
Summary and Conclusion

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Childhood obesity, also known as juvenile onset obesity which is currently on the rise and is extremely difficult to correct and often persists into adulthood. Current estimates suggest that one in four children are overweight or obese in United States and the scenario is almost becoming the same in India. Familial tendency, environment, lifestyle pattern, dietary habits and also infant nutritional status of the children are the major causative factors of childhood obesity. Many experts believe that 90 per cent of the consequences of childhood obesity are preventable by following a healthy active lifestyle and a balanced diet with good nutrition.

Hence the present study entitled **“Diet and lifestyle of obese children in the selected districts of Kerala and Tamil Nadu and the impact of Medical Nutrition Therapy”** was undertaken with the objectives to study the socio economic factors such as the monthly income of the families, residential area, occupation of the parents, birth order of the subject, family size, family system and number of siblings; to elicit details on infant nutritional status like pre natal weight gain of the mothers, complications during pregnancy, birth weight of the child, breastfeeding pattern, weaning pattern, weight increment in ages; life style pattern which included physical activity, screen time pattern, family dining habits and sleep pattern; to elicit the dietary habits of obese children like milk consumption pattern, vegetables and fruits consumption, details on fleshy food and beverages consumption, frequency of dining outside; to associate the obesity in children with various risk factors and to impart Medical Nutrition Therapy to the parents of obese children and assess its impact.

The study was conducted in ten selected districts of Kerala and Tamil Nadu (5+5). A total of 500 children both male and female in the age group of 5 to 10 years from each district were selected for the study. Since the age group selected for the study ranged from 5 to 10 years, the students studying from 1st standard to 5th standard were selected for the study. Using a well framed questionnaire and interview schedule the details on demographic profile, life

style pattern, dietary habits and nutritional knowledge of parents were elicited. Height and weight for all the selected children were taken and Body Mass Index (BMI) was calculated. Medical Nutrition Therapy was administered in two phases, medical management (which included lifestyle modifications, psychological support, drugs and surgery) and nutritional management (which included dietary modifications and nutrition education). Pamphlet and booklet were developed and was distributed to the parents of obese subjects. A power point presentation was also prepared incorporating all the necessary details regarding obesity. The impact of Medical Nutrition Therapy was also assessed.

The results of the study are summarized below.

- The age group selected for the present research ranged from five to ten years. It was clear that 10 per cent from Coimbatore, 25 per cent from Erode, 19 per cent from Tirupur, 18 per cent from Salem, 24 per cent from Kottayam, 19 per cent from Pathanamthitta, 16 per cent each from Allepey and Thrissur were of seven years age. Twenty four per cent from Tirupur, 22 per cent from Pathanamthitta and 29 per cent from Allepey district were 10 years old.
- It was observed that 57 per cent from Coimbatore, 50 per cent each from Erode and Tirupur, 55 per cent from Salem, 43 per cent from Kottayam, 58 per cent from Pathanamthitta, 46 per cent from Allepey and 53 per cent from Thrissur were boys.
- The students studying from first standard to fifth standard were selected for the study. Twenty seven per cent from Coimbatore, 21 per cent from Erode, 25 per cent from Tirupur, 10 per cent from Salem, 26 per cent from Kottayam, 16 per cent from Pathanamthitta, 14 per cent from Allepey and 19 per cent from Thrissur were studying in third standard.
- It was noted that 49 per cent from Coimbatore, 72 per cent from Erode, 57 per cent from Tirupur, 81 per cent from Salem, 12 per cent from Kottayam, eight per cent from Pathanamthitta, 52 per cent from Allepey and 63 per

cent from Thrissur were Hindus. Thirteen per cent from Coimbatore, three per cent from Erode and four per cent from Salem were Jains.

- The educational qualifications of the parents of the selected subjects in the state of Kerala and Tamil Nadu were elicited. It was revealed that 65 per cent from Coimbatore, 43 per cent from Erode, 68 per cent from Tirupur, 65 per cent from Salem, 81 per cent from Kottayam, 76 per cent from Pathanamthitta, 62 per cent from Allepey and 69 per cent from Thrissur were graduates.
- The occupation details revealed the fact that 23 per cent from Coimbatore, 11 per cent from Erode, 46 per cent from Tirupur, 21 per cent from Salem, 18 per cent from Kottayam, 35 per cent from Pathanamthitta, 25 per cent from Allepey and 28 per cent from Thrissur were businessmen.
- The details on annual income of the family revealed the fact that 41 per cent from Coimbatore, 22 per cent from Erode, 16 per cent from Tirupur, nine per cent from Salem, 28 per cent from Kottayam, 14 per cent from Pathanamthitta, 31 per cent from Allepey and 16 per cent from Thrissur had an income between Rs.45,000 to Rs. 2,15,000 and were categorized under the consuming class.
- It was noted that 83 per cent from Coimbatore, 53 per cent from Erode, 59 per cent from Tirupur, 67 per cent from Salem, 77 per cent from Kottayam, 80 per cent from Pathanamthitta, 56 per cent from Allepey and 76 per cent from Thrissur came from a nuclear family setup.
- It was obvious that 36 per cent from Coimbatore, 24 per cent each from Erode and Tirupur, 19 per cent from Salem, 29 per cent from Kottayam, 42 per cent from Pathanamthitta, 15 per cent from Allepey and 20 per cent from Thrissur had only three members in the family.
- The details regarding the number of children revealed the fact that 54 per cent from Coimbatore, 71 per cent from Erode, 64 per cent from Tirupur, 53 per cent each from Salem and Kottayam, 62 per cent from

Pathanamthitta, 60 per cent from Allepey and 43 per cent from Thrissur district had single child in the family.

- It was noted that 55 per cent from Coimbatore, 49 per cent from Erode, 56 per cent from Tirupur, 41 per cent from Salem, 21 per cent from Kottayam, 45 per cent from Pathanamthitta, 36 per cent from Allepey and 42 per cent from Thrissur skipped the breakfast. Lack of time to consume breakfast was one among the main reason listed out by the subjects in all the selected districts of Tamil Nadu and Kerala.
- Fifty per cent from Coimbatore, 55 per cent from Erode, 28 per cent from Tirupur, 65 per cent from Salem, 80 per cent from Kottayam, 57 per cent from Pathanamthitta, 59 per cent from Allepey and 53 per cent from Thrissur used computer regularly.
- It was observed that on weekdays 82 per cent from Coimbatore, 79 per cent from Erode, 65 per cent from Tirupur, 64 per cent from Salem, 49 per cent from Kottayam, 42 per cent from Pathanamthitta, 63 per cent from Allepey and 41 per cent from Thrissur districts spend more than an hour on screen. Fifty three per cent of the children Coimbatore, 51 per cent from Erode, 79 per cent from Tirupur, 42 per cent from Salem, 73 per cent from Kottayam, 65 per cent from Pathanamthitta, 80 per cent from Allepey and 60 per cent from Thrissur districts spend more than four hours on screen during weekends.
- It was observed that 79 per cent from Coimbatore, 84 per cent from Erode, 66 per cent from Tirupur, 69 per cent from Salem, 80 per cent from Kottayam, 81 per cent from Pathanamthitta, 61 per cent from Allepey and 60 per cent from Thrissur had the habit of snacking during screen time.
- It was clear that 51 per cent from Coimbatore, 37 per cent from Erode, 49 per cent from Tirupur, 65 per cent from Salem, 35 per cent from Kottayam, 36 per cent from Pathanamthitta, 41 per cent from Allepey and 45 per cent from Thrissur did not played regularly.

- It was obvious that 33 per cent from Coimbatore, 50 per cent from Erode, 44 per cent from Tirupur, seven per cent from Salem, 55 per cent from Kottayam, 52 per cent from Pathanamthitta, 34 per cent from Allepey and 44 per cent from Thrissur played both at school and home.
- It was interesting to know that 73 per cent of the subjects in Coimbatore, 85 per cent in Erode, 50 per cent in Tirupur, 56 per cent in Salem, 62 per cent in Kottayam, 69 per cent from Pathanamthitta, 64 per cent from Allepey and 81 per cent from Thrissur were interested in indoor games.
- It was obvious that 73 per cent from Coimbatore, 58 per cent from Erode, 56 per cent from Tirupur, 64 per cent from Salem, 66 per cent from Kottayam, 62 per cent from Pathanamthitta, 38 per cent from Allepey and 45 per cent from Thrissur were engaged in outdoor games only for a duration of less than thirty minutes.
- It was surprising to note that only five per cent from Coimbatore, nine per cent from Erode, 14 per cent from Tirupur, two per cent from Salem, nine per cent from Kottayam, none from Pathanamthitta, eight per cent from Allepey and seven per cent from Thrissur walked to school.
- It was observed that in all the selected districts of Kerala and Tamil Nadu the duration of physical education classes were less than one hour per week. But this period was mostly utilized for extra classes for the main subjects.
- It was clear that 59 per cent from Coimbatore, 41 per cent from Erode, 45 per cent from Tirupur, 63 per cent from Salem, 69 per cent from Kottayam, 42 per cent from Pathanamthitta, 64 per cent from Allepey and 65 per cent from Thrissur district receive pocket money from parents and relatives.
- It was noted that 23 per cent from Coimbatore, 25 per cent from Erode, 19 per cent from Tirupur, 17 per cent from Salem, 23 per cent from Kottayam, 19 per cent from Pathanamthitta, 25 per cent from Allepey and 30 per cent from Thrissur spend the pocket money they receive on sweets.

- It was found that 64 per cent from Coimbatore, 42 per cent from Erode, 64 per cent from Tirupur, 48 per cent from Salem, 40 per cent from Kottayam, 69 per cent from Pathanamthitta, 72 per cent from Allepey and 60 per cent from Thrissur had meals with parents only on weekends.
- The frequency of dining outside by the subjects in the selected districts were elicited. It was noted that 58 per cent of the subjects from Coimbatore, 69 per cent from Erode, 76 per cent from Tirupur, 72 per cent from Salem, 58 per cent from Kottayam, 71 per cent from Pathanamthitta, 62 per cent from Allepey and 69 per cent from Thrissur dined out once in a week regularly.
- It was noted that 79 per cent from Coimbatore, 75 per cent from Erode, 83 per cent from Tirupur, 59 per cent from Salem, 55 per cent from Kottayam, 63 per cent from Pathanamthitta, 65 per cent from Allepey and 59 per cent of the parents from Thrissur interacted with the subjects only for a small duration of fifteen to thirty minutes.
- It was clear that 23 per cent from Coimbatore, five per cent from Erode, 16 per cent from Tirupur, 13 per cent from Salem, 15 per cent from Kottayam, 26 per cent from Pathanamthitta, 23 per cent from Allepey and 27 per cent from Thrissur slept only for a duration of less than six hours daily.
- It was noted that 87 per cent from Coimbatore, 90 per cent from Erode, 96 per cent from Tirupur, 97 per cent from Salem, 100 per cent from Kottayam, 98 per cent from Pathanamthitta, 94 per cent from Allepey and 87 per cent from Thrissur district were non-vegetarins.
- The frequency of consuming non-vegetarian food stuffs by the selected subjects revealed the fact that 16 per cent from Coimbatore, 21 per cent from Erode, 22 per cent from Tirupur, 19 per cent from Salem, 22 per cent from Kottayam, 19 per cent from Pathanamthitta, 15 per cent from Allepey and seven per cent from Thrissur consumed the same everyday either as chicken, mutton or fish.

- Sixty four per cent from Coimbatore, 73 per cent from Erode, 50 per cent from Tirupur, 55 per cent from Salem, 64 per cent from Kottayam, 66 per cent from Pathanamthitta, 87 per cent from Allepey and 84 per cent from Thrissur preferred deep fat fried non-vegetarian food stuff.
- The favourite non-vegetarian food stuffs of the subjects were chicken, fish, meat and egg. It was noted that 79 per cent of the subjects from Coimbatore, 78 per cent from Erode, 69 per cent from Tirupur, 86 per cent from Salem, 69 per cent from Kottayam, 79 per cent from Pathanamthitta, 71 per cent from Allepey and 57 per cent from Thrissur preferred all the above food stuffs.
- The common breakfast food items preferred by the subjects were chapathi, idli, dosai, steamcake (puttu), appam, adai, upuma and sandwich.
- It was observed that 79 per cent each from Coimbatore, Tirupur and Allepey, 82 per cent from Erode, 65 per cent from Salem, 88 per cent from Kottayam, 74 per cent from Pathanamthitta, 68 per cent from Thrissur shared diet preferences similar to the parents.
- Seventy nine per cent of the subjects in Coimbatore, 80 per cent from Erode, 68 per cent from Tirupur, 69 per cent from Salem, 84 per cent from Kottayam, 65 per cent from Pathanamthitta, 82 per cent each from Allepey and Thrissur agreed that the mood of an individual affects their food choices to a great extent.
- It was shocking to note that 65 per cent from Coimbatore, 69 per cent from Erode, 73 per cent from Tirupur, 55 per cent from Salem, 64 per cent from Kottayam, 66 per cent from Pathanamthitta, 59 per cent from Allepey and 57 per cent from Thrissur did not prefer fruits and vegetables as they were fed with snacks from infancy.
- The milk consumption revealed the fact that 69 per cent from Coimbatore, 54 per cent from Erode, 62 per cent from Tirupur, 84 per cent from Salem, 74 per cent from Kottayam, 76 per cent from Pathanamthitta, 81 per cent

from Allepey and 80 per cent from Thrissur consumed milk thrice a day (300ml).

- It was clear that for 15 per cent from Coimbatore, 28 per cent from Erode, 25 per cent from Tirupur, 27 per cent from Salem, 28 per cent from Kottayam, 21 per cent from Pathanamthitta, 29 per cent from Allepey and for 52 per cent from Thrissur the fluid consumption was found to be less than 250 ml. The fluid consumed included milk, water, coffee, tea, carbonated beverages, shakes, etc.
- The favourite outside food stuffs of the obese subjects included noodles, Kentucky Fried Chicken (KFC), pizza, chat items and all fast foods, which were calorie dense.
- The favourite commercial drink of the subjects included cola, pepsi, maaza and seven up.
- It was clear that six per cent of the subjects from Coimbatore, three per cent from Erode, 10 per cent from Tirupur, three per cent from Salem, nine per cent from Kottayam, five per cent from Pathanamthitta, four per cent from Allepey and eight per cent from Thrissur consumed commercial foods and drinks everyday.
- Sixty five per cent from Coimbatore, 50 per cent from Erode, 65 per cent from Tirupur, 33 per cent from Salem, 45 per cent from Kottayam, 52 per cent from Pathanamthitta, 64 per cent from Allepey and 27 per cent from Thrissur preferred confectionary items.
- The mean nutrient intake of subgroups in the selected districts of Kerala and Tamil Nadu revealed the fact that the calorie intake and fat intake exceeded the Recommended Dietary Allowance (RDA). The calcium and protein intake met the RDA values while the iron intake was very poor when compared with the RDA (2010).
- It was also noted that four per cent from Coimbatore, eight per cent from Erode and Thrissur, five per cent from Tirupur and Allepey, three per cent

from Salem, 10 per cent from Kottayam and seven per cent from Pathanamthitta were allergic to certain food stuffs. The common allergents were milk, prawn, crab and egg.

- It was clear that 49 per cent from Coimbatore, 25 per cent from Erode, 14 per cent from Tirupur, 24 per cent from Salem, 25 per cent from Kottayam, 28 per cent from Pathanamthitta, 19 per cent from Allepey and 13 per cent from Thrissur had a birth weight greater than 3.5 kilograms.
- It was also noted that 43 per cent from Coimbatore, 23 per cent from Erode, 49 per cent from Tirupur, 62 per cent from Salem, 48 per cent from Kottayam, 45 per cent from Pathanamthitta, 19 per cent from Allepey and 29 per cent from Thrissur were the first child in the family.
- It was clear that 18 per cent from Coimbatore, three per cent from Erode, six per cent from Tirupur, two per cent from Salem, 13 per cent from Kottayam, 25 per cent from Pathanamthitta, six per cent from Allepey and 11 per cent from Thrissur were bottle fed during infancy.
- It was obvious that 30 per cent from Coimbatore, 50 per cent from Erode, 46 per cent from Tirupur, 47 per cent from Salem, 73 per cent from Kottayam, 59 per cent from Pathanamthitta, 23 per cent from Allepey and 33 per cent of the subjects from Thrissur district were breastfed only for a short duration which was less than six months.
- It was clear that for 45 per cent of the subjects in Coimbatore, 54 per cent from Erode, 24 per cent from Tirupur, 47 per cent from Salem, 53 per cent from Kottayam, 62 per cent from Pathanamthitta, 31 per cent from Allepey and for 36 per cent of the subjects from Thrissur, the weaning was started in the fourth month itself.
- The duration of weaning lasted for about two years for 44 per cent from Coimbatore, 35 per cent from Erode, 38 per cent from Tirupur, 29 per cent from Salem, 24 per cent from Kottayam, 41 per cent from Pathanamthitta, 25 per cent from Allepey and for 22 per cent from Thrissur.

- The type of weaned food used by the mothers for the subjects included commercial tinned foods, homemade foods with cereal-pulse combination, regular home diets and special feeds like Amirtham. Sixty three per cent from Coimbatore, 53 per cent from Erode, 58 per cent from Tirupur, 65 per cent from Salem, 83 per cent from Kottayam, 81 per cent from Pathanamthitta, 63 per cent from Allepey and 62 per cent from Thrissur were fed on commercially marketed tinned foods, mainly cerelac.
- The growth pattern of the subjects revealed that 27 per cent from Coimbatore, 51 per cent from Erode, 65 per cent from Tirupur, 31 per cent from Salem, 79 per cent from Kottayam, 12 per cent from Pathanamthitta, 25 per cent from Allepey and 61 per cent from Thrissur exhibited a steady growth pattern during infancy.
- It was reported that 62 per cent from Coimbatore, 45 per cent from Erode, 36 per cent from Tirupur, 59 per cent from Salem, 55 per cent from Kottayam, 49 per cent from Pathanamthitta, 25 per cent from Allepey and 37 per cent from Thrissur lost weight during infancy. The reasons for weight loss as said by the mothers included infection, measles, chicken pox and fever and poor food intake.
- All the selected subjects were immunized regularly except a few from the districts of Erode, Tirupur and Allepey.
- The visit to a paediatrician were done only during illness for 62 per cent from Coimbatore, 26 per cent from Erode, 37 per cent from Tirupur, 65 per cent from Salem, 26 per cent from Kottayam, 45 per cent from Pathanamthitta, 86 per cent from Allepey and 51 per cent from Thrissur
- It was surprising to note that 43 per cent from Coimbatore, 53 per cent from Erode, 65 per cent from Tirupur, 83 per cent from Salem, 69 per cent from Kottayam, 74 per cent from Pathanamthitta, 62 per cent from Allepey and 69 per cent of the parents from Thrissur were of the opinion that their child had a good nutritional status at present, despite the fact that only obese children were selected for the present research.

- Eight three per cent of the mothers from Coimbatore, 66 per cent from Erode, 48 per cent from Tirupur, 88 per cent from Salem, 79 per cent from Kottayam, 64 per cent from Pathanamthitta, 49 per cent from Allepey and 69 per cent from Thrissur experienced a complicated pregnancy. The type of complications included stress, anemia, hypertension, diabetes mellitus, overweight, underweight and oedema, though the pace and pattern differed in each district.
- The weight gain for mothers during pregnancy period were found to be +20 to 25 kilograms for 20 per cent from Coimbatore, 23 per cent from Erode, 34 per cent from Tirupur, 19 per cent from Salem, 26 per cent from Kottayam, 19 per cent from Pathanamthitta, one per cent from Allepey and 20 per cent from Thrissur.
- It was noted that 63 per cent from Coimbatore, 82 per cent from Erode, nine per cent from Tirupur, 12 per cent from Salem, 72 per cent from Kottayam, 77 per cent from Pathanamthitta, seven per cent from Allepey and 80 per cent from Thrissur resided in an urban area.
- It was observed that 77 per cent from Coimbatore, 42 per cent from Erode, 23 per cent from Tirupur, 48 per cent from Salem, 28 per cent from Kottayam, 78 per cent from Pathanamthitta, 16 per cent from Allepey and 45 per cent from Thrissur resided in apartments where the free space available was less when compared to an individual house with a courtyard.
- It was noted that 63 per cent from Coimbatore, 59 per cent from Erode, 34 per cent from Tirupur, 64 per cent from Salem, 61 per cent from Kottayam, 54 per cent from Pathanamthitta, 73 per cent from Allepey and 69 per cent from Thrissur were from well-off families and had a high socio-economic status.
- Eighty per cent of the schools selected for the present study in the states of Kerala and Tamil Nadu were considered as obesogenic schools as these schools offered little space for playgrounds and the physical learning classes were not as active as in the other schools. The reasons being bad

climate. It was also observed many a times that the physical training classes were mostly substituted by regular classes in order to cover the portions on time.

- It was clear that 46 per cent from Coimbatore, 72 per cent from Erode, 80 per cent from Tirupur, 59 per cent from Salem, 51 per cent from Kottayam, 65 per cent from Pathanamthitta, 81 per cent from Allepey and 68 per cent from Thrissur do attend tuition classes after school.
- The duration of tuition classes exceeded for more than two hours daily for 34 per cent from Coimbatore, 14 per cent from Erode, 15 per cent from Tirupur, 23 per cent from Salem, 30 per cent from Kottayam, 19 per cent from Pathanamthitta, 10 per cent from Allepey and 31 per cent from Thrissur.
- No time was spent on physical activity by 35 per cent of the subjects from Coimbatore, 21 per cent from Erode, 51 per cent from Tirupur, 45 per cent from Salem, 32 per cent from Kottayam, 27 per cent from Pathanamthitta, 37 per cent from Allepey and 32 per cent from Thrissur. Rest of the subjects engaged in activities like walking, dancing, swimming, playing and exercise.
- It was elicited that 95 per cent from Coimbatore, 79 per cent from Erode, 82 per cent each from Tirupur and Salem, 76 per cent from Kottayam, 75 per cent from Pathanamthitta, 90 per cent from Allepey and 69 per cent from Thrissur had a family history of obesity.
- It was evident from the present research that 42 per cent from Coimbatore, 29 per cent from Erode, 25 per cent from Tirupur, 15 per cent from Salem, 19 per cent from Kottayam, 17 per cent from Pathanamthitta, 12 per cent from Allepey and 13 per cent from Thrissur had gestational diabetes.
- It was found that one per cent from Coimbatore, three per cent from Erode, 15 per cent from Pathanamthitta, 10 per cent from Allepey and three per cent from Thrissur had single parent. Death or divorce of the partners resulted in single parenthood.

- The working details of the parents revealed the fact that both parents were working for 64 per cent of the subjects from Coimbatore, 48 per cent from Erode, 15 per cent from Tirupur, 25 per cent from Salem, 43 per cent from Kottayam, 82 per cent from Pathanamthitta, 22 per cent from Allepey and 66 per cent from Thrissur.
- Six per cent of the mothers from Coimbatore, one per cent each from Erode and Kottayam and two per cent from Thrissur admitted the fact that they had a crave for smoking during pregnancy.
- It was obvious from the study that advertisements influenced the food choices of the children to a greater extent. 83 per cent from Coimbatore, 74 per cent from Erode, 85 per cent from Tirupur, 96 per cent from Salem, 94 per cent from Kottayam, 84 per cent from Pathanamthitta, 70 per cent from Allepey and 96 per cent from Thrissur agreed that advertisements influence their choice for food.
- The study revealed the fact that there was an increasing trend in the percentage of overweight and obesity among the tribes of Idukki and Nilgris district, though underweight children were more predominant.

CONCLUSION

The results of the study exposed the fact that the percentage of obese children is on the rise in Kerala and Tamil Nadu, like in other states of India and globally. The study also showed that the socio economic factors like income of the family, family system, residential area and birth order of the child are positively associated with the prevalence of childhood obesity. In short the study showed that life style pattern like family history, minimum physical activity, long duration of screen time, snacking during screen time, dining outside very frequently and sleep pattern of the child do contribute to childhood obesity. Dietary habits like frequent consumption of deep fat fried fleshy foods; fast food consumption and soft drinks consumption play a vital role in increasing the number of obese children. Infant nutritional factors like duration of breast feeding initiation of weaning and type of foods weaned on

contributed more to obesity risk than pre natal weight gain of mothers, complications during pregnancy and breast feeding pattern.

So it was concluded that the increasing trend of the modern day epidemic of overweight and obesity in children calls for immediate action to reduce the incidence through appropriate nutritional intervention programmes involving school children, their parents and school authorities. Health professionals and policy-makers should focus on primordial or primary prevention of childhood obesity, in low- and middle-income countries, which are facing an epidemic of chronic non communicable diseases in the near future. If immediate measures are not taken the condition can lead to serious problems beyond repair.

SUGGESTIONS FOR FURTHER RESEARCH

- Formulation and supplementation of a fibre rich snack to obese children and its impact.
- Educate the obese population on the consumption of healthy snacks.
- Encourage children to have balanced diet through nutrition education.
- Engage children in physical activities which would spend the energy and assess its impact.
- Health status of tribal population in the states of Kerala and Tamil Nadu
- Association of obesity with heredity in selected school children.