



MANAGEMENT OF MALNOURISHED CHILDREN (1-5YEARS) WITH HOME-BASED AND FACILITY BASED INTERVENTION ON NUTRITIONAL STATUS OF MALNOURISHED CHILDREN: A COMPARATIVE STUDY

Nursing

Pabalpreet Kaur	M.Sc Nursing Student (Community Health Nursing), National Institute of Nursing Education, PGIMER, Chandigarh
Sushma K Saini *	Lecturer, National Institute of Nursing Education, PGIMER, Chandigarh *Corresponding Author
Suresh Kumar	Tutor, National Institute of Nursing Education, PGIMER, Chandigarh
Arun Kumar Aggarwal	Professor, School of Public Health, PGIMER, Chandigarh

ABSTRACT

Children are the delicate flowers who wilt away before they bloom due to the life threatening diseases. These diseases are responsible for mortality of under five children for which malnutrition is the major cause. The literature reveals that malnutrition can be managed by different strategies. Hence the present study was undertaken with an objective to identify 1-5 years children with malnutrition, to assess the feeding practices of children, to develop, implement and compare the effectiveness of protocols for home-based and facility based intervention to combat malnutrition in Dhanas, UT Chandigarh. Ethical approval was obtained from Institute Ethics Committee, PGIMER, Chandigarh and permission was taken from Director of Social Welfare Department and written informed consent was obtained from mothers. Dhanas was divided in two areas and by lottery method the area was randomized for Home Based and Facility Based Intervention. Purposive sampling technique was used to select samples and list of malnourished children was taken from Anganwadi centers. Total 152 children were enrolled (75 in facility based and 77 in home based intervention). Data was collected in 3 phases in August-November 2017 (pre- assessment, intervention phase and Evaluation phase). Pre assessment of feeding practices was done by using interview schedule and nutritional status was assessed by using weight for age chart in both groups. In intervention phase health teaching was given one to one in their own home settings in HBI group, Demonstration on cooking of nutritious food was given and booklet was given for dietary references. In FBI group intervention was given to a group of 3-4 mothers at Anganwadi centre near their houses. They were given health teaching, demonstration on cooking of nutritious food and booklet for dietary references. Mothers were asked to maintain diary of food given to children throughout the day in both groups. Five follow-ups were done in both group for reinforcement and to assess feeding practices. Diary was checked during each follow-up. Anthropometric measurement of malnourished children was done at the end of each month. The results showed that there was significant improvement in the nutritional status (weight) of malnourished children in both the groups. Improvement in relation to anthropometric parameters (weight, height, MUAC) was more in HBI group and improvement related to feeding practices and using anganwadi services was more in FBI group. Hence both the strategies are equally effective to combat malnutrition. The protocol to combat malnutrition can be used by nurses and other health professionals working in community.

KEYWORDS

Malnourished children, Mothers of malnourished children, home based intervention and facility based intervention.

INTRODUCTION:

Malnutrition is responsible for mortality and morbidity of millions of children each year. It includes both under nutrition and over nutrition but in middle and low middle income countries under nutrition is more prevalent. As per the National Family Health Survey (NFHS)-4 (2015-16), 35.7 per cent children below five years are underweight, 38.4 per cent are stunted and 21 per cent are wasted in the country¹.

Malnutrition affects the child's ability to grow normally. It deteriorates immune system of child, makes child more prone to get infectious diseases. Malnutrition is not caused by single factor. Various factors are responsible for malnutrition. Now a day's food is available but mothers don't have time to feed the child. Either mother is working or they spend more time in doing house hold work. Mothers put fewer efforts to feed the child.

Nutritional status of children remains normal till 6 months when baby is on exclusive breastfeeding. Failure in timely initiation of complementary feeding contributed to malnutrition. Either mother initiates the complementary feeding too early or too late. Early initiation causes diarrheal diseases whereas late initiation causes malnutrition in child.

Various management services were initiated by government of India to combat malnutrition. In India ICDS is a country wide programme in which supplementary feeding is given upto 6 years of child. Under this programme regular maintaining of growth of child is also done and nutritional status is checked regularly by using weight -for- age chart given by WHO.

Government of India has initiated so many programmes to combat malnutrition. But the truth is that still malnutrition is prevalent in our country and one of the major causes for under five mortality. These programmes are prepared on central level and instructions to run these

programmes are uniform throughout the country. These strategies may not be appropriate in all types of population. There is a need of some strategies at local level that can be used by health workers working at grass root level to combat malnutrition. Various strategies can be used to educate and motivate mothers for prevention and control of malnutrition. Mothers can be educated individually in their own houses or in a group at sub-centers or anganwadi centers. Both the approaches have its advantages and disadvantages. Home based teaching is time consuming but it pay more attention to mother and needs of child can properly assessed. Where as in group teaching it is difficult to assemble mothers at a point but mothers can share their experiences with each other's and make the learning more effective. There is need to assess the effectiveness of these strategies to combat malnutrition at local level and to implement the best strategy. Keeping this in mind the present study was undertaken by objectives To identify 1-5 years children with malnutrition, to assess the feeding practices of children, to develop, implement and compare the effectiveness of protocols for home-based and facility based intervention to combat malnutrition.

METHODOLOGY:

The study was conducted for the period of 5 months (July-November 2017). A comparative research design was used in the present study. Target population was comprised of malnourished children (1-5 years) and their mothers. Sample was taken by purposive sampling technique in the present study. List of malnourished children were taken from anganwadi centers. Total 152 subjects were enrolled in the study. Area randomization done with lottery method for two different strategies and avoid contamination. Area A allocated as facility based intervention group and Area B Allocated as home based intervention group.

Interview schedule was used to collect the Socio- demographic data of Child and parents of malnourished child. A set of questions was

prepared to assess the feeding practices of child. Assessment of the anthropometric measurement weight, height, MUAC, chest and head circumference with the help of weight scale and measuring tape was done. Nutritional status of children assessed through weight for age chart.

Protocol in the form of booklet on home-based and facility based intervention for management of malnutrition was made. The content validity of the tool and protocol was established with help of experts in the field of Nursing and Pediatrics. The reliability of the tool was checked by inter rater reliability. A pilot study was conducted among the malnourished children (1-5 years) to check the feasibility of tools. The results of pilot study revealed that study subjects was easily available, tools and protocol was found to be feasible to administer, 3 questions whose language was not clear to the respondent were reframed in the interview schedule. No problem was faced by the investigator during the pilot study. The average time taken for follow-ups was 25-30 minutes per subject.

Ethical clearance was taken from Institute Ethics Committee, PGIMER, Chandigarh. Prior permission was obtained from the Social Welfare Department, Chandigarh and anganwadi workers was also informed. Written informed consent was taken from the mothers of malnourished children (1-5 years). The intervention was divided into three phases.

PHASE-I: Identification of malnourished child: List of malnourished children was taken from Anganwadi centers of both the areas. In home based intervention group home visiting was done. Socio demographic Performa of child and parents was filled by investigator and feeding practices of children was assessed by interview schedule. Weight of children was measured by weighing machine and height, MUAC, Head and chest circumference was measured by measuring tape. Nutritional status of children was assessed by weight for age chart.

In facility based intervention groups the children along with mothers called at Anganwadi centers. Socio demographic Performa of child and parents was filled by investigator and feeding practices of children was assessed by interview schedule. Weight was measured by weighing machine and height, MUAC, Head and chest circumference was measured by measuring tape.

PHASE-II: Intervention:

In home based intervention: Educating mothers individually on breast feeding, complementary feeding, balanced diet with the help of flash cards was done. Demonstration on cooking of nutritious food was given. Demonstration on making Nutritious Laddos, Nutritious Dalia, Nutritious Poha, Nutritious Khichdi, Nutritious Pratha was given. A booklet was given to every mother for reference purpose. A diary was given to mothers and advised to record the meals they had given to child throughout the day.

In facility based intervention: Educating mothers in group of 3-4 at the anganwadi centers on breast feeding, complementary feeding balanced diet with the help of flash cards was done. Demonstration on cooking of nutritious food was given. Groups of mothers was demonstrated how to make the food more nutritious. Demonstration on making Nutritious Laddos, Nutritious Dalia, Nutritious Poha, Nutritious Khichdi, and Nutritious Pratha was given. A booklet was given to every mother for reference purpose. A diary was given to mothers and advised to record the meals they had given to child throughout the day.

Follow ups by investigator through home to home visit was done. Five follow-ups were done in both groups for reinforcement, to motivate the mothers and to assess feeding practices. First two follow-ups were done at frequent interval in first 2 weeks. Slowly the gaps in the follow-up were increased. Later three follow-ups were done in 2 months to make mothers independent. During each follow up one meal was given to child in front of investigator to see how much the child eat. Feeding practices of mothers was assessed. The diary maintained by mothers was checked during each follow-up both the group about the meals they had given to child throughout the day. Monthly follow-ups were done to assess the anthropometric parameters and nutritional status.

PHASE-III: Evaluation of intervention: In this phase after three months of intervention feeding practices was reassessed by interview,

weight of children was measured by weighing machine and compared with weight for age chart to assess the nutritional status of children. Height, MUAC, Head and chest circumference was measured by measuring tape. A diary was checked that was maintained by mothers regarding details of foods child has eaten throughout the day. In facility based intervention as follow-ups was done through home visit after giving intervention in Anganwadi. So, individual teaching was also given to reinforce and motivate the mothers during follow-ups as they were not following the correct practices. The data was analyzed using both descriptive and inferential statistics. Calculation was done with the help of Microsoft excel and statistical package for social sciences (SPSS) version 16.0.

RESULTS:

Results of the study revealed that the age of mothers were in the range of 20-36 years with mean age 25.89+3.38 in the facility based intervention group (FBI) and 26.73+3.32 among the home based intervention group (HBI). Nearly half (48.0%) of mothers in FBI group and 46.8% in the HBI group were in the age group of 26-30 years. The age of father was in the range of 24-40 years with mean age 30.21+3.97 in the FBI group and 29.73+3.19 among the HBI group with range of 24-36 years. More than half (56.0%) of father in FBI group and 51.9% in the HBI group were in the age group of 25-30 years. Educational status of the 40% of mothers of children having malnutrition was Secondary and above in FBI group and 41.6% HBI group. Educational status of the 45.3% father of children having malnutrition was secondary and above in FBI group and 53.2% in HBI group. Majority of mothers (94.7%) in FBI group and all in the HBI group were housewives.

The age of children was in the range of 13-60 months with mean age 33.49 + 11.99 months in FBI group and 33.46 + 12.32 months in HBI group. More than half (57.3%) children were male in FBI group and 33.8% in HBI group. Birth order of 48.0% children in FBI group and 63.6% in HBI group was 2. Two third (62.7%) of children in FBI group and 75.35% of children in HBI

group were born with birth weight of 2.5-3.5kgs. Two third (62.7%) children in FBI group and 67.5% children in HBI group were moderately malnourished.

Table 1: Socio- demographic profile of parents of malnourished children N=152

Socio-demographic variables	FBI group n=75(%)	HBI group n=77(%)	Chi-square/Fisher exact (df) p value
Age of mother (years) *			
20-25	34(45.3)	31(40.3)	1.77 (2) 0.4
26-30	36(48.0)	36(46.8)	
31-36	5(6.7)	10(13.0)	
Age of father (years) *			
<25	9(12.0)	10(13.0)	0.25 (2) 0.8
25-30	42(56.0)	40(51.9)	
>35	24(32.0)	27(35.1)	
Education of mother			
Illiterate	14(18.7)	11(14.3)	0.59(3) 0.8
Upto Primary	13(17.3)	14(18.2)	
Middle	18(24.0)	20(26.0)	
Secondary and above	30(40.0)	32(41.6)	
Education of father			
Illiterate			5.71(3) 0.1#
Upto Middle	13(17.3)	4(5.2)	
Secondary	14(18.7)	15(19.5)	
Senior secondary and above	14(18.7)	17(22.1)	
	34(45.3)	41(53.2)	
Occupation of father			
Pprofession/ Semi profession	11(14.7)	13(16.9)	2.22 (2) 0.3
Clerical, shop owner	19(25.3)	12(15.6)	
Skilled/ Semiskilled	45(60.0)	52(67.5)	
Occupation of mother			
Housewife	71(94.7)	77(100.0)	(1) 0.06**
Working	4(5.3)	-	

Religion			
Hindu	53(70.7)	43(55.8)	
Others(Muslim, Sikh, Christian)	22(29.3)	34(44.2)	3.58 (1) 0.58
*Socio-economic status (per capita income in Rs.)(as per BG Prasad scale, 2017)			
upper class(> 6346)	4(5.3)	9(11.7)	
Upper middle class (3173-6345)	5(6.7)	10(12.9)	4.04 (4) 0.40#
Middle class (1904-3172)	26(34.7)	22(28.6)	
Lower middle class (952-1903)	26(34.7)	29(37.7)	
Lower class (<951)	14(18.7)	7(9.1)	

*Age of mother mean +SD (range) FBI group 25.89+3.38(20-36)
HBI group 26.73+3.32(20-35)

*Age of father mean +SD (range) FBI group 30.21+3.97(24-40)
HBI group 29.73+3.19(24-36)

*Per capita income in Rs. mean +SD (range) FBI group 1759.08+993.563 (133-6250)

yate's corrected chi square, ** fisher exact test. HBI group 2476.26+1793.542(750-8333)

Table 2: Socio-demographic and clinical profile of children having malnutrition N=152

Socio demographic variable	FBI group n=75(%)	HBI group n=77(%)	Chi-square/Fisher exact (df) p value
*Age of child (months)			
13-24	26(34.7)	25(32.5)	1.11 (3) 0.7
25-36	24(32.0)	26(33.8)	
37-48	16(21.3)	20(26.0)	
49-60	9(12.0)	6(7.8)	
Gender of child			
Male	43(57.3)	26(33.8)	8.51 (1) 0.004
Female	32(42.7)	51(66.2)	
No. of children			
One	17(22.7)	22(28.6)	7.2 (3) 0.06#
Two	43(57.3)	49(63.6)	
Three	7(9.3)	5(6.5)	
Four	8(10.7)	1(1.3)	
Birth order			
1st child	23(30.7)	37(48.1)	7.87 (3) 0.5#
2nd child	36(48.0)	34(44.2)	
3rd child	10(13.3)	4(5.2)	
4th child	6(8.0)	2(2.6)	
Birth weight(kg)			
<2.5	23(30.7)	10(13.0)	7.39 (2) 0.02
2.5-3.5	47(62.7)	58(75.3)	
>3.5	5(6.7)	9(11.7)	
Nutritional status			
Moderately Malnourished	47(62.7)	52(67.5)	0.396(1) 0.5
Severely malnourished	28(37.3)	25(32.5)	

*Age of children mean + SD (range) FBI group 33.4933 + 11.99 (13.0-60.0) HBI group 33.4675 + 12.32 (14.0-60.0) , # yate's corrected chi square

Before intervention, two third (64.0%) of children were eating their meals in separate plate in FBI group but as after intervention it was significantly Increased to (82.7%) (p<0.05, as per X² test). Two third (68.8) percentage of children were eating their meals in separate plate in HBI group before intervention and it was increased to (77.9%). Before intervention most of the children (82.7%) were always consuming home prepared food in FBI group and after intervention it was significantly increased to (94.7%) (p<0.05, as per X² test). In HBI group before intervention most of the children (85.7%) were always consuming home prepared food and after intervention it was increased to (90.9%). Feeding pattern during illness changed in two third (73.3%) of children in FBI group and 76.6% in HBI group and it remains same in both the group after intervention. Near to half (44.0%) children eat less during illness in FBI group and 51.9% in HBI group.

Table 3- Assessing feeding practices of children having malnutrition before and after intervention. N=152

Assessing feeding practices of child	FBI group n=75(%) Base line	FBI group n=75(%) (End line)	Chi-square (df) p value	HBI group n=77(%) (Base line)	HBI group n=77(%) (End line)	Chi-square (df) p value
Child eats food in separate plate.						
Yes	48(64.0)	62(82.7)	6.6 (2) 0.03	53(68.8)	60(77.9)	4.2 (2) 0.12
No	27(36.0)	13(17.3)		24(31.2)	17(22.1)	
Eat home prepared food						
Yes	62(82.7)	71(94.7)	5.4(1) 0.02	66(85.7)	70(90.9)	0.8(1) 0.4
No	13(17.3)	4(5.3)		11(14.3)	7(9.1)	
Food pattern changed during illness						
Yes	55(73.3)	55(73.3)	-	59(76.6)	59(76.6)	-
No	20(26.7)	20(26.7)		18(23.4)	18(23.4)	
Type of change in feeding during illness						
Eat less	33(44.0)	33(44.0)	-	40(51.9)	40(51.9)	-
Drinks milk and fluid only	22(29.3)	22(29.3)		19(24.7)	19(24.7)	
No change	20(26.7)	20(26.7)		18(23.4)	18(23.4)	

All the subjects in both the groups were registered with ICDS. Before intervention near to half (45.3%) children in FBI group were going to anganwadi and after intervention it was significantly increased to 70.7% in FBI group (p<0.05, as per X² test). In HBI group near to one third (29.9%) were going to anganwadi before intervention and after intervention it was significantly increased to two third (62.3%). (p<0.05, as per X² test). Before intervention more than half of children (60.0%) in FBI group were consuming the anganwadi food whereas after the intervention it was significantly increased to 85.3% (p<0.05, as per X² test). One third of children (37.7%) in HBI group were consuming the anganwadi food whereas after the intervention it was significantly increased to 79.2% (p<0.05, as per X² test). Only 18.7% children were consuming anganwadi food daily in FBI group and 15.6% in HBI group which was significantly increased to 37.3% in FBI group and 27.3% in HBI group after intervention.

Table 4- Assessing the practicing of using Anganwadi services for children having malnutrition N=152

Variables related to anganwadi services	FBI group n=75(%) (Baseline)	FBI group n=75(%) (Endline)	Chi-square/ Fisher exact(df) pvalue	HBI group n=77(%) (Base line)	HBI group n=77(%) (End line)	Chi-square/ Fisher exact(df) p value
Child registered with ICDS						
Yes	73(97.3)	75(100.0)	(1)0.5	77(100.0)	77(100.0)	-
No	2(2.7)	-		-	-	
Child going to anganwadi						
Yes	34(45.3)	53(70.7)	9.8(1) <0.001	23(29.9)	48(62.3)	16.3(10) <0.001
No	41(52.7)	22(29.3)		54(80.1)	29(37.7)	
Consuming food distributed at anganwadi						
Yes	45(60.0)	64(85.3)	12.1 (1)<0.001	29(37.7)	61(79.2)	27.4(1)<0.001
No	30(40.0)	11(14.7)		48(62.3)	16(20.8)	
Frequency of consuming anganwadi food/week						
6 days	14(18.7)	28(37.3)	21.7 (3)<0.001	12(15.6)	21(27.3)	
2-3 days	10(13.3)	24(32.0)		4(5.2)	27(35.0)	
1-2 days	21(28.0)	12(16.0)		14(18.2)	13(16.9)	34.8(3)<0.001
Never	30(40.0)	11(14.7)		47(61.0)	16(20.8)	

Table 5: Comparison of nutritional status between two groups before and after intervention N=152

Nutritional status	FBI n=75(%)		X ² (df) p	HBI n=77(%)		X ² (df) p
	Before intervention	After intervention		Before intervention	After intervention	
Normal	-	34(45.3)	<0.001	-	27(35.1)	<0.001
Moderately malnourished	47(64.7)	26(34.7)		52(67.5)	33(42.9)	
Severely malnourished	28(37.3)	15(20.0)		25(32.5)	17(22.1)	

In FBI group initially two third (64.7%) children were moderately malnourished while 37.3% were severely malnourished whereas after intervention there was significant improvement in nutritional status in FBI group. Near to half (45.3%) children was having normal nutritional status, 34.7% were moderately malnourished and 20.0% were severely malnourished. In HBI group initially there were 67.5% children were moderately malnourished while 32.5% were severely malnourished whereas after intervention there was significant improvement in nutritional status in HBI group. More than one third (35.1%) children were having normal nutritional status, 42.9% were moderately malnourished and 22.1% were severely malnourished.

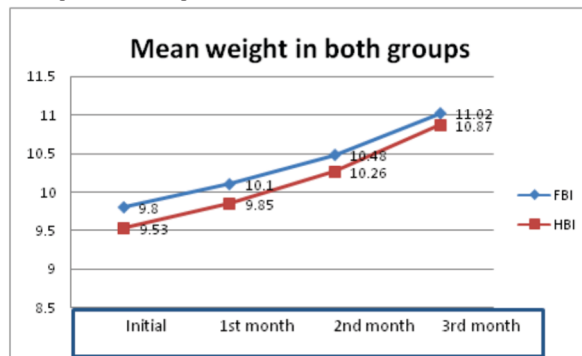
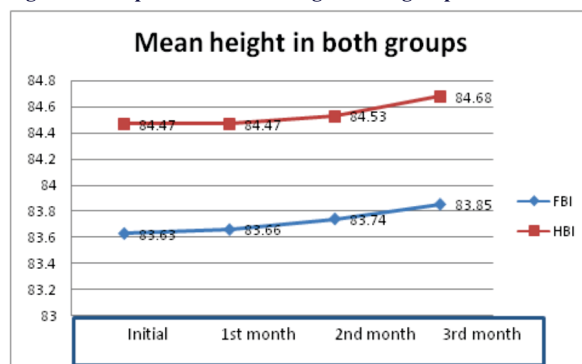
Table 6: Consumption of calories before and after intervention by children having malnutrition

Age (months) (Recommended Energy)	Energy consumed (kcal)	FBI n=75(%)		Fisher exact (df) p	HBI n=77(%)		Fisher exact (df) p
		Before intervention	After intervention		Before intervention	After intervention	
12-24 (800-1000kcal)	<600	7(26.9)	-	(2)<0.001	6(24.0)	-	(2)<0.001
	600-800	15(57.7)	3(11.5)		14(56.0)	2(8.0)	
	800-1000	4(15.4)	23(88.5)		5(20.0)	23(92.0)	
25-36 (1000-1200kcal)	<800	4(16.7)	-	(2)<0.001	4(15.4)	1(3.8)	(2)<0.001
	800-1000	12(50.0)	2(8.3)		16(61.5)	1(3.8)	
	1000-1200	8(33.3)	22(91.7)		6(23.1)	24(92.3)	
36-60 (1200-1400kcal)	<1000	8(32.0)	-	(2)<0.001	2(7.7)	-	(2)<0.001
	1000-1200	10(40.0)	1(4.0)		14(53.8)	1(3.8)	
	1200-1400	7(28.0)	24(96.0)		10(38.5)	25(96.2)	

In FBI group in 12-24 months of children only 15.4% were consuming recommended calorie in a day which was increased to 88.5% after the intervention. Children of 25-36 months in FBI group one third (33.3%) of children were consuming the recommended energy whereas it was increased to 91.7% after the intervention. In children of 36-60 months the recommended energy was 1200-1400kcal which was consumed by 28.0% of children and it was consumed by most of children (96.0%) after the intervention. Similarly in HBI group in the age group of 12-24 months the recommended energy was consumed by 20.0% children who were increased to 92.0% after the intervention. Recommended energy consumed by the 25-36 months children was 23.1% before the intervention which was achieved to 92.3% after the intervention. One third of children (38.5%) of children in age group of

36-60 months were consuming recommended energy before intervention which was consumed by maximum number of children (96.2%) after the intervention. There was significant difference in energy consumption before and after intervention in both the groups ($p < 0.001$ as per χ^2 test).

In FBI group the initial mean weight was 9.8 that were increased to 10.1, 10.48 and 11.02 subsequent months. In HBI group the initial mean was 9.53 that was increased to 9.85, 10.26 and 10.87 at subsequent months upto 3 months.

**Figure 1: Comparison of mean weight of two groups****Figure 2: Comparison of mean height of two groups**

In FBI group the initial mean height was 84.47 that were remained same in 1st follow up and then increased to 84.53 and 84.68 in subsequent month. In HBI group the initial mean height was 83.63 that were increased to 83.66, 83.74 and 83.85 at subsequent month's upto 3 months.

Table 7: Assessing the practices of consumption of junk food by child N=152

Assessing the practices of consumption of junk food by child (in last week)	Before and after intervention		Chi-square/Fisher exact (df) p value	Before and after intervention		Chi-square/Fisher exact (df) p value
	FBI group n=75(%)	FBI group n=75(%)		HBI group n=77(%)	HBI group n=77(%)	
Frequency of taking biscuits			24.6 (2) <0.001			2.8 (2) 0.2
1-2 times	39(52.0)	28(37.3)		40(51.9)	35(45.4)	
>2 times	30(40.0)	15(20.0)		22(28.6)	18(23.4)	
Not taking	6(8.0)	32(42.7)		15(19.5)	24(31.2)	
Quantity of taking biscuits			30.8 (4) <0.001			15.3 (4) 0.004
1-5 biscuits	16(21.3)	18(24.0)		15(19.5)	12(15.6)	
½ packet	18(24.0)	13(17.3)		21(27.3)	16(20.8)	
1 packet	20(26.7)	9(12.0)		6(7.8)	18(23.4)	
>1 packet	15(20.0)	3(4.0)		20(25.9)	7(9.0)	
Not taking	6(8.0)	32(42.7)		15(19.5)	24(31.2)	
Frequency of taking chips			23.3 (2) <0.001			6.0 (2) 0.04
1-2 times	34(45.3)	24(32.0)		31(40.3)	27(35.1)	
>2 times	30(40.0)	13(17.3)		33(42.8)	24(31.2)	
Not taking	11(14.7)	38(50.7)		13(16.9)	26(33.7)	
Quantity of taking chips			26.24 (3) <0.001			16.4 (3) 0.009
½ packet	14(18.6)	12(16.0)		10(12.9)	21(27.3)	
1 packet	23(30.7)	17(22.6)		27(35.1)	19(24.6)	
>1 packet	27(36.0)	8(10.7)		27(35.1)	11(14.4)	
Not taking	11(14.7)	38(50.7)		13(16.9)	26(33.7)	
Frequency of taking Maggie			2.3 (2) 0.3			19.7 (2) <0.001
1-2 times	27(36.0)	23(30.6)		43(55.8)	21(27.3)	
>2 times	20(26.7)	15(20.0)		15(19.5)	10(13.0)	
Not taking	28(37.3)	37(49.4)		19(24.7)	46(59.7)	

Quantity of taking Maggie			6.5(3) 0.08			33.7(3)<0.001
Some spoons	7(9.3)	12(16.0)		10(12.9)	18(23.4)	
½ katori	21(28.0)	17(22.6)		29(37.7)	7(9.1)	
1 katori	19(25.4)	9(12.0)		19(24.7)	6(7.8)	
Not taking	28(37.3)	37(49.4)		19(24.7)	46(59.7)	
Frequency of taking toffee			11.3(2) <0.001			15.9(2) <0.001
1-3 times	41(54.7)	35(46.6)		35(45.4)	21(27.3)	
>3 times	31(41.3)	24(32.0)		25(32.5)	15(19.5)	
Not taking	3(4.0)	16(21.4)		17(22.1)	41(53.2)	
Junk food taken by child before meals			29.04(1)<0.0001			34.6 (1) <0.0001
Yes	54(72.0)	21(28.0)		50(64.9)	14(18.2)	
No	21(28.0)	54(72.0)		27(35.1)	63(81.8)	
Junk food given at place of food.			10.7(1)<0.001			27.9(1) <0.0001
Yes	30(40.0)	12(16.0)		35(45.5)	6(7.8)	
No	45(60.0)	63(84.0)		42(54.5)	71(92.2)	

Before intervention the percentage of children consuming junk food was high but after intervention there were less children who were consuming junk food. Before intervention in FBI group 72% mothers and 64.9% in HBI were giving junk food to their children before meals which were significantly decreased after intervention in both the groups. Frequency and quantity of all types of junk food reduced in both the groups

DISCUSSION

Malnutrition is a serious public-health problem. Globally more than one third of children die due to under nutrition. Through Literature reveals many interventions that can manage malnutrition but still malnutrition is problem. It is the responsibility of health care professionals working in community to develop some strategies as per need of their areas to manage malnutrition. In present study two strategies are used i.e. Individually educating the mothers in their home settings and educating group of 3-4 mothers at anganwadi centers and evaluate their effectiveness on management of malnutrition. Both strategies have some benefits and disadvantages. Home based teaching is time consuming but investigator can pay more attention to the needs of child. Whereas in group teaching it was difficult to assemble the mothers together at a place. But mothers can learn from each other's experiences and making learning more effective.

To prevent and manage malnutrition Government of India has launched a nationwide ICDS programme. AWW was already having details of malnourished children in their areas. Hence, it was easy to access them and their list was obtained from anganwadi. In anganwadi weight for age chart is used to assess the nutritional status of children. This chart is basically made according to the growth standards of Indian children. This chart is used till 6 years of life and has different color code for boys and girls. This is also available in mother and child protection card. Due to easy availability and wider use in the study population to identify malnourished children this chart is used in present study. Since mothers also have this chart they can also easily monitor the growth of their child.

It is important to assess the current practices before implementing any strategies. In present study semi-structured interview schedule was used to obtain the data related to the current feeding practices of the children because for explaining the feeding practices open ended questions should be used. Other reason for using interview schedule is that it is easy to administer even in the mothers having low literacy. Inappropriate feeding is emerging as one major cause for malnutrition in under five children. Even if the food is available children are still underweight. The current practices revealed that all the children were not eating their meals in a separate plate, most of the children were consuming junk foods, most of the mothers either given junk food before meals or in place of food and only half of the children were started complementary feeding at 6 months, half of them either started complementary feeding early or late. A study was conducted to evaluate the effect of time allocated for feeding and its effect on nutritional status of infant reported that malnourished children had less time devoted to them for breastfeeding, food preparation and feeding³. Another study reported maternal education, hygienic and feeding practices of mother were found to be significantly associated with malnutrition².

Multi methods of teaching were used in the study to bring about the

comprehension of the topic. Face to face health education session has benefits than other method of teaching as by this method immediate feedback is possible and educator can make sure that information provided is understood by mothers. Flash cards with colored pictures in Hindi were used to make the learning more effective. It is not easy to comprehend all the things taught at one teaching so booklet was also given which they can refer whenever they required. To avoid the recall bias and make sure what child has eaten a diary was given to mothers to record daily food given to child. This will help the investigators to check the adherence of mother to the teaching and calculate calories consumed by child. A similar interventional study was conducted in Pakistan. They also prepared nutrition education booklet on importance of breast feeding, complementary feeding and balanced diet. They reported that after giving intervention one third of children in both the areas attained normal nutritional status. It is difficult for the mother to comprehend and follow all the teaching correctly in one teaching. Hence Follow ups by investigator through home to home visit were done to reinforce and motivate the mothers to feed the child as per protocol¹.

ICDS programme run since 1975 to improve the nutrition and reduce malnutrition. Supplementary food is provided to under six children that counts 1/3rd requirement of energy and proteins per day. It is important that all the under six children should be registered with their anganwadi. It is good that in present study all the subjects in both the groups were registered with ICDS. But all of them were not going to anganwadi centers regularly and those who are going regularly were not consuming anganwadi food. After intervention number of children going to anganwadi regularly and consuming food distributed at anganwadi centers was increased significantly in both the groups. A study was conducted in Ludhiana, they reported that out of total registered children (826) only 93 (11.3%) were attending the anganwadi centers⁴. A survey was conducted in M.P. reported that among 3-6 years children more than half children were consuming the supplementary food from anganwadi, 12.9% did not consume at all and 1.6% bring food from AWC but did not consume⁵.

Nutritional status can be assessed by weight, height, MUAC, ratio of head and chest circumference. Normally at birth head circumference was more than chest circumference (CC) at 1 year both are equal and after one year chest over taken head circumference (HC). In present study 14.7% children in FBI group and 18.2% children in HBI group were having either head circumference more than chest circumference or equal which did not improve after intervention. This may be due to short period of intervention i.e. only 3 months. A study was conducted in Haryana and Delhi. The results indicate that the longer the delay in CC overtakes HC, higher the chance for the children to be severely malnourished⁶. MUAC is another sensitive indicator for assessing the nutritional status of child. In children above 2 years MUAC should be 13.5cm or above but if it fails to achieve 13.5 cm then it indicates child is malnourished. In present study most of the children above 2 years in both groups were having mid arm circumference less than 13.5 cm. Near to half children in FBI group and more than one-third were having less height than normal according to their age as per height for age chart. But after intervention there was some improvement observed in MUAC and height. But it could not reach to normal level. This may be due to short period of intervention i.e. 3 months. Weight increased more rapidly among toddlers and pre-schoolers. The present study period was only 3 months, weight increased rapidly as compared to other anthropometric parameters. So the significant improvement

was observed in the nutritional status in both groups as per weight for age chart. After intervention near to half children in FBI group and more than one third children in HBI group attains normal nutritional status.

The results of study showed significant improvement in nutritional status of children in both the groups after intervention as per weight for age chart. It was concluded that both the strategies (HBI and FBI) are equally effective to combat malnutrition as per weight for age chart. Improvement in relation to weight, height, MUAC was more in HBI group and improvement related to feeding practices and practicing of using anganwadi services was more in FBI group. On the basis of results of study it was recommended that the mothers of under 5 children in community should be identified and they should be motivated and reinforced for giving nutritious diet to their child by nurses, doctors and other health care providers in the community (ANM, ASHA, AWW). So that malnutrition can be prevented and managed earliest in this age group.

REFERENCES:

1. MOHFW.National Family Health Survey [Internet]. Pib.nic.in. 2017 [cited 22 March 2018]. Available from: <http://pib.nic.in/newsite/mbErel.aspx?relid=169905>
2. Geetanjali S, Dhaneswari J, Parsuram , Srabani P, Tapan B. Prevalence of malnutrition among under five children of urban slums of Berhampur, Odisha, India: a community based crosssectional study. International Journal of Contemporary Pediatrics [Internet]. 2017 [cited 22 March 2018];4(6):2180-86. Available from: <http://www.ijcpdiatrics.com/index.php/ijcp/article/viewFile/1159/942>
3. Kamau-Thuita F, Omwega AM, Muita JW .Child care practices and nutritional status of children aged 0-2 years in Thika, Kenya. East Afr Med J [Internet]. 2002 [cited 22 March 2018];79(10):524-9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/12635757>
4. Thomas N. Sengupta P. Benjamin IA. An Assessment of the Integrated Child Development Services Programme in an Urban Area of Ludhiana, Punjab. IOSR Journal of Dental and Medical Sciences [Internet]. 2015[cited 22 march 2018]; 14(2) :58-61. Available from: https://www.researchgate.net/publication/281022186AnAssessmentoftheIntegratedChildDevelopmentServicesProgrammein_anUrbanAreaofLudhianaPunjab
5. Government of Madhya Pradesh.Poverty Monitoring & Policy Support Unit , SPC M.P., Bhopal, India [Internet]. Mplanningcommission.gov.in. 2010 [cited 22 March 2018]. Available from: <http://mplanningcommission.gov.in/international-aided-projects/pmpsu/pmpsu.htm>
6. Karimassery SR, Seth V, Jena TK, Shukla DK. Age at which chest circumference overtakes head circumference in children. The Indian Journal of Pediatrics[Internet]. 1995[cited 22 march 2018]; 69(1): 89-94.Available from: <https://www.researchgate.net/publication/12487982Ageatwhichchestcircumferenceovertakesheadcircumferenceinchildren>