Promoting Balanced Diet Plan for The Population of Andhra Pradesh- A Concept of Healthy Eating Based on the My Plate.

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Abstract: The Global burden of noncommunicable diseases constitutes a major public health challenge that undermines the social and economic development across the world. Globally in 2008, it is estimated that 63% of the 57 million deaths that occurred, were due to noncommunicable diseases. India is currently amid rapid socio-economic, demographic, nutrition and health transition. Four behavioural risk factors like tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol are significantly associated with the noncommunicable disease. In today's fast paced world, as we do not have enough time for planning a healthy meal, it will be easy if we adopt a simple healthy eating plan like My Plate. A Report of a study conducted in the state of Andhra Pradesh in 2014 showed that in the study population the prevalence of overweight was (BMI>25) 60%, was slightly higher among females as compared to males and Physical inactivity was 29.2%. Low intake of fruits and vegetables < 5 servings / day was seen in 53.5% of the study subjects. In this regard, there is a need to develop an standardised diet plan considering the intake of calories, according to the local needs, preferences and affordability by the population. Strengthened promotion and advocacy are urgently needed to address the effects of rapid urbanization, and unhealthy lifestyle through a whole-of government and whole-of-society approach to promote and protect health. To ensure nutritional adequacy by providing required guidance to people, formulation of dietary goals and specific guidelines is essential.

I.   Introduction

India is currently amid rapid socio-economic, demographic, nutrition and health transition. [1] According to Food Agriculture Organization (FAO), malnutrition has become a public health problem in India as well as across the globe. Although for several years focus was given to Under nutrition, now the focus is shifting to the Over nutrition as well.[2] Consumption of fast foods has become a global phenomenon and India's fast food industry is expanding at the rate of 40% every year as a result of which India ranks 10th in the world in the fast food per-capita spending.[3] Consequently, non-communicable diseases (NCDs) like diabetes, hypertension and cardiovascular disease are emerging as major public health problems, with wide variation in prevalence rates between urban and rural areas. [1] The potential contributing factors that have been studied include changes in the life style and adoption of sedentary habits, the influence of mass media and the increased consumption of energy- dense processed foods. [4] The south Indian State of Andhra Pradesh is situated on the south-east region with Bay of Bengal coastal line. As per the Prajasadhikara survey 2016 conducted in Andhra Pradesh the total population is about 4,34,30,412, with the male population of 2,17,69,654 and female population of 2,16,60,758. A Report of a study conducted in the state of Andhra Pradesh in 2014 showed that in the study population the prevalence of overweight was (BMI>25) 60%, was slightly higher among females as compared to males and Physical inactivity was 29.2%. Low intake of fruits and vegetables < 5 servings / day was seen in 53.5% of the study subjects. [5].

II.   My Plate Adaptation

Andhra Pradesh is well known for its spicy food. It is one of the leading producer of rice and chillies. The normal diet of local population of Andhra Pradesh consists of vegetarian as well as non-vegetarian food items. Andhra Pradesh is composed of two regions namely Coastal Andhra and Rayalaseema Regions where the food habits differ from each other and have their distinctive cuisines. In Coastal Andhra, rice is the staple diet where as in Rayalaseema region finger millet (raagi) is preferred. "My Plate" introduced by United States Department of Agriculture (USDA) promoted a healthy eating style with a focus on five food groups like fruits

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& vegetables, cereals, pulses, protein and dairy products for several years. (Fig 1) [6] In today's fast paced world, as we do not have enough time for planning a healthy meal, it will be easy if we adopt a simple healthy eating plan like My Plate. In this regard, there is a need to develop an standardised diet plan considering the intake of calories, according to the local needs, preferences and affordability by the population. (Fig 2)
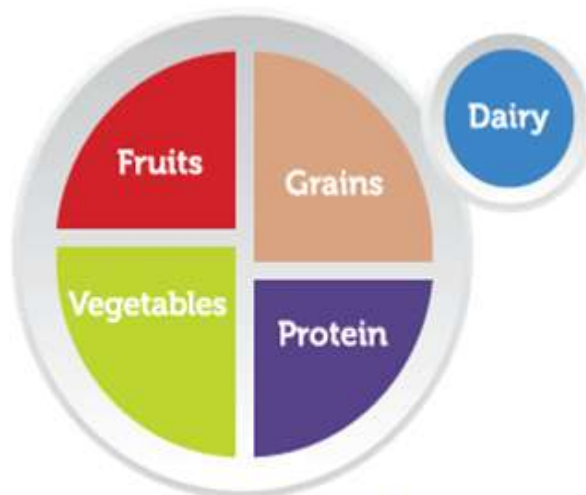

Fig 1 "My Plate" Concept by USDA (United States Department of Agriculture)
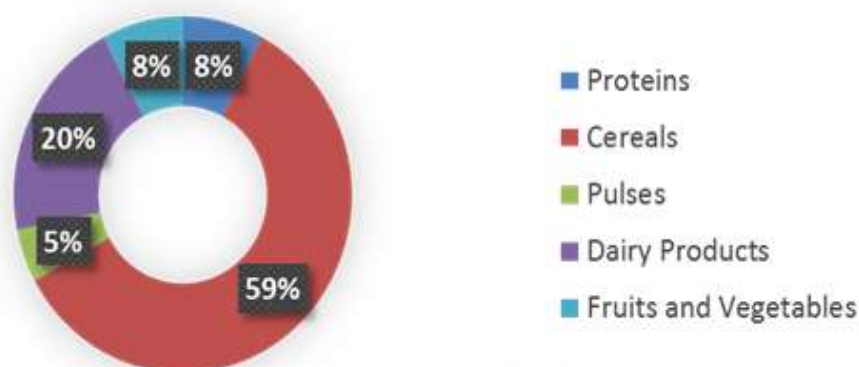
My Plate - Adopted for Andhra pradesh

Fig 2 My Plate adopted for Andhra Pradesh

Table:1 List of macronutrients available in food items of Andhra Pradesh*

Macronutrient	Percentage	Available in food item
Protein	8%	2 eggs-180 cal OR 1 egg omelette-160 cal OR Puri 2 pcs- 160 cal OR Dosa 2 pc -250 cal OR Idli 2 Pc -150 cal OR Chicken ¾ cup- 240 cal OR Mutton ¾ cup- 260cal
Cereals	59%	Cooked rice- 1360 cal/400gms OR chapatti 800 cal/4 Pcs Raagi roti- 400 cal/2 Pc
Pulses	5%	Bengal gram Boiled 164 cal/100gm OR Toor dal – 132cal/50gms
Dairy	20%	Cow's Milk+2tbspoon Sugar-180cal/100ml OR Buffalo's Milk+ 2tbspoon Sugar-320cal/100ml OR Tea (2 tsp sugar + 50 ml toned milk)- 150 cal/2 servings
Fruits and Vegetables	8%	Banana 232 cal/2pcs OR Green Leafy Vegetables-100cal/1/2 cup OR Grapes-50 cal/20pcs

*Calculated on basis of calories required for one day

Table:2 List of Micronutrient-rich Foods that are commonly available as identified by the National Institute of Nutrition- Hyderabad.

Nutrients	Food Groups	Foods	Nutrient content for 100 g edible portion
Beta Carotene -	Leafy vegetables	Ambat chukka, coriander leaves, ponnaganti, spinach,leaves, mint, radish leaves. Some other leafy vegetables like agathi, amaranth, curry leaves, fenugreek leaves and gogu	2-6 mg 7-15 mg 1 mg 6.5 mg 2.0 mg
	Other vegetables	Pumpkin and green chillies Carrot	0.9 mg
	Fruits	Ripe mango Papaya	
Folic Acid	Green leafy vegetables	Amaranth, ambat chukka, mint and spinach	120 mg
	Pulses	Bengalgram, blackgram, greengram and	120 mg
	Oilseeds	redgram Gingelly and soyabean	180 mg
Iron	Green leafy vegetables	Amaranth, bengalgram leaves, cauliflower greens and radish leaves	18-40 mg
Calcium	Cereals and Legumes	Ragi, bengalgram (whole), horsegram (whole), rajmah and soyabean	200-340 mg
	Green leafy vegetables	Amaranth, cauliflower greens, curry leaves, knol-khol leaves Agathi Colocasia leaves	500-800 mg 1130 mg
	Nuts and Oilseeds	Coconut dry, almond, mustard seeds and sunflower seeds Gingelly seeds Cumin seeds	1540 mg 130-490 mg 1450 mg
	Fish	Bacha, katla, mrigal, pran and rohu	1080 mg
	Milk and Milk Products	Buffalo's milk, cow's milk, goat's milk, curds (cow's) Cheese, khoa, skimmed milk powder and wholemilk powder	320-650 mg 120-210 mg 790-1370 mg
Vitamin C	Green leafy vegetables	Agathi, cabbage, coriander leaves, drumstic leaves, knol-khol greens	120-220 mg
	Other vegetables Fruits	Giant chillies (capsicum) Green chillies Amla Guava	137 mg 117 mg 600 mg 212 mg
Fibre	Cereals and Pulses	Wheat, jowar, bajra, ragi, maize, legumes, dhals and fenugreek seeds	>10 g
Vitamin A	Fats and edible oils	Butter, ghee (cow milk) and hydrogenated oil (fortified)	700 mg
Riboflavin	Cereal grains and products	Bajra, barley, ragi, wheat germs and wheat bread(brown)	0.2 mg
	Pulses and legumes	Bengalgram, blackgram, greengram, lentil, redgram and soyabean	0.2 mg
	Leafy vegetables	Amaranthus, carrot leaves, colacasia leaves, curry leaves, fenugreek leaves, gogu, mint, radish leaves and spinach	0.25 mg
	Nuts and Oilseeds	Gingelly seeds, mustard seeds, niger seeds, sunflower seeds, almond and walnut	0.3 mg
	Condiments and spices	Chillies dry, chillies green, coriander and cumin seeds	0.35 mg
	Fruits	Apricot dried and papaya Egg (hen)	0.23 mg
	Meat and poultry	Sheep's liver	0.26 mg
	Milk and milk products	Skimmed milk powder and whole milk powder (cow's milk)	1.7 mg 1.5 mg

III.   Discussion

The Global burden of noncommunicable diseases constitutes a major public health challenge that undermines the social and economic development across the world. Globally in 2008, it is estimated that 63% of the 57 million deaths that occurred, were due to noncommunicable diseases. Four behavioural risk factors like tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol are significantly associated with the noncommunicable diseases.[7] In 2008, deaths from noncommunicable diseases in low- and middle-income countries accounted for about 80% of all the deaths. Additionally, iron deficiency is the most common cause of Anaemia one of the most prevalent conditions in the world. About 50% of cases of anaemia are due to iron deficiency, although the proportion probably varies among population groups and in different areas, according

to the local conditions. Iron deficiency anaemia adversely affects cognitive and motor development, causes fatigue and low productivity and, in pregnant women, may be associated with low birth weight and increased risk of maternal and perinatal mortality.[8–10] District Level Household and Facility Survey – 4 (DLHS-4) conducted in Andhra Pradesh state during 2012- 2013 presented the anaemia Status by Haemoglobin Level in children, adolescents, women and pregnant women.[11] The dietary profile of the south Indians were always reflected unhealthy choices as there is high intake of refined cereals in the form of polished rice and very low intake of protective foods like fruits and vegetables which could result in the increase in prevalence of NCD's like diabetes, hypertension and cardiovascular diseases. [12] A study conducted in Vijayawada, Andhra Pradesh shows that the prevalence of overweight and obesity was 26.9% and 8.7%, where the reasons were eating outside home food and frequent eating of snacks. [13] Another study conducted in Mangalore, Karnataka showed that lack of awareness among school going children about intake of high calorie food were causing overweight among children. [14] Higher intake of fruit and vegetables was found to have protective effect against CVD risk factors by 48 %. [15] It was identified that the primary bottleneck is energy inadequacy and not the protein, as was earlier believed in the cereal/millet-based Indian dietaries. Increasing the quantities of habitually eaten foods can help the poor in overcoming the dietary energy gap. [11] My Plate users and Nutrition educators faced similar challenge in bringing the message of healthy eating among mothers who are less interested in nutrition and whose taste preferences do not include vegetables and fruits. [16,17] In 2015, a randomised control trial proved that art based nutrition education will help in increasing the knowledge on nutrition and change behaviour. It also proved that the visual arts related to nutrition with traditional nutrition is found to be more effective than education alone in improving the nutrition knowledge.[18]

IV.   Conclusion

The Global Action plan reminds that to combat the NCD's it is essential that as a part of primary prevention we identify the opportunities to prevent and control noncommunicable diseases that occur at multiple stages of life and design interventions targeting early life. The concept of balanced diet is not a new one yet there is lack of awareness about what to eat and how much to eat. Health and nutrition related information available through multiple sources tend to create unnecessary confusion among people. The My Plate concept might take some time to create awareness among people of Andhra Pradesh as it is a matter of healthy eating habits versus traditional cooking practices. Information, education and communication (IEC) /Behaviour change communication (BCC) activities including posters, flyers, leaflets, brochures, booklets, messages for health education sessions, radio broadcast or TV spots, etc. can act as a means of promoting desired, positive behaviours in the community. Nutrition education Knowledge, Attitudes, and Belief (KAB) model programs can be designed to influence fruit and vegetable consumption and to improve diet quality of school going children. To ensure nutritional adequacy by providing required guidance to people, formulation of dietary goals and specific guidelines is essential. Strengthened promotion and advocacy are urgently needed to address the effects of rapid urbanization, and unhealthy lifestyle through a Whole-of government and whole-of-society approach to promote and protect health.

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