

CHAPTER 4

ANALYSIS AND

INTERPRETATION OF

DATA

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This chapter deals with findings of the study interpreted from the data collected for research study and analysis based on objectives of the study. The present study was carried out in two phases. In phase I, exploratory survey was conducted on 703 children aged 1–3 years to identify their nutritional status followed by which risk factors of malnutrition was also identified by interviewing their mothers. In phase II, randomized control trial was carried out among children identified as malnourished and their mothers to evaluate the effectiveness of Family-Based Intervention Program on nutritional status of children aged 1–3 years, knowledge and nutrition related practices of their mothers.

The collected data was first coded and summarized in a master sheet and then analyzed with the help of computer using SPSS 22.0 version.

Organization of Study Findings

The findings of the present study have been organized based on the objectives and phases of the study.

Phase I:

Section 1: Sample characteristics

Section 2: Nutritional status of under-five children

Section 3: Risk factors related to malnutrition

3A: Description of risk factors related to malnutrition

3B: Odds between risk factors and nutritional status

Section 4: Relationship between the nutritional status and selected variables

Phase II:

Section 5: Sample characteristics

Section 6: Nutritional knowledge of mothers of under-five children

Section 7: Nutrition related practices of mothers of under-five children

Section 8: Effectiveness of FBIP on nutritional status of under-five children

Section 9: Effectiveness of FBIP on nutritional knowledge of mothers of
under-five children

Section 10: Effectiveness of FBIP on nutritional practices of mothers of
under-five children

Section 11: Additional Findings

11A: Correlation between Knowledge and Nutrition related practices of
Mothers

11C: Adequacy of intake of Nutrients in intervention group

12C: Perception of Mothers regarding factors related to malnutrition

Phase I

In this Phase, a sample of 703 children were screened to identify the nutritional status and explore the risk factors relating to malnutrition in them. It is described in below mentioned sections:

Section 1

Sample characteristics

This section describes the characteristics of samples in terms of demographic information and are described in terms of frequency and percentage. (Table 5)

Table 5: Frequency and percentage distribution of sample characteristics*n* = 703

Sl. No.	Sample Characteristics	Frequency	Percentage (%)
1.	Age of Child (in months):		
1.1	12 – 18	102	15
1.2	19 – 24	171	24
1.3	25 – 30	255	36
1.4	31 – 36	175	25
2.	Gender of the child:		
2.1	Male	353	50
2.2	Female	350	50
3.	Age of Mother (in years):		
3.1	Less than 20	16	2
3.2	21 – 25	202	29
3.3	26 – 30	387	55
3.4	31 – 35	78	11
3.5	Above 35	20	3
4.	Marital Status of mother:		
4.1	Married	675	96
4.2	Divorced	19	3
4.3	Separated	5	0.6
4.4	Widow	4	0.5
5.	Education of Mother:		
5.1	Non formal	107	20.5
5.2	Primary	71	13.6
5.3	Junior High School	47	9
5.4	High School	45	8.7
5.5	Intermediate	59	11.3
5.6	Diploma	81	15.5
5.7	Graduate	92	17.7
5.8	Post Graduate	19	3.7
6.	Education of Father:		
6.1	Non formal	96	17
6.2	Primary	132	23.4
6.3	Junior High School	49	8.7
6.4	High School	82	15.2
6.5	Intermediate	53	9.3
6.6	Diploma	68	12
6.7	Graduate	47	8.1
6.8	Post Graduate	36	6.1

7.	Occupation of Mother:		
7.1	Employed	98	14
	<i>Professional</i>	22	22.5
	<i>Skilled worker</i>	35	35.7
	<i>Unskilled worker</i>	41	41.8
7.2	Homemaker	605	86
8.	Occupation of Father:		
8.1	Employed	638	91
	<i>Professional</i>	37	5.8
	<i>Skilled worker</i>	232	36.4
	<i>Unskilled worker</i>	369	57.8
8.2	Unemployed	65	9
9.	Socio – Economic Status of family (monthly):		
9.1	Rs 7008 and above	379	54
9.2	Rs 3504 – 7007	241	34
9.3	Rs 2102 – 3503	62	9
9.4	Rs 1051 – 2101	21	3
10.	Religion:		
10.1	Hindu	632	89.9
10.2	Muslim	56	8
10.3	Christian	12	1.7
10.4	Others	3	0.4
11.	Type of family:		
11.1	Nuclear	249	35
11.2	Joint	454	65
12.	Number of children:		
12.1	1	261	37
12.2	2	337	48
12.3	3	86	12
12.4	>4	19	3
13.	Type of diet:		
13.1	Vegetarian	213	30
13.2	Non vegetarian	490	70
14.	Place of delivery:		
14.1	Government facility	387	55
14.2	Private facility	181	26
14.3	Home	135	19

The data in the Table 5 shows that mostly 255 (36%) children belonged to the age group of (25–30) months. Just over half the mothers 387 (55%) of children were in the age group of 26-30 years and 675 (96%) mothers were married. Around 521

(74%) mothers and 563 (80%) fathers of children were just literate. Of which it was found that majority of 139 (19.7%) mothers were graduate and about 147 (21%) fathers were graduate.

In occupation category, majority of mothers 605 (86%) were homemakers and 638 (91%) fathers were employed of which 369 (57.8%) were unskilled workers. Around 379 (54%) mothers' family had a family income of Rs. 7008 and above. Most of the children 490 (70%) had a non-vegetarian diet and around 387 (55%) children were born in a government facility. Regarding access to health care facility, it was found that maximum 678 (96%) reported mothers reported of having an access to health facility whenever their child gets and 673 (96%) reported of having Anganwadi services by ASHA worker. It is described in Fig. 6 and 7 respectively.

n = 678

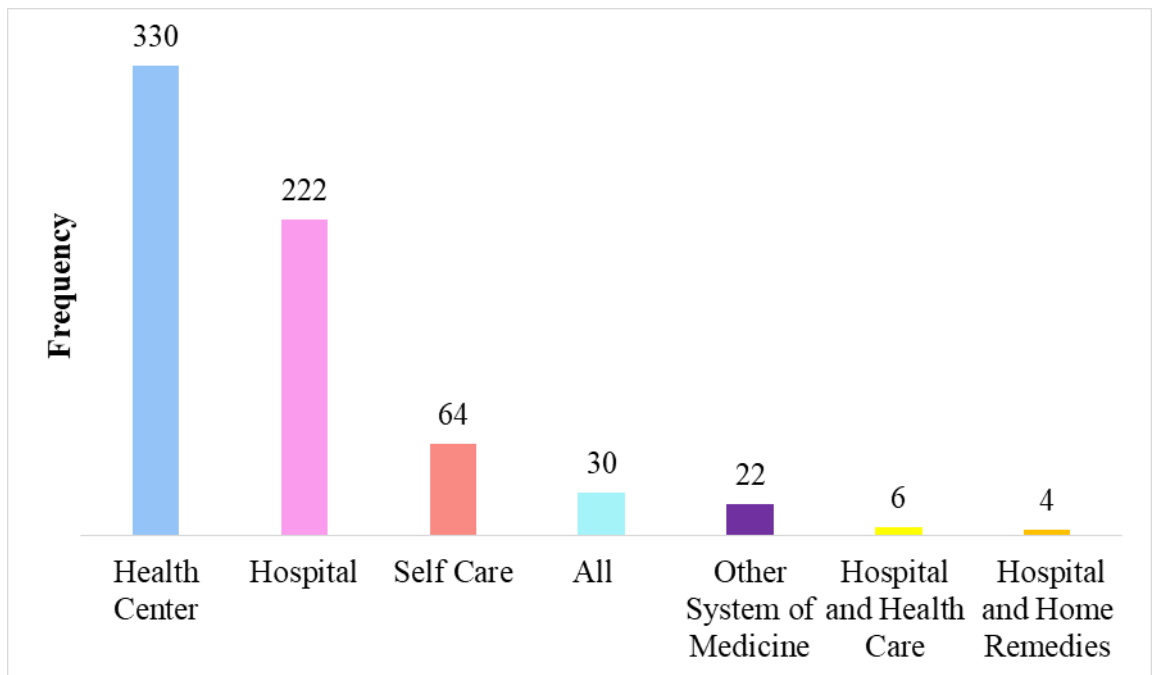


Fig.6. Distribution of samples on use of Health care facilities

n = 673

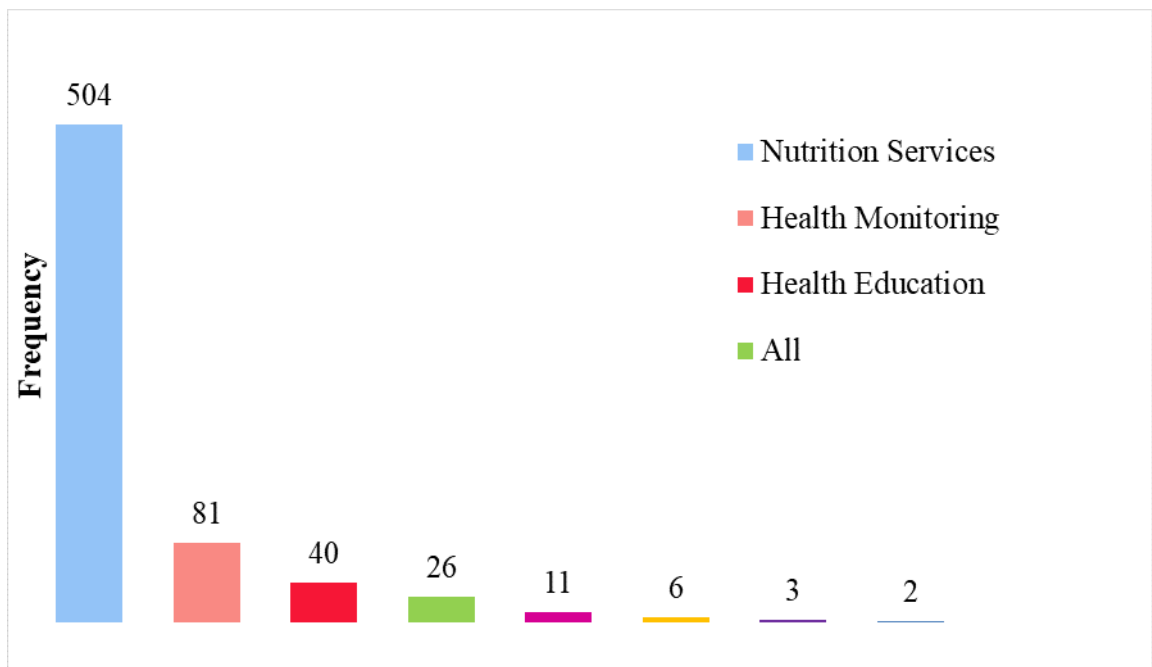


Fig. 7. Distribution of samples on use of Aganwadi Services

Section 2

Nutritional Status of under-five children

Children's nutritional status was assessed through weight, height and mid upper arm circumference. It is interpreted according to WHO criteria i.e., underweight (low weight for age), stunting (low height for age) and wasting (low weight for height) and has been described below.

Section 2 (A). Nutritional Status based on Weight for Age

Nutritional status of children was assessed by checking weight of child and was analyzed with help of WHO Anthro software and is described in Fig. 8 below:

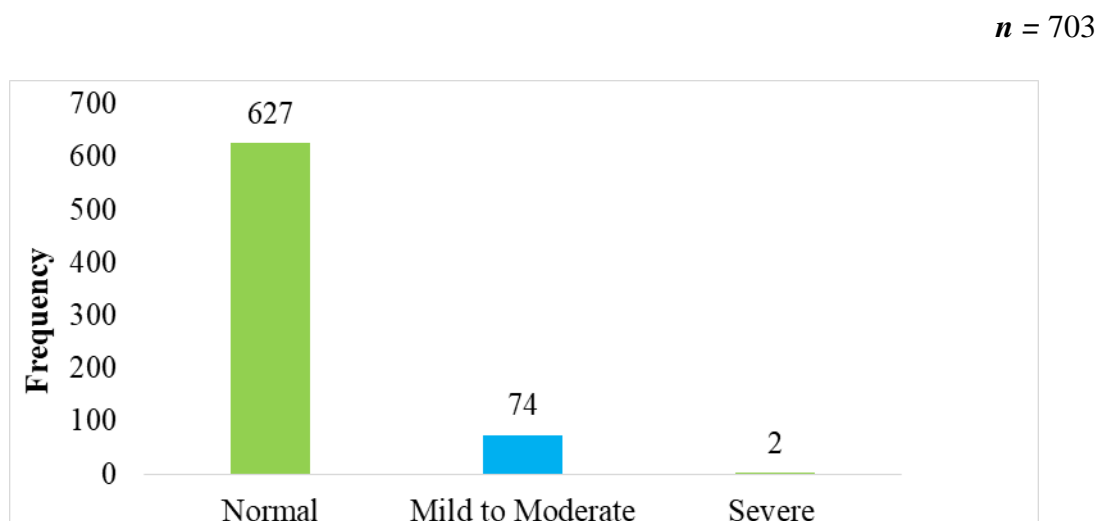


Fig. 8. Distribution of children based on nutritional status according to Weight for Age

The data in the Fig.8 reveals that a majority 627 (89%) of the children were found to be nourished and only 74 (11%) children were found to be undernourished in mild to moderate category.

Section 2 (B). Nutritional Status based on Weight for Height:

Nutritional status of children was assessed by checking weight and height of child and was analyzed with help of WHO Anthro software and is described in Fig. 9 below:

n = 703

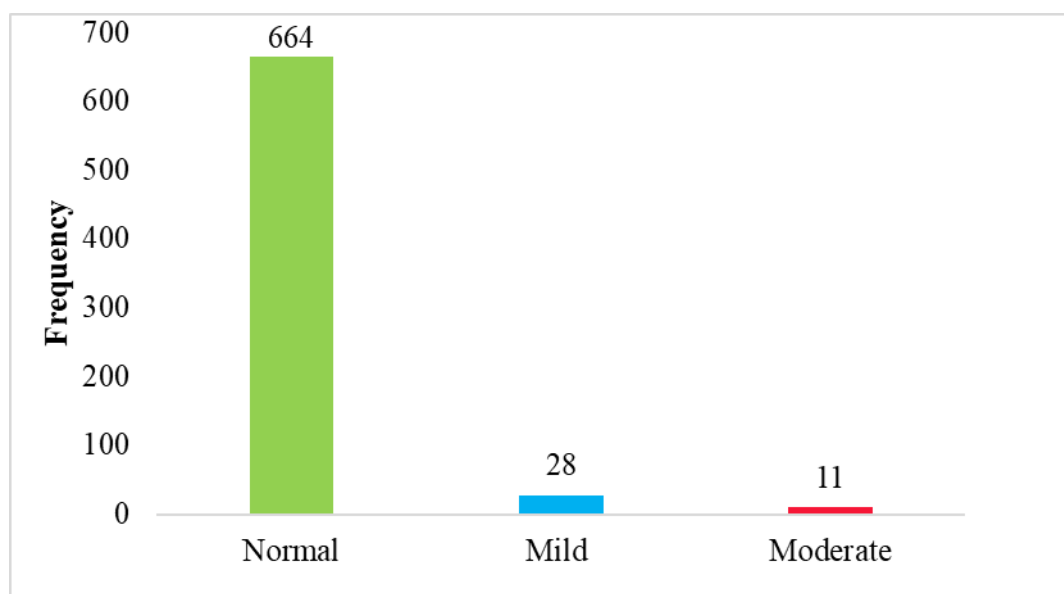


Fig. 9. Distribution of the children based on nutritional status according to Weight for Height

The data in the Fig. 9 reveals that a majority 664 (94%) of the children were found to be nourished and only 11 (1.5%) children were found to be undernourished in moderate category.

Section 2 (C). Nutritional Status based on Height for Age

Nutritional status of children was assessed by checking height of child and was analyzed with help of WHO Anthro software. It described in Fig. 10.

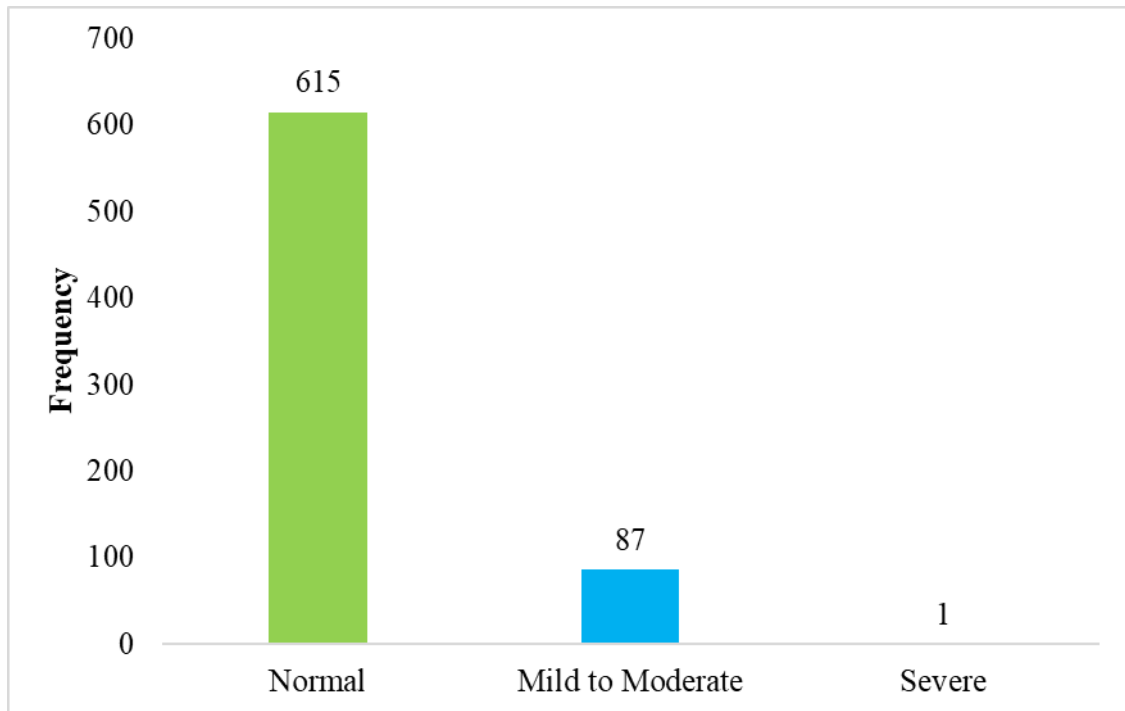


Fig. 10. Distribution of the children based on nutritional status according to Height for Age

The data in the Fig.10 reveals that a majority 615 (87%) of the children were found to be nourished and only 87 (11.5%) children were found to be undernourished in mild to moderate category.

The data regarding distribution of children having underweight and stunting or stunting and wasting or wasting and underweight is described in below mentioned Fig.11. It was found that maximum number of children (40) were falling in both weight for age and weight for height category and about three children were having both height for age and weight for height inadequate

$n = 152$

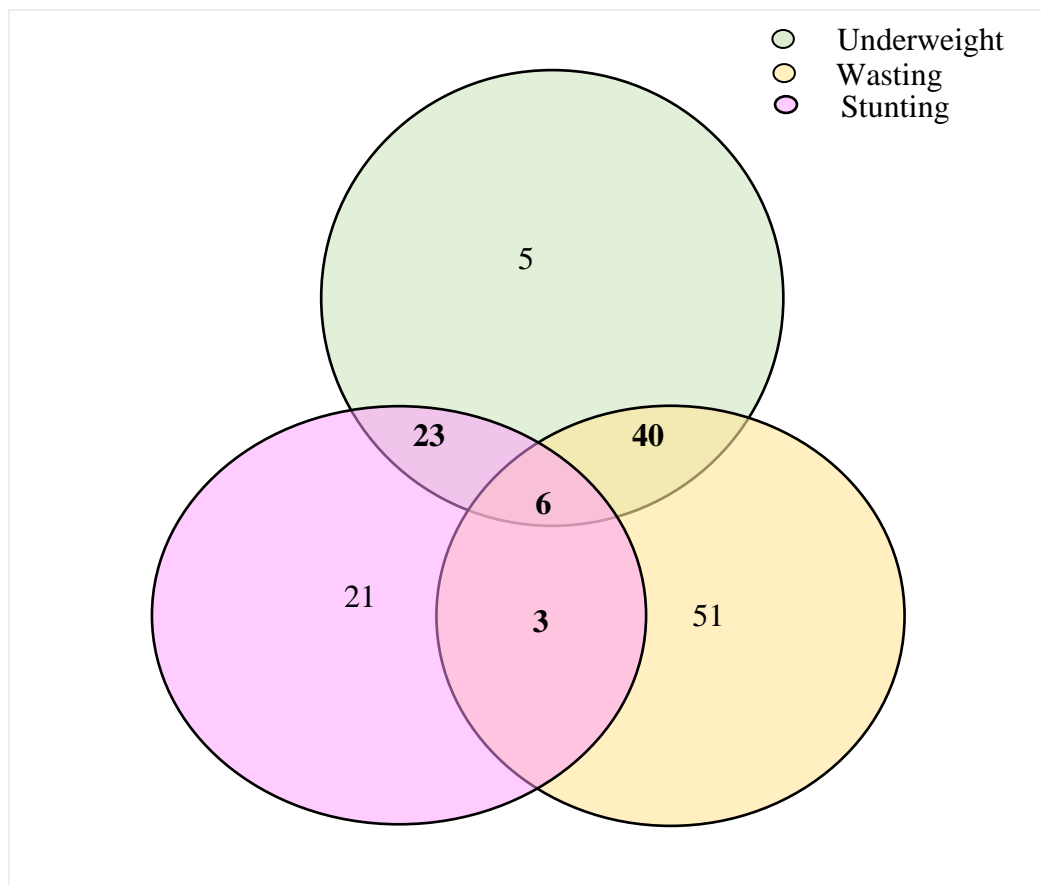


Fig. 11. Venn diagram representing frequency distribution of Underweight, Stunting and Wasting in Children

Section 2(D). Nutritional Status based on Mid Upper Arm Circumference

Nutritional status of children was assessed by checking mid upper arm circumference of child and was compared to the UNICEF criteria. Data was analyzed with help of Anthro software and is described in Fig. 12 below:

n = 703

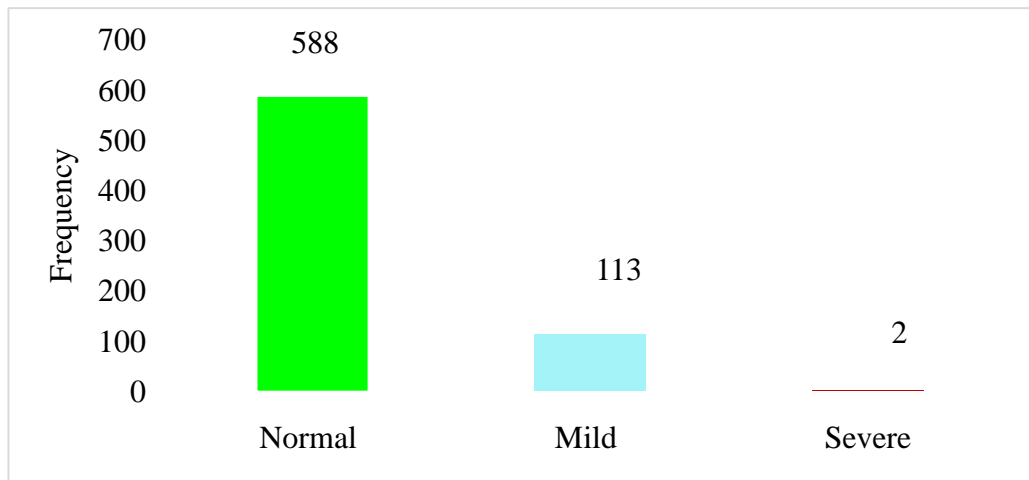


Fig. 12. Distribution of the children based on nutritional status according to Mid upper Arm Circumference

The data in Fig. 13 shows that the overall prevalence of malnutrition in children. It was found that 152 (21.6%) children were malnourished.

n = 703

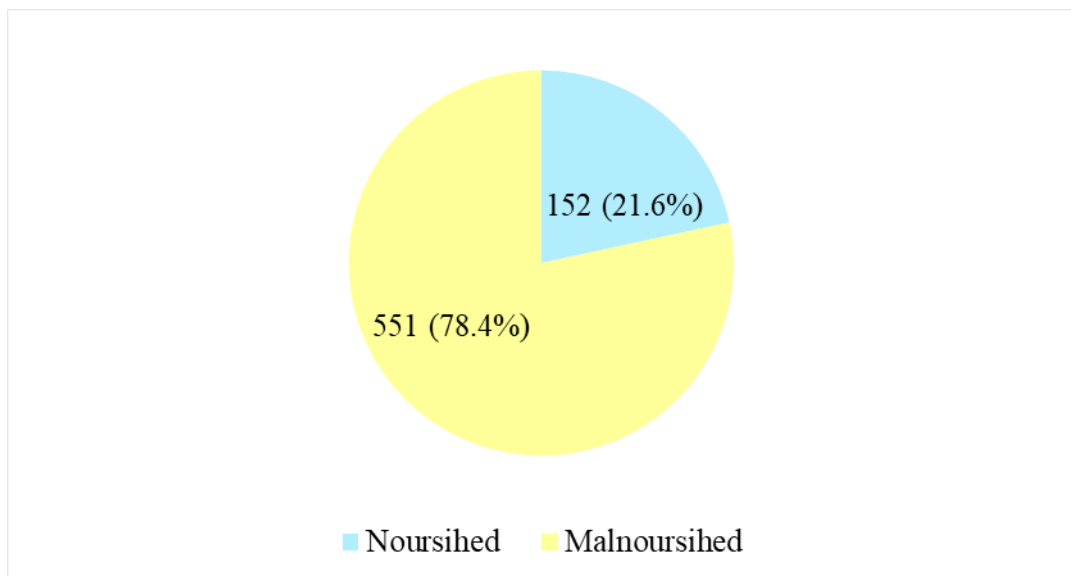


Fig. 13. Pie diagram representing Overall prevalence of Malnutrition in Children

Section 3

Description of risk factors related to malnutrition

The risk factors related to malnutrition was assessed by semi-structured interview schedule. It has been categorized into two sections i.e., section 3A and 3B and described below:

Section 3A: Risk factors of related to malnutrition

Frequency and percentage distribution of risk factors was computed into six areas which includes birth related factors, breast feeding practices, childhood illness, dietary characteristics, environmental characteristics health seeking behavior and utilization of health services. It is described in Table 6 below:

Table 6: Distribution of sample based on risk factors

n = 703

Sl. No.	Factors	Yes	%	No	%
I.	<i>Birth related Factors</i>				
1.	At least one visit to hospital during pregnancy	703	100	--	--
2.	During pregnancy iron and folic acid supplementation	697	99.1	6	0.9
3.	Anemia during pregnancy	79	11.2	624	88.3
4.	Tetanus toxoid immunization in pregnancy	703	100	--	--
5.	Weight gain during pregnancy	703	100	--	--
6.	Complications during pregnancy	74	10.5	629	89.5
7.	Duration of pregnancy 9 months	653	92.9	50	7.1
8.	Birth weight of child above 2.5 kg	621	88.3	82	11.7
9.	Ordinal first position of child in the family	409	58.2	294	41.8
II.	<i>Breast Feeding Practices:</i>				
10.	Breast feeding initiated within 1 hour	613	87.2	90	12.8
11.	Exclusive breast feeding	636	90.5	67	9.5

12.	Experienced problems during breast feeding	383	54.5	320	45.5
13.	Weaning initiated after six months	624	88.8	79	11.2
14.	Bottle feeding	406	57.7	297	42.3
III.	<i>Childhood Illness:</i>				
15.	Any medication for worm infestations	351	49.9	352	50.1
16.	Childhood illness	594	84.5	109	15.5
IV.	<i>Dietary Characteristics</i>				
17.	Child skipping meal	270	38.5	433	61.5
18.	Poor appetite of child	255	36.7	438	62.3
19.	Enjoys eating everything cooked by you	541	76.9	162	23.1
20.	Child choosy for food selection	482	68.5	221	31.5
21.	Supervise your child while eating	647	92	56	8
V.	<i>Environmental Characteristics</i>				
22.	Pucca house	166	23.6	537	76.4
23.	Flooring of house cemented	599	85.3	104	14.7
24.	Toilet in house	676	96.1	27	3.9
25.	Open drainage system	666	94.7	37	5.3
26.	Water source for drinking	703	100	--	--
27.	Sow your own vegetables	593	84.3	110	15.7
V.	<i>Health Seeking Behavior:</i>				
28.	Child's immunization	703	100	--	--
29.	Seek health when child ill	703	100	--	--

The data in table 6 above shows all the mothers had visited the hospital or health center at least once during pregnancy. The number of times they visited health facility is described in the *Fig. 14*.

$n = 703$

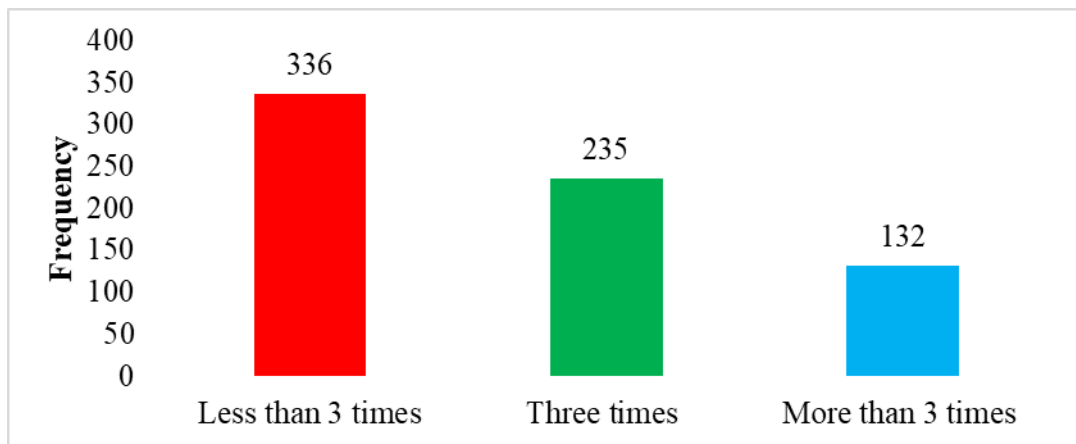


Fig. 14. Bar diagram representing frequency distribution based on visit to hospital during Pregnancy

Majority of the mothers [697 (99.1%)] took iron and folic acid supplementation during pregnancy, but it was observed that 79 (11.2%) were anemic during pregnancy. The distribution of mothers based on the classification of anemia is described in *Fig.15*.

$n = 79$

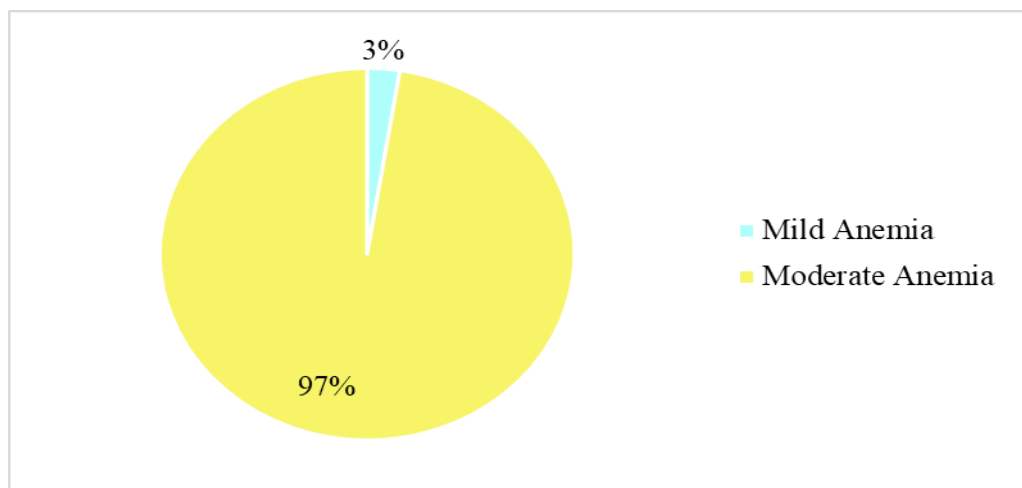


Fig. 15. Bar diagram representing frequency distribution of anemia during pregnancy

About 74 (10.5%) mothers experienced complications during pregnancy. The distribution of mothers based on complications during pregnancy is described in *Fig. 16*.

n = 74

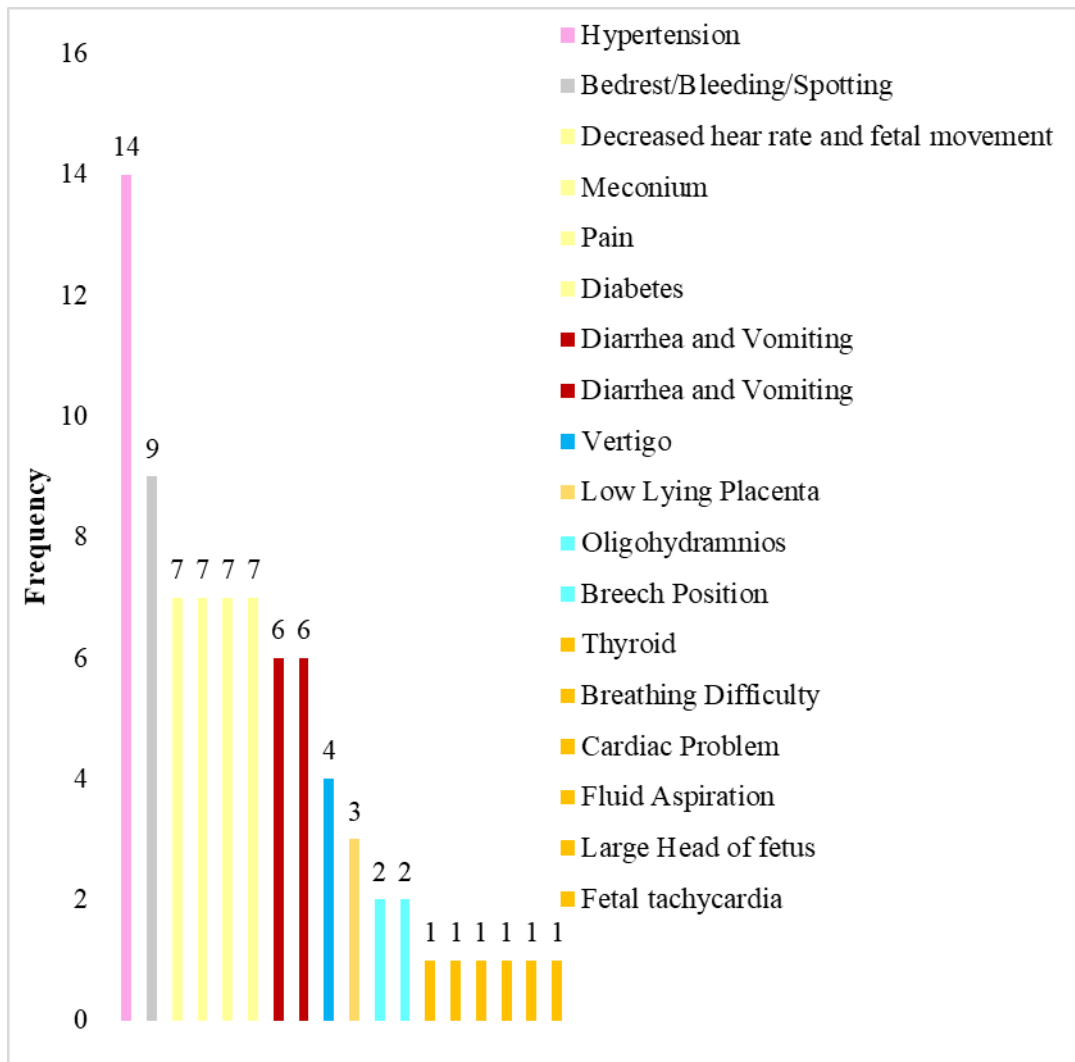


Fig. 16. Bar diagram representing frequency distribution of Complications in Pregnancy

Most of the children 621 (88.3%) had birth weight above 2.5 kg. Distribution of children having weight below 2.5 kg 82 (11.7%) is described in *Fig. 17*.

$n = 82$

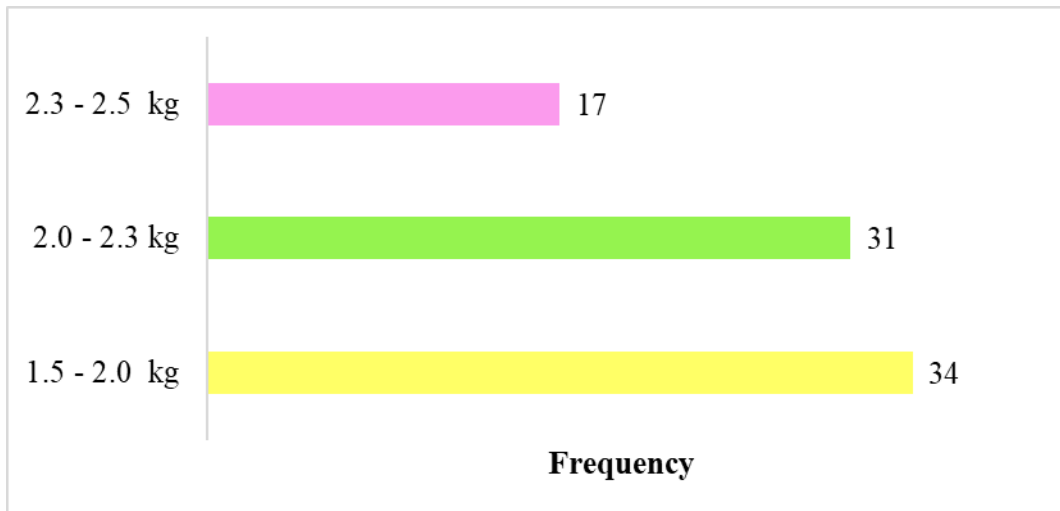


Fig. 17. Bar diagram representing frequency distribution of children with Birth Weight less than 2.5kg

Out of 703 children, 409 (58.2%) were first born in the family. The ordinal position of children is described in *Fig.18*.

$n = 703$

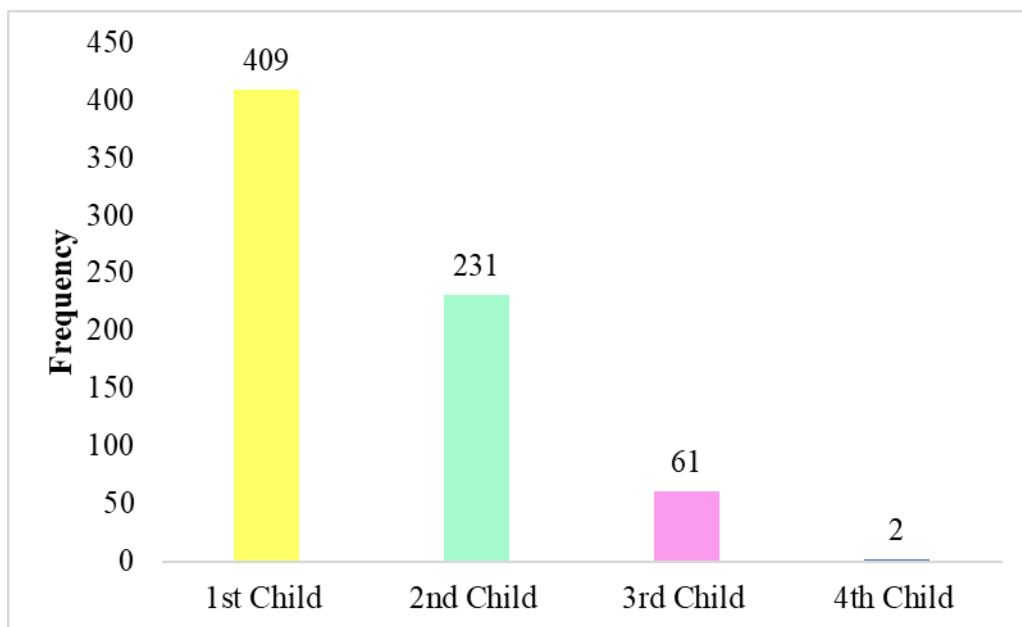


Fig. 18. Bar diagram representing frequency distribution of Ordinal position of Child

In breast feeding practices, most of the mothers 613 (87.2%) initiated breast feeding within one hour of birth of their child. Description on time of initiation of breast feeding after birth is given in *Fig. 19*.

n = 90

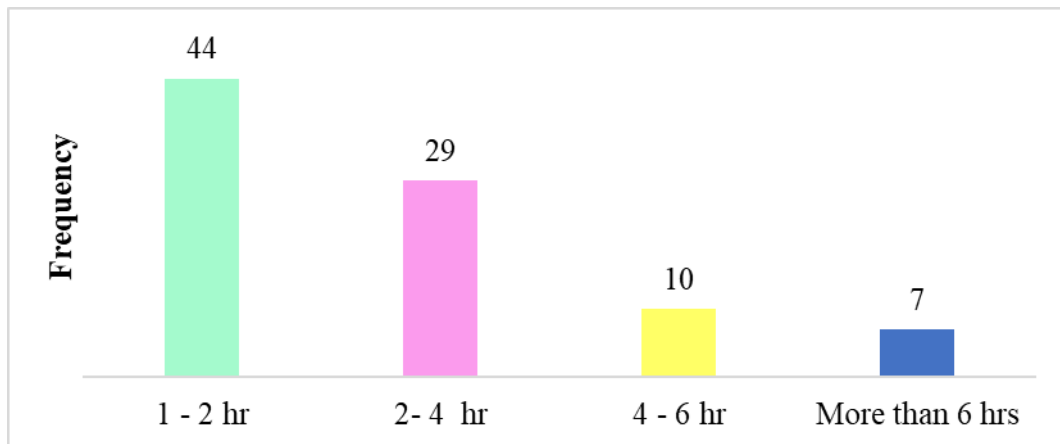


Fig. 19. Bar diagram representing frequency distribution based on time of initiation of breastfeeding

Most of the mothers 636 (90.5%) breast fed their child with milk only. About 383 (54.5%) mothers experienced problems in breast feeding and majority of the them 200 (52.2%) had breast swelling and pain (*Fig.20*). Maximum mothers 624 (88.8%) initiated weaning after six months. The distribution based on time of initiation of weaning is given in *Fig. 21*.

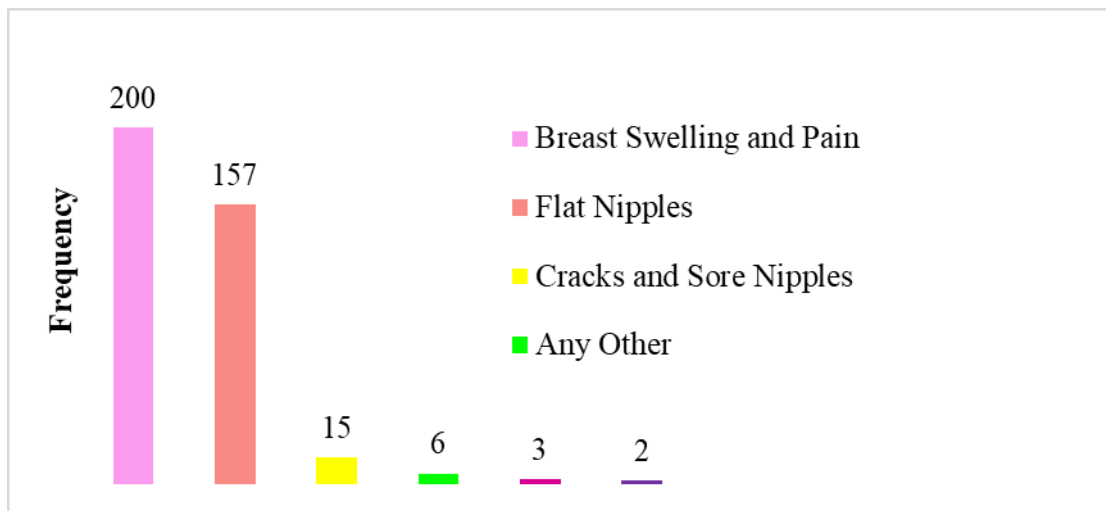


Fig. 20. Bar diagram representing frequency distribution of problems in Breast feeding

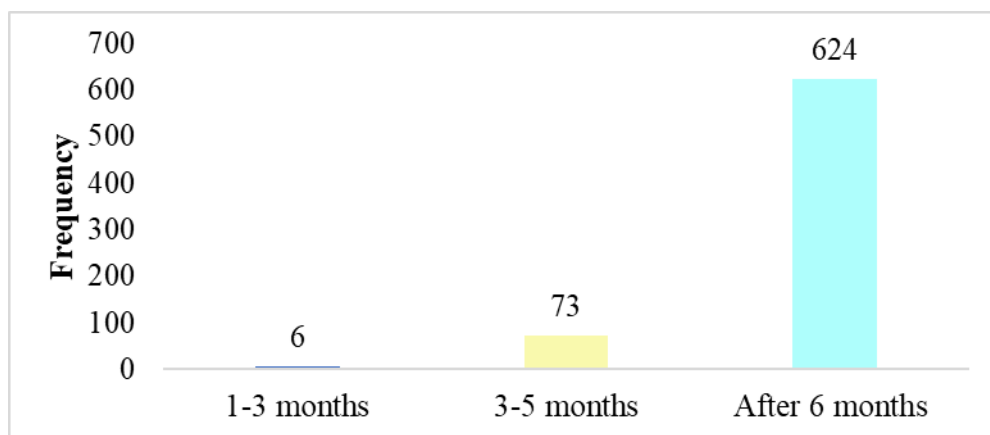


Fig. 21. Bar diagram representing frequency distribution based on time of initiation Weaning

In dietary characteristics it was found that mostly 270 (38.5%) children skipped meals (3-4) times in a week (Fig.22). About 482 (68.5%) children were choosy for food selection and majority of the mothers 647 (92%) had to supervise their child while eating.

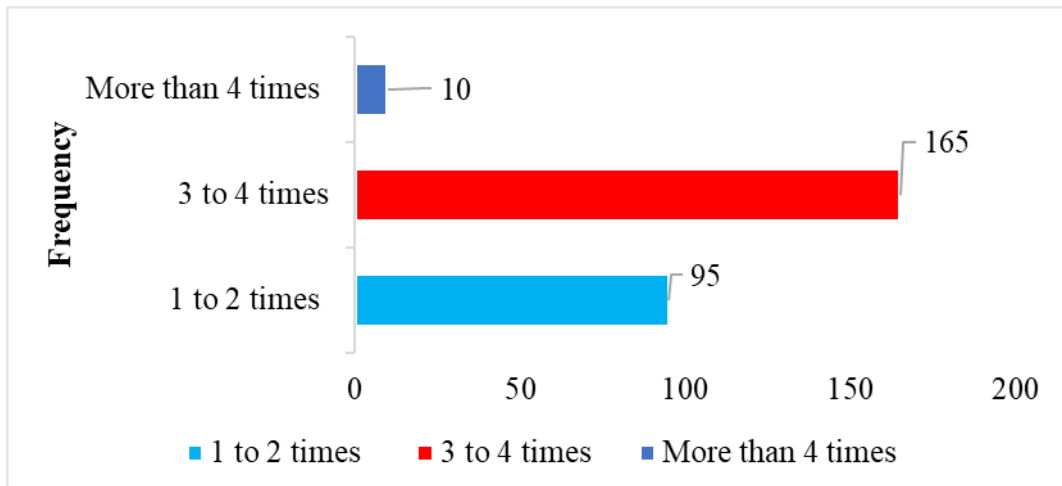
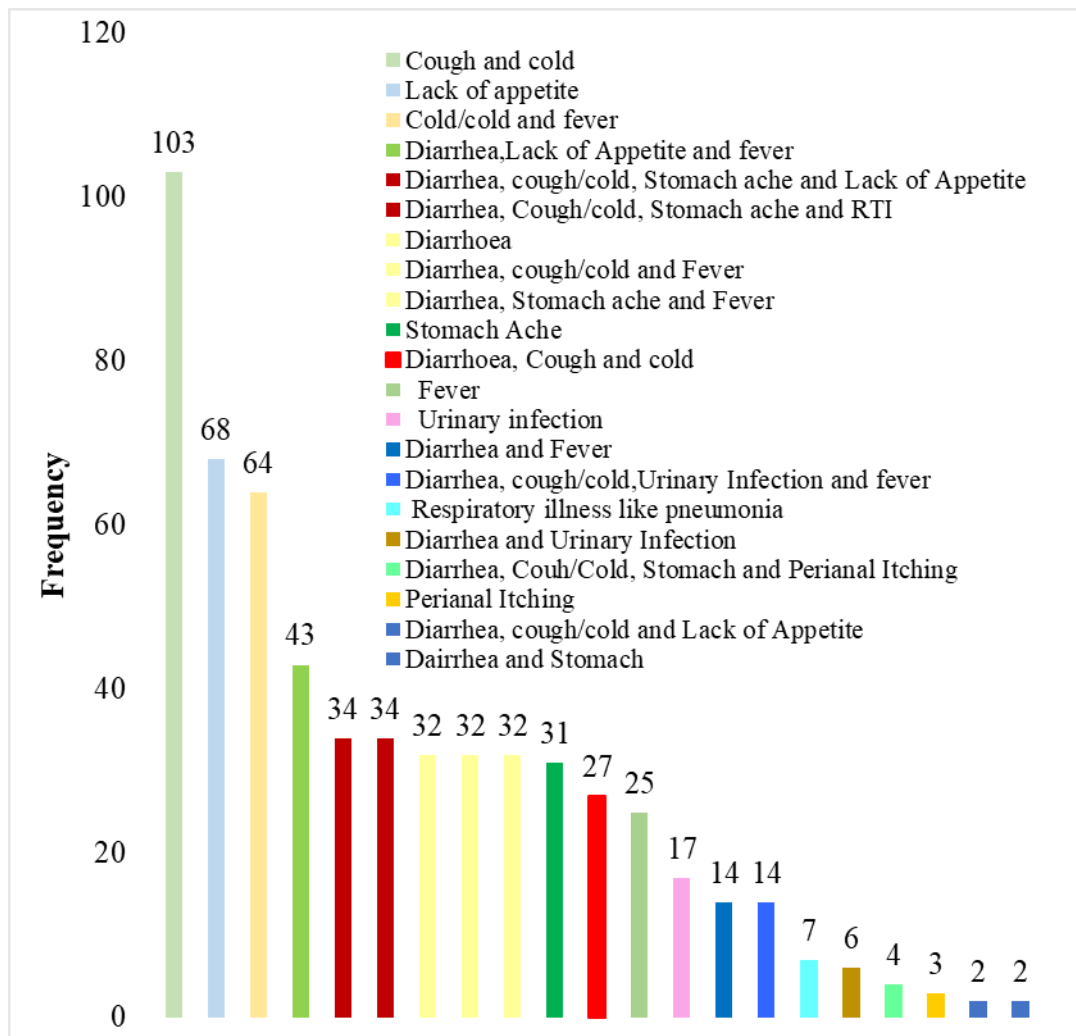


Fig. 22. Bar diagram representing frequency distribution of number of times Meal was Skipped in a week

In childhood illness, it was found that about 352 (50.1) children didn't receive medications for worm infestation and 594 (84.5) children experienced recurrent illness. The distribution of recurrent illness experienced by children is given in *Fig.23*.

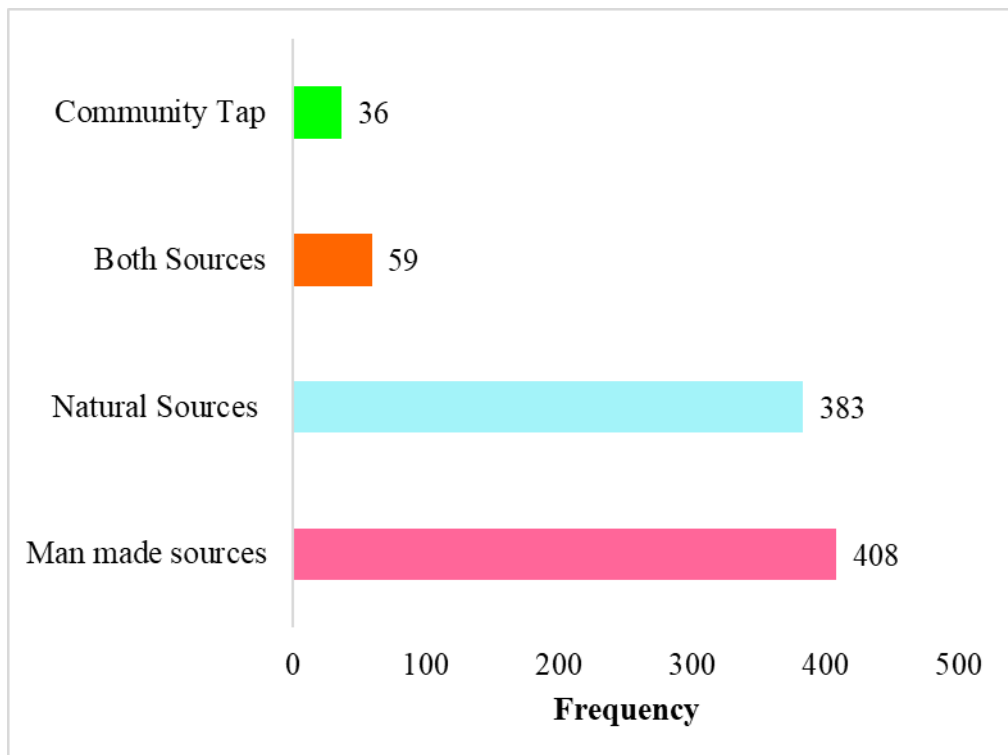


* Classes are mutually exclusive

Fig. 23. Bar diagram representing frequency distribution of childhood illness

In environmental characteristics, it was found that majority of the families 567 (76.4%) didn't have pucca house. Most of the families 599 (85.3%) had cemented flooring. About 676 (96.1%) families had toilet in their house and majority of the families 666 (94.7%) had open drain around their house. Most of the families 408 (58%) used tapped water source in their house and description about water sources is given in *Fig.24*.

n = 703*



* Classes are mutually exclusive

Fig. 24. Bar diagram representing frequency distribution of sources of water

Section 3B: Odds between risk factors and nutritional status

In order to explore the significant risk factors odds between nutritional status and risk factors was computed and is described in below mentioned table 7,8 and 9 below.

Table 7: Odds between risk factors and nutritional status (Underweight) of children.

n = 703

Factors	NW	UW	Unadjusted Odds Ratio (95% CI)	<i>p</i> value
<i>Birth related Factors</i>				
Iron and folic acid Supplementation				
Yes	622	75	1 (Ref)	0.643
No	5	1	0.396 (0.161-13.69)	
Anemia during pregnancy				
Yes	65	14	1.95 (0.271-0.965)	0.039*
No	562	62	1 (Ref)	
Complications during pregnancy				
Yes	70	4	0.44 (0.801-6.381)	0.123
No	557	72	1 (Ref)	
Duration of Pregnancy 9 months				
Yes	581	72	1 (Ref)	0.500
No	46	4	0.840 (0.287-2.454)	
Weight of child above 2.5 kg				
Yes	560	61	1 (Ref)	0.023*
No	67	15	2.055 (1.106-3.817)	
Child first born in the family				
Yes	366	43	1 (Ref)	0.693
No	261	33	1.103 (0.679-1.791)	
<i>Breast Feeding Practices:</i>				
Breast feeding initiated within 1 hour				
Yes	552	61	1 (Ref)	0.045*
No	75	15	1.809 (0.979-3.344)	
Breast feed with milk only for 6 months				
Yes	570	66	1 (Ref)	0.43
No	56	10	0.918 (0.365-2.307)	

Any of the problems for breast feeding				
Yes	347	36	0.65 (0.908-2.585)	0.233
No	280	40	1 (Ref)	
Weaning initiated after six months				
Yes	563	61	1 (Ref)	0.013*
No	64	15	2.163 (1.162-4.026)	
Bottle feeding				
Yes	354	52	1.67 (0.359-0.995)	0.046*
No	273	24	1 (Ref)	
<i>Childhood Illness:</i>				
Any medication for worm infestations				
Yes	311	40	1 (Ref)	0.618
No	316	36	0.879 (0.545-1.420)	
Child was not well				
Yes	540	54	0.396 (1.466-4.361)	0.001*
No	84	22	1 (Ref)	
<i>Dietary Characteristics</i>				
Child skips meal				
Yes	251	19	0.49 (1.163-3.447)	0.011*
No	376	57	1 (Ref)	
Poor appetite				
Yes	229	26	0.89 (0.679-1.862)	0.692
No	398	50	1 (Ref)	
Enjoys eating everything cooked by you				
Yes	492	49	1 (Ref)	0.006*
No	135	27	2.008 (1.209-3.333)	
Child choosy for food selection				
Yes	432	50	0.97 (0.718-1.506)	0.799
No	194	26	1 (Ref)	
Supervise child while eating				
Yes	576	71	1 (Ref)	0.636
No	51	5	0.795 (0.307-2.058)	
<i>Environmental Characteristics</i>				
Pucca house				
Yes	145	21	1 (Ref)	0.383

No	482	55	0.787 (0.461-1.346)	
Flooring of house cemented				
Yes	530	69	1 (Ref)	0.154
No	96	7	0.56 (0.250-1.256)	
Toilet in house				
Yes	604	72	1 (Ref)	0.497
No	23	4	1.458 (0.490-4.337)	
Open drainage system				
Yes	599	67	0.35 (1.301-6.346)	0.007*
No	28	9	1 (Ref)	
Sow your own vegetables				
Yes	542	51	1 (Ref)	0.000*
No	85	25	3.125 (1.839-5.312)	

OR> 1 Increased risk of malnutrition; OR= 1 No risk; OR< 1 Decreased risk of malnutrition* $p < .05$, = Significant, NW= Normal Weight, UW = Underweight

The data depicted in the Table 7 above shows chi square and odds computed between risk factors of malnutrition and nutritional status (Underweight). The bivariate logistic regression analysis found that the those mothers who are anemic during pregnancy have 1.95 times [95% CI (0.271, 0.965), $p = 0.039$] higher risk of having malnourished children, children weighing less than 2.5 kg at birth were twice [95% CI (1.106, 3.817), $p = 0.023$] at higher risk for malnutrition, non-initiation of breast feed within one hour of birth predisposes the child to 1.8 times [95% CI (0.979, 3.344), $p = 0.045$] higher risk for malnutrition, children with early initiation of weaning were two times [95% CI (1.162,4.026), $p = 0.013$] more at risk of developing malnutrition, children who were bottle-feeding were at 1.67 times [95% CI (0.359,0.995), $p = 0.046$] higher risk for developing malnutrition, children with recurrent illness were at 0.39 times [95% CI (1.466,4.361), $p = 0.001$] higher risk for developing malnutrition, children who skipped meal were 0.59 times [95% CI

(1.163,3.447), $p = 0.011$] higher risk for developing malnutrition and those children who do not enjoy while eating meals are twice [95% CI (1.209,3.333), $p = 0.006$] at risk for malnutrition. Environmental factors like having an open drain system around house was noted to have 0.35 times [95% CI (1.301,6.346), $p = 0.007$] higher risk for malnutrition and children whose families didn't sow their own vegetables were at 3.12 times [95% CI (1.839-5.312), $p = 0.000$] higher risk to develop malnutrition.

In multivariate logistic model, mothers with complications during pregnancy were found to have three times more risk to have a malnourished child [95% CI (1.040 -9.088), $p = 0.042$], children weighing less than 2.5kg at birth were twice at risk for development of malnutrition [95% CI (1.103,4.260), $p = 0.025$], non-initiation of weaning was found to have two times more risk for malnutrition in children [95% CI (1.323,5.172), $p = 0.006$], children who were bottle feeding were 2.12 times higher at risk for malnutrition [95% CI (0.271, 0.826), $p = 0.009$], risk for malnutrition in children with recurrent illness was found to be two times more [95% CI (1.372, 4.647), $p = 0.003$], children skipping meal were 2.3 times [95% CI (1.312, 4.341), $p = 0.004$] at higher risk for malnutrition, children not enjoying while eating meals were 1.9 times [95% CI (1.077, 3.351), $p = 0.027$] at higher risk for malnutrition, families having an open drain system around house was noted to have 2.4 times [95% CI (1.026,5.739), $p = 0.043$] higher risk for malnutrition in children and children whose families which didn't sow their own vegetables were at 2.9 times [95% CI (1.687,5.315), $p = 0.000$] risk to develop malnutrition. All these factors were found to be independently contributing to malnutrition.

Table 8: Odds between risk factors and nutritional status (Wasting) of children.*n* = 703

Factors	NW	W	Unadjusted Odds Ratio (95% CI)	<i>p</i> value
<i>Birth related Factors</i>				
Iron and folic acid Supplementation				
Yes	659	38	1 (Ref)	0.232
No	5	1	0.594 (0.138-23.75)	
Anemia during pregnancy				
Yes	71	8	2.15 (0.205-1.048)	0.059
No	593	31	1 (Ref)	
Complications during pregnancy				
Yes	67	7	1.94 (0.217-1.207)	0.120
No	597	32	1 (Ref)	
Duration of pregnancy 9 months				
Yes	617	36	1 (Ref)	0.885
No	47	3	1.035 (0.291-3.685)	
Weight of child above 2.5 kg				
Yes	585	36	1 (Ref)	0.427
No	79	3	0.617 (0.185-2.050)	
Child first born in the family				
Yes	391	18	1 (Ref)	0.117
No	273	21	1.569 (0.811-3.033)	
<i>Breast Feeding Practices:</i>				
Breast feeding initiated within 1 hour				
Yes	583	30	1 (Ref)	0.048*
No	81	9	2.159 (0.989-4.711)	
Breast feed with milk only for 6 months				
Yes	601	35	1 (Ref)	0.954
No	62	4	1.469 (0.406-5.317)	
Any of the problems for breast feeding				
Yes	366	17	0.59 (0.840-3.343)	0.160
No	298	22	1 (Ref)	

Weaning initiated after six months				
Yes	588	36	1 (Ref)	0.471
No	76	3	0.644 (0.193-2.14)	
Bottle feeding				
Yes	376	30	2.56 (0.183-0.837)	0.013*
No	288	9	1 (Ref)	
Childhood Illness:				
Any medication for worm infestations				
Yes	332	19	1 (Ref)	0.876
No	332	20	1.365 (0.668-2.788)	
Child was not well				
Yes	563	31	0.69 (0.642-3.219)	0.374
No	101	8	1 (Ref)	
Dietary Characteristics				
Child skips meal				
Yes	256	14	0.89 (0.571-2.195)	0.740
No	408	25	1 (Ref)	
Poor appetite				
Yes	244	11	0.58 (0.806-3.672)	0.281
No	420	28	1 (Ref)	
Enjoys eating everything cooked by you				
Yes	515	26	1 (Ref)	0.116
No	149	13	1.728 (0.866-3.446)	
Child choosy for food selection				
Yes	459	23	0.86 (0.761-1.770)	0.394
No	204	16	1 (Ref)	
Supervise child while eating				
Yes	614	33	1 (Ref)	0.078
No	50	6	2.232 (0.893-5.582)	
Environmental Characteristics				
Pucca house				
Yes	153	13	1 (Ref)	0.141
No	511	26	0.598 (0.300-1.193)	

Flooring of house cemented				
Yes	563	36	1 (Ref)	0.205
No	100	3	0.361 (0.102-1.281)	
Toilet in house				
Yes	638	38	1 (Ref)	0.669
No	26	1	0.645 (0.085-4.887)	
Open drainage system				
Yes	627	39	1 (0.045-0.085)	0.130
No	37	0	1 (Ref)	
Sow your own vegetables				
Yes	567	26	1 (Ref)	0.002*
No	97	13	2.922 (1.451-5.883)	

OR > 1 Increased risk of malnutrition; OR = 1 No risk; OR < 1 Decreased risk of malnutrition, * $p < .05$, = Significant, NW = Normal Weight, W = Wasting

Data in Table 8 above shows the chi square computed between risk factors of malnutrition (WFH) and nutritional status. The bivariate logistic regression analysis found that those mothers whose breast feeding was not initiated within one hour of birth were two times higher [95% CI (0.989, 4.711), $p = 0.048$] risk for malnutrition. Children with bottle-feeding were at 2.56 times higher [95% CI (0.183, 0.837), $p = 0.013$] risk and children whose families who don't sow their own vegetables were at 2.92 times [95% CI (1.451-5.883), $p = 0.002$] risk for malnutrition.

In multivariate logistic model, risk of malnutrition in children of anemic mothers during pregnancy was 2.17 times [95% CI (202, 1.069), $p = 0.072$] higher than non-anemic mothers, families having pucca house were 0.47 times lesser risk for having malnourished child [95% CI (0.234, 0.963), $p = 0.039$] and those families who didn't sow their own vegetables are three times [95% CI (0.026, 1.974), $p = 0.002$] risk for malnutrition in their children. All these factors were found to be independently contributing to malnutrition.

Table 9: Odds between risk factors and nutritional status (Stunting) of children.*n* = 703

Factors	NW	S	Unadjusted Odds Ratio (95% CI)	<i>p</i> value
<i>Birth related Factors</i>				
Iron and folic acid Supplementation				
Yes	611	86	1 (Ref)	0.282
No	4	2	1.016 (0.365-20.93)	
Anemia during pregnancy				
Yes	61	18	2.38 (0.239-0.765)	0.003*
No	554	70	1 (Ref)	
Complications during pregnancy				
Yes	62	12	1.40 (0.365-1.377)	0.309
No	553	76	1 (Ref)	
Duration of pregnancy 9 months				
Yes	574	79	1 (Ref)	0.224
No	41	9	1.444 (0.649-3.214)	
Weight of child above 2.5 kg				
Yes	546	75	1 (Ref)	0.331
No	69	13	1.371 (0.723-2.600)	
Child first born in the family				
Yes	357	52	1 (Ref)	0.853
No	258	36	0.949 (0.598-1.504)	
<i>Breast Feeding Practices:</i>				
Breast feeding initiated within 1 hour				
Yes	543	70	1 (Ref)	0.022*
No	72	18	1.939 (1.090-3.440)	
Breast feed with milk only for 6 months				
Yes	560	76	1 (Ref)	0.322
No	54	12	1.018 (0.435-2.381)	
Any of the problems for breast feeding				
Yes	335	48	1.02 (0.611-1.596)	0.990
No	280	40	1 (Ref)	

Weaning initiated after six months				
Yes	550	74	1 (Ref)	0.138
No	65	14	1.600 (0.855-2.994)	
Bottle feeding				
Yes	346	60	1.66 (0.372-0.966)	0.034*
No	269	28	1 (Ref)	
<i>Childhood Illness:</i>				
Any medication for worm infestations				
Yes	304	47	1 (Ref)	0.485
No	311	41	1.176 (0.722-1.916)	
Child was not well				
Yes	528	66	0.49 (1.187-3.447)	0.009*
No	87	22	1 (Ref)	
<i>Dietary Characteristics</i>				
Child skips meal				
Yes	236	64	1 (Ref)	0.962
No	379	54	0.988 (0.625-1.564)	
Poor appetite				
Yes	221	34	1.02 (0.602-1.639)	0.622
No	394	54	1 (Ref)	
Enjoys eating everything cooked by you				
Yes	487	54	1 (Ref)	0.000*
No	128	34	2.395 (1.495-3.837)	
Child choosy for food selection				
Yes	427	55	0.97 (0.720-1.493)	0.383
No	187	33	1 (Ref)	
Supervise child while eating				
Yes	568	79	1 (Ref)	0.402
No	47	9	1.376 (0.649-2.917)	
<i>Environmental Characteristics</i>				
Pucca house				
Yes	136	30	1 (Ref)	0.014*
No	479	58	0.548 (0.339-0.887)	

Flooring of house cemented				
Yes	522	77	1 (Ref)	0.538
No	92	11	0.550 (0.262-1.157)	
Toilet in house				
Yes	595	81	1 (Ref)	0.038*
No	20	7	2.570 (1.054-6.269)	
Open drainage system				
Yes	583	83	1.38 (.0248-2.091)	0.851
No	32	5	1 (Ref)	
Sow your own vegetables				
Yes	529	64	1 (Ref)	0.002*
No	86	24	2.306 (1.369-3.885)	

OR > 1 Increased risk of malnutrition; OR = 1 No risk; OR < 1 Decreased risk of malnutrition* $p < .05$, = Significant, NW = Normal Weight, S = Stunting

The above data in Table 9 shows the chi square computed between risk factors of malnutrition (HFA) and nutritional status. The bivariate logistic regression analysis found that the mothers who were anemic during pregnancy have 2.38 times [95% CI (0.239, 0.765), $p = 0.003$] higher risk of having malnourished children, children whose breast feeding was not initiated within one hour of birth are at 1.9 times [95% CI (1.090, 3.440), $p = 0.022$] higher risk for malnutrition, children bottle-feeding are at 1.66 times [95% CI (0.372, 0.966), $p = 0.034$] higher risk for malnutrition, children with recurrent illness are 0.49 times [95% CI (1.187, 3.447), $p = 0.009$] higher risk for malnutrition, children not enjoying while eating meals were at 2.3 times [95% CI (1.495, 3.837), $p = 0.000$] higher risk for malnutrition, families having pucca house were at 0.54 times higher risk for having malnourished child [95% CI (0.339, 0.887), $p = 0.014$], families not having toilet in the houses are 2.5 times [95% CI (1.054, 6.269), $p = 0.038$] more risk of having malnutrition in their children and those families who don't sow their own vegetables are 2.3 times [95%

CI (1.369,3.885), $p = 0.002$] risk for malnutrition in their children.

In multivariate logistic model, risk for malnutrition in children whose mothers were anemic during pregnancy is 2.12 times [95% CI (0.260, 0.877), $p = 0.017$] higher than non-anemic mothers, children with early initiation of weaning are 1.7 times [95% CI (0.902, 3.328), $p = 0.099$] more risk of developing malnutrition, risk for malnutrition in children with recurrent illness was found to be 1.7 times more [95% CI (1.020, 3.101), $p = 0.042$], children not enjoying while eating meals have 1.9 times [95% CI (1.170, 3.170), $p = 0.010$] risk for malnutrition, families having pucca house have 0.59 times less risk for having malnourished child [95% CI (0.358, 0.973), $p = 0.039$] and those families which didn't sow their own vegetables have twice the [95% CI (1.159, 3.496), $p = 0.013$] risk to develop malnutrition in children and were found to be independently contributing to malnutrition. All these factors were found to be independently contributing to malnutrition.

Section 4

Description of relationship between the nutritional status of under-five children and selected variables

Chi – square was computed to find the relationship between the nutritional status of children and selected variables and is described in Table 10.

Table 10: Association between nutritional status of children and selected variables in intervention group

n = 703

Variables	WFA		df	χ^2	<i>p</i> value	WFH		χ^2	Df	<i>P</i> value	HFA		χ^2	df	<i>P</i> value
	NW	UW				NW	W				NW	S			
Gender															
<i>Female</i>	305	45	1	3.027	0.053*	313	37	1.46	1	0.141	307	43	0.034	1	0.472
<i>Male</i>	322	31				325	28				308	45			
Mother's Educational status															
<i>Educated</i>	153	29	1	6.685	0.009*	162	20	0.89	1	0.211	458	63	0.333	1	0.323
<i>Un educated</i>	474	47				476	45				157	25			
Family Type															
<i>Joint</i>	400	54	1	1.561	0.130	409	45	0.67	1	0.248	396	58	0.078	1	0.440
<i>Nuclear</i>	227	22				229	20				219	30			
No. of children															
<i>One</i>	232	29	3	0.558	0.906	241	20	2.00	3	0.571	222	39	3.105	3	0.376
<i>Two</i>	303	34				303	34				297	40			
<i>Three</i>	75	11				76	10				79	7			
<i>Four</i>	17	2				18	1				17	2			
Place of delivery															
<i>Government</i>	348	39	2	2.838	0.242	358	29	4.21	2	0.122	337	50	4.053	2	0.132
<i>Private</i>	164	17				163	18				165	16			
<i>Home</i>	115	20				117	18				113	22			

* Significant at *p* < 0.05 level at 95% CI; NW = Normal weight, UW = Underweight, W = Wasting, S = Stunting

The data in table 23 shows that gender ($\chi^2 = 3.027, p = .053$) and mother's educational status ($\chi^2 = 6.685, p = .009$) was found to be significantly associated with nutritional status (underweight) of the children.

Phase II

This section describes effectiveness of Family-Based Intervention Program (FBIP) on nutritional status of children, nutritional knowledge and nutrition related practices of mothers and is described in below mentioned sections.

Section 5

Description of sample characteristics

This section describes the characteristics of sample in terms of demographic information of the identified malnourished children of selected villages. A comparison of sample characteristics between intervention and control group was done to test the homogeneity and is described in Table 11 below:

Table 11: Frequency and Percentage description of sample characteristics $n = 75+74=149$

Sl. No.	Sample Characteristics	Intervention Group		Control Group		<i>p</i> value
		Frequency	Percentage (%)	Frequency	Percentage (%)	
1.	Age of Child (in months):					
1.1	12 – 18	03	4.0	19	25.6	0.06
1.2	19 – 24	26	34.7	17	23	
1.3	25 – 30	23	30.7	25	33.8	
1.4	31 – 36	23	30.7	13	17.6	
2.	Gender of the child:					
2.1	Male	32	42.7	40	54.1	0..596
2.2	Female	43	57.3	34	45.9	
3.	Age of Mother (in years):					
3.1	Less than 20	03	4.0	01	1.4	0.99
3.2	21 – 25	23	30.7	28	37.8	
3.3	26 – 30	40	53.3	38	51.4	
3.4	31 – 35	07	9.3	06	8.1	
3.5	Above 35	02	2.7	01	1.3	
4.	Marital Status of mother:					
4.1	Married	69	92	70	94.6	0.963
4.2	Divorced	03	4	03	4	
4.3	Separated	01	1.3	00	0.0	
4.4	Widow	02	2.7	01	1.4	
5.	Education of Mother:					
5.1	Non formal	04	9.8	01	1.5	0.929
5.2	Primary	11	26.8	08	12.3	
5.3	Jr. High School	07	17.1	04	6.2	
5.4	High School	06	14.6	11	16.9	
5.5	Intermediate	06	14.6	13	20.0	
5.6	Diploma	06	14.6	21	32.3	
5.7	Graduate	01	2.4	04	6.2	
5.8	Post Graduate	00	0.0	03	4.6	
6.	Education of Father:					
6.1	Non formal	06	10.7	13	19.1	0.47
6.2	Primary	17	30.4	15	22.1	
6.3	Jr. High School	10	17.9	02	2.9	
6.4	High School	08	14.3	07	10.3	
6.5	Intermediate	02	3.6	07	10.3	
6.6	Diploma	09	16.1	16	23.5	
6.7	Graduate	02	3.6	05	7.4	
6.8	Post Graduate	02	3.6	03	4.4	

6.	Occupation of Mother:					
7.1	Homemaker	66	88	66	89.2	0.293
7.2	Employed	09	12	08	10.8	
	<i>Professional</i>	01	11.1	02	25.0	
	<i>Skilled worker</i>	02	22.2	03	37.5	
	<i>Unskilled worker</i>	06	66.7	03	37.5	
7.	Occupation of Father:					
8.1	Unemployed	01	1.3	02	2.7	0.90
8.2	Employed	74	98.7	72	97.3	
	<i>Professional</i>	02	2.7	06	8.3	
	<i>Skilled worker</i>	21	28.4	39	54.2	
	<i>Unskilled worker</i>	51	68.9	27	37.5	
8.	Socio – Economic Status of family (monthly):					
9.1	> Rs 7008	30	40	50	67.6	0.20
9.2	Rs 3504 – 7007	41	54.7	21	28.4	
9.3	Rs 2102 – 3503	04	5.3	03	4.1	
9.	Religion:					
10.1	Hindu	69	92	68	91.9	0.99
10.2	Muslim	04	5.3	05	6.8	
10.3	Christian	01	1.3	00	0.0	
10.4	Others	01	1.3	01	1.4	
10.	Type of family:					
11.1	Nuclear	48	64	53	71.6	0.25
11.2	Joint	27	36	21	28.4	
11.	Number of children:					
12.1	1	24	32	39	52.7	0.78
12.2	2	37	49.3	30	40.5	
12.3	3	11	14.7	05	6.8	
12.4	>4	03	4	00	0.0	
12.	Type of diet:					
13.1	Vegetarian	23	30.7	26	35.1	0.57
13.2	Non vegetarian	52	69.3	48	64.9	
13.	Place of delivery					
14.1	Govt. facility	24	32	57	77.0	0.42
14.2	Private facility	18	24	14	18.9	
14.3	Home	33	44	03	4.1	
14.	Access to health facility whenever child gets ill					
15.1	No	04	5.3	04	5.4	0.61
15.2	Yes	71	94.7	70	94.6	
	<i>Hospital</i>	17	23.9	24	34.3	
	<i>Health Centre</i>	49	69	41	58.6	
	<i>Self-care</i>	05	7	05	7.1	

15.	Receive any Aganwadi services by ASHA worker					
16.1	No	03	4	06	8.1	0.59
16.2	Yes	72	96	68	91.9	
	<i>Health Monitoring</i>	06	8.3	05	7.4	
	<i>Nutritional Services</i>	60	83.3	60	88.2	
	<i>Health Education</i>	04	5.6	02	2.9	
	<i>Any Other</i>	02	2.8	00	0.0	
	<i>All</i>	00	0.0	01	1.5	

The data in the Table 11 shows that about children 26 (34.7%) belonged to the age group of (19-24) months in intervention group and 25 (33.8%) children were in the age group of (25-30) months. About 43 (57.3%) children were females in intervention group and 40 (54.1) were male in control group. Maximum 40 (53.3%) in intervention group and 38 (51.4%) mothers in control group were of (26-30) years age. Majority 69 (92%) mothers in intervention group and 70 (94.6%) in control group were married. Around 11 (26.8%) mothers in intervention group had education till primary school and 21 (32.3%) mothers in control group were diploma holders. About 17 (30.4%) fathers in intervention group had education and 15 (22.1%) in control group were having education till primary school. In occupation category, majority of mothers in intervention group 66 (88%) and 66 (89.2%) in control group were homemakers when compared to father's, majority of the fathers in both intervention group 74 (98.7%) and 72 (97.3%) in control group were employed. Around 30 (40%) and 50 (67.6%) in intervention and control group had family income of Rs. 7008 and above, a total of 69 (92%) and 68 (91.9%) in intervention and control group were Hindus and around 48 (64%) and 53 (71.6%) in intervention and control group mothers had a nuclear family. A maximum of 37 (49.3%) mothers

in intervention group had more than two children and 39 (52.7%) in control group had only one child. Most of the children in both intervention 52 (69.3%) and control group 48 (64.9%) had a non-vegetarian diet, around 24 (32%) mothers in intervention and 57 (77%) in control group had delivered in government facility and approximately all the mothers in intervention 71 (94.7%), 72 (96%) and control group 70 (94.6%), (68 (91.9%)) reported of having an access to health facility whenever their child gets ill. Hence, it can be interpreted that groups were homogenous, suggesting that child and their mothers in both the groups belonged to same population.

Section 6

Description of Nutritional knowledge of Mothers of Children

The knowledge of mothers was assessed through structured knowledge questionnaire on nutrition of children and is described in Fig. 25 below. The data showed that majority 129 (88.3%) mothers had average knowledge, 6 (4%) had good knowledge and 11 (7.5 %) had poor knowledge regarding nutrition of children.

Domain wise knowledge level of mothers regarding nutrition shows that mean knowledge score was 13.80 ± 2.92 . The mothers had less than 50% knowledge in weaning and feeding, food sources and health services. It is described in Table 12.

n =146

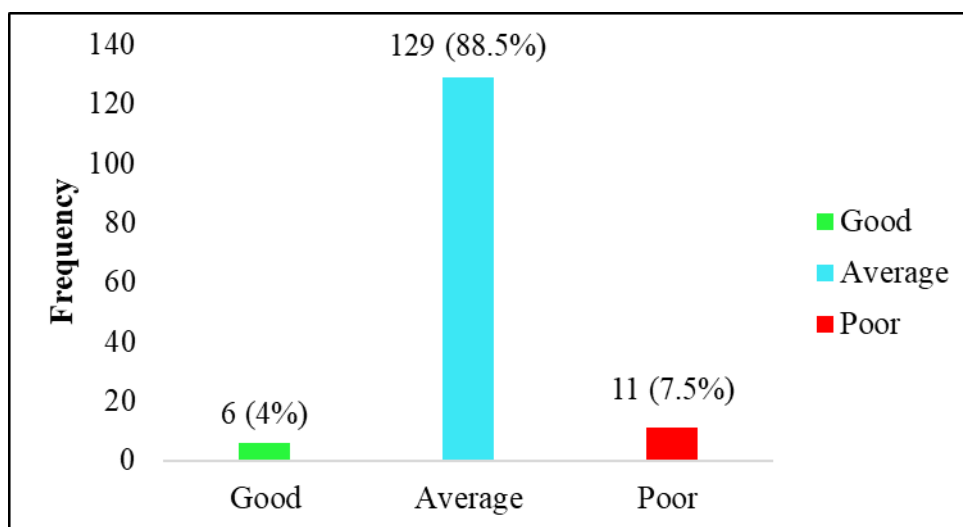


Fig. 25 Bar diagram representing knowledge level of mothers

Table 12: Domain wise knowledge level of mothers

n =146

Knowledge Domains	Good	Average	Poor	Maximum Score	Mean \pm SD	Mean %
	f / %	f / %	f / %			
Malnutrition, causes and Balanced diet	22 (15)	87 (59.5)	37 (25.5)	6	3.25 \pm 1.19	54
Symptoms and deficiencies	27 (18.5)	92 (63)	27 (18.5)	5	2.50 \pm 1.12	50
Weaning and feeding	19 (13)	98 (67.1)	29 (19.9)	5	2.35 \pm 1.03	47
Food sources	21 (14.3)	97 (66.5)	28 (19.2)	8	3.80 \pm 1.41	47.5
Health services	38 (26)	59 (40)	49	4	1.90 \pm 0.95	47.5
Total				28	13.80 \pm 2.92	

Section 7

Description of nutrition related practices of mothers of Children

The nutrition related practices of mothers in intervention and control group were assessed through structured practice questionnaire on nutrition related practices. and is described in below mentioned Fig. 26

n = 146

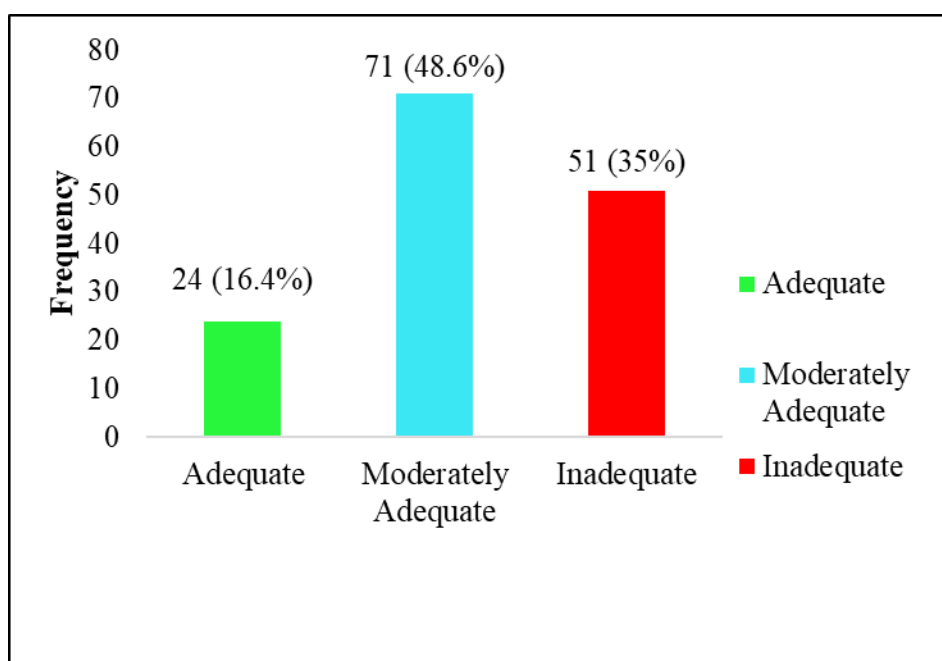


Fig. 26 Bar diagram representing nutrition related practices of mothers

The data in the Fig.26 shows that about 71 (48.6%) mothers had moderately adequate practices, 24 (16.4%) mothers had adequate practices and 51 (35%) had inadequate practices regarding nutrition for children. Domain wise pretest nutrition related practices of mothers shows that mean practice was 78.33 ± 16.47 . The mothers had less than 55% knowledge in feeding and eating. It is described in Table 13.

Table 13: Domain wise pretest nutrition related practices of mothers*n* = 146

Nutrition related practices areas	A	MA	IA	Maximum Score	Mean \pm SD	Mean %
	f / %	f / %	f / %			
Feeding & Eating Practices	3 (2)	62 (42.5)	81 (55.5)	90	48.33 \pm 11.89	53.7
Cooking practices	44 (30)	96 (66)	6 (4)	25	18.48 \pm 3.73	73.92
Hygienic practices	53 (36.3)	93 (63.7)	0	15	11.88 \pm 2.07	79.2
Total				130	78.33 \pm 16.47	

Section 8

Description of effectiveness of FBIP on Nutritional status of Children

The effectiveness of Family-Based Intervention Program on nutritional status was estimated in terms of weight, height and mid upper arm circumference of children. It is described in below.

The hypothesis stated was:

H₁: The mean pre-test–post-test difference of the scores of Nutritional status will be significantly higher in the intervention group than control group.

The alternate hypothesis was stated as:

H₀₁: There will be no difference in the scores of Nutritional status between intervention group and control group.

The trend line in mean gain of weights between intervention and control groups is presented in Fig.27

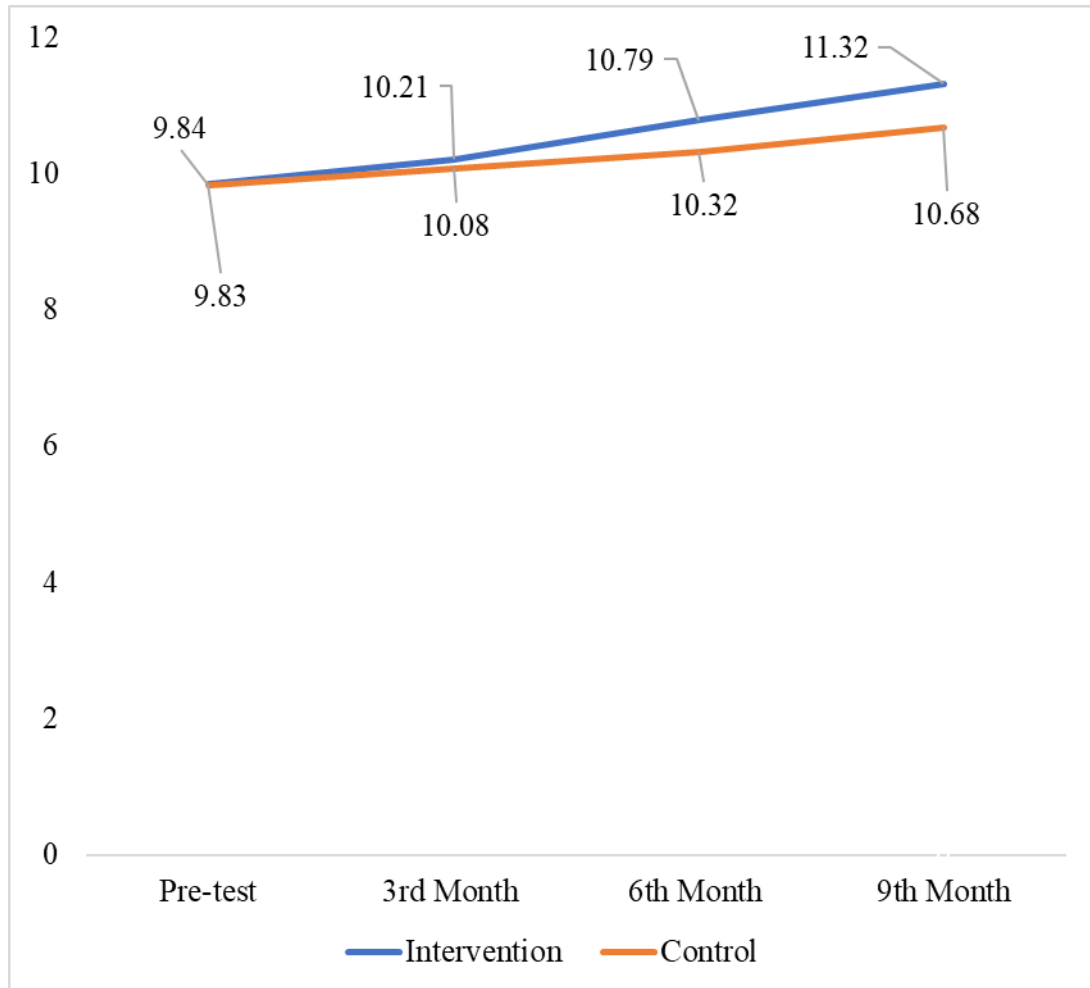


Fig. 27 Line diagram representing mean weight of children in intervention and control group

Comparison of mean weight of children at 3rd month, 6th month and 9th month between intervention and control group is presented in Table 14.

Table 14. Comparison of Nutritional Status in terms of weight $n = (75 + 74) = 149$

Group	Pre-test	Post-test			F	p value
		3 rd Month	6 th Month	9 th Month		
Intervention	9.8 ± 0.9	10.21 ± 0.85	10.79 ± 0.8	11.32 ± 1.5	48.3	<0.01*
Control	9.8 ± 1.1	10.08 ± 1.0	10.32 ± 1.0	10.68 ± 2.2		
Diff 95% CI	0.16 (-0.3 – 0.3)	0.15 (-0.2 – 0.4)	0.15 (0.2 – 0.8)	0.32 (- 0.08 – 1.3)	--	
t- value	0.036	0.83	3.08	2.00		
p value (between)	0.97	0.403	0.002*	0.047*	--	

* Significant at $p < 0.05$ level at 95% CI

Table 14 shows that there was significant difference in mean of weights between intervention group and control group at 6th month (10.79 ± 0.8 , 10.32 ± 1.0 , $t = 3.08$, $p < 0.05$) and 9th month (11.32 ± 1.5 , 10.68 ± 2.2 , $t = 2.0$, $p < 0.05$). r-Anova also showed a significant pre-test–post-test difference between mean weights of intervention and control group ($F = 48.3$, $p < 0.05$).

The trend of gain in weight (in grams) between intervention and control group at 3rd month, 6th month and 9th month is shown in Table 15 below.

Table 15. Trend of pre and post-test mean scores of weights $n = (75 + 74) = 149$

Group	Pre-test	Post-test					
		3 rd Month	Wt. gain (g.)	6 th Month	Wt. gain (g.)	9 th Month	Wt. gain (g.)
Intervention	9.84 ± 0.9	10.21 ± 0.85	370g	10.79 ± 0.8	950g	11.32 ± 1.5	1480g
Control	9.83 ± 1.06	10.08 ± 1.01	250g	10.32 ± 1.0	490g	10.68 ± 2.3	850g

The trend line in mean increase of heights between intervention group and control group is presented in Fig.28 below.

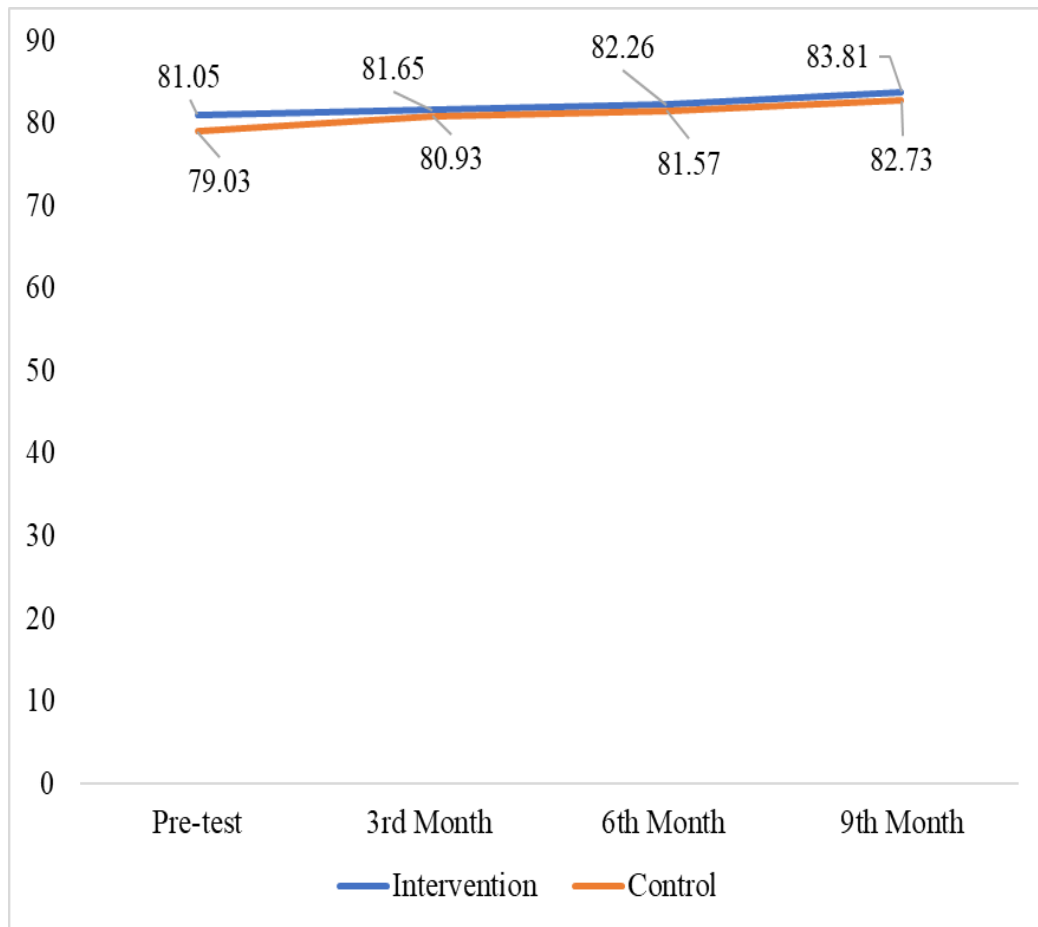


Fig. 28. Line diagram representing mean height of children in intervention and control group

Comparison of mean height of children at 3rd month, 6th month and 9th month between intervention and control group is presented in Table 16

Table 16. Comparison of pre and post-test mean scores of heights within group

$$n = (75 + 74) = 149$$

Group	Pre-test	Post-test			F	p value
		3 rd Month	6 th Month	9 th Month		
Intervention	81.05 ± 4.9	81.65 ± 5.2	82.26 ± 5.1	83.81 ± 5.2	29.8	<0.01*
Control	79.03 ± 10.9	80.93 ± 5.3	81.57 ± 5.3	82.73 ± 5.3		
Diff 95% CI	2.03 (-0.7 – 4.7)	0.76 (- 0.9 – 2.4)	0.877 (-0.8 – 2.6)	1.1 (-0.7 – 2.8)	---	
t- value	1.48	0.89	1.02	1.22	----	
p value (between)	0.13	0.37	0.30	0.22		

* Significant at $p < 0.05$ level at 95% CI

Table 16 shows that there was difference in mean of heights between intervention group and control group at 6th month (82.26 ± 5.1 , 81.57 ± 5.3) and 9th month (83.81 ± 5.24 , 82.73 ± 5.30) but was not significant. r-Anova showed a significant pre-test–post-test difference between mean heights of children in intervention and control group ($F = 29.8$, $p < 0.05$).

The trend of gain in height (in cm) between intervention and control group at 3rd month, 6th month and 9th month is shown in Table 17 below.

Table 17. Trend of pre and post-test mean scores of heights within group

$$n = (75 + 74) = 149$$

Group	Pre-test	Post-test					
		3 rd Month	Ht. gain (cm)	6 th Month	Ht. gain (cm)	9 th Month	Ht. gain (cm)
Intervention	81.05 ± 4.9	81.65 ± 5.2	0.6	82.26 ± 5.1	1.2	83.8 ± 5.2	2.76
Control	79.03 ± 10.9	80.93 ± 5.3	0.7	81.57 ± 5.3	1.4	82.7 ± 5.3	2.56

Comparison of mean MUAC of children at 3rd month, 6th month and 9th month between intervention and control group is presented in Table 18.

Table 18. Comparison of MUAC scores pre and post-test mean scores

$$n = (75 + 74) = 149$$

Group	Pre test	Post-test			F	p value
		3 rd Month	6 th Month	9 th Month		
Intervention	12.84 ± 1.1	12.98 ± 1.2	13.1 ± 1.1	13.2 ± 1.2	10.3	<0.01*
Control	12.94 ± 1.3	12.91 ± 1.2	13.0 ± 1.1	13.0 ± 1.2		
Diff 95% CI	0.201 (0.61-0.21)	0.05 (0.44 – 0.34)	- 0.23 (0.360 – 0.42)	- 0.18 (0.2 – 0.6)		
t- value	0.95	0.22	0.12	0.93		
p value (between)	0.34	0.81	0.90	0.35		

* Significant at $p < 0.05$ level at 95% CI

Table 18 shows that there was difference in mean of MUAC of children 9th month (13.2 ± 1.2) in intervention group than control group (13.0 ± 1.2) at 9th month but was not significant. r-Anova shows significant pre-test–post-test difference between mean MUAC of children in intervention and control group (F = 10.3, $p < 0.05$).

The trend of gain in MUAC (in cm) between intervention and control group at 3rd month, 6th month and 9th month is shown in Table 19 below.

Table 19. Trend of pre and post-test mean scores of MUAC within group

$$n = (75 + 74) = 149$$

Group	Pre test	Post-test					
		3 rd Month	MUAC gain (cm)	6 th Month	MUAC gain (cm)	9 th Month	MUAC gain (cm)
Inter-vention	12.84 ± 1.6	12.98 ± 1.7	0.14	13.1 ± 1.1	0.24	13.2 ± 1.2	0.34
Control	12.94 ± 1.3	12.91 ± 1.2	0.02	13.0 ± 1.1	0.06	13.0 ± 1.2	0.06

The overall the effectiveness of FBIP on weight, height and MUAC in terms of frequency distribution from pretest to posttest III is described in Fig. 29 below. Proportion of children underweight and wasted in pre-test were found to decrease in the follow-up visits done at 6th and 9th month.

Thus, the null hypothesis was rejected and research hypothesis H₁ for data presented for weight assessed at 6th and 9th month was accepted i.e., the mean pre-test–post-test difference of the scores of Nutritional status were significantly higher in the intervention group than control group.

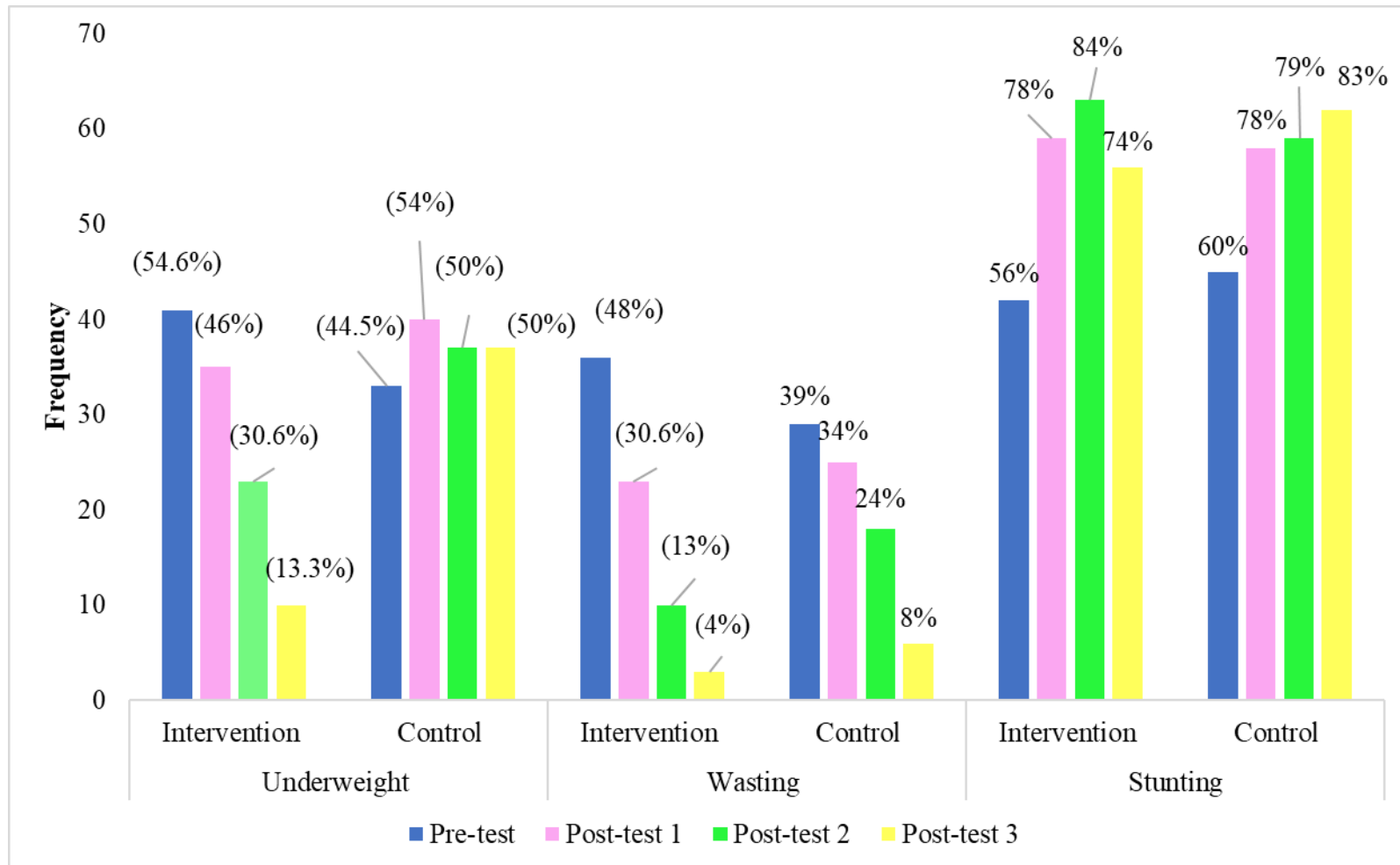


Fig. 29 Bar diagram representing prevalence of Underweight, Stunting, Wasting

Section 9: Effectiveness of FBIP on nutritional knowledge of mothers of under-five Children

The effectiveness of FBIP on nutritional knowledge of mothers was estimated between control and intervention group. It is described below.

The hypothesis stated was:

H₂: The mean pre-test–post-test difference of the scores of Nutritional knowledge will be significantly higher in the intervention group than control group.

The alternate hypothesis was stated as:

H₀₂: There will be no significant difference in the pre-test- post-test of Nutritional knowledge scores between intervention group and control group.

The pre-test and post-test knowledge scores of intervention and control group is described in Fig.30 below. It was found that most of the mothers 67 (91.7%) in intervention and 62 (85%) in control group had average knowledge regarding nutrition in pre-test.

In the post-test 2 it was found that about 25 (29%) of mothers in intervention group compared to control group 6 (8%) had good knowledge.

$n = [73+ 73=146]$, $[73+ 73=146]$, $n = [71+ 72] =143$,

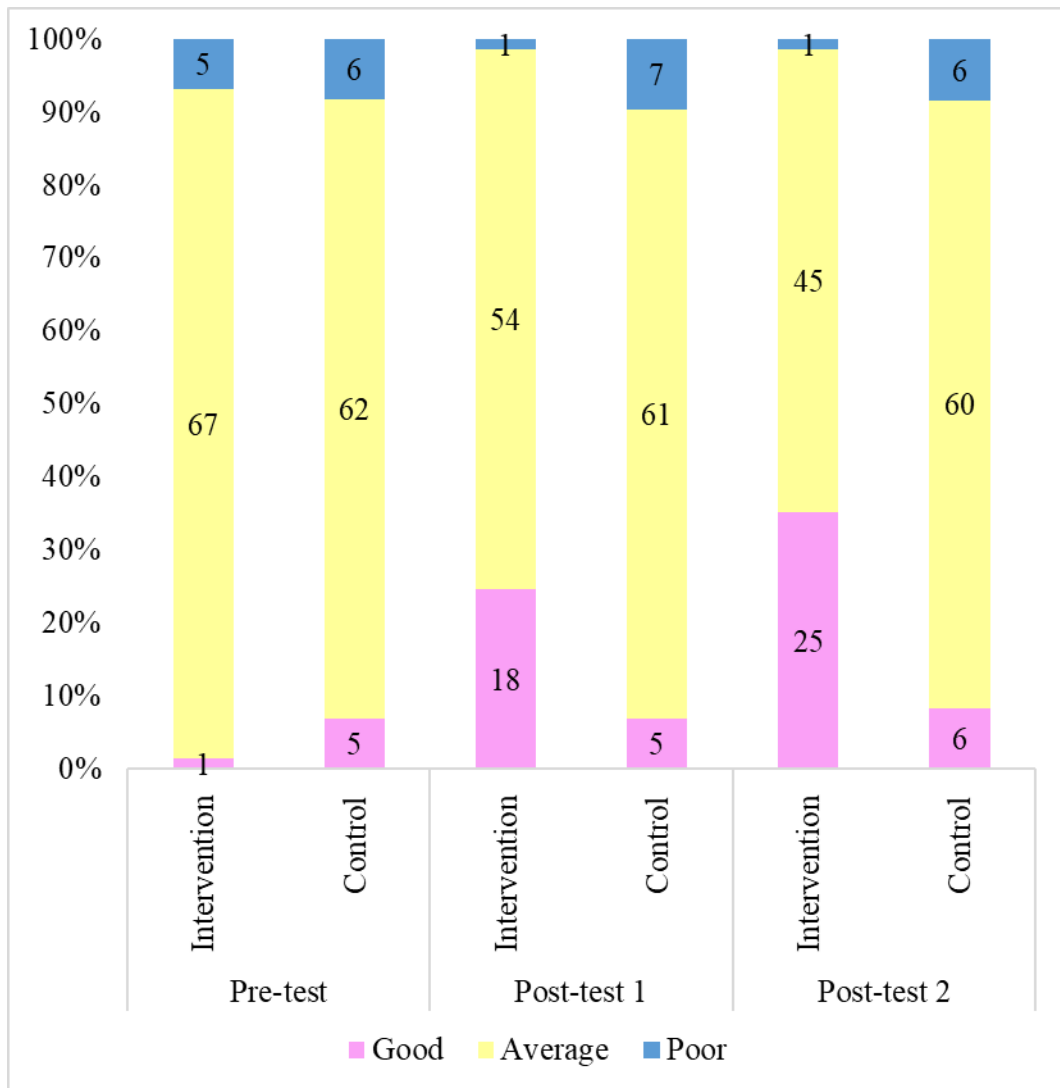


Fig. 30 Bar diagram representing Pre-test and Post-test knowledge level of mothers in intervention and control group

Effectiveness of intervention on knowledge of mothers regarding nutrition is described in Table 20.

Table 20: Comparison of nutritional knowledge of mothers between control and intervention group by using r-Anova and independent t-test

$n = 73+73=146$

Group	Pre-test	Post-test 1	Post-test 2	F	p value
Intervention	13.67 ± 2.58	17.36 ± 3.21	17.36 ± 4.22	53.30	< 0.001*
Control	13.93 ± 3.25	14.30 ± 3.31	14.10 ± 3.52		
Diff 95% CI	- 0.26	3.06	3.26	--	
t-value	- 0.543	5.67	5.05		
p value (between)	0.588	< 0.001*	< 0.001*	--	

* Significant at $p < 0.05$ level at 95% CI

Table 20 shows comparison of knowledge of mothers regarding nutrition between groups. There was significant increase in post-test knowledge of mothers in intervention group than control group at 1st month (17.36 ± 3.21, 14.30 ± 3.31, $p < 0.05$) and at 3rd month (17.36 ± 4.22, 14.10 ± 3.52, $p < 0.05$). r-Anova was calculated in order to estimate increase in nutritional knowledge of mothers which showed significant difference within group ($F = 53.3$, $p < 0.05$).

Hence, H_{02} was rejected and H_2 was accepted i.e., the mean pre-test–post-test difference of the scores of Nutritional knowledge were significantly higher in the intervention group than control group.

Section 10: Description of effectiveness of FBIP on nutritional practices of mothers of under-five Children

The effectiveness of FBIP on nutritional related practices of mothers in control and intervention group. It is described below.

The hypothesis stated was:

H₃: There will be significant improvement in the means of post-test nutrition related practice scores in intervention group than control group.

The alternate hypothesis was stated as:

H₀₃: There will be no significant difference in the pre-test–post-test of Nutrition related practice scores between intervention group and control group.

The pre-test and post-test nutrition related practice scores of intervention and control group is described in Fig.31 below. It was found that most of the mothers 42 (57%) in intervention and 33 (45%) in control group had average practices regarding nutrition in pre-test. In the post-test 2 it was found that about 31 (42%) of mothers in intervention group as compared to control group 21 (28%) had satisfactory practice.

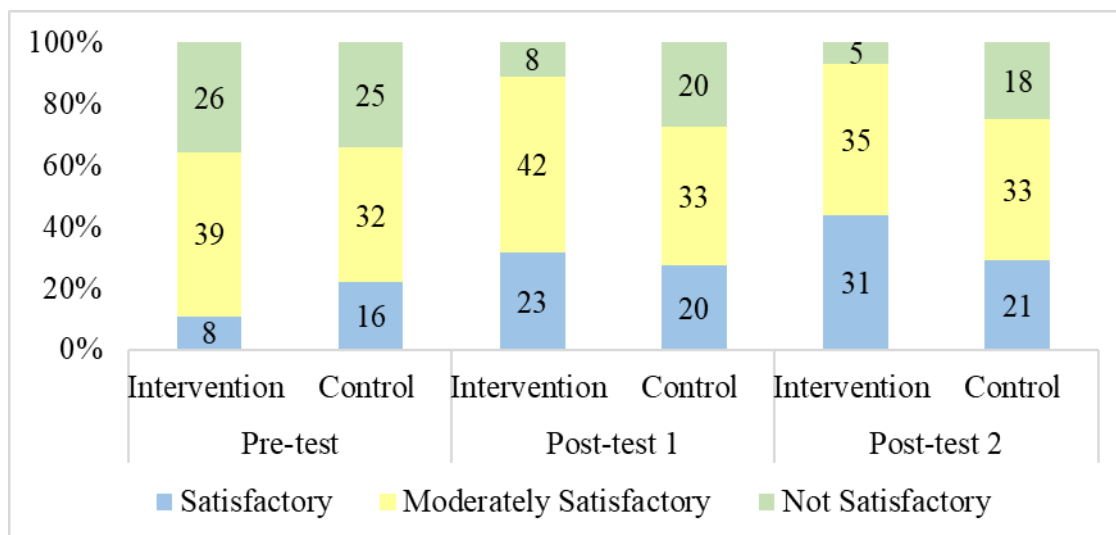


Fig. 31 Bar diagram representing post – test I and II nutrition related practices of mothers in intervention and control group

Effectiveness of intervention on nutrition related practices of mothers regarding is described in Table 21.

Table 21: Comparison of nutritional practices of mothers within control and experimental group by using r-Anova and independent t-test

$n = 73+73=146$

Group	Pretest	Posttest 1	Posttest 2	F	<i>p</i> value (Within group)
Intervention	75.79 ± 15.16	89.55 ± 16.03	93.45 ± 20.7	47.74	<0.001*
Control	80.86 ± 17.40	82.19 ± 17.60	81.63 ± 19.86		
Diff 95% CI	5.11	6.87	11.33	--	
t-value	- 1.89	2.45	3.36		
<i>p</i> value (between)	0.060	0.015*	0.001*	--	

* Significant at $p < 0.05$ level at 95% CI

Table 18 shows comparison of nutrition related practices of mothers between groups. There was significant increase in post-test practices of mothers in intervention group than control group at 1st month (89.55 ± 16.03 , 82.19 ± 17.60 , $p < 0.05$) and at 3rd month (93.45 ± 20.07 , 81.63 ± 19.86 , $p < 0.05$). r-Anova was calculated in order to estimate increase in nutrition related practices of mothers which showed significant difference within group ($F = 47.74$, $p < 0.05$).

Hence, H_{03} was rejected and H_3 was accepted i.e., there was significant improvement in the means of post-test nutrition related practice scores in intervention group than control group.

Section 11: Additional Findings

Section 11.A: Correlation between Nutritional Knowledge and Nutrition related practices of Mothers

Scatter diagram was plotted to find correlation between pretest knowledge of mothers on nutrition and their nutrition related practices in intervention and control group. It is described in below mentioned Fig. 32.

[$n = 73,73$; $r = 0.01$; $p = 0.9$]

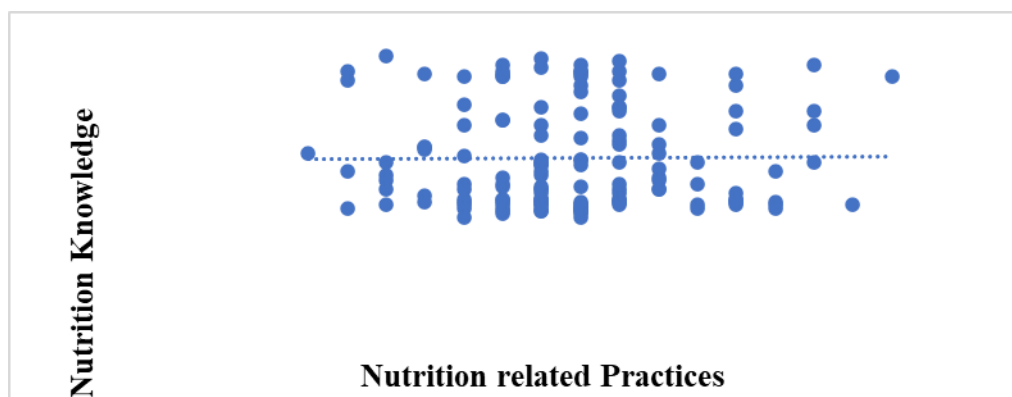


Fig. 32 Scatter diagram representing correlation between nutrition related practices and knowledge of mothers

Fig. 32 depicts that there was no correlation found between pretest nutrition related practices and knowledge of mothers in intervention and control group ($r = 0.205, p = 0.04$).

Section 11.C: Adequacy of intake of Nutrients in intervention group

A three-day dietary recall was done to determine adequacy of nutrient intake. It was calculated using Diet-Cal software and is presented in Table 22. It was found that majority of the children in the intervention group had inadequate intake of nutrients.

Table 22: Distribution of children based on adequacy of nutrients

n = 75

Nutrients	Recommended daily allowances (RDA)*	Inadequate		Adequate	
		f	%	f	%
Proteins	16.7	65	86.7	10	13.3
Energy	1060	69	92	06	8
Fats	27	57	76	18	24
Calcium	600	52	69.3	23	30.7
Iron	9	56	74.7	19	25.3

Section 11.D: Perception of Mothers regarding factors related to malnutrition

As a part of need assessment, focused group discussion and in-depth interviews on perception of mothers regarding factors relating to malnutrition in their children aged 1-3 years was done. About six to eight mothers participated in the focused group discussion. The discussion lasted for 45 minutes. In addition to

focused group discussions, in-depth interviews were also conducted among mothers of identified malnourished children to explore further their perception on reasons for malnutrition in their children.

The purpose of the meeting was explained to the mothers and written consent was obtained before discussion. The information was retrieved through an open-ended questionnaire and leading questions were also used in the conversation. The author played the role of facilitator and carried out the discussion with mothers with the help of open-ended questionnaire. The facilitator kept on probing the mothers so that they could share their experiences and relevant information could be extracted. Audiovisual recording was done by an assist to the author who acted as a recorder and notes of the discussion were made by another assist to the author. The recording and notes were organized, rewritten and transcribed verbatim in the Hindi language and further retranslated into English. Following themes were generated from responses as described below:

- A. Concept of Malnutrition
- B. Nutrition related practices
 - i. Breast feeding
 - ii. Weaning
 - iii. Eating Practices
 - iv. Issues in feeding Toddlers
- C. Understanding of causes of malnutrition
- D. Health Care Facilities
 - i. Routine care services
 - ii. Support from ASHA/Aganwadi Worker

iii. Distance from Health Centre

E. Support from Family members

A. Concept of Malnutrition

Most of the mothers did not clearly understand the concept of malnutrition but had basic understanding of it. Some of them stated that malnutrition is one form of weakness. Two mothers said that every second child gets malnutrition and they told that go this information from television. They also expressed that it happens due to poor spacing. Regarding awareness of nutrition mothers said that nutritious food is full of all nutrients, it helps to strengthens bones, enhances growth in child, helps the body to work and brings changes in body.

B. Nutrition related Practices

The nutrition related practices of mothers identified during focused group discussion and in-depth interviews emerged under four areas; breast feeding, weaning, eating practices and issues in feeding toddlers.

i. Breast feeding

Mothers expressed that it is important to breast feed the child till six months. Three mothers expressed that they prefer giving either powder milk (artificial feeding) or cow's milk when their feed doesn't come or they do not have time as they have to go to the fields. Most of them breast feed their child till five years along with bottle feed.

ii. Weaning

Most of the mothers were not aware when to initiate weaning for the child. Some of them expressed that they had started weaning before six months. Few mothers stated that they initiated weaning by the end of four months. They included

‘daliya’, khichri’, ‘dal’ water without spices, lentil water. Mothers expressed that these were healthy for their child. Once the child reaches one year, mothers try to give full diet to their child and even introduce outside food.

Some mothers reported that their child had problems (diarrhea, vomiting, stomach pain) after starting weaning. It was stated by mothers that they had followed the instructions of their mother-in-law regarding selection of weaning food items. One mother said that whatever is available at home she gives that. Another mother said whatever others suggest she gives to her child.

When asked about the benefits of above-mentioned food items they responded that they get proteins, fats and carbohydrates and it help to give strength (‘takat’, ‘shakti’...) to their children.

iii. Eating Practices

All mothers stated that it is very difficult to feed the toddlers. They said there is nothing right food for the child as they are not aware. One mother even expressed that it is difficult to cook separately for the child. Whatever is cooked at home they give that and if the child eats completely what is given to him it is the right food.

Mothers responded that when their child doesn’t eat food, they supplement by giving milk and in order to develop taste they add Complian and Bournvita. Some mothers even expressed that in order to fill the stomach of child they give chowmein, momos, Maggi etc., though they know that it is not healthy still they have to give, as children demand for it.

iv. Issues in feeding Toddlers

One mother stated that feeding the child itself is a big problem as we have to run behind them. Mothers even mentioned that their children don’t eat or like home

prepared food, instead they want chips, momos, chowmein and cold drink from outside. They also said that when children don't eat food prepared at home, they give bottle feed.

C. Understanding of causes of malnutrition

All mothers stated that the child who doesn't eat properly develop weakness. The children who are ill from the birth stay weak throughout. Some mothers even expressed that the children whose treatment is discontinued in between remains weak. Mothers who do not consume proper diet during pregnancy also leads to weakness in the child.

Few mothers stated that it is the responsibility of mothers to feed ('*khilana aur pilana*') the children. Also, breast feeding till six months was mentioned by the mothers. Some mothers said that due to calcium deficiency their children eat mud and it is also a reason for malnutrition.

D. Health Care Facilities

i. Aganwadi services

It was expressed by the mothers that they use Aganwadi services for immunizations, weight and height measurements and for availing ration. Mothers expressed that height measurement is usually not done in the Aganwadi and also, they were not aware regarding importance of height for children. Mothers stated that weight is not documented in their antenatal card but verbally weight is informed to them and it is recorded in their register.

For immunization, mothers mentioned Aganwadi workers remind them for next due date by mentioning it in the Aganwadi card. For ration related services, mothers stated that fifth of every month they receive ration from Aganwadi. But children do

not eat ration provided by them and instead demand packed foods. We know it is not healthy but we still give it.

ii. Support from ASHA/Aganwadi Worker

Mothers expressed that ASHA and Aganwadi workers come only for round and ask about health status from road. No home visiting happens as they are busy. They come only during inspection. It was expressed that there is no instruction or health education regarding child's nutrition from health workers.

iii. Distance from Health Centre

All the mothers said that whenever their child gets sick, they consult the doctor in government hospital. They also reported that there is problem in accessing the health care facilities.

E. Support from Family members

Mothers told that sometimes they get help from husband for feeding the child but it depends upon their moods as they get tired from work, so we usually don't ask. Majority of mothers said that they get support from family members in some household activities like cleaning, cooking and looking after their child when they go to fields. But most of the house activities they do by themselves.

Conclusion

The findings from the focused group discussions and in-depth interviews revealed that mothers had some awareness regarding the causes of malnutrition. It was also highlighted from the discussion that there is a need to empower the mothers and develop their capacity in feeding the children with variety of foods available locally. It is also required that they should be able to monitor the growth of child

regularly so that they can identify decrease in weight and height even if health care workers are not able to trace or check at regular intervals.

Chapter Summary

This chapter dealt with analysis and interpretation of findings through descriptive and inferential statistics using SPSS version 22. The data was illustrated and organized under the headings such as sample characteristics, nutritional status of under five children, knowledge and practice of their mothers and effectiveness of FBIP on knowledge and nutrition related practices of mothers. The study was found the intervention was found to be effective.