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Original Research Article

Effectiveness of supplementary suckling technique in underweight infants

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ABSTRACT

Background: The period from birth to 6 months is part of a larger critical 'window of opportunity' within which the impact of undernutrition has both immediate and long term adverse consequences. Protocols for older children are often extended to this age group owing to the absence of evidence-based treatment protocols. The following study was carried out to assess the effectiveness of supplementary suckling technique and lactation counselling over counselling alone in management of malnourished infants in the age group of 1- 6 months.
Methods: After IRB clearance, all underweight infants with weight for age <-2SD by WHO charts were enrolled in the study. Once identified as lactation failure, the infants were randomly allocated into two groups using SAS 9.2 package. Both, cases and controls were counselled regarding breast feeding practices as per WHO module. Cases were additionally started on supplementary feeds by Supplementary Suckling Technique (SST) for the 1st week. Weight gain was monitored at enrolment, on day 7 and day 14. Weight gain >20gm/day in the 2nd week was considered successful re-lactation. Data was analysed using student unpaired t test and chi square test.
Results: Mean weight gain per day in 1st and 2nd week in the cases was significantly higher than that in the controls (p= <0.001). In 2nd week, maximum weight gain i.e. 20-30 g/day was found in 93.3% cases as against 13.3% controls (p=0.01) depicting successful re-lactation.
Conclusions: Lactation counselling along with supplementary suckling technique should be the standard of care in management of malnourished infants.

Keywords: Malnourished infants, Re-lactation, Supplementary suckling technique

INTRODUCTION

Acute malnutrition in children under 5 years is a major public health concern, currently affecting approximately 20 million individuals worldwide. Although infants below 6 months constitute a minority of this group, an estimated 3.8 million of such young infants are affected.[1] Severe malnutrition in this age group has direct consequences in terms of survival and morbidity. During no other period in life does development, maturation, and growth occur with such rapid velocity and intensity as in the first 6 months.[2] The period 0 to 6 months is a part of a larger critical 'window of opportunity' within which the impact of undernutrition has both immediate and long term adverse consequences. Despite the wide range of possible problems underlying acute malnutrition among infants under 6 months of age, the cornerstone of treatment will almost always be feeding support.

Protocols for older children are often extended to this age group owing to the absence of age-specific evidence-based treatment protocols.[3] Thus, there is an urgent need to better understand, how to best address the specific needs of this population in clinical settings. Keeping this in mind, the following study was carried out to study the

demographic and clinical profile of underweight infants in the age group of 1 to 6 months and to assess the effectiveness of counselling and a relatively new intervention like supplementary suckling technique in management of malnourished infants.

METHODS

This was a prospective case-control study conducted in the nutrition ward of a tertiary hospital in a metropolitan city from October 2014 to September 2015. After the clearance from Institutional Review Board, all underweight infants, 1 month to 6 months of age, fulfilling the criteria for weight for age <-2 SD by WHO charts, were enrolled in the study. A total of 60 underweight infants were enrolled in this study. Infants with organic cause for malnutrition, infants born to HIV positive mothers, and infants of mothers with no milk output were excluded from the study. History and clinical findings were recorded in a case record form. Once identified as lactation failure, infants were randomly allocated into two groups using SAS 9.2 package. Both, cases and controls were counselled regarding breast feeding practices as per a pre-designed pre-set lactation counselling module based on WHO/UNICEF breastfeeding counselling training manual.[4] Cases were additionally started on supplementary feeds by Supplementary Suckling Technique (SST) for the 1st week. Composition of F-75 and volume of feeds of F-75 as per weight band were according to the MOHFW Operational Guidelines for Severe Acute Malnutrition.[5] The supplementation was given via no. 8 nasogastric tube. The tip was cut back beyond the side ports approximately 1 cm and the cap at the end of the tube was removed. F-75 was put in a cup. The mother/health staff was asked to hold the cup with one hand initially 5-10 cm above the breast. The end of the tube was put in a cup. The tip of the tube was put on the breast at the nipple and the infant was offered the breast. When the infant sucked on the breast with the tube in his mouth, the milk from the cup was sucked up through the tube and was taken by the infant. The cup/katori was gradually lowered to approximately 10 cm below the level of the breast so that the milk did not flow too quickly and distressed the infant. They were discharged on day 7 of SST and were asked to follow up on day 14. Weight gain was monitored at enrolment, on day 7 and day 14 in both the groups. Case definitions used in the study were:

Lactation failure: If any two of the below three criteria were present

- Maternal perception of low milk output
- Weight for age <-2 SD
- Presence of breast/nipple problem or presence of faulty feeding habits

Re-lactation through SST: If babies continued to gain weight satisfactorily i.e. greater than 20gms/day, even 1 week after stopping SST.

Data was given as Mean and SD for quantitative variables and Number (Percentage %) for qualitative variables. Student unpaired t test and chi square test were applied for the above two respectively.

RESULTS

Data from total 60 infants were analyzed. The results of this study were categorized as follows:

- Demographic and clinical parameters of infant: The mean age at enrolment was 1.84 months in cases and 1.73 months in controls. Female preponderance was observed with Male: Female ratio of 0.6:1. First by birth order was seen in 58.3%. There were 61.7% pre-terms while 35% were small for gestational age at birth. Neonatal Intensive Care Unit support was needed in 55% infants.
- Demographic and clinical parameters of mother: Maximum (76.7%) mothers were in the age group of 20-30 years and 8.3% mothers had weight <45 kg at enrollment. Multiple gestation was observed in 25% mothers. More than half (56.7%) babies were born by cesarean section.
- Feeding habits of the baby: Breast feeding was initiated after 24 hours in 56.7% infants. At the time of enrolment, 65% babies were already receiving complementary feeds while 35% were being exclusively breastfed.
- Anthropometry at enrolment: The mean weight in kilograms of cases and controls at enrolment was 2.03 ± 0.86 and 2.03 ± 0.51 respectively. The mean length in centimeters was 45.72 ± 6.52 and 45.32 ± 3.22 in the cases and controls respectively.
- Comparison of serial weight in both the Groups.

Comparison of Mean Weight in Kilograms at enrolment and at the end of 1st and 2nd week (Table 1).

Table 1: Comparison of mean weight in kilograms at enrolment and at the end of 1st and 2nd week.

	Cases	Controls	P
Enrolment	2.03 ± 0.86	2.03 ± 0.51	
1st week	2.20 ± 0.80	2.15 ± 0.52	<0.001
2nd week	2.38 ± 0.87	2.26 ± 0.53	<0.001

Mean weight at enrolment was 2.03 ± 0.86 kg and 2.03 ± 0.51 kg in cases and controls respectively. At the end of 1st week, the mean weight of the cases group was 2.20 ± 0.80 kg while that of the control group was 2.15 ± 0.52 kg. At the end of 2nd week, it was 2.38 ± 0.87 kg and 2.26 ± 0.53 kg in the above groups respectively. Comparison of Mean Weight Gain/day in grams in both groups (Table 2).

Mean weight gain per day at the end of 1st week was 24.99 ± 2.80 g in cases and 15.48 ± 3.05 g in controls. Mean weight gain per day at the end of 2nd week was 26.00 ± 3.30 g in cases and 15.90 ± 3.30 g in controls.

Thus, mean weight gain per day in 1st and 2nd week in the cases was higher than the controls and this difference was found to be statistically significant (p= <0.001).

Table 2: Comparison of Mean Weight Gain/day in grams in both groups.

	Cases	Controls	P
1st week	24.99 ± 2.80	15.48 ± 3.05	<0.001
2nd week	26.00 ± 3.30	15.90 ± 3.30	<0.001

Distribution of mean weight gain/day among the infants in 1st week (Table 3).

Table 3: Distribution of mean weight gain/day among the infants in 1st week.

Gain in wt/day (g)	Cases n (%)	Controls n (%)
< 10	0 (0.0)	2 (6.7)
10 -15	0 (0.0)	13 (43.3)
15-20	2 (6.3)	15 (50.0)
20-30	28 (93.3)	0 (0.0)

Majority of the cases had weight gain of 20-30 g/day while majority of controls gained only 10-20 g/day in the 1st week (Figure 1).

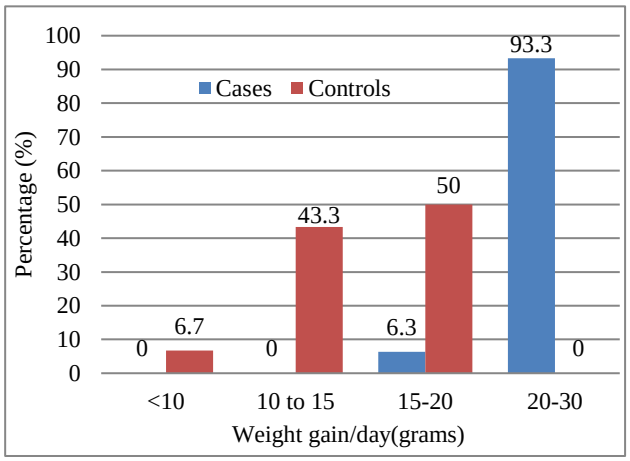

Figure 1: Comparison of mean weight gain/day (grams) in first week.

Distribution of mean weight gain/day among the infants in 2nd week (Table 4).

Table 4: Distribution of mean weight gain/day among the infants in 2nd week.

Gain in weight/day (g)	Cases n (%)	Controls n (%)
< 10	0 (0.0)	1 (3.3)
10 -15	0 (0.0)	10 (33.3)
15-20	2 (6.3)	15 (50.0)
20-30	28 (93.3)	4 (13.3)

Maximum weight gain i.e. 20-30 g/day was found in 28 (93.3%) cases as against 4 (13.3%) controls and this difference was statistically significant (p=0.01) (Figure 2).

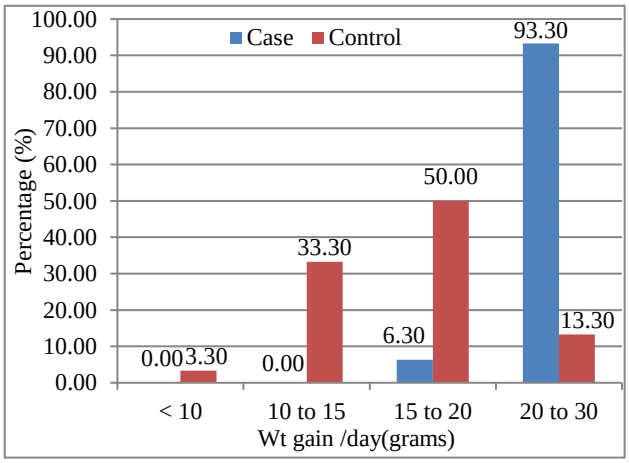

Figure 2: Comparison of mean weight gain/day (grams) in second week.

Thus, after stopping SST, 28 (93.3%) infants in the cases group continued to have optimal weight gain i.e. >20 g/day. None among the cases had a weight gain of less than 15 g/day even after stopping SST.

DISCUSSION

In this study, we focussed on the effectiveness of SST. Evidence based literature on the usefulness of SST is scarce. To our knowledge and after extensive review of literature, we could not find studies which have compared the effectiveness of SST over counselling in management of malnourished infants.

Mean age in months in our study was found to be 1.84 in cases and 1.73 in controls. Majority of the babies were of low birth weight probably because they were referred to us from the high risk outdoor. Similar findings were also observed in recent studies.[6-8] Caesarean section delivery was observed in 34 (56.7%) babies. C. Nobile et al., M. Lee et al., Silva et al., in their respective studies demonstrated association between LBW and caesarean delivery.[9-11] Thus, early lactation success was strongly influenced by the mode of delivery.

Only 5 (8.3%) infants had a history of having been initiated on breastfeeding within the first hour of life. Rest of the babies received breast feeding after first 24 hours. Similar observations were made in some studies.[12,13] All mothers of cases and controls reported insufficient milk output and inadequate weight gain at enrolment. Lack of serial weight measures at presentation also makes it impossible to differentiate an infant that is gaining weight steadily from an infant that is not gaining or is losing weight. In our study, owing to the fact that majority of our study population belonged to the lower

socioeconomic sections of the society with lesser awareness of proper feeding practices and technique, the actual adequacy of milk output and feeding can only be assessed by a trained expert.

Out of our total study population, 48 (80.0%) infants had length less than 49 centimeters while 29 (48.3%) had length less than 45 centimeters. Data on the weight-for-length index is not presented here, as 80 % of the infants in our study population were shorter than 49 cm in length, hence weight for length index could not be calculated using the NCHS standards. Forty eight percent infants were shorter than 45 cm, also excluding them from calculation using the 2006 WHO standards. This is similar to the study done by Wilkinson et al in Niger in 2009, 64% percent of the infants admitted were shorter than 49 cm in length while 32% percent were shorter than 45cm.[7]

Majority of subjects were either preterm and/or small for gestational age at admission and most of them were under the age of 2 months of postnatal age, having a mean weight <2.5kg and a mean length <49cm. Under these circumstances, it is not possible to use strict anthropometric criteria for admission alone.

In our study the mean weight of the cases group was 2.20±0.80 kg at the end of one week and 2.38±0.87 kg at the end of second week which were significantly higher than in the control group.

Mean weight gain per day at the end of 1st week was 24.99±2.80 g in cases and 15.48±3.05 g in controls. Mean weight gain per day at the end of 2nd week was 26.00 ± 3.30 g in cases and 15.90±3.30 g in controls. Weight gain criteria for successful SST is taken as 20 g per day and signifies that breast milk production is improving.[6] The treatment outcome in our setting was much better than in similar studies done on SST in the past.[1,7,8]

Teferi et al in their retrospective study found that SST was successfully used in the management of SAM infants <6 months.[14] In a case report by Muresan in the year 2011, it was demonstrated how re-lactation was possible using SST.[15] In a qualitative study by Lelijveld et al on SST, it was concluded that SST is a potentially vital child health intervention to re-establish effective exclusive breastfeeding in malnourished infants.[16]

There was a statistically significant weight gain in the cases group both at the end of 1 week and at the end of 2 week of enrolment, with successful re-lactation in 93.3% Vs. 13.3% in control group (p=<0.001) This clearly depicts that SST along with counselling is a better modality to manage lactation failure than counselling alone in management of malnourished infants less than 6 months.

Limitations

The limitations of this study were that firstly it was difficult to convince mothers to get admitted for 7 days for supplementary suckling technique and secondly trained staff nurses are required for SST.

CONCLUSION

Thus, lactation counselling along with Supplementary Suckling Technique should be the standard of care in management of secondary lactation failure. SST has been found to be effective in an inpatient setting. Feasibility and utility of such an approach in inducing re-lactation in mothers at community level needs to be investigated.

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