caffeinated drinks is associated with sleep disturbances in adolescents (3b).
- Regular (>4/wk) consumption of caffeinated drinks is associated with psychiatric disturbances in adolescents (3b).

JUNCS: (Junk foods, Ultra-processed foods, Nutritionally inappropriate foods, Caffeinated/Colored/Carborated beverages and Sugar-sweetened beverages). BMI: Body mass index.
Level of evidence, as per center for Evidence-based Medicine [78] has been provided at the end of each recommendation.

to raise awareness of having salad bars in school canteens in order to improve child nutrition [85]. Slusser, *et al*. [86] reported that after the introduction of salad bar in 337 children (ages 7-11) studying in three Los Angeles Unified School District elementary schools, there was a significant increase in frequency (2.97 to 4.09, $P<0.001$) of fruits and vegetables consumed among the children with a significantly lower mean energy ($P=0.03$), cholesterol ($P=0.02$), saturated fat ($P<0.001$) and total fat intakes ($P=0.03$). A systematic review has also demonstrated that replacing sugar sweetened beverages (SSB) with drinking water in school canteens and vending machines reduces the consumption of SSB and lowers the body mass index (BMI) [87].

Food Labeling

Evidence supports "Front of Pack" nutrition labeling as an intervention as it helps consumers to make healthier choices at point of purchase. However, a survey conducted in Delhi schools revealed that only 24.6% of children always looked at the content label and 28.8% never checked the label [79]. A market survey conducted by National Institute of Nutrition revealed that even though the food labeling regulation in India is at par with the developed world it is usually not read at the point of purchase; therefore there is a need to evolve and experiment symbol-based labeling of foods in India [88].Countries have different labeling systems like the "key hole" symbol in Nordic countries, a "traffic light" labeling system in United Kingdom, and "Health of Star Rating System" in Australia [89-91]. Evidence suggests that labeling of energy drinks also has a significant impact on their purchase, especially in adolescents [92].

There is low quality evidence available in favor of caloric labeling of menus in restaurants [93]. Two systematic reviews conducted to study the effectiveness of caloric labeling at point of purchase on caloric consumption concluded that caloric labeling alone may not be sufficient in decreasing purchase and consumption [94,95].

Regulation of Advertisements

Advertisement of JUNCS foods leads to unhealthy food choices thereby leading to obesity. In a survey conducted in Delhi schools, 85.1% students reported that television was the major source of junk food advertising, followed by magazines (78.5 %), internet (29.5%) and billboards in and around their schools (22%). The study also revealed that junk food advertising created a desire to consume them in 88.7 % students [79]. Russel, *et al*. [96] in a systematic review and meta-analysis (11 studies) reported that food advertising on television (TV) resulted in increased dietary intake among children. Enough evidence is available that proves that advertisements of fast foods and nonalcoholic beverages on TV, print media, and online portals (such as You Tube) positively impacts its consumption and adversely affects the BMI [97-100]. Marketing strategies directed to children, promotion using popular personalities and premiums like free toys influence children's decision regarding purchase of advertised products [101, 102]. Roberto, *et al*. [103] reported that children perceived the food item with licensed characters to taste better than those presented in plain packages ($P<.001$).

Taxes and Subsidies

World Health Organization has recommended a fiscal policy on levy taxation on unhealthy food to encourage healthy eating habits [104]. Thow, *et al*. [105] conducted a systematic review (24 studies) that showed taxes and subsidies influenced consumption in the desired direction, with larger taxes being associated with more significant changes in consumption, body weight and disease incidence. However, the quality of the evidence of all the studies included in the review was generally low. Mhurchu, *et al.* [106] in a randomized controlled trial concluded that pricing strategies can act as a promising intervention to effect population dietary habits. Colchero, *et al*. [107] reported that tax on SSBs was associated with reductions in their purchases.

Information, Education, and Communication

School-based interventions are seen to be an effective strategy in reducing the consumption of the JUNCS foods. Gordon, *et al*. [108] in a systematic review (48 studies) of school cafeteria interventions reported that fast and intuitive thinking interventions like emoticon labeling, incentives, convenience and appeal were more common (89%) and more effective in significantly reducing BMI as compared to mixed interventions (67%) and slow and cognitively defined interventions (33%) like classroom nutritional programs and educational programs. Avery, *et al*. [109] concluded from their systematic review and meta-analysis that school-based education programs focusing on reducing SSB consumption offer opportunities for implementing effective and sustainable interventions. Their effectiveness can be improved by peer support and changing the school environment to support educational programs.

EXISTING RECOMMENDATIONS, GUIDELINES AND POLICIES

Fast Food

Dietary guidelines on permissible amount of fats, carbohydrates, protein, free sugar, salt and micronutrients

are available in more than 60 countries. World Health Organization [110] and Dietary Guidelines for Americans (2015-2020) limit intake of free sugars to less than 10% of total energy intake [111]. The Science Advisory Committee for Nutrition (SACN) from UK (2015) and ESPGHAN Committee on Nutrition (2017) [112,113] recommended free sugars intake of 5% or less of total dietary intake for adults and children aged over two years. Australian and New Zealand dietary guidelines also recommend limiting consumption of added sugars. For fats, WHO and US dietary guidelines recommend that total fat should not exceed 30% of total energy intake, saturated fatty acid intake should be <10% of total energy intake and trans fatty acids to <1% [111,114]. Further, salt intake should be less than 5 g/d (2g/d sodium) [115].

Advertisement and marketing: United Kingdom in 2006 banned advertisements for foods high in fat, sugar or salt (HFSS) in television programs made for children age 4-15 years [99]. Mexico, Brazil, Taiwan, Canada, South Korea, Chile and Ireland have also taken steps to regulate advertisement, marketing and sales of these products. Some countries like Denmark, Hungary, France have introduced economic policies as recommended by the WHO in 2008 [116]. United States in 2014 mandated that schools will no longer be allowed to sell unhealthy junk food and SSBs in their cafeterias, vending machines or students store [117].

In 2015, Delhi High Court set a ban on sale of HFSS food, including sugar-sweetened carbonated and non-carbonated beverages, within the school or within 50 meters of its premises [80]. Ministry of Women and Child Development has also issued similar guidelines and advised all school canteen foods to be color-coded (green, yellow, orange) based on nutritional value. The color-coded canteen policy was also endorsed by FSSAI [118-120].

Fruit Juices

American Academy of Pediatrics (AAP) has recommended no fruit juices for children below 12 months of age [121]. British Nutrition Foundation has limited fruit juice to maximum of 1 portion (150 mL) a day [122] whereas Australian guidelines limit consumption of fruit juice to half cup with no added sugar, to be taken occasionally [123].

Food labeling: United States Food and Drug Administration directed that any juice reconstituted from pulp must be mentioned on the label and must list the percentage of all the other ingredients [121]. In UK fruit juices must not be labeled with no added sugar claim and sugar must not be added to fruit juice; also the words 'containing naturally occurring sugars' must also appear [124].

Advertisement and marketing: In March 2018, the UK government, proposed to ban vast majority of fruit juices from advertising aimed at children [125]. In France, Government directed that all advertisements related to drinks high in fat, sugar and salt must carry a health message or a warning; unlimited refills of sugary drinks are banned [126]. Australian Taskforce has also recommended against the sale of SSBs in school canteens and vending machines [127].

Energy Drinks

American Academy of Pediatrics and the American College of Sports Medicine (ACSM) have stated that energy drinks are not intended for children and adolescents; also not recommended before and after strenuous activity. They have advised against mixing energy drinks with alcohol [128, 129]. Water is advocated as the main source of hydration, even during exercise. European Food Safety Authority (EFSA) have concluded that maximum caffeine intake of 3 mg/kg/d (maximum 200 mg/d) can be considered safe for children and adolescents [130]. Canada Health Association considers 2.5 mg/kg/d intake of total caffeine as safe [131].

Labeling: All energy drinks should have the advisory statement stating "not recommended for children or pregnant or breast-feeding women" or similar [132]. Further, European Union Soft Drinks Association (UNESDA) asked that the statement must be placed in the same field of vision as the name of the beverage, followed by a reference to the caffeine content expressed in mg per 100 mL [133]. American Beverage Association (ABA) have stressed upon quantitative caffeine declaration to be separate and apart from the Nutrition Facts Panel [134].

Advertisement and marketing: American Beverage Association (ABA) recommends that marketing of energy drinks should not be permitted to children younger than 12 years of age [134]. Any images of children on company website and advertisement in media where target audience is children is also prohibited. No commercial promotion is permitted in primary and secondary schools and within 100 meters [132,134]. European Union has also not permitted marketing or sampling in audience where more than 35% are children less than 16 years of age [133]. In India, FSSAI has recommended that non-alcoholic beverages with caffeine content more than 145 mg/L of caffeine will be labelled as caffeinated beverage and caffeine content in these beverages should not cross 300 mg/L, irrespective of the source of the caffeine [135].

GUIDELINES AND RECOMMENDATIONS

Based on the review of evidence, and the deliberations during, before and after the meeting, the group arrived at the following consensus guidelines:

A. Guidelines for Children and Families

1. *General Recommendations*

- Avoid consumption of the JUNCS foods and beverages by all children and adolescents, as far as possible.
- Alternatively, limit consumption of the JUNCS foods at home/outside and suggest to have not more than one serving per week; serving not exceeding 50% of total daily energy intake for that age.
- Do not consume foods while watching television/ screen.
- The Group endorses WHO guidelines to eliminate trans-fat and reduce free sugars to <5% of total energy intake.
- Freshly cooked home foods with minimal addition of sugar and no trans-fats should be preferred over restaurant/packaged foods.
- Traditional and acceptable home-made snacks with long shelf-line can be offered to children as alternative to the JUNCS foods.
- Lunch boxes packed only with healthy food should be carried to school if school does not have provision of providing healthy mid-day meal.
- The JUNCS food should not be offered as reward/gift to any child as this gives undue promotion to unhealthy foods.

2. *Fruit juices*

- Encourage intake of regional and seasonal whole fruits over fruit juices in children and adolescents.
- Fruit juices/fruit drinks/SSBs should not be offered to infants and young children aged below 2 years.
- For children and adolescents (2-18 years) fruit juices, fruit drinks and SSBs should be avoided as far as possible. Water should be encouraged as the best drink and should be promoted over fruit juices/drinks at home and school.
- Fruit juices/drinks, if given, should be limited to 125 mL per day for children aged between 2-5 years, and 250 mL per day for age >5 years; and these should preferably be given as fresh juices.

3. *Caffeinated drinks*

- Caffeinated energy drinks should not be consumed by children and adolescents. Intake of carbonated drinks, tea and coffee is to be completely avoided by children <5 years.
- In school going children and adolescents, tea/coffee intake should be limited to maximum of half cup/day (100 mL) in 5-9 y, and one cup/day (200 mL) in adolescents (10-18 y), provided no other caffeinated products (cola, chocolates) are being consumed.

B. Policy Recommendations for Schools, Labelling, Advertising, and Marketing

1. *Guidelines for Schools*

- The Group supports Ministry of Women and Child Development recommendations of ban on sale of HFSS foods in school canteens and in near vicinity of 200 meters (LOE 5). We also suggest expanding these recommendations to all the JUNCS foods.
- Efforts to regulate availability of the JUNCS foods in schools must be coupled with ensuring availability and affordability of a variety of healthy snacks and foods in mid-day meals or school canteens (LOE 1b).
- School authorities should ensure availability of safe and potable drinking water in schools to reduce consumption of SSBs (LOE 2a).
- Ensuring ongoing support, provision of resources, monitoring, feedback and recognition will help to increase the compliance of schools to provide healthy food to children (LOE 1b).

2. *Guidelines for Labeling*

- We support and advocate traffic light coding of all packaged food as suggested by FSSAI. Labeling of nutritional content of packaged foods should be further strengthened.
- The Group also supports labeling 'not suitable for children' and advocates addition of 'adolescents' for unsuitability of caffeinated energy drinks
- The Group supports traffic light coding of food available in school canteens (LOE 5), for their nutritional value; and advocates its extension to all packaged/ultra-processed foods in future.

3. *Guidelines for Advertisements*

The Group agrees that advertising has strong impact on dietary intake. Advertisement of the JUNCS foods may lead to unhealthy food choices (LOE 1a) and is likely to be associated with increasing obesity (LOE 2a).

- The Group recommends legal ban of screen/print/ digital advertisements of all JUNCS foods for

channels/magazines/websites/social media catering to children and adolescents through legislative measures.

- The Group recommends ban of branding and use of licensed characters for promoting fast foods/SSBs.
- Advertisements ridiculing healthy foods need to be legally banned.
- The Group also recommends screen/print/digital advertisements promoting healthy foods for channels catering to children and adolescents and use of licensed characters for branding and promoting healthy foods. Modalities for funding of same need to be explored.

4. *Guidelines for Marketing*

- The Group suggests providing tax discounts on healthy foods and beverages and regulation of discounts on large portions and multiple purchases of the JUNCS foods.
- Differential taxation on the JUNCS and healthy foods/ beverages should be considered to promote healthy eating.
- Ensuring availability of variety of healthy food menu at markets/restaurants will give better options for general public, thereby promoting healthy lifestyle.
- Steps should be taken to curb round the clock availability of the JUNCS food on order through mobile Apps.

C. Behavioral Change and Communication

- School-based interventions are more effective than home-based strategies. All schools should promote balanced diets and highlight adverse impacts of unhealthy foods in a structured curriculum.
- Nutrition education initiatives should be taken to increase awareness among school children. Schools should be motivated to organize poster-easy-competitions, debates, etc on adverse effects of the JUNCS foods, besides teaching about healthy and balanced diet.
- Parents should themselves follow healthy eating habits and serve as role models for children thereby providing them a nutrition sensitive and enabling environment.

D. Role of Indian Academy of Pediatrics (IAP)

- Indian Academy of Pediatrics should ensure promotion of and dissemination of these Guidelines to children, adolescents, and teachers in schools through all running and planned school-based modules developed from time to time.
- The Academy should advocate and appeal to government (FSAAI, MoWCD, MoH) agencies for front-of-pack traffic light labeling of food and ensuring compliance of directives to schools, besides including these Guidelines in the school health program.
- Children, parents and general public should be advocated about the associated ill health effects of the JUNCS foods in various forms such as observing obesity prevention day, distribution and display of charts/posters in pediatricians' clinics.
- The Academy should avoid promoting the JUNCS foods through its instruments and activities by avoiding sponsorships from makers of such foods.

Contributors: All authors were part of the National Consultation (*Annexure* 1) that formulated these Guidelines. PG, DS, PK and DiS conceived the Consultation and Guidelines, prepared its agenda, and executed administratively. NB, HGM, KM and SK extensively reviewed the literature and also wrote the first draft of respective sections assigned to them. Review of literature was peer reviewed by PK, DS and PG. The draft recommendations were prepared by DS. KEE, RD, RH, USK, KI, SSG, JPD, NM, AG, AKR, SB, RS, RRK, BJP, STS and DiS actively participated in the consultation and/or subsequent discussions and provided critical inputs at every stage to finalize the draft recommendations. HPS led the consultation and discussions and crystallized the output. He provided intellectual inputs and overall guidance at every step. RRK, USK, RH, STS, BJP and DiS provided the administrative support from the Indian Academy of Pediatrics and coordinated between the Consultative Group and Executive Board members of the Academy. The final document was drafted by NB, HGM, KM, SK; compiled by NB; and edited by DS, PK and PG. All authors approved the final Recommendation paper.
Funding: None. *Competing interest*: None stated.

REFERENCES

1. Gupta A, Kapil U, Singh G. Consumption of junk foods by school-aged children in rural Himachal Pradesh, India. Indian J Public Health. 2018;62:65-7.
2. Kaushik JS, Narang M, Parakh A. Fast food consumption in children. Indian Pediatr. 2011;48:95-101.
3. Joseph N, Nelliyani M, Rai S, Babu YPR, Kotian SM, Ghosh T, *et al*. Fast food consumption pattern and its association with overweight among high school boys in Mangalore city of southern India. J Clin Diag Res. 2015;9: LC13-17.
4. Mittal H, Gupta P. Fruit drinks: How healthy and safe? Indian Pediatr. 2008;45:215-7.
5. Bhushan C, Taneja S, Khurana A. Burden of Packaged Food on Schoolchildren: Based on the CSE survey 'Know Your Diet' 2017. Centre for Science and Environment, New Delhi. Available from: *http://www.indiaenvironmentportal.org.in/files/file/Burden%20of%20Packaged%20Food%20on%20School%20Children.pdf*. Accessed January 20, 2019.

6. Keshari P, Mishra CP. Growing menace of fast food consumption in India: Time to act. Int J Comm Med and Public Health. 2016;3:1355-62.
7. International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS.
8. Bedi N, Dewan P, Gupta P. Energy drinks: potions of illusion. Indian Pediatr. 2014;51:529-33.
9. Zhang Qi. Food policy approaches to obesity prevention: an international perspective. Curr Obes Rep. 2014;3: 171-82.
10. World Health Organization. Breastfeeding. Available from: *https://www.who.int/nutrition/topics/exclusive_breastfeeding/en/*. Accessed January 4, 2019.
11. World Health Organization. Global Recommendations on Physical Activity for Health. Geneva: World Health Organization; 2010.
12. Definition of fast food. Available from: *https://www.merriam-webster.com/dictionary/fast-food*. Accessed March 1, 2019.
13. Draft Guidelines for regulating food high in fat, sugar and salt (HFSS) also popularly known as junk food. Available from:*www.indiaenvironmentportal.org.in/.../Junk%20Food%20Guidelines%20-%20January*. Accessed March 01, 2019.
14. Working Group Members on Matters related to Junk foods and Addressing Problem of Obesity in India in 2015. Report of Working Group on Addressing Consumption of Foods High in Fat, Salt and Sugar (HFSS) and Promotion of Healthy Snacks in Schools of India. Available from: *http://nipccd.nic.in/reports/hfss.pdf*. Accessed March 01, 2019.
15. Monteiro CA, Cannon G, Levy RB, Moubarac JC, Jaime P, Martins AP, *et al*. NOVA. The star shines bright. [Food classification. Public health] World Nutrition. 2016; 7:1-3.
16. Lexico: Dictionary Definition of Caffeinated drinks. Definition. Available from: *https://en.oxforddictionaries.com/definition/caffeinated*. Accessed 20 April 2019.
17. Lexico: Dictionary Definition of Carbonated beverages. Definition. Available from: *https://en.oxforddictionaries.com/definition/carbonated.* Accessed April *21,* 2019.
18. Get the Facts: Sugar-Sweetened Beverages and Consumption. Centers for Disease Control and Prevention. Available from: *https://www.cdc.gov/nutrition/data-statis tics/sugar-sweetened-beverages-intake.html*. Accessed April 22, 2019.
19. Monteiro CA, Moubarac JC, Levy RB, Canella DS, Louzada MLDC, Cannon G. Household availability of ultra-processed foods and obesity in nineteen European countries. Public Health Nutr. 2018;21:18-26.
20. Braithwaile I, Stewart AW, Hancox RJ, Beasley R, Murphy R, Mitchell EA. The ISAAC phase three study group. Fast food consumption and body mass index in children and adolescents: an international cross sectional study. BMJ. 2014;4:1-9.
21. Statista. United States: How often do you eat fast food (any quick service restaurant) in any given week (on average)? Available from: *https://www.statista.com/statistics/561297/us-average-fast-food-consumption-per-week/*. Accessed January 16, 2019.
22. Vandevijvere S, De Ridder K, Fiolet T, Bel S, Tafforeau J. Consumption of ultraprocessed food products and diet quality among children, adolescents and adults in Belgium. Eur J Nutr. 2018. doi: 10.1007/s00394-018-1870-3. [Epub ahead of print].
23. Jain A, Dhanawat J, Kotian MS, Angeline R. Assessment of risk factors of non-communicable diseases among high school students in Mangalore, India. Int J Health Allied Sci. 2012;1:249-54.
24. Puri S, Bhatia V, Swami H, Rai S, Mangat C. Impact of a diet and nutrition related education package on the awareness and practices of school children of Chandigarh. The Internet J Epidemiol. 2007;6:1-7.
25. Nemnuhoi H, Sharma S. Trends in fast food consumption among adolescents in Ludhiana (Punjab). Food Sci Res J. 2016;7:276-80.
26. Vaida N. Prevalence of fast food intake among urban adolescent students. The International Journal of Engineering and Science. 2013;2:353-59.
27. Kumar H, Palaha R, Kaur A. Study of consumption, behaviour and awareness of fast food among university hostellers. Asian J Clin Nutr. 2013;5:1-7.
28. Mishra SK, Mukhopadhyay S. Eating and weight concerns among Sikkimese adolescent girls and their biocultural correlates: an exploratory study. Public Health Nutr. 2011;14:853-9.
29. Vidya B, Damayanthi MN, Sharada R, Manjunatha S. Junk food consumption pattern and obesity among school going children in an urban field practice area: a cross sectional study". J Evidence-based Med Healthcare. 2015; 2: 1796-1801.
30. Prabhavathi Y, Krishna Kishore NT, Ramesh Kumar M. Consumer preference and spending pattern in Indian fast food industry. International Journal of Scientific and Research Publications. 2014;4:1-5.
31. Purushothaman S, Reddy C, Chaly PE, Priyadarshni I. Predilection for junk food consumption among 15-year-old schoolchildren in North Chennai, India. Medical Journal of Islamic World Academy of Sciences. 2015;23:125-30.
32. Kansagara T, Parmar DV, Chauhan M, Dave P. A study on dietary intake among school going adolescent girls in rural and urban area of Jamnagar District, Gujarat. Int J Med Sci Public Health. 2018;7:697-702.
33. Kotecha PV, Patel SV, Baxi RK, Mazumdar VS, Shobha M, Mehta KG. Dietary pattern of schoolgoing adolescents in urban Baroda. India. J Health Popul Nutr. 2013;31:490-6.
34. Namrata, Agrahari K, Jaiswal M, Singh A. A comparative study on the consumption pattern of fast food among adolescent girls and boys of Sultanpur. International Journal of Home Science 2016;2:7-16.
35. Singh M, Mishra S. Fast food consumption pattern and obesity among school going (9-13 year) in Lucknow District. International Journal of Science and Research. 2014;3:1672-4.
36. Shukla R, Shukla M, Ahmad S, Shukla NK, Sidhu HK.

Expenses incurred on junk food consumption among adolescent girls: A pilot study. International J Multidisciplinary Res Develop. 2017;4:291-29.
37. Shokeen S. A study on fast food pattern consumption in India. International Journal of Research and Engineering. 2016;3:10-5.
38. Singh AK, Maheshwari A, Sharma N, Anand K. Lifestyle associated risk factors in adolescents. Indian J Pediatr. 2006;73:901-6.
39. NIPCCD. Eating Pattern of School Going Children in Delhi - A Report. New Delhi: Child Development Division, National Institute of Public Cooperation and Child Development; 2008.
40. Goel S, Kaur T, Gupta M. Increasing proclivity for junk food among overweight adolescent girls in district Kurukshetra, India. International Research Journal of Biological Sciences. 2013;3:80-4.
41. Meena M, Varma K. Fast food consumption among adolescent schoolgirls in Jaipur. International Journal of Innovative Research and Review. 2015;3:38-4.
42. Anitharaj MS. "Global Fast Food Retailing in India – A way ahead. IOSR Journal of Business and Management (IOSR-JBM). 2018:23;38-43.
43. Goyal A, Singh NP. Consumer perception about fast food in India: An exploratory study. British Food Journal. 2007;109:182-95.
44. Ministry of Food Processing Industries (MOFPI). Annual Report 2015-2016. Available from:*http://www.mofpi.nic.in/sites/default/files/15-16-finalannualreportenglish.pdf*. Accessed March 01, 2019.
45. India Brand Equity Foundation. Indian Food Processing, Exports of Processed Food and Related Products. Available from *https://www.ibef.org/industry/indian-food-industry.aspx*. Accessed March 01, 2019.
46. Jubilant Food Works Limited. Available from: *http://www.jubilantfoodworks.com/wp-content/uploads/2017/06/JFL-Corporate_Presentation.pdf*. Accessed March 01, 2019.
47. PWC. Retail and Consumer Quarterly Newsletter Q1 FY 2018. Available from: *https://www.pwc.in/assets/pdfs/industries/retail-and-consumer/newsletters/retail-and-consumer-quarterly-newsletter-q1-fy-2018.pdf*. Accessed March 01, 2019.
48. The changing landscape of the retail food service industry. Available at https://www.pwc.in/research-insights/2018/the-changing-landscape-of-the-retail-food-service-industry.html. Accessed March 01, 2019.
49. Rauber F, da Costa Louzada ML, Steele EM, Millett C, Monteiro CA, Levy RB. Ultra-processed food consumption and chronic non-communicable diseases-related dietary nutrient profile in the UK (2008-2014). Nutrients. 2018;10. pii:E587. doi: 10.3390/nu10050587.
50. Martínez Steele E, Popkin BM, Swinburn B, Monteiro CA. The share of ultra-processed foods and the overall nutritional quality of diets in the US: evidence from a nationally representative cross-sectional study. Popul Health Metr. 2017;15:6.
51. Moubarac JC, Batal M, Louzada ML, Martinez Steele E, Monteiro CA. Consumption of ultra-processed foods predicts diet quality in Canada. Appetite. 2017;108: 512-20.
52. Braithwaite I, Stewart AW, Hancox RJ, Beasley R, Murphy R, Mitchell EA, *et al*. Fast-food consumption and body mass index in children and adolescents: an international cross-sectional study. BMJ Open. 2014;4: e005813.
53. Dubois L, Farmer A, Girard M, Peterson K. Regular sugar sweetenedbeverage consumption between meals increases risk of overweight among preschool-aged children. J Am Diet Assoc. 2007;107:924-34.
54. Ludwig DS, Peterson KE, Gortmaker SL. Sweetened drinks and childhood obesity: A prospective, observational analysis. Lancet.2001;357:505-8.
55. Costa CS, Del-Ponte B, Assunção MCF, Santos IS. Consumption of ultra-processed foods and body fat during childhood and adolescence: a systematic review. Public Health Nutr. 2018;21:148-59.
56. Thompson OM, Ballew C, Resnicow K, Must A, Bandini LG, Cyr H, *et al*. Food purchased away from home as a predictor of change in BMI z-score among girls. Int J Obes Relat Metab Disord. 2004;2:282-9.
57. Niemeier HM, Raynor HA, Lloyd-Richardson EE, Rogers ML, Wing RR. Fast food consumption and breakfast skipping: predictors of weight gain from adolescence to a dulthood in a nationally representative sample. J Adolesc Health. 2006;39:842-9.
58. Costa CS, Rauber F, Leffa PS, Sangalli CN, Campagnolo PDB, Vitolo MR. Ultra-processed food consumption and its effects on anthropometric and glucose profile: A longitudinal study during childhood. Nutr Metab Cardiovasc Dis. 2019;29:177-84.
59. Mistry SK, Puthussery S. Risk factors of overweight and obesity in childhood and adolescence in South Asian countries: a systematic review of the evidence. Public Health. 2015;129:200-9.
60. Bibiloni Mdel M, Pich J, Pons A, Tur JA. Body image and eating patterns among adolescents. BMC Public Health. 2013;13:1104.
61. Park SJ, Lee SM, Kim SM, Lee M. Gender specific effect of major dietary patterns on the metabolic syndrome risk in Korean pre- pubertal children. Nutr Res Pract. 2013;7: 139-45.
62. Shang X, Li Y, Liu A, Zhang Q, Hu X, Du S, *et al*. Dietary pattern and its association with the prevalence of obesity and related cardiometabolic risk factors among Chinese children. PLoS One. 2012;7:e43183.
63. Rauber F, Campagnolo PD, Hoffman DJ, Vitolo MR. Consumption of ultra-processed food products and its effects on children's lipid profiles: A longitudinal study. Nutr Metab Cardiovasc Dis. 2015;25:116-22.
64. Romero-Polvo A, Denova-Gutiérrez E, Rivera-Paredez B, Castañón S, Gallegos-Carrillo K, Halley-Castillo E, *et al*. Association between dietary patterns and insulin resistance in Mexican children and adolescents. Ann Nutr Metab. 2012;61142-50.
65. Karatzi K, Moschonis G, Barouti AA, Lionis C, Chrousos GP, Manios Y. Dietary patterns and breakfast consumption in relation to insulin resistance in children.

The Healthy Growth Study. Public Health Nutr. 2014;17: 2790-7.
66. Kelishadi R, Qorbani M, Djalalinia S, Sheidaei A, Rezaei F, Arefirad T, Safiri S, Asayesh H, Motlagh ME. Physical inactivity and associated factors in Iranian children and adolescents: The weight disorders survey of the CASPIAN-IV study. J Cardiovasc Thorac Res. 2017;9:41-8.
67. Zhao Y, Wang L, Xue H, Wang H, Wang Y. Fast food consumption and its associations with obesity and hypertension among children: results from the baseline data of the childhood obesity study in China mega-cities. BMC Public Health.2017;17:933.
68. Oellingrath IM, Svendsen MV, Hestetun I. Eating patterns and mental health problems in early adolescence - a cross-sectional study of 12-13-year-old Norwegian school children. Public Health Nutr. 2014;17:2554-62.
69. Xu H, Sun Y, Wan Y, Zhang S, Xu H, Yang R, *et al*. Eating pattern and psychological symptoms: A cross-sectional study based on a national large sample of Chinese adolescents. J Affect Disord. 2019;244:155-63.
70. Jacka FN, Mykletun A., Berk M, Bjelland I, Tell GS. The association between habitual diet quality and the common mental disorders in community-dwelling adults: The Hordaland Health study. Psychosom Med. 2011;73:483-90.
71. Baldrick FR, Elborn JS, Woodside JV, Treacy K, Bradley JM, Patterson CC, *et al*. Effect of fruit and vegetable intake on oxidative stress and inflammation in COPD: A rando-mised controled trial. Eur Respir J. 2012;39:1377-84.
72. Evans EW, Hayes C, Palmer CA, Bermudez OI, Cohen SA, Must A. Dietary intake and severe early childhood caries in low-income, young children. J Acad Nutr Diet. 2013; 113:1057-61.
73. Vargas CM, Dye BA, Kolasny CR, Buckman DW, McNeel TS, Tinanoff N, *et al*. Early childhood caries and intake of 100 percent fruit juice: Data from NHANES, 1999-2004. J Am Dent Assoc. 2014;145:1254-61.
74. Arria AM, Bugbee BA, Caldeira KM, Vincent KB. Evidence and knowledge gaps for the association between energy drink use and high-risk behaviors among adolescents and young adults. Nutr Rev. 2014;72 Suppl 1:87-97.
75. Mangi MA, Rehman H, Rafique M, Illovsky M. Energy drinks and the risk of cardiovascular disease: A review of current literature. Cureus. 2017;9:e1322.
76. Park S, Lee Y, Lee JH. Association between energy drink intake, sleep, stress and suicidality in Korean adolescents: energy drink use in isolation or in combination with junk food consumption. Nutr J. 2016;15:87.
77. Smit HJ, Cotton JR, Hughes SC, Rogers PJ. Mood and cognitive performance effects of "energy" drink constituents: caffeine, glucose and carbonation. Nutr Neurosci. 2004;7:127-39.
78. Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, Liberati A, *et al*. The 2011 Oxford CEBM Evidence Levels of Evidence (Introductory Document). Oxford Centre for Evidence-Based Medicine. Available from: *https://www.cebm.net/index.aspx?o=5653*. Accessed 10 June 2019.
79. Centre for Consumer Studies, Indian Institute of Public Administration. Mishra S, Pathania M. Evaluation of the effect of Junk food on the health of schoolchildren of Delhi. Available From: *http://www.consumereducation.in/ResearchStudyReports/JunkFood2016.pdf*. Accessed March 01, 2019.
80. The Times of India. Time up for junk food in school canteens in Delhi. Available from: *https://timesof india.indiatimes.com/city/delhi/Time-up-for-junk-food-in-school-canteens-in-Delhi/articleshow/49422275.cms*. Accessed March 01, 2019.
81. DownToEarth. Delhi High court orders curb on junk food sale in school all over India. Available from: *https://www.downtoearth.org.in/news/delhi-high-court-orders-curb-on-junk-food-sale-in-schools-across-india-49038*. Accessed March 01, 2019.
82. Woods J, Bressan A, Langelaan CC, Mallon A, Palermo C. Australian school canteens: Menu guideline adherence or avoidance? Health Promotion Journal of Australia. 2014; 25:110-5.
83. Nathan N, Yoong SL, Sutherland R, Reilly K, Delaney T, Janssen L, *et al*. Effectiveness of a multicomponent intervention to enhance implementation of a healthy canteen policy in Australian primary schools: a randomised controlled trial. Int J Behav Nutr Phys Act. 2016;13:106.
84. Locatelli NT, Canella DS, Bandoni DH. Positive influence of school meals on food consumption in Brazil. Nutrition. 2018;53:140-4.
85. Harris DM, Seymour J, Grummer-Strawn L, Cooper A, Collins B, DiSogra L, *et al*. Let's move salad bars to schools: A public–private partnership to increase student fruit and vegetable consumption. Child Obesity. 2012;8:294-7.
86. Slusser WM, Cumberland WG, Browdy BL, Lange L, Neumann C. A school salad bar increases frequency of fruit and vegetable consumption among children living in low-income households. Public Health Nutr. 2007;10:1490-6.
87. Vargas-Garcia EJ, Evans CEL, Prestwich A, Sykes-Muskett BJ, Hooson J, Cade JE. Interventions to reduce consumption of sugar sweetened beverages or increase water intake: evidence from a systematic review and meta-analysis. Obes Rev. 2017;18:1350-63.
88. National Institute of Nutrition. Assessment of Current Scenario of Food Labelling in India. 2009. Available from: *http://www.icmr.nic.in/annual/2009-10/english/nutrition.pdf*. Accessed March 01, 2019.
89. Nordic Council of Ministers. About the keyhole. Available from: *http://www.norden.org/en/nordic-council-of-ministers/council-of-ministers/council-of-miministefor-fisheries-and-aquaculture-agriculture-food-and-forestry-mr-fjls/keyhole-nutritinu-label*. Accessed November 28, 2013.
90. Food Standards Agency. Front-of-pack nutrition labeling. Available from: *http://food.gov.uk/scotland/scotnut/signpostig/#.UpejmuLK-ne*. Accessed March 01, 2019.

91. Australia Food News. Australian ministers approve front-of-pack labeling system but dairy products approach still to be finalized. Jun 17. 2013 Available from: *http:// www.ausfoodnews.com.au/2013/06/17/australian-ministers-approve-front-of-pack-labellingsystem-but-dairy-products-approach-still-to-be-finalised.html*. Accessed March 01, 2019.
92. Temple JL, Ziegler AM, Epstein LH. Influence of price and labeling on energy drink purchasing in an experimental convenience store. J Nutr Educ Behav. 2015;48:54-9.
93. Crockett RA, King SE, Marteau TM, Prevost AT, Bignardi G, Roberts NW, *et al*. Nutritional labelling for healthier food or non-alcoholic drink purchasing and consumption. Cochrane Database Sys Rev. 2018;2:CD009315.
94. Swartz JJ, Braxton D, Viera AJ. Calorie menu labeling on quick-service restaurant menus: an updated systematic review of the literature. Int J Behav Nutr Phys Act. 2011;8:135.
95. Kiszko KM., Martinez OD, Abrams C, Albel B. The influence of calorie labeling on food orders and consumption: A review of the literature. J Community Health. 2014;39:1248-69.
96. Russell SJ, Croker H, Viner RM. The effect of screen advertising on children's dietary intake: A systematic review and meta analysis. Obesity Rev. 2019;20:554-68.
97. Dalton M, Longacre K, Drake K, Cleveland L, Harris J, Hendricks K, *et al*. Child targeted fast food television advertising exposure is linked with fast food intake among preschool children. Public Health Nutr. 2017;20:1548-56.
98. Boyland EJ, Safran MK, Halford KCG. Exposure to 'healthy' fast food meal bundles in television advertisements promotes liking for fast food but not healthier choices in children. British J Nut. 2015;113:1012-8.
99. Dhar T, Baylis K. Fast-food consumption and the ban on advertising targeting children: The Quebec experience. J Marketing Res. 2011;48:799-813.
100. Tan LA, Ng SH, Omar A, Karupaiah T. What's on YouTube? A case study on food and beverage advertising in videos targeted at children on social media. Child Obes. 2018;14:280-90.
101. Brand JE. Television Advertising to Children: A Review of Contemporary Research on the Influence of Television Advertising Directed to Children. Canberra: Australian Communications and Media Authority, Commonwealth of Australia; 2007.
102. Keller K, KuilemaL G, Lee N, Yoon J, Mascaro B, Combes AL, *et al*. The impact of food branding on children's eating behavior and obesity. Physiol Behav. 2012;106:379-86.
103. Roberto CA, Baik J, Harris JL, Brownell KD. Influence of licensed characters on children's taste and snack preferences. Pediatrics. 2010;126:88-93.
104. World Health Organization. 2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Non-communicable Diseases. Geneva: WHO; 2008.
105. Thow AM, Jan S, Leeder S, Swinburn B. The effect of fiscal policy on diet, obesity and chronic disease: A systematic review. Bull World Health Organ. 2010;88:609-14.
106. Mhurchu CN, Blakely T, Jiang Y, Eyles HC, Rodgers A. Effects of price discounts and tailored nutrition education on supermarket purchases: A randomized controlled trial. Am J Clin Nutr. 2010;91:736-47.
107. Colchero MA, Popkin BM, Rivera JA, Ng SW. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. BMJ. 2016;352:h6704.
108. Gordon KE, Dynan L, Siegel RM. Healthier choices in school cafeterias: A systematic review of cafeteria interventions. J Pediatr. 2018;203:273-9.
109. Avery A, Bostock L, McCullough F. A systematic review investigating interventions that can help reduce consumption of sugars sweetened beverages in children leading to changes in body fatness. J Hum Nutr Diet. 2015;28:52-64.
110. World Health Organization. Guideline: Sugars Intake for Adults and Children. Geneva: World Health Organization; 2015.
111. US Department of Health and Human Services and US Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th ed. December 2015. Available from: *http://health.gov/dietaryguidelines/2015/guidelines/*. Accessed February 10, 2019.
112. Scientific Advisory Committee on Nutrition (2015). Carbohydrates and Health. Available from:*https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/445503/SACN_Carbohydrates_and_Health.pdf*. Accessed January 18, 2019.
113. Fidler Mis N, Braegger C, Bronsky J, Campoy C, Domellöf M, Embleton ND, *et al*. ESPGHAN Committee on Nutrition. Sugar in Infants, Children and Adolescents: A position paper of the European Society for Pediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition. J Pediatr Gastroenterol Nutr. 2017;65:681-96.
114. World Health Organization. Healthy Diet. Available from: *https://www.who.int/news-room/fact-sheets/detail/healthy-diet*. Accessed January 20, 2019.
115. World Health Organization. Guideline: Sodium Intake for Adults and Children. Geneva: WHO; 2012.
116. World Health Organization (WHO). 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Non-Communicable Diseases. Geneva: WHO; 2008.
117. Bergallo P, Castagnari V, Fernández A, Mejía R. Regulatory initiatives to reduce sugar-sweetened beverages (SSBs) in Latin America. PLoS One. 2018;13:e0205694.
118. Food Safety and Standards Authority of India. Draft guidelines for making available wholesome, nutritious, safe and hygienic food to school children in India. Available from: *http://www.old.fssai.gov.in/Portals/0/Pdf/Order_Draft_Guidelines_School_Children.pdf*. Accessed February 20, 2019.
119. Food Safety and Standards Authority of India. Report of the Expert Group on Consumption of Fat, Sugar and Salt

and its Ill Health Effects on Indian Population. India: FSSAI: 2017.
120. FOODnavigator-asia.com. India FSSAI to finalise on pack traffic light labeling regulations. Available from: *https://www.foodnavigator-asia.com/Article/2018/05/28/India-s-FSSAI-to-finalise-on-pack-traffic-light-labelling-regulations*. Accessed February 20, 2019.
121. Heyman MB, Abrams SA. AAP Section on Gastroenterology, Hepatology, and Nutrition, AAP Committee on Nutrition. Fruit Juice in Infants, Children, and Adolescents: Current Recommendations. Pediatrics. 2017;139:e20170967.
122. British Nutrition Foundation. Healthy Hydration Guide. Available from: *https://www.nutrition.org.uk/healthyliving/hydration/healthy-hydration-guide.html.* Accessed February 02, 2019.
123. Better Health Channel. Children's diet: fruit and vegetables. Available from: *https://www.betterhealth.vic.gov.au/health/HealthyLiving/childrens-diet-fruit-and-vegetables*. Accessed March 02, 2019.
124. FOODnavigator-asia.com. APAC sugar taxes: How 2018 is shaping up from a policy perspective. Available from: *https://www.foodnavigator-asia.com/Article/2018/01/03/APAC-sugar-taxes-How-2018-is-shaping-up-from-a-policy-perspective*. Accessed March 01, 2019.
125. BeverageDaily.com. UK sets sugar reduction targets for juice and milk-based drinks. Available from: *https://www.beveragedaily.com/Article/2018/05/23/UK-sets-sugar-reduction-targets-forjuice-and-milk-based-drinks.* Accessed February 01, 2019.
126. Business Insider. Unlimited sugary drinks refills banned in France. Available from: *https://www.businessinsider.in/Unlimitedsugary-drink-refills-are-now-banned-in-France/articleshow/56811607.cms*. Accessed February 01, 2019.
127. National Preventative Health Taskforce. Australia: The Healthiest Country by 2020. Canberra: Commonwealth of Australia; 2009.
128. American Academy of Pediatrics. Sports Drinks and Energy Drinks for Children and Adolescents: Are they appropriate? Committee on Nutrition and the Council on Sports Medicine and Fitness. Pediatrics. 2011;127: 1182-9.
129. American College of Sports Medicine Updated Energy Drink Guidelines. Summit Medical Group. Available from: *https://www.summitmedicalgroup.com/news/nutrition/american-college-sports-medicine-updated-energy-drink-guidelines/*. Accessed January 26, 2019.
130. EFSA NDA Panel (EFSA Panel on Dietetic Products, Nutrition and Allergies), 2015. Scientific Opinion on the safety of caffeine. EFSA Journal. 2015;13:4102.
131. Wikoff D, Welsh BT, Henderson R, Brorby GP, Britt J, Myers E, *et al*. Systematic review of the potential adverse effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. Food Chemical Toxicol. 2017;109:585-648.
132. ICBA Guidelines for the Composition, Labelling and Responsible Marketing of Energy Drinks. Available from: *http://www.icba-net.org/files/resources/energy-drink-guidelines.pdf.* Accessed February 05, 2019.
133. UNESDA Code for the Labelling and Marketing of Energy Drinks. UNESDA – Soft Drinks Europe. Available from: *https://www.unesda.eu/wp-content/uploads/2018/02/Updated-UNESDA-Energy-Drinks-Code_November-2017.pdf.* Accessed January 27, 2019.
134. American Beverage Association. ABA Guidance for the Responsible Labeling and Marketing of Energy Drinks. Available from: *https://www.ameribev.org/les/resources/2014-energy-drinks-guidance-approved-by-bod-43020c.pdf.* Accessed January 07, 2019.
135. Food Safety and Standards Authority of India. Food Safety and Standards Authority of India proposes regulation of energy drinks, and caffeine (Revised). Available from: *https://old.fssai.gov.in/Portals/0/STANDARDS_OF_ENERGY_DRINKS_.pdf.* Accessed January 16, 2019.

ANNEXURE 1 PARTICIPANTS OF THE CONSENSUS MEETING

Chairperson: Piyush Gupta; *Convener*: Praveen Kumar
*Members (in alphabetical order)***:** AK Rawat, Anju Pradhan Sinha (ICMR, Delhi), Devindra Shakappa (NIN, Hyderabad), Dheeraj Shah, Digant D Shastri, Hema Gupta Mittal, HPS Sachdev, JH Panwal (MoWCD), KE Elizabeth, Kirtisudha Mishra, Kristin Indumathi, Nidhi Bedi, Niranjan Mohanty, Raghvendra Singh, Rekha Harish, Rupal Dalal, Srikanta Basu, Sumaira Khalil, Upendra S Kinjawadekar.
Could not attend: AP Dubey, Abner Daniel (UNICEF), Ajay Gaur, Alka Mathur, Arjan De Wagt (UNICEF), Bakul Jayant Parekh, CP Bansal, JP Dadhich (BPNI), Rachita Gupta (WHO-India), R Remesh Kumar, Santosh T Soans, Sheetal S Gandhi, Sila Deb (UNICEF), Umesh Kapil, Virendra Kumar.