

Association of feeding practices and immunization with nutritional status of infants in jasra block of Allahabad district

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Abstract

Objective: The objective was to find the association of feeding practices and immunization with nutritional status of infants in Jasra Block of Allahabad district. **Materials and Methods:** A cohort study was conducted in a rural community among infants born during the period of November 2011 to April 2012. Information, Education and Counselling was given to their mothers starting from last 3 months of pregnancy and continued till the newborns completed 1-year of age. Then feeding practices, immunization, and nutritional status (in terms of weight for age) was assessed. **Results:** About 56.25% infants were exclusively breastfed and 53.75% infants were timely started on complementary feeding. 87.5% infants were fully immunized and the rest 12.5% were partially immunized. Growth of more than half of the infants, i.e., 47 (60%) followed a normal growth curve and weight of 33 (40%) infants was below 2 standard deviation. There was no significant difference between the mean weight at birth (i.e., 2.56 kg for infants with adequate feeding and immunization practices and 2.51 kg for infants with inadequate immunization and feeding practices). On the other hand, difference in the mean weight among two groups at 3, 6, and 9 months was statistically significant. **Conclusion:** Feeding practices and immunization have an association with nutritional status of infants in terms of better weight for age.

Key words: Feeding, Immunization, Information, Education and counseling, Nutritional status

Early child development programs are designed to improve the survival, growth and development of young children, prevent the occurrence of risks, and ameliorate the negative effects of risks [1]. In the home front, a number of simple strategies (including breastfeeding, appropriate complementary feeding practices, basic hygiene practices, e.g., hand washing) have been shown to prevent infant and childhood illness and malnutrition. Health workers can promote essential nutrition behaviors by assessing the feeding practices and provide appropriate counseling and corrective measures on proper feeding, encouraging the appropriate feeding of sick children both during and after illness, and distributing or promoting consumption of micronutrients (Vitamin A, iron, and iodized salt) [2].

Approximately, three million children die each year due to vaccine-preventable diseases. Immunization has been one of the most significant and cost-effective public-health interventions to decrease childhood morbidity and mortality [3]. Successes of immunization include worldwide eradication of smallpox, control of poliomyelitis with hopes of eradication. The incidence of most other vaccine-preventable diseases, excluding pertussis,

and tetanus has shown a reduction of $\geq 99\%$, compared with the annual morbidity prior to development of the corresponding vaccine [4].

Growth assessment is used to promote child health and survival worldwide. Disturbances in the health and nutrition, regardless of their etiology, almost always affect growth. Growth monitoring strives to improve nutrition, reduce the risk of inadequate nutrition, educate caregivers, and produce early detection and referral for conditions manifested by growth disorders. At the population health level, cross-sectional surveys of anthropometric data help define health and the nutritional status for the purpose of program planning, implementation, and evaluation [5]. Growth monitoring is also used in all settings to assess the response to intervention.

We have planned this study to find the association of feeding practices and immunization with nutritional status of the cohort of newborns born to mothers, who received Information, Education and Counseling (IEC) from third trimester of antenatal period till the infants completed 1-year of age.

MATERIALS AND METHODS

This was a cohort study conducted in Jasra block, a rural block in Allahabad District of Uttar Pradesh. The study was approved by institutional ethics committee, M.L.N. Medical College, Allahabad. Multi-stage random sampling was done to select villages. In the first stage, two (Jasra and Ghoorpur) of the four total PHCs in Jasra block were randomly selected followed by selection of two sub-centers each from the two selected PHCs. These were Ghoorpur 2 and Birwal (from Ghoorpur PHC) and Jasra and Rera (from Jasra PHC). In the third stage, one village was randomly selected from each of the selected sub center. Further complete enumeration of pregnant women presenting with amenorrhea of 4-6 months duration during the period (August 1, 2011 to February 29, 2012) was done in the four selected villages. Thus, a total of 80 women were included in the cohort.

The study cohort consisted of all the infants born during the period of November 2011 to April 2012 in the selected villages/ASHA areas and these were followed till 1-year of age. Every village was visited twice a month during the study period, once during their vaccination session and the second time 15 days apart. During each visit, pregnant women/mothers were counseled and IEC was given regarding newborn care, age-appropriate infant feeding, recognizing the danger signs according to structured IEC material provided in "mother and child protection card" of National Rural Health Mission (NRHM).

Weight of the infants was recorded every month. Data regarding feeding practices (adequate feeding practices included - colostrum given, no pre-lacteals, timely initiation of breastfeeding, exclusive breastfeeding, complementary feeding [6]), and immunization status (fully and partially immunized [7]) of infants was collected and was compared with weight for age at 1-year.

Weight for age was taken as the parameter (outcome variable) of the nutritional status of infants in the study. For this purpose, growth standards adopted by the Government of India within the NRHM program as per the WHO child growth standards (2006) [8], for monitoring the young child growth and development were used. Separate growth charts for boys and girls below 3 years were used for assessment of infant's weight for age. Based on infant's weight for age on the growth chart, infants were classified in to - normal weight, underweight: <2 standard deviation (SD) and severely underweight: <3 SD.

Data analysis

The data collected were analyzed using statistical software, SPSS version 17.0. Statistical analysis was using *t*-test to compare the mean weight at birth, 3, 6, 9, and 12 months of age.

RESULTS

The study comprised of a total of 80 infants. Table 1 depicts the background characteristics. 53.8% of the infants were male and 46.2% were female. 96.2% belonged to Hindu religion and the rest 3.8% were Muslims. Table 2 depicts feeding

Table 1: Background characteristics of infants

Characteristics	n=80	%
Religion		
Hindu	77	96.2
Muslim	3	3.8
Caste		
General	7	8.75
OBC	25	31.25
SC	48	60.0
Gender		
Male	43	53.8
Female	37	46.2
Socio-economic status (Modified B.G. Prasad Classification) [20]		
Lower middle Class (III)	8	6.7
Upper lower Class (IV)	36	30.3
Lower Class (V)	36	30.3

Table 2: Feeding practices and immunization status of infants

Feeding practices	n=80	%
Initiation of breastfeeding		
<1 h	66	82.5
>1 h	14	17.5
Colostrum		
Yes	54	67.5
No	26	22.5
Prelacteal		
Yes	32	40
No	48	60
Exclusive breastfeeding		
Yes	45	56.25
No		
Predominant	23	28.75
Partial	8	10
Only top feed	4	5
Timely initiation of complementary feeding		
Yes	43	53.75
No		
Early	18	22.5
Delayed	19	23.75
Immunization		
Fully immunized	70	87.5
Partially immunized	10	12.5

practices and immunization of infants. 56.25% infants were exclusively breastfed and 53.75% infants were timely started on complementary feeding. 87.5% infants were fully immunized and the rest 12.5% were partially immunized. Table 3 shows that more than half of the infants i.e., 47 (60 %) gained weight to reach within the normal range while 33 (40%) infants' weight was below 2 SD. No infant was severely underweight.

There was statistically no significant difference between mean weight at birth (i.e., 2.56 kg for infants with adequate feeding and immunization practices and 2.51 kg for infants with inadequate immunization and feeding practices). On the other hand, difference in the mean weight among two groups at 3 months ($p=0.04$), 6 months ($p=0.03$) and 9 months ($p=0.03$) was statistically significant. As shown in Fig. 1, linear forecasting of mean weight gain among both groups shows a highly significant difference ($p<0.000$).

Table 3: Classification of infants according to their weight for age at 1-year of age (WHO growths chart for boys and girls up to 3 years age)

Weight for age	Mean weight (in kg)	n=80	%
Normal	8.62±0.60	47	58.75
Underweight (-2 SD to -3 SD)	7.12±0.33	33	41.25
Severely underweight (<-3 SD)	00	00	00

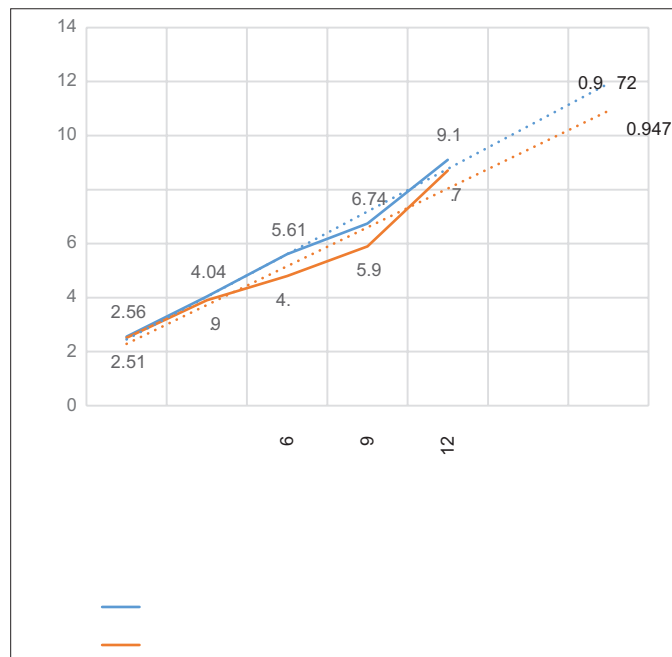


Figure 1: Mean weight gain pattern among group of infants with adequate feeding and immunization practices and group with inadequate feeding and immunization practices

DISCUSSION

Ukegbu et al. [9] in a prospective cohort study carried out at three comprehensive health centers in Nigeria recorded that the number of infants that received colostrum was 118 (82.5%) which was higher than those (67.5%) in present study. Findings similar to those observed in the present study, were reported by Froozani et al. [10] in their study conducted in Iran in which higher rates of exclusive breastfeeding was found in the study group (54%), comprising of 59 mother-infant pairs, who received breastfeeding education than in the control group (6.5%). Mahmood et al. [11] reported in their study conducted in Bareilly district that about 13.8% of mothers started giving semi-solid foods before 6 months of age, while nearly 13% of the mothers gave semi-solid foods after 9 months, which is comparable to the findings of present study. Findings similar to those observed in present study were reported by Salmaso et al. [12] in their study in which they found that 79% infants had been vaccinated in accordance with the recommended schedule (i.e., during the 1-year of life).

According to the NFHS-3 survey (2005-2006) [13] data, practice of pre-lacteals feeding was reported in more than half i.e., 59.8% infants in rural India and 86% prevalent in the state of Uttar Pradesh which is much higher than the present study (40%). According to NFHS-3 survey, only about half the children in age group of 6-9 months received complementary food which is comparable to the findings in the present study (53.75%) [13]. In a report of Annual Health Survey, Uttar Pradesh (2010-11) [14], only 32.9% mothers initiated breastfeeding within 1 h, which is lower than the present study (82.5%). Same survey showed that the percentage of children between the age of 6-35 months being exclusively breastfed for 6 months in rural areas of Uttar Pradesh was only 17.7%, which is lower than the findings of present study (56.25%). Similarly, Muchina et al. [15] in a cross-sectional study conducted in Nairobi, Kenya reported a significant association between discontinuation of breastfeeding and underweight as well as weaning before 6 months and underweight.

In a study conducted by de Souza et al. [16], higher coverage of immunization was reported to be associated with lower prevalence of inadequate weight gain in infants. Ukegbu et al. [9] reported that the infants who were exclusively breastfed for 6 months, achieved a better and more rapid growth in weight and length compared to those in non-exclusively breastfed group ($p<0.01$).

Castillo et al. [17] in a survey conducted in Chile, reported that, prevalence of underweight in children younger than 6 months was higher among children who received breast milk along with infant formula than children who were exclusively breastfed ($p<0.01$). On the other hand, 6-8 months old children who were exclusively breastfed and had never received solid foods were more likely to be malnourished than those who had

received both breast milk and solid foods ($p < 0.01$). Kalanda et al. [18] in a prospective cohort study found that infants with early complementary feeding had lower weight for age at 6 months ($p < 0.05$), and at 9 months ($p = 0.07$) of age.

In our study, more than half of the infants maintained a normal growth curve. In a study conducted by Anand et al. [19] in Haryana on 250 children aged 6-47 months, authors reported the 32.5% and 7% prevalence of moderate and severe malnutrition, respectively. The lower percentage of underweight infants in the present study shows the impact of IEC on growth and development of infants. According to report of NFHS-3 [13] survey about 45.6% infants in rural areas of Uttar Pradesh are underweight which more than the present study where 41% infants were found to be underweight.

CONCLUSION

Promotion of infant feeding practices and full immunization can lead to improvement in the nutritional status of infants in terms of better weight for age.

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