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Childhood Undernutrition in India

Although undernutrition will remain a significant issue affecting children's health in low and middle-income countries (LMICs), among 42 LMICs rates of overweight and obesity grew an average of 0.7 percentage points per year. An estimated 19% of rural women and 37.2% of urban women are overweight or obese (Popkin, Adair, & Ng, 2012). Global trends toward overweight and obesity are rapidly becoming significant health issues in developing countries creating a double burden of malnutrition (Dang & Meenakshi, 2017). India is an example of one country where diets once consisted mainly of coarse grains such as "sorghum, barley, rye, maize, and millet", and now consist of mainly processed food-products[1] consisting of "Rice and Wheat"(Popkin, Horton, Kim, Mahal, & Shuigao, 2001). The nutrition transition, or shift to high-fat, low-nutrient dense, processed food product has a significant effect on children's nutrition and health. Among the most vulnerable to the impact of nutrient deficiencies are children aged 0- to 5-years. Increasing nutrition in children in India is a complex issue; alleviating it would require fundamental changes in national policy that would need to improve sanitation, promote physical activity, as well as access to healthcare and healthful foods.

[1] This term refers to highly processed foods, often produced with additives, such as preservatives, to give a longer shelf life, and is meant to include fast food.

Children in India require access to healthy, affordable food in order to combat food insecurity, hunger as well as high rates of obesity.

Within the past decade, India has had a major increase in agricultural exports, from $5 billion in 2003 to $39 billion in 2013. In 2013, the top exports (in billions) were Rice ($7.1) , Buffalo ($4.0), Soybean Meal ($3.8), Guar Gum ($2.4), Corn ($1.2), Wheat ($1.0) and other products ($17.1). India's government provides subsidies in support of agricultural exports such as rice and wheat (Flake, 2014). This climb in exports to a record high is not reflected in nutritional outcomes for Indian children. Contrary to the amount of food being grown in India, access to these foods is often not possible. Per capita calorie consumption is declining below 2100 kcal per day in urban areas and 2400 kcal per day in rural areas, whereas overall consumption of fat is increasing (Deaton & Drèze, 2009).

In 2013, Indian Parliament approved the National Food Security Act (NFSA) providing food for "two-thirds of India's total population of 125 billion to 5 kg of rice, wheat or coarse cereals per month at highly subsidized prices"(Kishore & Chakrabarti, 2015). The Indian government purchases crops of wheat and rice directly from farmers at minimum support prices (MSPs). These highly subsidized crops lead to high exportation of commodities, as well as uses other than for human consumption. These policies create a disconnect in the food supply chain that result in poor access to food for Indian families. Overall there has been a decline in calories from cereals, and increase in cheap processed food often termed "Western Diet" (Deaton & Drèze, 2009; Popkin, 1993). This refers to a shift from a variety of coarse grain to processed food-products that use highly processed white flour made from wheat and rice. India's national food program, which disseminates foods for the NFSA, the Targeted Public Distribution System (TPDS) has a reputation of corruption, poor targeting to the needs of the population and an

overall low-impact in improving food security (Kishore & Chakrabarti, 2015). Industrialized food systems contribute new and different problems, food politics dictate how food is distributed, although there is sufficient production of food to feed all the people of India.

Anthropometric indicators in India for children and adults are among the worst in the world even during a time of high economic growth in India. Policy like the National Food Security Act (NFSA), has had a positive impact in overall improvement in child and infant mortality, and more needs to be done to address the still high rates of stunted, wasted and underweight children in India. Data from National Family Health Survey (NFHS)-1 (1992-93) to the most current NFHS-4 (2015-16) show that the infant mortality rate has dropped from 79 births per thousand live births to 41 per thousand. For the same time period, under-five mortality rates have dropped from 109 deaths per 1000 live births, to 50, and trends in mothers who had antenatal care visits is on the rise. ("NFHS-4 (National Family Health Survey-4)," 2017) Although all of these indicators show improvement, the trends for improvement in children's nutritional status is coming much slower: 38% of children (under-five years) are stunted and 36% were considered underweight ("NFHS-4 (National Family Health Survey-4)," 2017). India remains one of the poorest countries in the world with a population of over one billion and a birth rate well above population replacement (Griffiths & Bentley, 2001).

NFSA inadequately addresses factors of food and nutrition security for children in India. However, the NFSA fails to define malnutrition within the law, and in doing so inadequately addresses some of the issues that are causing malnutrition and hunger. Children in India often suffer from diarrhea and other maladies, "triggering a vicious cycle, with unsanitary living conditions and unclean water leading to repeated infections that result in malnutrition" (Mander, 2015). Children who are malnourished are more susceptible to disease when exposed to parasite

and diarrheal-causing illnesses, thus further perpetuating the issues related to nutrient deficiency. The NFSA law also does not require states to provide medical treatment for children with malnutrition; an imperative in ending the cycle of malnourishment.

In May of 2015, the Indian State of Madhya Pradesh created a program proposal to provide eggs to preschool children in tribal villages in order to provide much needed protein. This initiative to improve childhood malnutrition was shot down by the chief minister of the state, Shivraj Chouhan (Chatterjee, 2015; "Ministers Index," 2009). Political and social opinions in a mostly vegetarian state heavily impacted the failure of this policy, ultimately resulting in the rejection of this proposal. “While these states as a whole may be mostly vegetarian, the poorest- and most malnourished- Indians generally are not. They would eat eggs if only they could afford them” (Chatterjee, 2015). It is evident that the complex political and social issues preventing children from receiving adequate nutrition are not easily ameliorated. Overall, India has seen a large surge in consumption of dairy products such as eggs. Throughout the developing world, there has been an increase in animal-source food intake (Popkin et al., 2012). Animal protein can significantly improve the nutrient profile of a child’s diet. “Animal source foods supply not only high-quality and readily digested protein and energy, but are also a compact and efficient source of readily available micronutrients”(Neumann, Harris, & Rogers, 2002). Diet quality or the ability to provide sufficient supply of protein of “high biologic value” is as important as diet quantity in addressing childhood malnutrition(Neumann et al., 2002). In many cases, if it were available, animal-source foodstuffs would be a welcome addition to a diet otherwise lacking in nutrient density.

Within the same communities suffering from hunger and malnutrition, they are also rapidly increasing rates of obesity. The transition in diets to highly processed foods has been

observed globally. At present, India is experiencing a shift in the demographic composition of the country (aging population and lower birth rate), and epidemiologic shifts (from non-communicable diseases to chronic disease), the country has also experienced an increase in animal protein sourced foods (Popkin, 1993). As this transition occurs, especially for children, an increase in calorie expenditure in the form of physical activity must also accompany in order to achieve balance of increased consumption and energy expenditure. School lunch programs like the one proposed in Madhya Pradesh, that support the nutrition of children under 5, must be supported by Indian government. The creation and implementation of projects that support the promotion of childhood nutrition are of the upmost importance.

Extensive evidence shows that a lack of antenatal care and poor nutrition during pregnancy affects the health outcomes of children regarding likelihood of obesity in adulthood. In 2016, only 45% of pregnant women in India attended the recommended 4 antenatal visits ("India ", 2018). A focus on policy that improves maternal health and nutrition will have a lasting impact on the health of India's children. From observational studies of maternal exposure to famine and extreme stress experienced during wartime, we know that children are certainly impacted by the mother's health (Popkin et al., 2012). The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) stress the importance of the first 1000 days of life for a child, including the time spent in utero. Access to healthcare at this point in an individual's life is crucial to their health, providing nutritional supplementation, access to immunizations, deworming and follow up to undernourished and sick children has a monumental effect on positive health outcomes for children: significantly reducing the health disparities experienced by children (Ravi & Singh, 2016). Although breastfeeding provides a safe way to feed small children, current rates of early initiative breastfeeding (within 1 hour of birth) stand at

45% exhibiting potential for vast improvement("India ", 2018; Tiwari et al., 2016). Creating policy that improves a pregnant mother's nutrition has long lasting protective effects on the unborn child, as well as supporting young families so they can attain good health.

In order to improve anthropometric indicators of nutrition in Indian children, policies must be implemented that encourage access as well as redistribution of foods to promote healthful food and reward healthy eating habits at all members of a community. Increasing food and nutrient security for households with children in India is a complex problem, requiring that families have access to affordable, sustainable, and culturally appropriate foods. This is also incumbent on the fact that Indians have proper water sanitation to prepare and eat food, as well as potable drinking water.

One way government policy can promote food security is by promoting small-holder farmers to produce their own food at a lower cost and also teaching farmers to diversify their sources of income so that they are not as reliant on the output of one crop. Implementing policy that supports sustainability and economic viability would help to address some of these food-related issues seen in India involving all socioeconomic status levels. Systemic changes are faced with a dual burden of disease, households (both rural and urban) struggle with both food insecurity and malnutrition. Rates of undernutrition and obesity vary globally, but there is an overall increase in both among urban poor, reflected by increased food insecurity. These issues often occur within the same community, household or individual (Popkin et al., 2012). Overweight and obesity in children result in an increased risk of adulthood obesity, hypertension, atherosclerosis and a variety of other non-communicable diseases, and comorbidities such as musculoskeletal disorders and some cancers ("Obesity and Overweight," 2018). Problems

associated with underweight and undernutrition in children are stunting, learning disability and micronutrient deficiencies (Adair, 2008).

Attaining the common goal of food-and nutrition-security for all children in India is a complex and multifaceted issue. Indian government must step in to create a food system that functions efficiently, with the ability to provide for all families' food needs. According to the number of exports of agricultural commodities, there is an abundance of food for all of India's over one billion citizens, and in depth examination of where issues lie within the food supply chain can give more insight into what must be fixed. Finding ways to help support small-holder farmers in India could help grow the local economies and connect people to healthier food options. Proposing sustainable food procurement strategies that link people to fresh affordable foods is one viable solution to alleviate childhood hunger, malnutrition and obesity.

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