Appendix I

Institutional Human Ethical Committee Clearance Certificate

INSTITUTIONAL HUMAN ETHICS COMMITTEE

Avinashilingam

Institute for Home Science and Higher Education for Women

Deemed to be University Under category 'A' By MHRD, (Estd. u/s 3 of UGC Act 1956)

Re Accredited with 'A' Grade By NAAC, Recognised by UGC Under Section 12 B

Coimbatore - 641043, Tamil Nadu, India

Seek and Ye Shall Find

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16nd August 2018

To
Mrs. Rajya Lakshmi Devi Yenumula
Department of Food Science and Nutrition
Avinashilingam Institute for Home Science and
Higher Education for Women
Coimbatore – 641 043

Dear Madam,

Ref : Your presentation of the proposal No. IHEC/17-18/FSN/53 entitled "Effect of Nutritional Interventions on Vitamin A and Iron on Nutritional Status of School Children (6-8 years)" to the IHEC on 13th August 2018

The Institutional Human Ethics Committee of our University hereby grants approval to your research proposal No. IHEC/17-18/FSN/53 entitled "Effect of Nutritional Interventions on Vitamin A and Iron on Nutritional Status of School Children (6-8 years)" submitted and presented by you. The Approval number for the same is AUW/IHEC-17-18/FSN/FHP-05.

We wish you all the best in your research endeavours.

Regards,

Dr.S.Uma Mageshwari
Member Secretary

Institutional Human Ethics Committee

Appendix II

Interview Schedule to Elicit the Information regarding the Socio-economic Background Dietary Intake, Anthropometric Measurements and Dietary Pattern

SOCIO ECONOMIC BACKGROUND

1. Name of the Interviewer:
2. Name of the interviewee:
3. Age:
4. Sex:
5. Name of Father:
6. Address:
7. Family type: Joint / Nuclear
8. Religion:
9. Caste:
10. Family Status

S.No.	Name of the Family Members	Relation to the Child	Age	Sex	Education	Occupation	Monthly Income

Other sources of Income

i. Rent House / boat:
ii. Agriculture:
iii. Netmaking:
iv. Others:

12. Total Family Income:

13. Monthly Expenditure pattern

S.No.	Details	Amount Spent	Percentage of Amount spent
	Food		
	Paan/Betel Nut/Tobacco and Alcoholic Drinks		
	Clothing/ Recreation		
	Purchase of household needs		
	Transport		
	House Rent /boat rent		
	Debts		

I. NUTRITIONAL ANTHROPOMETRY

Height (cm):

Weight (kg):

Body mass index:

III. DIETARY INTAKE

14. Type of diet : a) Vegetarian b) Non- Vegetarian c) Ova- Vegetarian

15. Type of Meal pattern: a) Two Meal b) Three Meal c) Four Meal

16. Food Frequency

S.No.	Food	Quantity	Frequency of consumption of food items					
			Daily	Weekly	Fortnightly	Monthly	Occasionally	Not at all
1	**Cereals:**							
	Raw Rice							
	Parboiled rice							
	Puffed rice							
	Bajra							
	Jowar							
	Maize							
	Ragi							
2	**Pulses:**							
	Red gram							
	Green gram							
	Black gram							
	Bengal gram							
	Horse peas							
	Cow peas							
	Soya							
3	Roots & Tubers:							
	Arbi							
	Potato							
	Sweet Potato							
	Beetroot							
	Carrot							
	Turnip							
	Tapioca							
	Yam							
4	**Green Leafy Vegetables:**							
	Agati							
	Amaranth							
	Cabbage							
	Coriander							

	leaves							
	Curry leaves							
	Fenugrek leaves							
	Drumstick Leaves							
	Mint Leaves							
	Spinach							
5	**Other Vegetables:**							
	Ashgourd							
	Beans							
	Bittergourd							
	Bottlegourd							
	Brinjal							
	Cauliflower							
	Cabbage							
	Drumstick							
	Ladies Finger							
	Pumpkin							
	Tomato							
6	**Fruits:**							
	Amla							
	Apple							
	Banana							
	Dates							
	Grapes							
	Guava							
	Jackfruit							
	Lemon							
	Mango							
	Papaya							
	Pineapple							
	Pomegranate							
	Sapota							
	Watermelon							
7	**Non-Vegetarian Foods:**							
	Chicken							
	Crab							
	Dried Fish							
	Dried Shrimp							
	Fish							
	Mutton							
	Shrimp							

8	**Milk and Milk Products:**							
	Buttermilk							
	Curd							
	Cheese							
	Nuts:							
	Cashewnut							
	Coconut							
	Groundnut							
9	**Fats & Oils:**							
	Buttermilk							
	Ghee							
	Refined Oil							
	Vanaspathi							
9	**Sugar:**							
	Jaggery							
	Refined sugar							
	Honey							

17. Type of beverage consumed

Beverage	**Quantity**	**Frequency**
Tea		
Coffee		
Aerated Drinks		
Natural Juices		
Fruit Juices		
Alcohol		
Others		

Appendix III

Clinical Examination Schedule

Name: Religion:

Sex: Caste:

Age: Address:

S.No.	Site	Sign
1.	General Appearance	Loss of subcutaneous fat
		Sunken or hollow cheeks
2.	Hair	Easily plucked hair, alopecia
		Dry, brittle hair
		Corkscrew hairs
3.	Nails	Spooning
		Transverse depigmentation
4.	Skin	Dry and scaly flaky paint
		Nasolabial seborrhoea
		Psoriasiform rash
		Pallor
		Follicular haemorrhage
		Easy bruising
		Hyperpigmentation
5.	Eyes	Night blindness
		Photophobia) xerosis
		Conjunctival inflammation
		Retinal field defect
6.	Mouth	Glossitis
		Bleeding gums
		Angular stomatitis
		Cheilosis
		Decreased taste or smell
		Tongue fissuring
		Tongue atrophy
		Loss of tooth enamel
7.	Neck	Goitre
		Cretinism
		Parotid enlargement
8.	Extremities	Oedema
		Bone tenderness
		Bone/ joint pain
		muscle pain
		joint swelling
9.	Neurological	Nystagmus
		Wide based gait
10.	Any other Symptoms	

Sri Lakshmi, 2006.

Appendix IV

Description of Procedures for Anthropometric Measurements

Standing height

The subject should stand erect looking straight on a levelled surface, without shoes, with heels together and toes apart. The anthropometer rod should be placed behind the subject in the centre of the heels perpendicular to the ground. The investigator standing on the left side of the subject should firmly hold the chin of the subject with his/her left hand and the occiput of the subject with his right little finger in the Frankfurt horizontal plane (an imaginary line joining the tragus of the ear and infra orbital margin of the eye). The moving head piece of the anthropometer should be placed in the sagittal plane over the head of the subject applying a slight pressure to reduce the thickness of hair. The reading should be taken when the anthropometer rod is still in position. An average of three measurements is taken as the final measurement.

Measure the height up to 200cm/78inch with memo paper

For Measuring Standing Wall Type, Measuring Bar: - Vertical, Easily Moved and Fixed Horizontal Rod

Maximal Height of Measuring: - 2 Metres

Measurement Resolution: - 0.5 cm

Material: Plastic Body

Weight

The weight was taken using digital weighing balance. The subjects were asked to remove footwear, wearing minimal clothing and stand on the platform with one foot on either side of the scale without holding on to anything and they were erect. The weight was recorded to the nearest of 0.1 kg. Zero error was corrected every time before actual weighing. The weighing balance should be tested periodically for its accuracy with known standard weights. The following precautions should be taken to measure body weight:

1. The Zero error of the weighing scale should be ensured before taking the weight and corrected as and when required.

2. The individual should wear minimum clothing, and be without foot wear.

3. The individual should not lean against or hold anything, while the weight is recorded.

4. The measurements should preferably be taken under basal conditions in early mornings.

The Salter 9000 electronic bathroom scale is suitable for use on carpets as well as hard floor surfaces. It has an easy to read 1" LCD screen. These scales use 2 lithium CR2032 batteries (included) Size; 27 x 28.5 x 4cm approx. large platform for generous foot room. Max 150kg ÷ 100g, 23st 8lb ÷ 0.2/1lb.

Appendix V

Procedure for Biochemical Analysis

Blood Haemoglobin was determined using Sahlis method (Mukherjee, 2004)

The blood sample was drawn from the fingertip of the children and the haemoglobin concentration (g/dl) was estimated by Sahli's method by using haemoglobinometer before and after interventions. Graduated tube was filled with N/10 HCl up to mark 2. The finger of the subject and the needle was sterilized with alcohol, then prick the finger with needle and drawn the blood with the help of the pipette up to 0.2 ml. Care should be taken not to allow any air bubbles inside the pipette while sucking the blood. If the blood goes beyond the mark, it was drawn out by touching the tip of the pipette with cotton. The blood was transferred into the graduated tube by blowing gently and the test tube was allowed to stand for 3-4 minutes. The liquid was diluted with distilled water till the colour matches with the standard colour prism and haemoglobin level was recorded.

Serum Retinol was estimated using HPLC method (Raghuramulu, 2003).

Principle: The vitamin A is extracted with a suitable organic solvent and an aliquot of the organic phase is injected onto a normal or reversed phase HPLC column, followed by an eluting solvent of suitable polarity. Retinol, which is eluted as a sharp peak within 1-6 min is detected by a sensitive UV detector set at 325-328nm. Retinol is quantitated by use of peak height ratios or peak area ratios relative to an internal standard (retinyl acetate or other appropriate analogues).

Reagents

Solvents of HPLC graph must be free of particles.

Standards: A stock standard solution of retinyl acetate in ethanol (50µg retinol/ ml) is prepared by dissolving about 1 mg of retinyl acetate in 10 ml of ethanol, determining the concentration in a 1/30 dilution of an aliquot in ethanol by use of the E1CM 1% at 325 nm as 1795, and then diluting the stock standard appropriately with ethanol. A typical calculation is as follows:

A 1:30 dilution of a solution of all-trans retinyl acetate, prepared and assayed as indicated above, gave an absorbency reading at 328 nm of 0.58 in ethanol. The concentration of vitamin A expressed as retinol in this solution is:

$$\frac{0.58\times 30}{0.1795} \text{ or } 96.9\ \mu g/ml$$

Then 10ml of this solution is diluted to 19.4 ml to yield the stock standard with 50µg retinol/ ml.

Procedure:

1. Normal Phase Transfer 100µl of serum, 15 µl of internal standard solution (4 µg/ml of retinyl acetate or propionate) and 100µl of methanol to a conical centrifuge tube. Mix the contents of the tube with a vortex mixer. Add 200µl of extraction solvent (petroleum ether 80, dichloromethane 19.3, isopropanol 0.7 by volume) and cap the tube. Extract by interrupted mixing on the vortex mixer for 60s. After centrifugation (3000 rpm, 2 min) inject 100 µl of the supernatant into the column by the use of a Hamilton syringe. Elute with the same solvent as used for extraction.
   Chromatographic conditions:

Column	15×0.2cm i.d. Micro Pak Si-10
Mobile phase	petroleum ether: dichloromethane: isopropanol (80:19.3:0.7)
Flow rate	0.5ml/min
Pressure	10kg/cm2
Detector wavelength	328nm

Detection sensitivity	0.04 AUFS* on recorder
Temperature	Ambient
Recorder	Speed Not specified
Retention time (min)	
Retinol	5.0
Retinyl acetate	6.2

*AUFS- Absorbance unit at full scale.

Calculation

By use of an internal standard) losses due to incomplete extraction, inaccurate aliquots, oxidation etc. are automatically corrected. The internal standard should have physical and chemical properties sufficiently similar to retinol, is suitably separated from retinol on HPLC) should not coincide with other 325nm absorbing materials in serum, and is not converted to retinol under the assay conditions. A precisely known amount of the internal standard is added to the aliquot of plasma to be analysed. By determining the relative extraction efficiency and detector response of retinol and the internal standard) a standard curve is fashioned in which the ratio of peak heights (or areas) is plotted against the retinol concentration in plasma. In experimental samples, the peak height (or area) ratio is determined and the appropriate plasma retinol concentration determined from the standard curve.

A standard curve is prepared by adding varying amounts of retinol (i.e.,10-120 ng) to a fixed amount (i.e.,50 ng) of internal standard in a final volume of 100µl of eluting solvent, injecting the solution on HPLC under assay conditions, measuring the peak heights, and calculating the peak height ratio. The peak height ratio is then plotted as the abscissa with the standard retinol concentration (for a 100µl plasma aliquot) as the ordinate.

Appendix VI

Three-day 24 hr. Recall Method

Day 1

Particulars	Food Stuff	Amount
Early Morning		
Breakfast		
Mid- Morning		
Lunch		
Snacks		
Dinner		
Others(specify)		

Day 2

Particulars	Food Stuff	Amount
Early Morning		
Breakfast		
Mid- Morning		
Lunch		
Snacks		
Dinner		
Others(specify)		

Day 3

Particulars	Food Stuff	Amount
Early Morning		
Breakfast		
Mid- Morning		
Lunch		
Snacks		
Dinner		
Others (specify)		

Appendix VII

Preparation of the Orange Fleshed Sweet Potato (OFSP)

Individual Orange fleshed sweet potatoes (about 200 g each) were rinsed in tap water. A brine solution was prepared by adding 4.6 g of table salt to 4 L of tap water. The brine was boiled in a steam kettle. Boil the sweet potatoes with the skin intact. One kg of the orange fleshed sweet potato was dumped into the boiling water and cooked for about 15 min, until fork-tender. These boiled OFSP were removed from the pot using a straining ladle, peeled and cut into 100g of cubes and placed in plastic zipper-lock bags. The bags of cooked OFSP cubes were stored in two insulated chests before serving. These to be served were removed directly from the zipper-lock bags and placed on serving plates. Cooked potatoes were held for no longer than two hours before serving.

Appendix VIII

Knowledge, Attitude and Practice (KAP) Schedule

Knowledge

1. Among the following which is needed for child's growth

A) Rice B) Milk C) Vegetables D) Fruits

2. Which food is required for good eye sight

A) Apple B) Orange fleshed Sweet potato C) Chicken D) Do not know

3. Which among the following builds your body

A) Meat B) Carrot C) Oil D) Do not know

4. Which nutrient is present in Green Leafy vegetables

A) Protein B) Carbohydrate C) Vitamins &Minerals D) Fat

5. Which among the foods are vitamin A rich

A) Fish and egg B) Rice and wheat C) leafy vegetables& fruit D) Do not know

6. Which type of fat is good for health

A) Ghee B) Dalda C) Lard D) Vegetable fat

7. Low intake of vegetables causes

A) Constipation B) growth retardation C) Memory loss D) Do not know

8. What does spinach contain

A) Fat B) Protein C) Vitamin A D) Do not know

9. Is it essential to consume an egg daily for children

A) Yes B) No

10. Rich source of Iron

A) Goat liver B) Milk C) Potato D) Oils

11. Which foods can prevent dry brittle hair in children

A) Milk and milk products B) Fish and eggs C) Grains and dal D) Do not know

12. Which food is required for energy

A) Green leafy vegetables B) Rice, wheat, ragi C) Fruits D) Do not know

13. Which among the following foods is rich in Vitamin C

A) Fish B) Lemon C) Banana D) Do not know

14. Anaemia is caused due to the deficiency of

A) Iron B) Calcium C) vitamin B D) Do not know

15. Which among the following is a symptom of anaemia

A) Pale eyes B) Vomiting C) Growth retardation D) Do not know

16. Which among the following should be taken to prevent drying of skin

A) Carrot B) Cauliflower C) bitter gourd D) Do not know

17. Which of the following will result, if the diet is deficit of Vitamin A

A) Night Blindness B) Fever C) Headache D) Do not know

18. Milk is rich in

A) calcium and energy B) vitamin C C) vitamin A D D) Do not know

19. Foods to be given to a child suffering from cracked corners of mouth

A) Milk B) Rice C) Liver D) Do not know

20. Fish is a good source of

A) Energy B) Vitamin A C) Iron D) Do not know

Attitude

1. Which type of fish do you consume?

A) Live catch B) Dried

2. How do you cook fish?

A) Fried B) Curry C) Soup

3. Choose the food below which gives you energy

A) Vegetables B) rice C) Dal D) do not know

4. Do children need more Calcium than an adult?

A) Yes B) No C) Don't know

5. Which type of food would you give your child on a daily basis to improve his immunity?

A) Fresh foods B) Dried foods C) Processed foods D) Do not know

6. Pregnant and Lactating women should eat more Vitamin A rich foods because

A) They need more Vitamin A B) To prevent Vitamin A deficiency in children

C) Do not know

7. Infants get Vitamins and minerals from mother's breast milk

A) Yes B) No C) Do not know

8. An infants iron stores can only last upto

A) 4-6 months B) 6-8 months C) Do not know

9. Which type of rice is good for health?

A) Raw hand pounded B) Parboiled C) Raw milled D) Do not know

10. Immunization is essential for new borns because

A) to fight against infection B) to grow fast C) do not know

11. One of the reasons for anaemia is

A) Less intake of green leafy vegetables B) Intake of raw foods

C) Lack of exercise D) Do not know

12. Fish is a rich source of

A) Vitamin A B) Vitamin C C) Vitamin B D) Do not know

13. Diet deficit of green leafy vegetables and yellow fruits and vegetables leads to

A) Night blindness B) Jaundice C) Constipation D) Do not know

14. Which among the following foods could be given to a child having diarrhea

A) Milk B) Coconut water C) Soda D) Do not know

15. Salted foods should be avoided for Infants

A) Yes B) No C) Do not know

16. Fibre present in foods helps in

A) Relieving constipation B) Causing diarrhoea

C) Causing fever D) Do not know

17. Drinking water for children should be

A) Sea water B) Tap water C) Bore water D) Do not know

18. Prepared food should be eaten within

A) 1 hour B) 2 hours C) 4 hours D) Do not know

19. Stagnation of water

A) Breeds mosquitoes B) Acts as a good manure

C) Increases hygiene D) Do not know

20. Which of the following foods can be given during fever

A) Rice kanji B) Wheat roti C) Fish D) Do not know

Practice

1. How often you take bath

A) Daily B) Alternate days C) Once in 2 days

2. How often wash hands before handling food

A) Always B) Sometimes C) Never

3. Do you wash rice, dal and vegetables before cooking

A) Yes B) No

4. How many times you wash rice before cooking

A) 1 time B) 2 times C) 3 times D) more than 3 times

5. By which method do you cook rice

A) Pressure cooking B) Boiling C) Both

6. What do you do with the excess of water after cooking

A) Drained off B) Consumed as food C) Used for animal feeds

7. When do you wash the vegetables

A) Before cutting B) After cutting C) Both D) Not washed at all

8. Soaking the cut vegetables in water for long periods

A) Enhancing nutrient loss B) Prevents nutrient loss

C) Neither gain nor loss D) Do not know

9. How often you include millets in your diet

A) Daily B) Once a week C) Occasionally D) Never

10. How often your children drink milk

A) Once a day B) Twice a day C) Thrice a day D) Never

11. How often you include meat in your diet

A) Daily B) Twice a week C) Thrice a week D) Once a week

12. How much fish do you consume in a meal

A) 50 gm B) 100 gm C) less than 50 gm D) less than 25 gm

13. Which among the following do you use in storing raw food commodities

A) Tin with tight lid B) Tin with loose lid C) Gunny bags D) Any other

14. Which among the following utensils do you use for cooking

A) Iron B) Steel C) Aluminium D) Mud

15. Which salt do you use

A) Sea salt B) Iodised salt

16. Which among the following method do you practice to cook vegetables

A) Steaming B) Boiling C) Frying D) Roasting

17. Which among the following foods do you consume to relieve cough

A) Honey B) Ginger C) Ajwain seeds D) Garlic

18. Do you have a kitchen garden in your house

A) Yes b) No

19. How often do your child fall ill

A) Once a month B) Once in 3 months C) Once in 6 months D) Rarely

20. Where do you go to seek medical help during illness

A) Hospitals B) Home remedies C) Taking to priests

Appendix VIII

Plagiarism Report

Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC.Recognised by UGC Under Section 12 B
Coimbatore – 641 043., Tamil Nadu, India

PLAGIARISM CHECK REPORT (THESES)

1.	Name of the Research Scholar	Rajya Lakshmi Devi Y
2.	Roll No. and Year of Registration	15PHFNP003, 2015
3.	Department	Food Science and Nutrition
4.	Name of the Research Guide	Dr. Thilakavathy Subramaniyam
5.	Title of the Thesis / Dissertation	Effect of Nutrition Interventions on Vitamin A and Iron Nutriture of School Children (6-8 years) of Fisher-men Community
6.	Similarity Content (%) Identified	**8%** (Excluding Review of Literature)
7.	Software Used	Turnitin
8.	Date of Verification	30/07/2021

Checked by :

30/7/21
Information Scientist

Y. Rajya Lakshmi Devi
31/7/21
Research Scholar

30.07.21
Assistant Librarian

S. Thilakavathy
Research Guide

Date: 30-07-2021

Details of Research Publications

Scholar : Y.Rajya Lakshmi Devi

Roll No. : 15PHFNP003

Discipline : Food Science and Nutrition

Supervisor : Dr.S.Thilakavathy

S.No.	Article	Journal	Other Details Vol/No./Page No./year	Published in UGC CARE / Scopus Indexed / Web of Science List of Journals
1.	Nutritional Status of children Aged 6–8 Years Old of Fisherfolks Residing in the Areas of Coastal Rural Kakinada of East Godavari District, Andhra Pradesh	Asian Journal of Multidimensional Research (AJMR)	Vol.7, No.5, Pg.404-410 2018	ISSN: 2278-5853
2.	Prevalence of Vitamin A Deficiency in Fisherfolk Children (6-8 Years) of East Godavari District and Effect of Supplementation of Orange Fleshed Sweet Potato	Journal of Research, ANGRAU	Vol.49, No.1, Pg.53-62 2021	ISSN: 0970-0226.

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