

# Evaluation of overall diet quality indexes of the children at the age of 6-24 months and its impact on health in Matiari, Sindh, Pakistan

Sanam Iram Soomro (Ph.D. Analytical Chemistry)

Co-authors;

Dr. Asad Ali (PIA)

Dr. Sheeraz (Senior Manager)

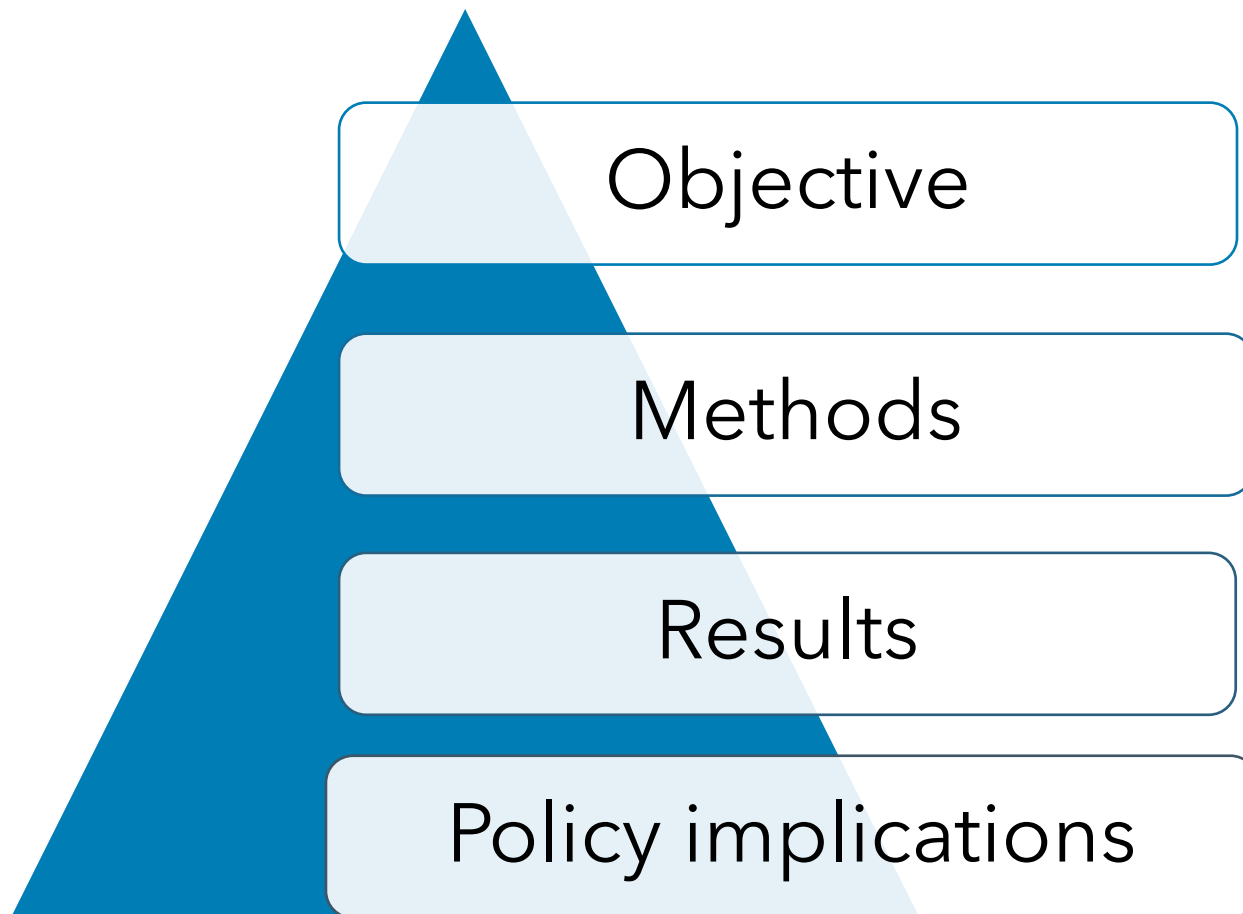
Dr. Fayaz Umrani (manager)

Pediatrics and child health

Research and Training Center Matiari,  
Aga Khan University



# Outline



# Objectives



# Objectives

- Evaluate the dietary pattern of infant children changes with respect to age
- To evaluate the diet quality index of infants of age 6-24 months.
- Diet Quality indices used for the evaluation would be standard.

# Methods





# Sampling

The selected area of our study is 2 different union councils of Matiari (Seekhat / Khyberand Shah Alam Shah G Wasi) and 400 villages

A total of 370 children was selected.

The selection criteria were divided into malnourished (case) and well-nourished (control).

The 50 children are selected for control and 320 children of the case study



# Data collection and analysis

- The 24-hour questionnaire was selected for collecting the baby data.

S/No:	Question	Description
01	Child ID	Entered the Study Child's unique ID number here.
02	Today's Date	Formatted DD/MMM/YY
03	Study Researcher/ Nutritionist/Fieldworker ID	Entered the Study Researcher / Nutritionist / Fieldworker's unique ID number here.
04	Line number	This should be filled in as 1, 2, 3, etc., to enumerate each line of data
05	Food number	This should be sequentially numbered for each food item, recipe or breast milk feed, etc.
06	Meal	Identified each feeding episode/meal/snack separately. All foods/drinks that are offered together should get the same number.
07	Home	Where was the food consumed? Write "1" if it was consumed at Home and "0" if it was elsewhere.
08	Time	Recorded the time of the feed/offering of food or liquid in HH:MM in 24 hour time cycle. Our goal was to get relative times; we do not expect exact times here.
09	Recipe description	Named the recipe; Most common recipe name were used to write for better understanding
10	Recipe code	Recipes were coded with unique code
11	Food Item: description	Described the food item sufficiently to allow identification of proper code.
12	Food Item: Code	Entered the six digit code designated for this food..

# Data collection and analysis

S/No:	Question	Description
14	Food served: Portion Size description	Described what was served to the child in proportion
15	Food served: amount (in g)	Amount of portion were measured into gram by using electronic balance and were wrote on questioner
16	Food leftover: Portion size description	For more accuracy we have asked the left portion size also to remind them again.
17	Food left over amount (in g)	Amount of portion were measured into gram by using electronic balance and were wrote on questioner
18	How many times was the child nursed during the daytime:	Wrote down the number of times the child was put to the breast for feeding during the day (sunrise to sunset) in the last 24 hours
19	How many times was the child nursed during the night:	Wrote down the number of times the child was put to the breaks for feeding during the nighttime (sunset to sunrise) in the last 24 hours.
20	Total times nursed:	Add the number in question 18 & 19 to get the total times the baby was nursed in the last 24 hours.
21	Comments	Relevant details from interviewer or coder after the interview was completed such as special food offered to the child due celebration or other festivities. Ideally interviewer should conduct recall interview on day that is typical but if such instances, please note that in this section.
22	Is this form collected for secondary recall?	This question asks if the form was collected for secondary recall. If it is collected for secondary recall, ensure it was done within 2-7 days since the actual first recall.
23	Supplements	In this questionnaire, the data of the supplements were also collected, in addition, the intervention of supplements such as Acha mum and Rutf was administered to those children who were in different stages of malnutrition (Intermediate or greater).



# Data collection and analysis

- The collected data were, homogenized .
- The nutrient data set was developed by following FAO/INFOODS criteria.
- The ASEAN and USDA food composition tables and databases are used mostly.

# Results and Discussion



# Standard Dietary Guidelines

- Initiate breastfeeding within 1 hour of birth.
- Exclusive breastfeeding for the first six months.
- Continue breastfeeding until 2 years of age and beyond.
- Introduce complementary feeding at six months with small amounts of food and increase gradually as the child gets older.
- Gradually increase food consistency and variety.
- Be responsive to infant and child needs i.e., feed the infant directly and assist older children.
- Feed children slowly and patiently and encourage them to eat but don't force them.
- Practice good hygiene by washing hands frequently with soap particularly before preparing and eating foods and after using the toilet, use clean utensils, and ensure proper food handling.

# Standard Dietary Guidelines

- Prepare complementary foods from locally available foods.
- Feed infants (aged 6-8 months) 2-3 times daily with soft foods which are easily digested by infants (banana, mashed potato, thick porridge, kheer, vegetable soup, kitchri) in addition to breast milk.
- Feed infant (aged 9-11 months) 3-4 times daily with soft foods which are easily digested by infants (banana, mashed potato, bread, thick porridge, kheer, egg, vegetable soup) in addition to breast milk .
- Feed child (aged 12-23 months) 3-4 times daily with homemade foods which are nutritious and digestible plus 1-2 additional snacks (bread, vegetables, egg, sandwich, banana, kheer, apple or any other fruit, egg, fish, chicken etc.) in addition to breast milk.
- Avoid giving sweets, candies, bakery products and beverages to children, and replace them with healthy foods such as fruits and vegetables, beans and pulses, nuts and dairy products.
- \*\* Serve child with fortified cereals or vitamin-mineral supplements as needed. Increase fluid intake including more breast feeding and offer soft food to infants and children during illness.

# Standard Dietary Guidelines

- Feed infant (aged 9-11 months) 3-4 times daily with soft foods which are easily digested by infants (banana, mashed potato, bread, thick porridge, kheer, egg, vegetable soup) in addition to breast milk .
- Feed child (aged 12-23 months) 3-4 times daily with homemade foods which are nutritious and digestible plus 1-2 additional snacks (bread, vegetables, egg, sandwich, banana, kheer, apple or any other fruit, egg, fish, chicken etc.) in addition to breast milk.
- Avoid giving sweets, candies, bakery products and beverages to children, and replace them with healthy foods such as fruits and vegetables, beans and pulses, nuts and dairy products.
- Serve child with fortified cereals or vitamin-mineral supplements as needed. Increase fluid intake including more breast feeding and offer soft food to infants and children during illness

# Food Groups consumption pattern-surveyed

Food Groups	6 m		7 m - 12 m		> 12 m	
	case	control	case	control	case	control
CEREALS	321 (100)	49 (100)	1627 (100)	256 (100)	2240 (100)	314 (100)
ROOTS AND TUBERS	38 (11.8)	7 (14)	691 (42)	97 (38)	1561 (69)	219 (69)
LEAFY VEGETABLES	0 (0)	0 (0)	37 (2.3)	6 (2)	214 (9.5)	35 (11)
OTHER VEGETABLES	7 (2)	0 (0)	229 (14)	44 (17)	904 (40)	123 (39)
FRUITS	28 (9)	4 (8)	268 (16.4)	49 (19)	791 (35)	129 (41)
FLESH MEATS	1 (0.3)	0 (0)	70 (4.3)	13 (5)	21 (0.9)	26 (8)
EGGS	2 (0.6)	0 (0)	30 (1.8)	6 (2)	114 (5)	22 (7)
FISH AND SEAFOOD	0 (0)	0 (0)	0 (0)	1 (0.3)	3 (0.1)	1 (0.3)
LEGUMES, NUTS AND SEEDS	8 (2.4)	3 (6)	210 (13)	26 (10)	753 (33)	109 (35)
OILS AND FATS	89 (27.7)	9 (18)	1049 (64.4)	141 (55)	1987 (89)	267 (85)
SWEETS	4 (1.2)	2 (4)	109 (6.6)	31 (12)	672 (30)	126 (40)
BEVERAGES, SPICES AND CONDIMENTS	84 (26)	14 (28)	820 (50.3)	147 (57)	1977 (88)	277 (88)
MILK AND DAIRY PRODUCTS	321 (100)	49 (100)	1602 (98)	256 (100)	1999 (89)	295 (94)



# Food Sub-Groups consumption pattern- surveyed

Food sub-groups	Case		Control	
	frq	g/d	frq	g/d
Breast milk, whole, raw	3974		674	524
Buffalo milk, whole, raw	158	> 20	15	> 20
Wheat flour bread (chapatti)	146	< 10	25	< 10
Biscuits	143	< 10	19	< 10
Cerelac	136	> 20	9	10_20
Milk powder, infant formula	129	> 20	-	-
Buffalo milk tea	72	10_20	13	10_20
Cow milk, whole, raw	66	> 20	-	-
Goat milk, whole, raw	65	10_20	-	-
Pearl sago	37	10_20	-	-
Potato boiled	32	< 10	5	< 10
Rusk	31	< 10	8	< 10
Banana, flesh, raw	22	< 10	4	< 10

# Food Sub-Groups consumption pattern- surveyed

	Case		Control	
Food sub-groups	frq	g/d	frq	g/d
Breast milk, whole, raw	16413	> 20	2904	> 20
Wheat flour bread (chapatti)	2062	10_20	286	10_20
Buffalo milk tea	770	> 20	171	> 20
Biscuit	874	< 10	151	< 10
Buffalo milk, whole, raw	1021	> 20	232	> 20
Rusk	417	< 10	59	< 10
Potato boiled with salt	498	10_20	54	10_20
Crisp, asli rings, package	152	< 10	41	< 10
Cerelac	378	> 20	28	10_20
Cake, sponge	176	< 10	27	< 10
Yogurt based salted drink	–	–	26	< 10
White rice cooked with butter	166	< 10	46	< 10
Banana, flesh, raw	190	< 10	18	< 10
Yogurt, plain, raw	113	< 10	14	< 10
Yellow lentil curry with plain spices and ghee	–	–	13	< 10
Cow milk, whole, raw	576	10_20	22	< 10
Potato curry with plain spices and oil	–	–	11	< 10
Puff pastry	–	–	11	< 10
Chocolate, dipsip cookies, packaged	–	–	10	< 10
Milk powder, infant formula	214	10_20	–	–
Pearl sago with cow milk	147	< 10	–	–
Wheat porridge	115	< 10	–	–

# Food Sub-Groups consumption pattern- surveyed

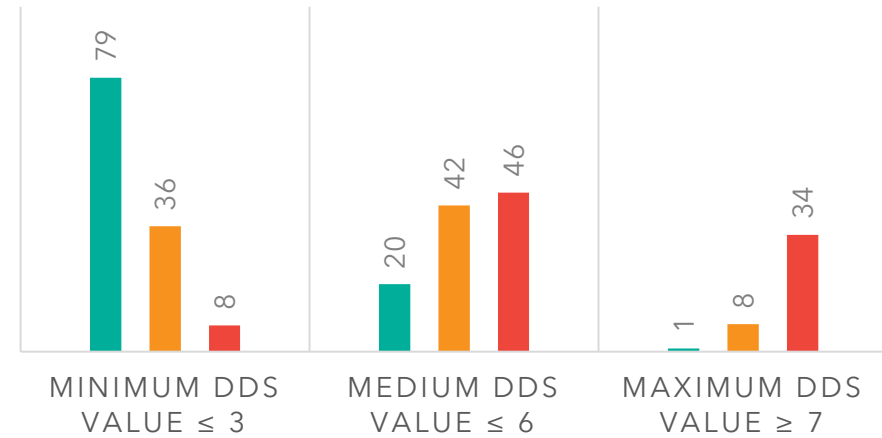
Food sub-groups	Case		Control	
	frq	g/d	frq	g/d
Breast milk, whole, raw	11475	> 20	1938	> 20
Wheat flour bread (chapatti)	4775	> 20	598	> 20
Buffalo milk tea	2144	> 20	367	> 20
Buffalo milk, whole, raw	1872	> 20	180	> 20
Biscuit	1310	< 10	136	< 10
Rusk,	924	< 10	114	< 10
Potato boiled with salt	694	10_20	80	10_20
Crisp	663	< 10	140	< 10
Banana, flesh, raw	503	10_20	77	10_20
Cake, sponge	455	< 10	70	< 10
Yogurt based salted drink	451	10_20	76	> 20
White sugar, whole, raw	407	< 10	42	< 10
Potato curry	392	< 10	83	< 10
White rice cooked with butter	388	< 10	41	< 10
Yellow lentil curry with plain spices and ghee	330	< 10	42	< 10
Goat milk tea	302	< 10	–	–
Cow milk, whole, raw	241	< 10	–	–
Puff pastry	222	< 10	56	< 10
Goat milk, whole, raw	219	< 10	–	–
Black tea	218	< 10	–	–
White rice boiled with salt	216	< 10	39	< 10
Mango, flesh, raw	–	–	31	< 10
Chocolate, dipsip cookies, packaged	–	–	39	< 10
Betel nut, sanam gold, package	–	–	11	< 10
Cow milk tea with cow milk ≈ 45% and sugar ≈ 10%	–	–	10	< 10
Chicken egg fried with plain spices and ghee	–	–	10	< 10

# Dietary diversity

Case study				Control Study		
Age	Min- DDS value $\leq$ 3	Med- DDS value $\leq$ 6	Max- DDS value $\geq$ 7	Min-DDS value $\leq$ 3	Med- DDS value $\leq$ 6	Max- DDS value $\geq$ 7
6	255 (79)	63 (20)	3 (0.9)	42 (86)	7 (14)	0 (0)
7-12	705 (36)	823 (42)	155 (8)	115 (45)	106 (41)	35 (14)
> 12	194 (8)	1173 (46)	861 (34)	36 (11)	132 (42)	146 (46)

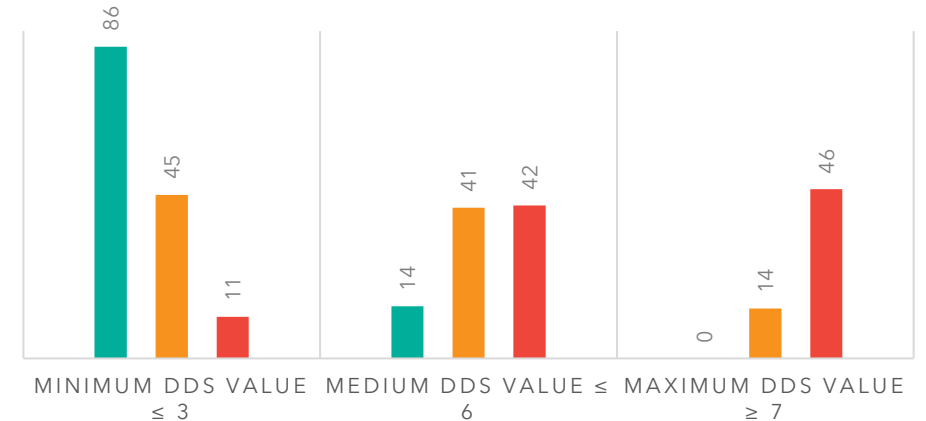
## CASE STUDY

■ 6 ■ 7-12 ■ > 12



## CONTROL STUDY

■ 6 ■ 7-12 ■ > 12



# Dietary intake

Nutrients list	RDI Values	Average nutrient intake of infants children (Case Study)	Average nutrient intake of infants children (Control Study)	Percentage of children with inadequate intakes (Case study)	Percentage of children with inadequate intakes (Control study)
Age	0-6 months	0-6 months (n=321)	0-6 months (n=50)	0-6 months (n=321)	0-6 months (n=50)
Energy (Kcal/ /d)	930	704.2	643.1	272 (85)	45(90)
Protein (g/d)	10	27.9	27.8	6 (2)	0(0)
Dietary fiber (g/d)	31	1.0	0.5	321 (100)	49(98)
Carbohydrate (g/d)	10	75.4	58.7	153 (48)	27(54)
Total sugar (g/d)	60	56.5	58.2	197 (61)	2(4)
Fat (g/d)	30	31.2	32.5	182 (57)	28(56)
Ca (mg/d)	200	298.1	236.9	103 (32)	37(74)
Iron (mg/d)	0.27	0.4	0.2	216 (67)	38(76)
Magnesium (mg/d)	30	209.4	163.6	64 (20)	17(34)
Phosphorus (mg/d)	100	269.8	211.3	43 (13)	11(22)
Potassium (mg/d)	400	644.6	560.3	64 (20)	14(28)
Sodium (mg/d)	110	233.5	172.4	48 (15)	10(20)
Zn (mg/d)	2	1.3	0.6	297 (93)	48(96)
Copper (mg/d)	0.2	0.4	0.4	22 (7)	2(4)
Vitamin A (µg/d)	400	540.8	488.6	111 (35)	18(36)
Beta-Carotene (µg/d)	600	145.4	147.4	320 (100)	49(98)
Vitamin D (µg/d)	10	4.5	2.3	286 (89)	47(94)
Vitamin E (mg/d)	4	4.0	2.8	247 (77)	43(86)
Thiamine (mg/d)	0.2	0.4	0.2	154 (48)	29(58)
Riboflavin (mg/d)	0.3	0.7	0.5	44 (14)	9(18)
Niacin (mg/d)	2	3.2	1.8	171 (53)	29(58)
Vitamin B6 (mg/d)	0.1	0.6	0.1	102 (32)	22(44)
Total folate (µg/d)	65	66.1	47.1	238 (74)	46(92)
Vitamin C (mg/d)	40	48.6	37.4	174 (54)	29(58)
Phytate (mg/d)	0	96.0	51.3		
Cholestrol (mg/d)	100	100.7	109.9	173 (54)	24(48)

# Dietary intake

Nutrients list	RDI Values	Average nutrient intake of infants children (Case Study)		Average nutrinte intake of infants children (Control Study)	
		Percentage of children with inadequate intakes (Case study)	Percentage of children with inadequate intakes (Control study)		
Age	7-12 months	7-12 month (n=1667)	7-12 month (n=260)	7-12 month (n=1667)	7-12 month (n=260)
Energy (K cal/ /d)	1020	714.5	662.5	1508 (90)	240(92)
Protein (g/d)	11	26.3	26.0	48 (3)	2(1)
Dietary fiber (g/d)	35	3.1	2.1	1601 (96)	256(98)
Carbohydrate (g/d)	10	80.1	66.4	1267 (76)	218(84)
Total sugar (g/d)	95	54.5	54.3	277 (17)	33(13)
Fat (g/d)	35	31.1	31.7	1129 (68)	188(72)
Ca (mg/d)	260	317.9	263.3	1077 (65)	203(78)
Iron (mg/d)	11	0.4	0.3	1667 (100)	259(100)
Magnesium (mg/d)	75	258.4	205.9	573 (34)	105(40)
Phosphorus (mg/d)	275	281.4	232.2	1106 (66)	199(77)
Potassium (mg/d)	860	642.6	576.7	1390 (83)	231(89)
Sodium (mg/d)	370	353.6	326.0	1134 (68)	188(72)
Zn (mg/d)	3	0.9	0.6	1617 (97)	259(100)
Copper (mg/d)	0.22	0.5	0.4	121 (7)	13(5)
Vitamin A (µg/d)	500	526.1	682.1	1148 (69)	259(100)
Beta-Carotene (µg/d)	600	186.2	166.6	1638 (98)	252(97)
Vitamin D (µg/d)	10	5.2	3.8	1461 (88)	242(93)
Vitamin E (mg/d)	5	3.1	2.7	1534 (92)	250(96)
Thiamine (mg/d)	0.3	0.3	0.2	1171 (70)	207(80)
Riboflavin (mg/d)	0.4	0.6	0.5	638 (38)	121(47)
Niacin (mg/d)	4	2.9	2.1	1478 (89)	248(95)
Vitamin B6 (mg/d)	0.3	2.3	0.6	1245 (75)	225(87)
Total folate (µg/d)	80	60.4	51.7	1413 (85)	237(91)
Vitamin C (mg/d)	50	35.8	33.4	1435 (86)	230(88)
Phytate (mg/d)	0	181.7	122.8		
Cholestrol (mg/d)	200	95.1	100.3	1654 (99)	254(98)



# Dietary intake

Nutrients list	RDI Values	Average nutrient intake of infants children (Case Study)	Average nutrinite intake of infants children (Control Study)	Percentage of children with inadequate intakes (Case study)	Percentage of children with inadequate intakes (Control study)
Age	1-3 yr	> 12 months (n=2553)	> 12 months (n=312)	> 12 months (n=2553)	> 12 months (n=312)
Energy (K cal/ /d)	1140	833.1	836.1	2184 (86)	265(85)
Protein (g/d)	20	24.7	25.4	880 (34)	94(30)
Dietary fiber (g/d)	40	8.4	8.3	2387 (93)	287(92)
Carbohydrate (g/d)	19	107.7	107.3	1916 (75)	239(77)
Total sugar (g/d)	130	54.6	57.5	738 (29)	79(25)
Fat (g/d)	40	32.2	33.0	1947 (76)	237(76)
Ca (mg/d)	700	349.9	334.6	2219 (87)	278(89)
Iron (mg/d)	7	0.4	0.4	2553 (100)	312(100)
Magnesium (mg/d)	80	348.4	335.1	239 (9)	36(12)
Phosphorus (mg/d)	460	343.4	330.1	2034 (80)	262(84)
Potassium (mg/d)	2000	774.7	767.4	1728 (68)	210(67)
Sodium (mg/d)	800	786.0	854.0	1692 (66)	199(64)
Zn (mg/d)	3	0.9	0.9	2539 (99)	312(100)
Copper (mg/d)	0.34	0.7	0.7	68 (3)	13(4)
Vitamin A (µg/d)	300	1341.6	1512.2	2553 (100)	312(100)
Beta-Carotene (µg/d)	1100	330.6	347.8	2421 (95)	298(96)
Vitamin D (µg/d)	15	9.5	8.8	2196 (86)	267(86)
Vitamin E (mg/d)	6	2.7	2.8	2398 (94)	293(94)
Thiamine (mg/d)	0.5	0.3	0.3	2240 (88)	281(90)
Riboflavin (mg/d)	0.5	0.5	0.5	1636 (64)	207(66)
Niacin (mg/d)	6	2.8	2.7	2468 (97)	305(98)
Vitamin B6 (mg/d)	0.5	4.4	4.1	1885 (74)	219(70)
Total folate (µg/d)	150	70.2	72.4	2435 (95)	291(93)
Vitamin C (mg/d)	150	28.5	31.3	2533 (99)	308(99)
Phytate (mg/d)	0	360.7	331.0		
Cholestrol (mg/d)	300	81.6	85.3	2552 (100)	312(100)

## Policy implications

- The total diet pattern study shows that the diet under the age of 0-6 months is good but there is only a need to add some more quantity of food and fortify foods over all the child.
- There is also the role of the mother's health. It directly affects the nutrients of breast milk.
- 6-24 months age group. This study survey helps to make policies for infants children to reduce the malnutrition to secure the future with good health for all ages.
- There is need to be assess the nutrition status clinically and the groups of children with good quality of food, water and better enviroment as well for comparision. Only the quality of food is not the main cause of malnutrition but there is also need to be check the quality of water and eating hygencity parameter for further understanding

# Thank you

