Impact of Exclusive Breastfeeding on Anthropometry, Morbidity and Duration of Hospitalization of Infants Under Six Months of Age

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ABSTRACT

Introduction: Breast milk is the best feed for the infants. Breast milk has got several immunological benefits protecting the infants from various infectious diseases and some chronic diseases of adulthood. Exclusively breastfed babies get less infected and have proper growth and development. **Aims**: To study the impact of exclusive breastfeeding on morbidity and hospital stay of infants of four weeks to six months of age. **Methods**: This was a hospital based cross sectional study done at Pediatric department of Nepalgunj Medical College, Nepalgunj, a tertiary care referral hospital in Nepal, conducted over a period of one year from January 2022 - December 2022. All the infants meeting the inclusion criteria were included for the study. **Results**: A total of 278 infants of 4 weeks to 6 months of age meeting inclusion criteria were included. More than sixty four percent infants were exclusively breastfed. The majority of patients belonged to modified kuppuswamy class 3. Significant impact on nutritional outcome was seen with feeding pattern as 1.7 higher times chance of being underweight in breastfeeding along with supplementary feeding with a highly significant p value of 0.002. Exclusively breastfed infants suffering from respiratory diseases, gastroenteritis, fever and due to other various morbidities were hospitalized for less than one week. Morbidity and hospital stay had a statistically significant relationship with feeding pattern. Higher morbidity was observed due to various diseases of infancy like respiratory diseases, gastroenteritis, sepsis, etc. in breastfeeding along with supplementary feeding group as compared to exclusively breastfeeding group. **Conclusion:** Statistically significant association was found in terms of morbidity, hospital stay and feeding pattern amongst exclusively breastfed infants and breastfeeding along with supplementary fed infants. Less morbidity and shorter hospital stay was observed in exclusively breastfed infants as compared to breastfeeding along with supplementary feeding infants.

Keywords: Breastfeeding, Exclusive, Infants

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INTRODUCTION

Breastfeeding is very essential and is a denotion which helps in reducing infant morbidity. Breast milk is the best food for the infants. It provides adequate nutrition, prevents infectious diseases and comorbid conditions like diabetes mellitus and obesity in future.[1,2,3] Exclusively breastfed babies have higher intelligence quotient.[4] Breastfeeding is cost effective intervention in poor countries like ours. Improper infant feeding leads to various problems of under 5 children like malnutrition causing higher risk of infections making it a vicious cycle of malnutrition and infections. Timely start of breastfeeding, avoidance of prelacteal feeds, giving colostrum, exclusive breastfeeding for 6 months helps maintaining proper growth and development of the child and protects from various infectious diseases.[5,6] WHO recommends exclusive breastfeeding for 6 months of age and continuation till 2 years of age along with introduction of complimentary food at 6 months.[7] Breast milk contains IgA, oligosaccharides, lactoferrin, antibodies and other immune cells having bactericidal, viricidal

and fungicidal properties preventing from various infectious diseases.[8,9] Significant reduction of under 5 morbidity can be done by exclusive breastfeeding of 6 months and continuation till 2 years along with complimentary feeds as per IYCF (infant and young child feeding).[10] Colostrum is sometimes discarded due to lack of knowledge of its nutritional and immunological benefits and the new born is given prelacteal feeds.[11] Studies have shown exclusive breastfeeding of around 50% in Nepal.[12] Therefore we conducted this study to find out impact of exclusive breastfeeding on morbidity and duration of hospital stay of infants 4 weeks to 6 months of age.

METHODS

This was a hospital based cross sectional study done at Pediatric department of Nepalgunj Medical College, Nepalgunj, a tertiary care reference hospital in Nepal. This study was conducted over a period of 1 year from January 2022 – December 2022. All the infants in the age group of 4 weeks to 6 month admitted at Nepalgunj Medical College during the study period were included for the study. The exclusion criteria were preterm infants, weight of infants less than 2.5 kg, APGAR score less than 7, infants who expired and infants of parents not willing to participate in the study. During the study period, a total of 512 infants in the age group of one to six months were admitted out of which 278 met the inclusion criteria and were included in our study. From the first day of start of study data collection was done till the last day of study duration and a data size of 278 was collected that met inclusion requirements by convenient sampling strategy. A detailed proforma was developed and written consent was taken from the parents of the infants. A detailed history including duration of start of feeding after delivery, type of feed given, duration of exclusive breastfeeding, age of introduction of complimentary feeding, duration of breastfeeding was taken. Modified Kuppuswamy scale was used to access the socioeconomic class.[13] Relevant clinical examination was done and required investigations like hemogram, chest x-ray, blood culture sensitivity (CS), urine CS, urine routine microscopy (RME), stool RME, cerebrospinal fluid (CSF) microscopy, protein, sugar and culture, malarial parasite (MP) serology, Typhoid IGM, rK-39, scrub typhus IgM were also sent. Duration of hospitalization due to various diseases like bronchiolitis, bronchopneumonia, gastroenteritis, meningitis, meningitis, encephalitis, sepsis, urinary tract infections (UTI) and fever due to other causes was also recorded. The study was approved by institution's ethical committee.

Data was analyzed in statistical package program SPSS version 20. All numerical variables were tabulated and calculated by using descriptive statistics, Chi-square test, and odds ratio. P value less than 0.05 was considered as of statistical significance.

RESULTS

TA total of 278 infants of 4 weeks to 6 months of age meeting inclusion criteria were included in our study. Out of 278 infants, 64.74% of infants were exclusively breastfed and 35.25% were top fed as depicted in figure 1. Male infants constituted 57.91% of study population and remaining were females with a sex ratio of 1.37:1 (figure 2). Maximum numbers of patients belong to modified kuppuswamy class 3(46.04%) and least number of patient belonged to class 1 as shown in figure 3. Association of anthropometrical parameters and its impact on the nutritional outcome in relation with the exclusive breastfeeding and breastfeeding along with supplementary feeding is shown in table I. It is found to have a significant impact on nutritional outcome with the feeding pattern with 1.7 times chance of being underweight in infants with breastfeeding along with supplementary feeding as compared to exclusive breastfeeding with p value of 0.002 which is highly significant whereas chance of being stunted and wasted was found to be 1.4 times and 1.3 times higher in breastfeeding along with supplementary feeding group in comparison to exclusive breastfeeding group with non significant p value.

Duration of hospitalization due to various diseases in relation to feeding pattern is depicted in table II. Exclusively breastfed infants suffering from respiratory diseases, gastroenteritis, fever and due to other various morbidities were hospitalized for less than one week as compared to infants who were fed with breast milk along with supplementary milk were hospitalized for more than one week for the similar morbidity. All the infants with meningitis/encephalitis and sepsis were hospitalized for more than one week because these diseases need treatment for more than one week. There was a statistically significant association of morbidity and hospital stay in relation to feeding pattern as depicted in table III.

Distribution of morbidity in relation to feeding pattern is depicted in table IV showing higher morbidity due to various diseases of infancy like respiratory diseases, gastroenteritis, sepsis, etc. in breastfeeding along with supplementary feeding group as compared to exclusively breastfeeding group.

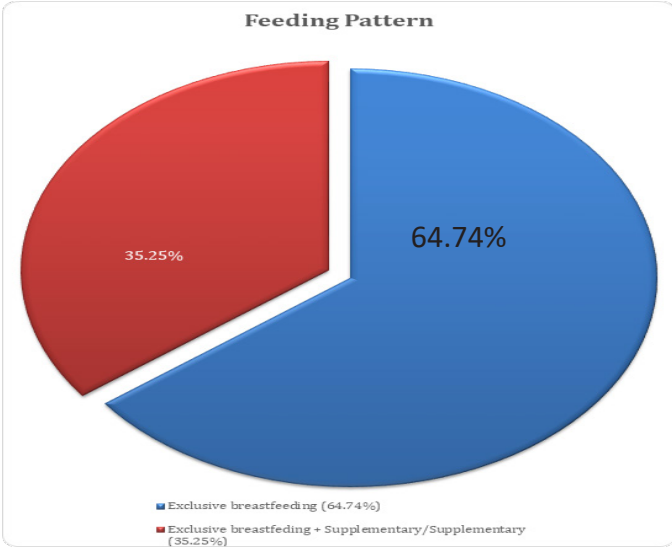

Figure 1: Distribution of feeding pattern

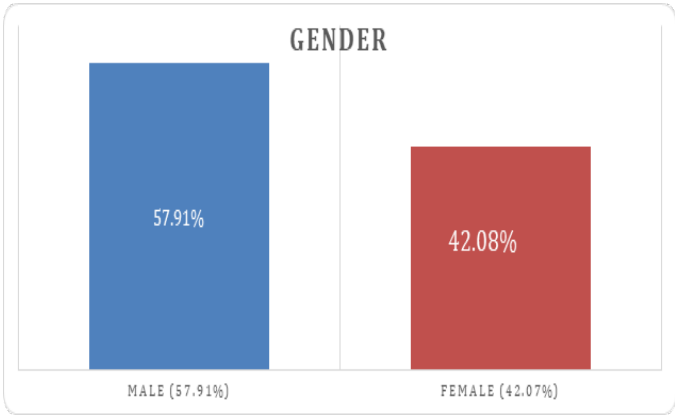

Figure 2: Sex distribution of infants

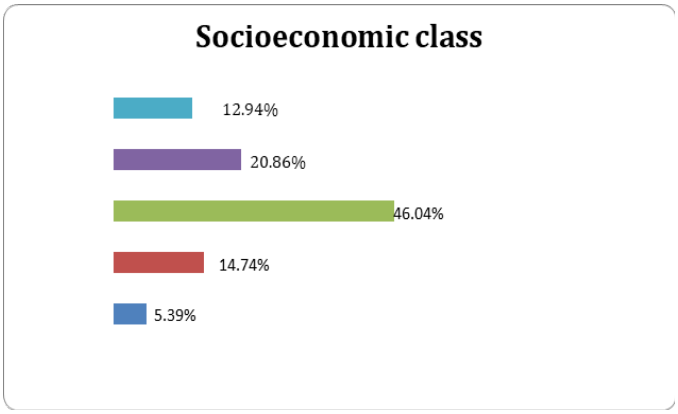

Figure 3: Distribution of Socioeconomic class

Variables	Underweight			Stunting			Wasting		
	f %	Odds	p value	f %	Odds	p value	f %	Odds	p value
Exclusive feeding	19	0.52	0.02	10	0.6	0.56	7	0.3	0.183
Breastfed+ Supplementary/ Supplementary	12	1.7		8	1.4		7	1.3	

Table I: Association of Anthropometry and feeding pattern

Morbidity	Breastfed		Breastfed+Supplementary/ Supplementary	
	<1 week	>1 week	<1 week	>1 week
Respiratory disease	71	7	32	23
Gastroenteritis	38	2	13	5
Meningitis/ encephalitis	0	17	0	5
Sepsis	0	21	0	10
Fever	13	1	7	2
UTI	8	2	0	1
Total	130	50	52	46

Table II: Duration of hospitalization due to various disease in relation to feeding pattern

Morbidity pattern	Chi square (χ2)	p value	Mean hospital stay (Breastfed+Supplementary/ Supplementary)
Respiratory disease	138.38	0.001	3.21 days versus 6.73 days
Gastroenteritis	39.90	0.000	4.72 days versus 7.58 days
Meningitis/ encephalitis	11.38	0.001	6.23 days versus 8.92 days
Sepsis	18.99	0.001	3.57 days versus 8.43 days
Fever	13.65	0.001	2.61 days versus 6.47 days
UTI	6.23	0.013	3.12 days versus 6.34 days

Table III: Association of morbidity and hospital stay in relation to feeding pattern

Morbidity	Breastfed		Breastfed+Supplementary/ Supplementary	
	Number	%	Number	%
Respiratory disease	78	28.05	55	19.78
Gastroenteritis	40	14.38	18	6.47
Meningitis/ encephalitis	17	6.11	5	1.79
Sepsis	21	7.55	10	3.59
Fever	14	5.03	9	3.23
UTI	10	3.59	1	0.35
Total	180	64.74	98	35.25

Table IV: Distribution of morbidity in relation to feeding pattern

DISCUSSION

Globally significant burden of infant morbidity and mortality is observed because of lack of exclusive breastfeeding.[15,16] To deal with this, proper dietary intake is mandatory during the first few months of infancy. Breastfeeding was referred as ideal food for infants by Kramer et al for the first six months of life sand is vital for infant's survival, health and development.[17] Exclusive breastfeeding also helps in infant and maternal emotional bonding. However in poor countries like Nepal, supplementary feeding is started even before six months of life along with breastfeeding or even without breastfeeding due to lack of awareness and education, increasing infants morbidity and mortality.[18] Studies have shown that smaller size at birth and infancy is associated with increased risk of type 2 DM, cardiovascular diseases, adiposities and metabolic diseases in adulthood.[19] We did not find any statistically significant association of gender with pattern of breastfeeding practices. Other studies have also shown no gender association with feeding pattern.[20] In our study, we found maximum number of morbidity in lower middle class of modified kuppuswamy scale 3 the reason for this may be their lower level of education, awareness, educational level, socio cultural practices and ignorance.[21]

Another key finding from our study was statistically significant association of exclusive breastfeeding and breastfeeding with supplementary feed in relation to underweight which

was found to be 1.7 times higher odds as compared to only exclusive breastfed infants. The reason for this may be frequent episodes of diarrhea in infants fed with supplementary feeds and low immunity causing less weight for age.[22]

Statistically significant association was found between morbidity and hospital stay in relation to feeding pattern which was found to be 3.21 days vs 6.73 days in respiratory diseases with p value of 0.001, 4.72 days vs 7.58 days with p value of 0.000 in gastroenteritis, 6.23 days vs 8.92 days in meningitis/ encephalitis with p value of 0.001, 3.57 days vs 8.43 days with p value of 0.001 in sepsis, 2.61 days vs 6.47 days with p value of 0.001 days in fever and 3.12 days vs 6.34 days with p value 0.013 in UTI. Similar significant association was also found in the study done by Kaur A. et al.[14]

Higher morbidity due to various morbid conditions of infancy like respiratory diseases, gastroenteritis and sepsis was found in breastfeeding along with supplementary fed group in comparison to exclusive breastfed group. Similar results were also obtained in the study of Bahl R. et al.[23] There was statistically significant association of duration of hospitalization in exclusively breastfed infants as compared to breastfed plus supplementary fed or only supplementary. In different morbidity like respiratory diseases, gastroenteritis, meningitis/encephalitis, sepsis, fever and UTI. Tiewsoh K. et al in their study at AIIMS, New Delhi have also showed that exclusively breastfed infants admitted for pneumonia have shorter duration of hospitalization i.e. 14% as compared to infants with mixed feeding with prolonged hospital stay >5 days (86%).[24] Another study done by Cushing et al have also showed lower incidence and shorter duration of hospitalization of respiratory diseases in infants with exclusively breastfed infants hospitalized for 5 days as compared to non breastfed infants who were hospitalized for 6 days (significant results at 95% CI).[25] Our study is also supported by study of Kaur A. et al who observed shorter hospital stay in exclusively breastfed infants compared to mixed fed in cases of gastroenteritis 2.59 vs 7.48 days, ARI 3.47 vs 6.85 days, Meningitis 1.86 vs 6 days but in our case it was 4.72 vs 7.58 days, 3.21 vs 6.73 days, 6.23 vs 8.92 days respectively.[14]

LIMITATIONS

The limitation of our study was that it was a single center study conducted in a small sample size, with convenient sampling so for generalization of results in multicentric study on a larger sample size should be done. The length of stay of infants might have influenced by social and financial factors.

CONCLUSION

There was a statistically significant association in the morbidity, hospital stay and feeding pattern amongst exclusively breastfed infants and breastfeeding along with supplementary fed infants. Less morbidity and shorter hospital stay was observed in exclusively breastfed infants as compared to top fed infants.

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