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A study on the nutritional impact of Kerala floods 2018 on the Kuttanad residents of Alleppey district -A KSCSTE funded project

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Abstract
Floods had created a huge havoc for the state of Kerala during the months of July and August 2018. These months have seen a significant rise in the incidence of both natural and manmade emergencies with a concomitant increase in the numbers of stricken, displaced persons. While sickness and homelessness are perhaps the most visible problems for affected populations, malnutrition combined with micronutrient deficiencies is not uncommon and equally serious.
So the study envisaged to improve understanding of the nutritional implications of an emergency situation. It highlighted the need to include nutrition in plans for emergency preparedness. The main focus of the study was to identify the nutritional lacunae that occurred in the families displaced during the floods. It aimed to check the adequacy of nutrient intake of each family. A sample of 25 families (12 families from upper Kuttanad and 13 families from lower Kuttanad) consisting 100 members were selected from the Kuttanad Taluk. A structured questionnaire to assess the socio-economic status, dietary patterns, sanitation and economic losses was used as a tool. The food intake during the flood periods was assessed with the help of Recommended Dietary Allowances (RDA) and Nutritive value for foods. The data was analyzed statistically using appropriate statistical tests.

Keywords: Floods, Emergency, Displaced, Malnutrition, Micronutrient, Deficiency, Lacunae, Adequacy

Introduction
Kerala experienced an abnormally high rainfall from 1 June 2018 to 19 August 2018. This resulted in severe flooding in 13 out of 14 districts in the State. As per India Meteorological Department (IMD), Kerala received 2346.6 mm of rainfall from 1 June 2018 to 19 August 2018 in contrast to an expected 1649.5 mm of rainfall. This rainfall was about 42% above the normal. Further, the rainfall over Kerala during June, July and 1st to 19th of August was 15%, 18% and 164% respectively, above normal.
The consequences of flood on human health increased short-term risks of mortality, injury, certain communicable diseases and psycho social trauma. Moreover, impacts of flooding on nutritional health are likely to be quite severe in Kerala population. Flooded households were affected by adverse condition including food insecurity.

Objectives
This study envisaged understanding of the nutritional implications of an emergency situation. The main focus of the study was to identify the nutritional lacunae that occurred in the families displaced during the floods. It aimed to check the adequacy of nutrient intake of each family.

Methodology
Case studies on flood affected families from the Kuttanad area of Allepey District, Kerala was chosen for the study. Structured questionnaires were used to assess the general information, socio-economic profile, anthropometric measurements, dietary intake patterns, sanitation and hygiene and economical damage and losses. 24 Hour Recall method was used to collect the foods consumed while they were at the refugee camps. The food intake pattern was assessed with the help of Food Frequency Chart. Nutritional needs and food rations were calculated using the Recommended Daily Allowance tables (ICMR 2010) and Nutritive Value tables.

Water Sanitation and Hygiene (WASH) tool was used to check the availability of potable water. A DaLA (Damage and Loss Assessment) tool was also used to determine the damages and losses that occurred in each family. Nutritional status of the family members was assessed by their body composition analysis and determination.

Results

The houses of many families of lower Kuttanad are situated close to the rivers like Manimala River. The rains of mid-July had breached the bunds that surrounded the house. The floodwater had threatened and entered the houses. During the floods in August, their houses were half submerged in the water and the walls got damaged. The people of the upper Kuttanad areas like Kainakary, Thalavady, Edathua, etc did not have adequate relief camps. They all stayed in their own houses or the upstairs of their neighbours' houses.

This study focussed on to mainly assess the socioeconomic status, anthropometric data, dietary data, sanitation, hygiene, direct and indirect losses of 25 families who were affected by the July- August 2018 Kerala Floods.

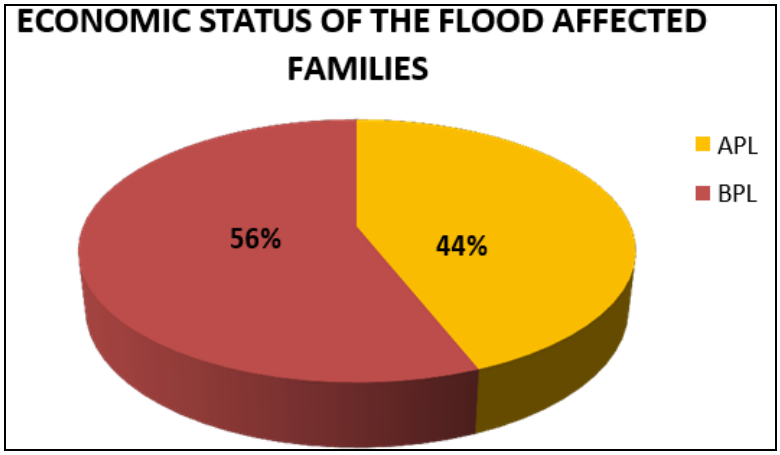

Fig 1: Economic status of the flood affected families (N=25 families)

The study found that 14 (56%) out of the 25 case families studied were below poverty line. The people in the lower Kuttanad are all engaged in work of daily wages. The educational level of majority of the members of the families was up to school level. Family size varied from two members to ten members.

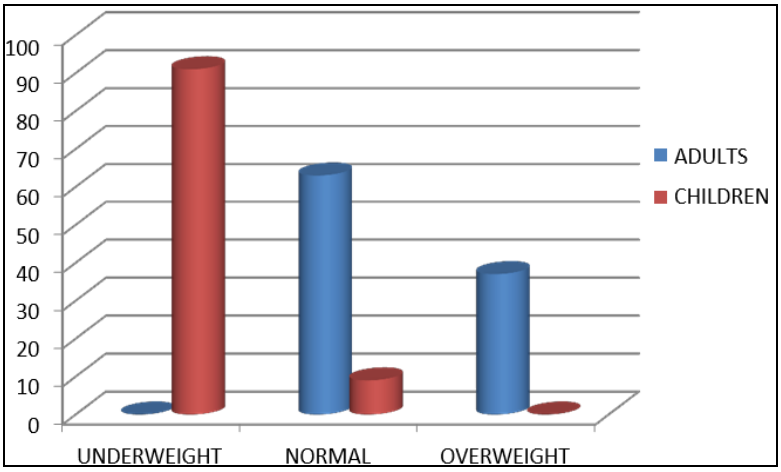

Fig 2: Anthropometric data of the members affected by floods (N=100 members)

The anthropometric data revealed that 37% of adults were overweight and 91% of the children in the age group (3-9 years) were underweight.

Table 1: Percentage of Nutrient intake adequacy of the families (N=25 families)

Nutrient	Number of families which met at least half of their requirements	% of families that met at least half of their requirements
Energy	0	0
Protein	2	8
Fat	19	76
Iron	2	8
Calcium	1	4
Vitamin A	0	0
Vitamin C	7	28

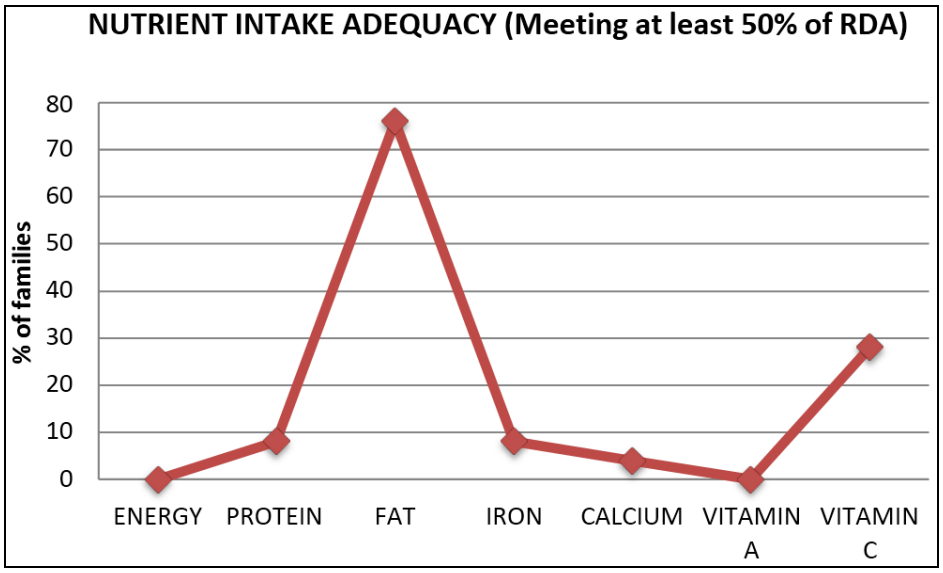

Fig 3: Nutrient intake adequacy of the families (N=25 families)

The August floods destroyed all the raw food items and ration stored by the families in their homes. They all had to rely on the food supplied at the relief camps. A 24-hour recall of the diet served at the relief camp was compared with the Recommended Dietary Allowances of the members. Results revealed that none of the nutrients met the requirements of the people.

The energy and Vitamin A from the diet did not meet even half the requirements of the members. However there was no food shortages faced by any of these families and their hunger was satisfied. A general food basket based on providing 2,100 kcal per person per day was also formulated by the agencies. Individual energy requirements are estimated for different population groups according to age, gender, weight and physical activity level. The mean per capita energy requirement is not specific to any age or sex group and should therefore not be considered as the requirement of a particular individual. The estimate of 2,100 kcal/person/day was also designed to include the needs of pregnant and lactating women within the population. Timely distribution of an adequate, basic ration: At the onset of an emergency, ensuring an adequate basic ration for the needy population is crucial. (Food and Nutrition Needs in Emergencies, UNHCR/UNICEF/WFP/WHO)

The assessments regarding the water, sanitation and hygiene (WASH) showed that the families suffered without safe and clean drinking water. Initially scarcity of potable water threatened the families. The solid wastes accumulated in the house premises. The families endured the unsanitary conditions. These were later cleaned and cleared when the flood waters receded with the support and help of various governmental and non-governmental agencies.

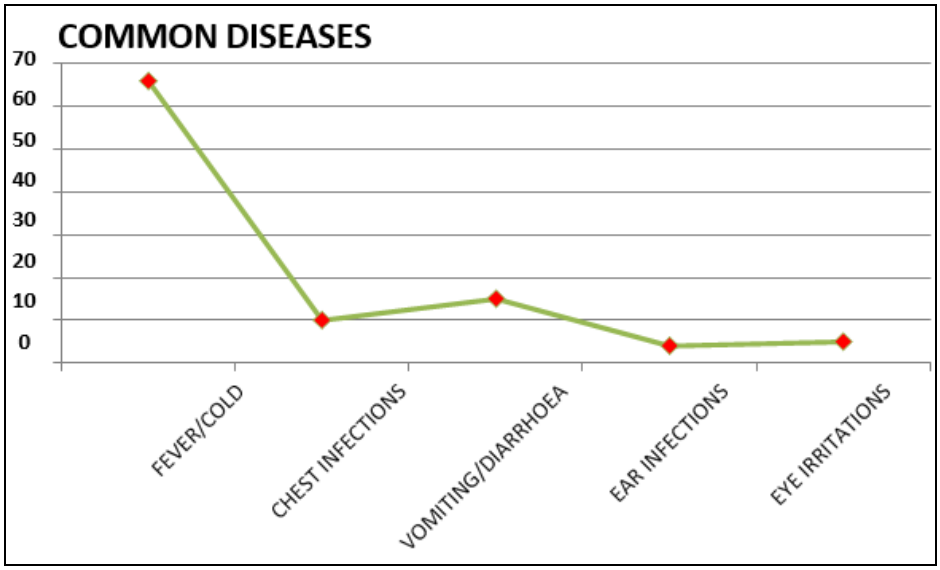

Fig 4: Common diseases among the families during flood periods (N=25 families)

The common infections and conditions that affected the families seeking relief in the relief camps include respiratory tract infections, cough, fever, chills, vomiting and diarrhoea. This was prevalent amongst the children and the adults. These were satisfactorily treated by the medical specialists posted at the camp.

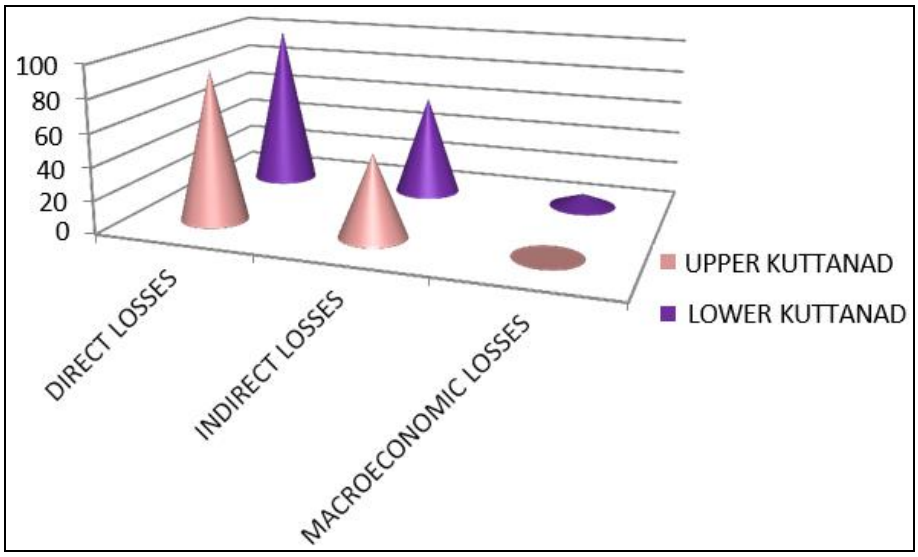

Fig 5: Details regarding the Damage and Loss Assessment (N=25 families)

The data regarding the damages and losses (DaLa) caused to the families revealed that there were major physical damages like cracks and collapses caused to the parts of their buildings. Indirect losses like damages to furniture, electric, electronic appliances were also extensive. The internal rooms of the houses, walls, door had collapsed in many case families. Some of the families lost their items of livelihoods- shops, mills, tailoring equipment and farming areas.

The post flood activities included the cleaning and clearing of the houses and surroundings, aid from government and non-governmental agencies. To clean the houses there were special cleaning groups in some of the regions. Many of the families cleaned their houses themselves. The government provided many essential items like food grains, clothes, books through the Panchayats. The government offered money as part of the immediate assistance measures and for the repair and maintenance of the buildings. Various non-governmental agencies like Evangelical Fellowship of India Commission on Relief (EFICOR), retail and wholesale shops provided necessary items to every families through the Panchayats.

Flooding not only had a negative economic impact, but also affected their immediate environment. The emergency food provisions met the hunger pangs of the people but were nutritionally inadequate. The availability of potable water was another huge problem. They used small water filtration techniques for drinking water. But those techniques seemed ineffective. The mobile health care systems included specialist doctors, nurses to take care of the patients. Emergency response provided food distribution for vulnerable groups, mobile clinics and health care, emergency shelter and household kits, water purification tablets, water storage containers and hygiene materials. However emergency response was still difficult to control the grim situation. Migration and relocation were even more difficult for people due to heavy rains.

Conclusion

Emergency feeding should not only satisfy hunger but also consider nutritional needs. Otherwise, malnutrition, with its consequences of morbidity and mortality, will remain uncontrolled. In addition to sustaining life and maintaining good health, emergency nutrition also provides relief to the condition of casualties, boosts the morale of displaced people, and enables emergency workers to perform their tasks.

This study highlighted the nutrition lacunae of the flood affected population. The disaster management team should consider supply of nutritionally adequate foods in their emergency kits especially if the period of strife is prolonged. Further adaptation strategy is strongly needed for local people.

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