“A Pilot Study of Iron Deficiency Anemia, Vitamin D Status and Health Awareness in children of Rural Tamil Nadu”
(2014-2015)

Sponsored by

TAMILNADU PLANNING COMMISSION, CHENNAI.

Conducted by
Kanchi Kamakoti CHILDS Trust Hospital and
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Chennai - 600 034
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Final study Report
A Pilot Study of Iron Deficiency Anemia, Vitamin D Status and Health Awareness in children of Rural Tamil Nadu.

Introduction:

Anemia prevalence in young children continues to remain over 70% in most parts of India despite a policy being in place and a program that has been initiated for a long time. The irreparable damage that anemia in childhood can cause particularly to the development of a young child on one hand and the knowledge and mechanism available for its control on the other, makes this silent morbidity completely unacceptable in modern times where we strive for millennium development Goals.

Worldwide, at any given moment, more individuals have iron-deficiency anemia than any other health problem (1). Anemia is the most common morbidity among micronutrients and affects health, education, economy, and productivity of the entire nation. Anemia, like fever, is a manifestation and not a disease per se. The most common group among the causes for anemia is malnutrition and among that group, iron deficiency makes up the bulk of it. A large portion of iron deficiency is preventable with appropriate and timely intervention. Iron deficiency as vitamin D deficiency is the most common nutritional disorder in the world. The numbers are staggering: two billion people — over 30% of the world’s population — are anemic, mainly due to iron deficiency; and in developing countries this figure is frequently exacerbated by malaria and worm infections (2). Iron deficiency affects more children than any other condition, making it a public health epidemic. The effects of anemia on children are the most dire because their bodies are still developing, including the brain, which is the fastest developing organ in infancy and early childhood.

Iron deficiency, and the anemia that results from it, is a major health problem affecting more than 3.5 billion people in developing countries, impairing the cognitive development of children. Anemia is most often a hidden deficiency, with a few overt symptoms (3).
There are no current estimates of the total Iron Deficiency cases, but based on anemia as an indicator, it is estimated that most preschool children in developing counties are iron deficient (4) (See Table 1).

Vitamin D deficiency prevails in epidemic proportions all over the Indian subcontinent, with a prevalence of 70%–100% in the general population. In India, widely consumed food items such as dairy products are rarely fortified with vitamin D. Indian socioreligious and cultural practices do not facilitate adequate sun exposure, thereby negating potential benefits of plentiful sunshine. Consequently, subclinical vitamin D deficiency is highly prevalent in both urban and rural settings, and across all socioeconomic and geographic strata. Vitamin D deficiency is likely to play an important role in the very high prevalence of rickets, osteoporosis, cardiovascular diseases, diabetes, cancer and infections such as tuberculosis in India (5).

Vitamin D deficiency has a bearing not only on skeletal but also on extra skeletal diseases. Owing to its multifarious implications on health, the epidemic of vitamin D deficiency in India is likely to significantly contribute to the enormous burden on the healthcare system of India. Cultural and social taboos often dictate lifestyle patterns such as clothing—that may limit sun exposure and vegetarianism—which certainly limits vitamin D rich dietary options. Most Indians are vegetarians. The socioeconomically backward people constitute a large percentage of the population in India. The underprivileged generally suffer from overall poor nutrition. Vitamin D rich dietary sources are limited and unaffordable to most Indians (6,7).

There is Paucity of data regarding prevalence of vitamin D and iron deficiency in Tamil Nadu particularly in rural Tamil Nadu. Hence we have attempted this study.

**Aims & Objectives of Kanchi Kamakoti CHILDS Trust Hospital:**

The aims and objectives of this benevolent mission will be to provide basic pediatric health services not only at a tertiary care level services offered at Chennai, but also as outreach program (Mahaswami Rural Telemedicine Project) in rural Kanchipuram district –

✓ At an affordable to low income group and lower middle class.
✓ To keep tertiary care pediatric services at reach of common man.
✓ Ambulance service – Any sick children who need inpatient care will be transferred to Kanchi Kamakoti CHILDS Trust Hospital in Chennai in hospital ambulance from anywhere.

Aims and Objectives of this pilot study:

1) To determine the status of Iron deficiency, Vitamin D deficiency and the awareness among rural populace regarding nutrition, immunization, family planning and sanitation in children of Rural Tamil Nadu. This is a community based study done at the grass root level with direct interaction with the rural populace.
2) To determine the sunlight exposure behavior of children in rural areas of Tamil Nadu since this might have a direct bearing on the prevalence of Vitamin D Deficiency in Rural Children.

Material and methods:

All children (whose parents give consent) attending our outpatient department, from February 2014 to December 2014 were included in the study.

History was elicited from all the families regarding diet, iron deficiency, exposure to sunlight (to identify risk for Vitamin D Deficiency) nutritional awareness, vaccination and sanitation, on the basis of a pre-prepared questionnaire (the questionnaires are included in the annexures). Complete physical examination and nutritional assessment will be carried out by the medical team. From all the included subjects a blood sample will be taken to assess hemoglobin level and serum calcium, phosphate and serum alkaline phosphatase (SAP). SAP will serve as a screening tool for vitamin D deficiency and if clinically or biochemically indicated further tests will be carried out wherever needed and appropriate.

Inclusion criteria for cases:  Age 0 – 18 years.

Exclusion criteria: Aged > 18 years.

Parents unwilling to get their wards included in the study.
Statistics:

This is a prospective, descriptive study to determine the prevalence of iron deficiency anemia, proneness to hypovitaminosis D and awareness regarding nutrition, immunization, family planning and sanitation in the rural populace. The sample size was finalized based on the prevalence of iron deficiency anemia and vitamin D deficiency in Indian subcontinent, after discussing with the statistician.

Sample Size:

1010 subjects were selected based on nutritional status. They were chosen from Rural Children attending our hospital outpatient department or from those seen in Health Camps conducted by our Hospital. Subjects were covered from Chengalpet, Thiruvannamalai, Cuddalore, Thiruvallur and Kanchipuram, Arakkonam, Kumbakonam, Vellore District, Chennai peripheral area. (Approximately 12 to 22% in each).

Laboratory Work Up:

All the included children will be worked up with hemoglobin level, red cell indices and serum calcium, phosphate, Vitamin D level, intact PTH and serum alkaline phosphatase (SAP).

Data Analysis:

1) Anaemia – Prevalence and Severity

2) Exposure to Sunlight – Adequacy and Inadequacy – Prevalence

3) Vitamin D Deficiency – Prevalence and its relation to Exposure to sunlight exposure

4) Knowledge, Awareness of healthy Dietary practices in relation to Iron and Calcium Intakes

5) Prevalence of Other Micronutrient deficiencies with overt manifestations
Results and Discussion:

We have analyzed a total of 1010 children and the results are as follows. In total 476 (47.12%) were male children and 532 (52.8%) were female children. This data is only from the cohort of kids whose parents have given consent so cannot be extrapolated to state that the gender percentage of females in on the rise.

Among the total cohort 0-4 years age group was 18 (1.7%), 5-10 years was 394 (39%), 11-15 years 480 (47.5%) and 16-18 years 118 (11.6%) respectively (see figure 1).

We analyzed the family size in rural population and families with only 2 kids and who had completed their families were majority. According to World Health Organization (WHO) exclusive breast feeding is advocated till 6 months of age. We enquired in our questionnaire as to how many people knew about it and its importance. 937 (92.7%) knew about the importance of exclusive breast feeding and its advantages till 6 months of age of the baby (see figure 2). After the concept of exclusive breast feeding till 6 months, we enquired about the awareness of the families regarding starting of complementary feeds at 6 months of age. 821 (81.28%) know about the importance of complementary feeding at 6 months age and 189 (18.7%) were continuing only breast feeding even after 6 months of age.

906 (89.7%) knew about the importance of birth spacing and had spaced out and planned pregnancies at intervals of 3 years (see figure 3). Surprisingly the knowledge about iron rich foods 954 (94.4%) was adequate and the rest did not have the knowledge about vegetarian iron rich sources.

Parents want to do everything possible to make sure their children are healthy and protected from preventable diseases. Vaccination is the best way to do that. Vaccination protects children from serious illness and complications of vaccine-preventable disease. Vaccine-preventable diseases, such as measles, mumps, and whooping cough, are still a threat. Though vaccination has led to a dramatic decline in the number of cases of several infectious diseases, we included in our questionnaire the knowledge about importance of vaccines and vaccine preventable diseases. 931
(92.1%) had awareness about age specific vaccines for vaccine preventable diseases (see figure 4). 686 (67.9%) had the knowledge about what vaccines prevent which diseases and they told that they had acquired that knowledge when they enquired about the vaccines being put for their kids in the vaccination clinics either government run or private owned (see figure 5). The superbly planed and implemented government pulse polio program is bearing result now. Among the study families 918 (90.8%) were aware, even before the mass media advertisements by the government agencies, about the importance of pulse polio immunization (see figure 6).

A healthy, balanced diet for children provides essential vitamins, minerals and other nutritional goodies that kids need for healthy growth and development. Vitamins and minerals are vital for our bodies to function properly and each one plays a specific role in the body. Calcium is vital for strong, healthy bones and teeth. Good sources of calcium include dairy products (milk, yoghurt and cheese), green leafy vegetables and bony fish. Vitamin C - supports little immune systems and is also needed to form collagen, which is essential for the development of healthy bones, gums and blood vessels. Good sources of vitamin C include citrus fruits (lemons, limes and grapefruit), strawberries and broccoli. B vitamins - work together to help the body convert the food we eat into energy and provide the support kids need to stay active. Good sources of B vitamins include whole grains, poultry and eggs. Iodine - is a mineral required for normal brain development, concentration and learning ability, making it crucial to support young brains. Good sources of iodine include seafood and fortified bread. Zinc - is needed for normal growth and development in infants and supports healthy immune function in kids. Good sources of zinc include seafood, meat and beans. 906 (89.7%) had the awareness of incorporating high protein diet in their regular diet (see figure 7).

It is a well-known fact that, inadequate supply of iodine during gestation results in damage to the fetal brain that is irreversible by mid-gestation unless timely interventions can correct the accompanying maternal hypothyroxinemia. Even mild to moderate maternal hypothyroxinemia may result in suboptimal neurodevelopment. So in our questionnaire we incorporated the question – as to how many know about the
importance of iodine in the diet. But this knowledge was not as ubiquitous as the knowledge about high protein diet and only 764 (75.6%) know about the importance of iodine in the diet and about its importance in relation to the neurological development and consequences (see figure 8).

Coming to the basic theme of the study about knowledge about the iron and its importance in diet - 954 (94.4%) know about the importance of iron in the diet and about its importance in relation to the hematological consequences and some of them even knew about the neurological issues of anemia (only the families who had a hyperactive kid in the family and who had been prescribed iron for hyperactive kids in the past by pediatricians) (see figure 9).

The great variety of national dishes and dietary patterns that have sustained diverse populations throughout the world and over many years, clearly indicates that different combinations of food can lead to good nutritional status. These combinations may include foods from different groups like cereals and pulses, fruits and vegetables, milk and milk products, nuts and oilseeds, meat, fish and poultry etc. However, cereals and pulses play a predominant role in diets of developing countries. Cereals are the cheapest sources of food energy and contribute a high percentage of calories and proteins in the diets of Indian population. Pulses are considered as poor man’s meat due to their high protein content ranging from 20 to 40% and this makes them important in human food from nutrition point of view (8). Based on this we attempted in our study to estimate as to how many people in general rural populace knew about the importance of mixing cereal s and pulses in appropriate quantities. 765 (75.7%) know about the importance of mixing cereals and pulses in the regular staple diet (figure 10).

Many people in the world suffer from water borne diseases. Water receives microorganisms from air, sewage, soil and other organic wastes. Fecal pollution of water leads to introduction of variety of intestinal pathogens that causes water borne diseases (9). Defecation on boundaries of water bodies results in bacteriological contamination (10). Millions of people in many states in India are affected by waterborne diseases and a large number of them are in crippling stage and leading
vegetative life (11). According to WHO, about 600 million episodes of diarrhea and 40,00,000 childhood deaths are reported per year due to contaminated water and lack of sanitation. Based on this back ground information, we estimated the knowledge of general public on the fallacies of open air defecation. 980 (97%) of the population knew about the fallacies of open air defecation (see figure 11). In association with the same safe and hygienic practices, 790 (78.2%) of the population knew about cholera and worm infestations (see figure 12).

The most beneficial intervention to prevent communicable diseases at home based setting is hand-hygiene education with use of non-antibacterial soap. Use of antibacterial soap showed little added benefit compared with use of non-antibacterial soap. Hand hygiene is clearly effective against gastrointestinal and, to a lesser extent, respiratory infections (12). In this regards we attempted to find out as to how many people in general population know about the importance of hand washing. 993 (98.3%) knew about the importance of hand hygiene and hand washing before feeding the kids and before cooking/ food handling and after defecation (see figure 13).

Preventing mosquitoes from breeding in standing water could be an effective and relatively inexpensive supplementary strategy. This method, known as larval source management (LSM), formed the mainstay of early malaria control operations, and was used with great success historically all over the world. We estimated the knowledge of prevention of malaria and prevention of water stagnation in the general populace. 977 (96.7%) knew about the importance avoiding stagnation to prevent malaria (see figure 14).

Little if any cutaneous production of vitamin D3 occurs at latitudes above and below 35° N and 35° S during the winter months. It was postulated that those residing in tropics synthesize enough vitamin D3 year round. Several studies have documented the effect of latitude, season and time of the day on the cutaneous production of vitamin D3 in an ampoule model. Studies from India have shown high prevalence of vitamin D deficiency despite abundant sunshine (13). So we estimated with a questionnaire - the hours of exposure to sunlight. 61 (6%) were exposed between 7am-9am, 23 (2.1%) were exposed between 9am-11am, 10 (0.9%) were exposed between
11am-1pm, 18 (1.7%) were exposed between 1pm-3pm, 613 (60.6%) were exposed between 3pm-5pm, 221 (21.8%) were exposed between 5pm-7pm and 64 (6.2%) do not spend time playing outdoors (see figure 15).

We observed that majority of children had inadequate sunlight exposure (less than 30 minutes per week). Most children had negligible sunlight exposure only between 3 pm to 5 pm during which cutaneous production of Vitamin D is inefficient. (613/1010). Interestingly only 61 children had sunlight exposure between 9 am to 3 pm thus denying them the best chances of natural Vitamin D production. 434 out of 1010 children assessed had been wearing long sleeves and long pants most of the day thus again limiting effective sunlight exposure thus making them susceptible to Vitamin D Deficiency.

86% of the children had inadequate sunlight exposure based on the information from the parents (This information is indicative of changing lifestyle and could be a significant risk factor for Vitamin D Deficiency). This might be due to the fact that in most schools PT classes and drills are usually held in the afternoon than in the morning hours.

It has been studied and reported that the best time for UV Light exposure for cutaneous synthesis of vitamin D is between 10 and 2 pm. Most school children are unfortunately in their shady class rooms than outdoors on schooldays and in front of TV screens indoors on holidays at home.
Conclusions:

✔ Milk Consumption amongst Rural Children is Low. (average being 210 ml/day much lower than the recommended minimum of 300 ml). This makes them vulnerable to dietary calcium deficiency exposing them to the risk of metabolic bone diseases and short stature.

✔ Majority of Rural Children are given commercial food/milk supplements. There is a need to promote correct and economical methods of providing low cost food supplements to school children in rural areas. Parent education is the need of the hour in this direction.

✔ Awareness about Immunization, Hygiene Practices, Birth spacing and Benefits of Breast Feeding is High amongst Parents of Rural Children.

✔ Nearly 1/3rd of Rural Children are Anaemic based on WHO Definition. (32.3%). Consideration for more vigorous Iron Supplementation program particularly in infants and toddlers is mandatory by governmental and non governmental agencies.

✔ Exposure to Sunlight is Insufficient in Majority of Rural Children. This is mainly due to the fact that Physical Education sessions are held during afternoons in most schools thus limiting efficient sunlight exposure during the best hours for UV radiation between 10 am to 2 pm.

✔ Overt Vitamin D Deficiency is uncommon in Rural Children.

✔ Vitamin D deficiency awareness and the need for sunlight exposure need to be taken in to the general public through mass media.

✔ Public are already aware of the communicable diseases and also about malaria menace. They need to be encouraged the prevention of mosquito breeding sites etc.

✔ Mass supplementation of vitamin D, during all the vaccination visits, like vitamin A during measles and MMR vaccinations should be given a serious thought.
RECOMMENDATIONS:

1) Intensification of parent education on appropriate supplementary feeding in rural areas of Tamil Nadu.

2) More effective governmental programs for Iron Supplementation of infants and children routinely are needed in rural areas.

3) Consideration for Schools to implement Outdoor Physical Education Sessions to be held between 10 am to 2.00 pm ensuring at least 30 minute sunlight exposure per week will be a right step in preventing Vitamin D Deficiency in children.
Table 1 shows the World Health Organization defined criteria for anemia cut off as measured by the hemoglobin (4). This cut-off is used at sea level only and those who reside at a higher altitude will have a higher hemoglobin level, necessitating an adjustment to their level of hemoglobin consideration, in assessing anemia, so as to account for their physiological increase in hemoglobin.
Figure 1:
AGE DISTRIBUTION

Age distribution of the 1010 study cohort. 0-4 years age group was 18 (1.7%), 5-10 years was 394 (39%), 11-15 years 480 (47.5%) and 16-18 years 118 (11.6%) respectively.

Figure 2:
AWARENESS – EXCLUSIVE BREASE FEEDING AGE

937 (92.7%) knew about the importance of exclusive breast feeding and its advantages till 6 months of age of the baby.
Figure 3:
AWARENESS – IMPORTANCE OF BIRTH SPACING

906 (89.7%) knew about the importance of birth spacing and had spaced out and planned pregnancies at intervals of 3 years.

Figure 4:
AWARENESS ABOUT AGE WISE VACCINES

931 (92.1%) had awareness about age specific vaccines for vaccine preventable diseases.
686 (67.9%) had the knowledge about what vaccines prevent which diseases.

Among the study families 918 (90.8%) were aware, even before the mass media advertisements by the government agencies.
906 (89.7%) had the awareness of incorporating high protein diet in their regular diet.

764 (75.6%) know about the importance of iodine in the diet and about its importance in relation to the neurological development and consequences.
954 (94.4%) know about the importance of iron in the diet and about its importance in relation to the haematological consequences and some of them even knew about the neurological issues of anaemia.

765 (75.7%) know about the importance of mixing cereals and pulses in the regular staple diet.
980 (97%) of the population knew about the fallacies of open air defecation.

Figure 12:
KNOWLEDGE OF COMMUNICABLE DISEASES (CHOLERA / WORM INFESTATIONS)

790 (78.2%) of the population knew about cholera and worm infestations.
993 (98.3%) knew about the importance of hand hygiene and hand washing before feeding the kids and before cooking/ food handling and after defecation.

977 (96.7%) knew about the importance avoiding stagnation to prevent malaria.
Figure 15:
References:


Appendix – Questionnaire
துற்றகாலத்தை ஆராத்து, கொண்டாம் முக்கியமான நூற்று ஆசிரியர்களான அமை

(சூத்தேஸ்வரன் விழாகுடை கிருஷ்ண கவிஞர்களின் புத்தாண்டு வாசகாலம்)

அருகிலுள்ள படம் : ................................................................. மலர் : ............... பரிதைச: ☐ அவசண நூற்று குறிக்குறி: .................................................................

தலவாள் படம் : .................................................................................................................................

மலர் : .................................................................................................................................

எதிராளி : .................................................................................................................................

........................................................................................................................................................................

பொருள்கள் குறிப்பிட்டுக் கிளைநிலை: 

1. குன்றிய கிருஷ்ணக் குட்டி அச்சாரத்தை புரிந்து ஓடிசலாம் ☐ கதிரவை ☐ கதிரிலை

2. குறுக்கு புரிந்து கிருஷ்ணக் குட்டி அச்சாரத்தை புரிந்து ஓடிசலாம் ☐ கதிரவை ☐ கதிரிலை

3. கணவன் வணங்கி குட்டி அச்சாரத்தை கோவிலுக்கு புரிந்து ஓடிசலாம் ☐ கதிரவை ☐ கதிரிலை

4. குறி (Salt) குறிப்பிட்டு, கரடு கொண்டு தூக்கியுள்ளாமே புரிந்து, சூத்தேஸ்வரன் பரிதைச கிளைநிலைக்கு குட்டி வருவது புரிந்து ஓடிசலாம் ☐ கதிரவை ☐ கதிரிலை

5. உலகப் பொருள் (Balanced diet) குறிப்பிட்டு தூக்குகின்றே கிளைநிலையை புரிந்து ஓடிசலாம் ☐ கதிரவை ☐ கதிரிலை

6. குருக்கொண்டு கிருஷ்ணக் குட்டி (Complementary diet)

நூற்று பொருள் /பார்க்கள் குறிப்பிட்டு கிளைநிலையை புரிந்து ஓடிசலாம் ☐ கதிரவை ☐ கதிரிலை

7. குருக்கொண்டு கிருஷ்ணக் குட்டி குறிப்பிட்டு கிளைநிலையை புரிந்து ஓடிசலாம் ☐ கதிரவை ☐ கதிரிலை

கருத்து காலப் பாடல்:

1. குறுக்கு குறிப்பிட்டு கிருஷ்ணக் குட்டி புரிந்து ஓடிசலாம்?

☐ கதிரவை படம் ☐ கதிரவை மலர் ☐ பிரித் திளக

2. குறுக்கு குறிப்பிட்டு?

☐ சுருக்க படம் ☐ மலர் -

3. குறுக்கு குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு?

☐ மலர் - ☐ மலர் -

4. குறுக்கொண்டு குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு குறி குறிப்பிட்டு?

☐ கதிரவை ☐ கதிரிலை

5. பொருள் குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு?

☐ கதிரவை ☐ கதிரிலை

குறுக்கு:

1. குறுக்கு குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு குறிப்பிட்டு?

☐ கதிரவை ☐ கதிரிலை

2. குறுக்கொண்டு குறிக்குறி குறுக்கொண்டு குறிப்பிட்டு குறிப்பிட்டு?

☐ கதிரவை ☐ கதிரிலை

KKCTH/CTMRF/TPC/2014
3. Pulse Polio கட்லும்பு முறைக் காற்றலம் முதல் பழக்கம் தொடர்கை நிறைவு

4. கிளை செய்செய்யு (Pneumoccal, Typhoid) முறைக் காற்றலம்

கருகைகள்:

1. பூக்கிக்குறைவு வேலை குழாவிகளுக்கு குறைவுப் பரிமாற்றத் தொடர

2. கைதூட்டு வீரியங்கள் (கைக் கைவேலை) புற்று

3. பல குழாவிகள் ஆறியும் புற்று

4. மாசைகள்/யூதைகள் வேளாண்மை காற்றலம் குழாவிகளுக்கு முன் பரிமாற்றம் தொடர்கை நிறைவு

5. குழாவ் நேரங்கள் பல்குறைவு புழாப்புகளுக்கு புற்று

6. குழாவ் தெற்குகள் புழாப்புகளுக்கு புற்று (செருட்டா/சென்றா/சென்றார்/சென்றார்) குழாவிகள் புழாப்புகள்.

7. குழாவுகள் நேரங்களில் புழாப்புகளும் குழாவுகளும் குழாவுகள்

(குழாவுகள் வேலை குழாவிகளுக்கு புழாப்பு குழாவிகளுக்கு புழாப்பு குழாவிகளுக்கு)

கொடுப்புக்கள் - D புற்று:

1. குழாவில் குறிக்குரிய மருத்துவ முறையில் முறையிட்டு குழாவின் குழாவிங்கு முறையிட்டு குழாவிங்கு?
   ☐ கவலை 7-9 ☐ கவலை 9-11 ☐ கவலை 11-மூன்றும் 1 ☐ மூன்றும் 1-3 ☐ மூன்றும் 3-5 ☐ மூன்றும் 5-7

2. பாதுகாப்பாக குழாவிங்கு புற்று
   ☐ குழாவிங்கு புற்று? அமைப்பு: குழாவிங்கு
   ☐ குழாவிங்கு புற்று? அமைப்பு: குழாவிங்கு

3. குழாவிங்கு நேரங்கள் (வேளாண்மை) குழாவிங்கு புற்று மற்றும் குழாவிங்கு?
   ☐ குழாவிங்கு குழாவிங்கு அமைப்பு: குழாவிங்கு
   ☐ குழாவிங்கு அமைப்பு: குழாவிங்கு

4. குழாவிங்கு புழாப்பு முறையிட்டு குழாவிங்கு?
   ☐ குழாவிங்கு குழாவிங்கு
   ☐ குழாவிங்கு

5. குழாவிங்கு (Long Sleeves) முறையிட்டு குழாவிங்கு (Long Pants)
   குழாவிங்கு குழாவிங்கு

6. குழாவிங்கு புற்று (Sunscream Cream) குழாவிங்கு புழாப்பு முறை?
   ☐ குழாவிங்கு குழாவிங்கு
Annexure 1

Awareness regarding Nutrition, Sanitation, Family planning,
Immunization in Rural Kancheepuram, Tamilnadu

Nutrition:
1. Knowledge about iron rich foods – YES/NO (leafy vegetables/jaggery/drumsticks)
2. High Protein diet – YES / NO (Eggs/ pulses/ soya beans/ meat)
3. Mixed diet or vegetarians, do they know importance – YES / NO
4. Know the importance mixing pulses & cereals for balanced diet – YES / NO
5. Do they know about Iodine & its importance in mental ability – YES / NO
6. When should Complementary feeding be started - _______months
7. Knowledge about what complementary feeds can be started – YES / NO
8. Awareness about till what exclusive breast feeding should be done – YES / NO

Family Planning:
1. How many children have they got ______
2. Do they know importance of birth spacing – YES / NO
3. Awareness that they should follow birth spacing – YES / NO
4. Awareness about problems of no birth spacing (IUGR/ Prematurity) - YES / NO
5. Hospital delivery of or home delivery - ____________
6. Knowledge of importance of normal birth weight – YES / NO

Immunization:
1. Do they know age wise vaccines – YES / NO
2. Awareness of what vaccines to prevent what diseases – YES / NO
3. Do they know importance of pulse polio immunization – YES / NO
4. Awareness of optional vaccines – YES / NO

Sanitation:
1. Do they know the disadvantages of open air defecation – YES / NO
2. Knowledge of communicable diseases (Cholera/ Worm infestations) – YES / NO
3. Awareness of importance of hand washing - YES / NO

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4. Malaria prevention by avoiding water stagnation – YES / NO
5. Do they wash vegetables etc before cooking – YES / NO

Annexure 2

A Study Of Prevalence & Awareness Of Anemia in Rural Tamilnadu

Name:                                                     Age:               Gender: M / F     MRD:

Address/Village name:

Family H/o:
Similar c/o pallor_________ Bld transfusion_________ Early
death__________
Consanguinity_________ Gall stones__________

Awareness of mother:
Iron rich foods /cooking vessels/ regular deworming/ symptom pick up- fatigue/pallor

Investigations:
Hb%: calcium: phosphorus: SAP: vitamin D:

Annexure 3

Questionnaire on assessment in sunlight exposure and life style for vitamin D deficiency

✓ How many hours per day do you spend outdoors and at what time?
(7am to 9am/ 9am to 11am/ 11am to 1pm/ 1pm to 3pm/ 3pm to 5pm/ 5pm to 7pm).
✓ The time spent outdoors is spent under the sun or under tree/ cloud cover.
✓ Do you go for vacation regularly?
✓ If yes – what season and in which climate/ season?
✓ What percent of your time per day are you wearing a brimmed hat or head
dress?
✓ What percent of time do you wear long sleeves or long pants?
✓ What percent of time do you wear sun screen and what is the SPF?
✓ Do you have any UVA or UVB protection?

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