

A Comparison of the Effect of Breast Feeding, Mixed Feeding and Top Feeding on Weights of Infants and Children

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A retrospective analysis of 503 patients admitted to diarrhoea ward between June to August 2003 was done regarding their weight and feeding practices. Out of them 36 children were excluded as they did not full fill the required criteria. So a total of 467 patients were studied. The patients were divided into three groups depending upon whether they were breast fed, mixed i.e. both breast and top fed, or top fed respectively. All patients between the ages of birth and 24 months were included. The number of patients in breast fed, mixed fed and top fed were 134,135 and 198 respectively. Male to female ratio was 1.4:1,1.5:1,1.4:1,with mean age in breast fed group for females 6.9 ± 4.7 months and males 10.3 ± 7.63 , in mixed fed group 8.3 ± 5.97 months and 8.4 ± 6.4 months and in top fed group 8.25 ± 7.35 months and 7.65 ± 5.72 months respectively. Mean weight in each group was 6.1 ± 1.9 , 5.7 ± 2.1 and 4.9 ± 2.0 kg. When weight of breast fed children was compared with those of mixed fed the difference was not statistically significant with p value of 0.236, while the comparison with top fed was highly significant with p value of 0.000. Similarly babies on mixed feeding had significantly better weight than that of top fed with p value of 0.004. Although it has been stressed upon and a lot of effort has been put in to encourage breast feeding but still top feeding and mixed feeding are on the top resulting in malnourished and wasted children. From our study it is obvious that top fed children are grossly malnourished, and exclusive breast feeding is low. We need to take more steps to encourage breast feeding.

Key words: Breast feeding, top feeding, malnourished

The number of malnourished babies and toddlers is increasing. This is not only obvious in our daily hospital practice but many surveys have shown that malnutrition incidence has gone up. A recent survey conducted over the past two years to probe nutritional status of women and children in Pakistan yielded very disturbing trends with an estimated 38% of children between the ages of 6 months and 5 years were reported under weight and another 36.8% were stunted according to an analyst¹.

There are many factors responsible for this including failure of exclusive breast feeding^{2,3}, early initiation of water supplementation^{4,5,6,7}, introduction of prelacteal feeds like ghutti, honey, gripe water etc, mixed feeding⁸, large family size, more than 3 children under 5 years, unemployment increasingly high cost of living and poor hygienic conditions etc. For a poor country like Pakistan breast milk is the best source of nutrition for children. Studies have shown that breast fed babies have a lower incidence of morbidity and mortality^{8,9}. Unfortunately the trend of top feeding/mixed breast feeding along with bottle feeding is not changing. There may be different reason like illiteracy, misbelieves about breast milk efficacy and safety, lack of self confidence of mother about breast feeding etc.

The purpose of this study was to compare feeding practices and their impact on weight of infants and children up to 2 years of age.

Methodology

This was a retrospective descriptive study.. The inclusion criteria was children under two years of age with history of acute watery diarrhea, A specially designed questionnaire

was used to record all the information from patient's charts. The parameters were recorded including name, age, sex, weight and mode of feeding on the Performa. These Patients were then grouped into three groups depending upon the feeding practices. First Group had exclusively breast fed patients, Second group comprised of mixed fed and third Group consisted of babies and toddlers who were top fed.

Exclusive breast fed meant only breast feeding without water, ghutti honey etc., while mixed feeding meant combined breast feeding and top feeding. Top feeding included all children on either formula or cow's/buffalo's milk or both.

The data was processed in SPSS soft ware for windows version 10, after coding and decoding of variables. The data was analyzed and the three groups were compared with each other regarding feeding pattern and weight of these children.

Results

It was done on 503 patients admitted to the diarrhea section of Pediatric department Mayo hospital from June to August 2003 36 patients were excluded from the study as they did not fulfill the set criteria. So a total of 467 patients were studied, these were divided into three groups i.e., exclusively breast fed, Mixed fed (breast fed+top fed) and top fed alone. Table -1 shows the distribution of children in each group.

This shows that out of the total, number of top fed children is significantly higher than breast fed or mixed fed, while the later two are comparable.

Table 1. Cross tabulation Mode of Feeding by Gender.

Mode of Feeding	Female	Male	Total
Breast Fed	56	78	134
Mixed Fed	53	82	135
Top Fed	84	114	198
Total	193	274	467

In the study the mean age in breast feds was 6.9± 4.7 months for females and 10.7 ±7.6 for males. In mixed feds females were 8.2 ±5.9 months and males were 8.4 ±6.4 months ,while in top feds females had mean age of 8.2±7.3 and males had 7.6±5.7 months (Table-2)

Table 2. Summary of different age groups with standard deviation.

	N	Mean	Sd	Min	max
Female					
Breast Fed	56	6.98	4.70	0.12	24
Mixed Fed	53	8.23	5.97	0.22	24
Top Fed	84	8.25	7.35	0.12	24
Male					
Breast Fed	78	10.73	7.63	0.15	24
Mixed Fed	82	8.41	6.42	0.13	24
Top Fed	114	7.65	5.72	0.16	24

Table 3 shows further subdivision of these patients according to age and sex and by mode of feeding. These patients were divided into 4 subgroups according to their ages.

Table 3: Cross tabulation Age group by Mode of feeding and gender.

	0.0 - 6.0 months	6.1-12 months	12.1-18 months	18.1 - 24 months
Female				
Breast Fed	29	24	02	01
Mixed Fed	24	20	06	03
Top Fed	46	21	08	09
Male				
Breast Fed	28	25	12	13
Mixed Fed	37	33	06	06
Top Fed	61	38	10	05

The results show that there is no gender preference and number of males and females is almost equal in each group in all the three feeding groups. (Table-3). Summary statistics of weight by age, gender and mode of feeding is shown in Table 4.

Table 5 summarizes the mean weights with standard deviation of patients in these groups. Mean weight of breast feds is 6.1 ±1.9, of mixed feds 5.7± 2.1and top feds have 4.9± 2.0. Detailed analysis of the data shows that when weights for different age groups were compared, weights of breast fed babies from 0-6 months group and 6.1 -12 months of age were higher than those of mixed and top fed children with p value of 0.0005 and 0.002 respectively.

Table 4. Summary statistics of weight by age, gender and mode of feeding.

Age in Months	N	mean	sd	min	max
Breast Fed Female					
0.0-6.0 months	29	4.33	1.54	2.50	10.00
6.1 - 12.0 months	24	6.85	0.87	5.50	8.00
12.1-18.0 months	2	6.75	0.35	6.50	7.00
18.1 - 24.0 months	1	7.00	-	7.00	7.00
Breast Fed male					
0.0 - 6.0 months	28	4.69	1.37	2.00	7.50
6.1 - 12.0 months	25	7.00	1.15	5.00	9.50
12.1 - 18.0 months	12	8.29	1.20	7.00	10.50
18.1 - 24.0 months	13	8.32	1.56	5.50	10.00
Mixed fed female					
0.0 - 6.0 months	24	3.89	1.17	2.00	6.50
6.1 - 12.0 months	20	6.24	1.18	4.00	8.00
12.1 - 18.0 months	6	7.50	1.41	5.50	9.00
18.1 - 24.0 months	3	8.50	3.04	5.00	10.50
Mixed fed male					
0.0 - 6.0 months	37	4.20	1.50	1.50	7.20
6.1 - 12.0 months	33	6.85	1.44	4.00	10.00
12.1 - 18.0 months	6	8.00	1.18	6.50	9.00
18.1 - 24.0 months	6	8.83	1.08	7.50	10.00
Top fed female					
0.0 - 6.0 months	46	3.43	1.15	1.60	6.00
6.1 - 12.0 months	21	5.94	1.89	2.80	8.50
12.1 - 18.0 months	8	6.69	1.44	5.00	9.00
18.1 - 24.0 months	9	7.78	0.62	7.00	9.00
Top fed male					
0.0 - 6.0 months	61	3.85	1.17	1.30	6.20
6.1 - 12.0 months	38	6.03	1.45	3.25	9.50
12.1 - 18.0 months	10	8.08	1.26	6.50	10.80
18.1 - 24.0 months	5	7.06	3.47	1.80	10.00

Table 5. Summary statistics of weight (Kg) by mode of feeding.

Mode of Feeding	N	Mean	SD
Breast Fed	134	6.15	1.97
Mixed Fed	135	5.71	2.10
Top Fed	198	4.98	2.05
Total	467	5.53	2.10

ANOVA (Analysis of Variance) test showed significant mean difference in weight among Breast Fed Mixed Fed and Top Fed groups (p=0.0000).

Mean difference among groups is significant among at 5% level of Significance (ANOVA test).. When overall weights of breast fed, mixed fed and top fed were compared, the breast feds were of better weight than top fed with statistically significant P value of 0.000,while weight difference between breastfed and mixed fed was not statistically significant P value 0.236.

Bonferroni pair wise comparison of mean weight between Breast Fed Mixed Fed and Top Fed groups with p-values difference is significant at 5% level of significance. The results of this study show that number of exclusively breast fed babies is less as compared to top fed and mixed fed babies. The weight of top fed babies is significantly less as compared to breast fed and mixed fed

especially up to 1 year of age with p-value of 0.0005 and 0.002.

Table 6 Mean weight among mode of feeding group by age

Mode of Feeding	n	Mean	SD	P-value
0-6 months				
Breast Fed	57	4.51	1.46	0.0005*
Mixed Fed	61	4.08	1.37	
Top Fed	107	3.67	1.17	
Total	225	3.99	1.34	
6.1-12.0 months				
Breast Fed	49	6.92	1.02	0.002*
Mixed Fed	53	6.62	1.37	
Top Fed	59	6.00	1.60	
Total	161	6.49	1.42	
12.1-18.0 months				
Breast Fed	14	8.07	1.24	0.4551
Mixed Fed	12	7.75	1.27	
Top Fed	18	7.46	1.48	
Total	44	7.73	1.35	
18.1-24.0 months				
Breast Fed	14	8.23	1.54	0.2811
Mixed Fed	9	8.72	1.75	
Top Fed	14	7.52	2.02	
Total	37	8.08	1.80	

Discussion

The study was designed to compare the effect of different feeding practices on weight. The study population was non-randomly selected according to preset inclusion criteria. A controlled study was not possible because feeding pattern for babies is selected by mother herself and ethically it is not right to influence her choice.

The most striking results of this study are that overall population is malnourished and under weight. The weight of children in breast fed group and mixed fed group is more as compared to top fed.

The study shows that breast feeding and its maintenance is an important factor for child survival and growth. Diluted or incorrectly made formulas, diluted cow's milk and bottle feeding, all contribute enormously towards increased morbidity and mortality^{6,7}. Different infections like diarrhea, bronchiolitis, pneumonia, Otitis media to which these malnourished children are more prone to, lead to poor weight gain and stunted growth.^{10,11}

This is an established fact that combined top and breast feeding eventually leads to breast feeding failure. In a study on Peruvian children early initiation of combined feeding leads to poor growth and poor weight gain¹⁶. The results of this study are similar to the above mentioned study, as average weights of the babies and toddlers who were on combined feed were less as compared to breast fed children. This could possibly be explained by the fact that some calories coming from breast milk along with protective agents like immunogenic agents, secretory antibodies, leukocytes and complex carbohydrates that are active against viruses, bacteria and parasites protect these children^{6,11,15}

The term Exclusive breast feeding has been expressed in different manners by different authors. In a study by Riffat et al it means no pre or para lacteal feeds, no honey, ghutti, herb extracts etc⁶. In another study it is seen that water supplementation leads to increased incidence of diarrhea. Two separate studies one by Riffat and other by Almroth has also shown that even in hot and arid conditions there is no need for water supplementation and breast milk is sufficient to take care of daily fluid requirement and weight gain^{5,17}.

There is another important observation In this study that breast feeding is still not the most common or most accepted way of feeding. Only 134 patients were reported to be breast fed out of 467. In a developing country like Pakistan where malnutrition, under nutrition, infant mortality and child mortality are so high, exclusive breast feeding may lower the alarmingly high rates of these health indices^{10,11}.

Conclusion

The results of this study show that children on top feed don't grow and gain weight as they should. There is still need to promote breast feeding and maternal education about safety, efficacy and complete balanced status of breast milk. There is need to involve as many NGOs, obstetricians and media to spread this message as possible.

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