

## Study of the Relationship between Breastfeeding Practices and Infant Morbidity among Nurses at Kenyatta National Hospital, Kenya

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### Abstract

Nurses, who are the promoters of Exclusive Breast Feeding (EBF) to mothers, find it challenging to practice it themselves because they care for patients with infections and work in infectious environments such as hospital. They do not wish to expose their babies to these environments because the babies' immunity is still very low, making them prone to acquiring nosocomial infections, which are costly to treat. Besides, all children, including those of nurses, are prohibited by law from visiting their sick relatives in hospital wards. Studies have revealed that the practice of EBF is low among nurses (e.g. 35.9% in Ethiopia; 11.1% in Nigeria; and 21.3% in Kenya [at Kenyatta National Hospital (KNH)]). Other studies have also found significant associations between low EBF practice and higher infant morbidity. High infant morbidity is also associated with higher health care costs. Only a few studies have been done on nurse EBF uptake. For example, no study in Kenya (or elsewhere) has associated nurse EBF uptake with infant morbidity. The current study seeks to establish these associations in order to influence policy. The broad objective of the study was: To determine the relationship between nurses' breastfeeding practice with frequency of their infant morbidity. The study used Prospective Cohort Design and Mixed (quantitative and qualitative) Methods. The Purposive Sampling Technique was used to enrol EBF mothers into the study, matching them with NON-EBF mothers by: a) age of baby; b) age of mother; c) marital status; and d) parity. The study population was female nurses of reproductive age. The data was collected using Structured Questionnaire and analysis done by R Software. A total of 435 nurses participated in the study. About 214 nurses' children had experienced disease incidences (RTI, GE and OM) ( $p < 0.05$ ). There was significant association between disease incidences and feeding practice ( $p < 0.05$ ). The children who were exposed were 2.69 times more likely to suffer from the three diseases. The study recommends a change in the Kenyan maternity leave policy from three to six months for nurses to enable them achieve desirable EBF levels, which will reduce their infant morbidities among the children of the nurses.

**Keywords:** Exclusive Breast Feeding (EBF); RTI; GE; OM

### Introduction

Exclusive breastfeeding (EBF) rates remain low at 36% globally, 36% in Africa WHS (2015) and 61% in Kenya [1]. Generally, a lot of studies have been done on EBF among mothers revealing demographic factors [2], knowledge [3], attitude [4] and socio-cultural factors [5] as the major reasons for low rates. Lack of EBF has been associated with higher morbidity [6-8] and which are associated with higher costs of care [9,10].

Nurses who are the promoters of EBF to mothers find it almost impossible to achieve it because they care for individuals with infections and work in an infectious environment (hospital) hence they cannot expose their babies to such environment. The baby's immunity is still very low making them prone to acquiring nosocomial infections which are costly to treat, nevertheless, that is why all children including those for nurses are prohibited by law to visit the patients in the wards [11]. Only few studies on breastfeeding nurses revealing very low EBF rates [12] with workplace factors and maternity policy as the main reasons being associated with the low rates [13] and could be associated with high morbidity among their infants, as well as costs of care [10,14].

However, no study has ever associated nurses' EBF uptake with infant morbidity in order to influence policy. No study has ever been done among nurses in Kenya or elsewhere to determine the association of EBF with infant morbidity and mechanisms to address the problem. The broad research question was: Are the nurses' breastfeeding practices associated with their infant morbidity? The broad objective of the study was: To determine the relationship between nurses' breastfeeding practice with frequency of their infant morbidity.

### **Aim of the Study**

This study aimed to fill a gap of rigorous research relating specifically to the nurses as lactating working mothers that could answer whether increasing their maternity leave to six months could increase their EBF uptake hence reducing disease prevalence.

### **Research Methods**

#### **Study area**

The study was conducted at KNH, Nairobi, Kenya. KNH is the Kenya National referral hospital and also the largest referral hospital in East Africa hence it has a national outlook. KNH also has many nurses compared to other hospitals who are the study subjects in this case hence was easy to conduct the study.

#### **Study population**

The study population were women (nurses) of reproductive age.

#### **Study design**

This study adopted prospective cohort design to demonstrate the relationship between nurses' breastfeeding practices with frequency of morbidities. All nurses with children aged 6 to 8 months were targeted for the study. A baseline study was then conducted to identify the EBF mothers to form one arm of the study while NON-EBF mothers formed the other arm of the study. The EBF mothers were matched by NON-EBF mothers by age of the baby, age of the mother, marital status and parity to avoid biasness.

#### **Study method**

The study used interviews by structured questionnaire to collect the data. The qualitative data was collected by FGD, KII and while in-depth interviews was done to explore and explain the relationship between nurses' breastfeeding practice with their infant morbidity at KNH. This method was used to explain findings, expand understandings and validate data from quantitative method through in-depth interviews and open ended questions.

#### **Sampling method/technique**

This random sampling technique was used to choose the sample. All EBF mothers with 6 months, 7 months and 8 months old babies were eligible to be enrolled into the study. A list of mothers meeting the criteria below was made and using random tables those meeting the criteria were chosen. The sample size was determined by Fisher, *et al.* 2007  $N = Z^2pq/d^2$   $n =$  desired sample size  $z =$  standard deviation of required confident level given as 1.96  $p =$  proportion of the target population. The sample size was 384. Since this study is associated with high dropout of participants as in any cohort because it's longitudinal, an increment of 20% of the sample size was provided to cater for the drop out and hence increase response rate. Hence the sample size was adjusted to  $n = 384 * 20\% = 76$ , hence the targeted sample size was  $384 + 76 = 460$ .

#### **Inclusion and Exclusion Criteria**

The study included female nurses (employees of KNH) who had six to eight months old infants. These nurses had a history of having practised breastfeeding before the study begun. The study systematically included only nurses with infants with no history of underlying diseases that would interfere with immunity like sickle cell disease, HIV, leukaemia just to mention a few.

#### **Ethical considerations**

The research approval was given by KNH/University of Nairobi (UoN) ERC and GLUK ERC.

## Results

### The study population

The study population was 435, (215 on EBF wing while 220 were on the NON-EBF wing). For age, majority of respondents (174) were between ages 34 - 40 while ages 45 - 49 had the least (4). Marital status had married respondents as majority (185) while those who were divorced were the least (50). On parity, majority of the respondents (150) were para 2's while para 4 + 1 had the least (6).

### The Relationship Between Breastfeeding Practices and Infant Morbidity

The participants were asked to state if their children had suffered from Respiratory Tract Infection (RTI), Gastroenteritis (GE) and/or Otitis Media (OM). The frequency of illness from RTI, GE and OM were recorded and analysed as below.

	Outcome +	Outcome -	Total	Inc risk*	Odds
Exposed +	155	60	215	72.1	2.583
Exposed -	59	161	220	26.8	0.366
Total	214	221	435	49.2	0.968
Risk ratio	2.69 (2.13, 3.40) at 95% CI				
Chi-square	X2 test statistic: 89.178 p-value: < 0.001				

**Table 1:** Infant morbidities and Breastfeeding practices

From table 1, 155 NON-EBF and 59 EBF respondents had children who had been ill. Majority of the respondents (161 responses) from the EBF group reported that their children had not been ill with RTI, GE and OM. The risk ratio was 2.69 which is greater than 1 indicating that the exposed group (NON-EBF) were 2.69 times more likely to suffer from RTI, OM and GE than the relative unexposed (EBF) group. The chi-square test was significant at  $p < 0.05$  indicating an association between the Breastfeeding practices and diseases incidences. Risk Ratio (RR) showed that as the children were exposed to NON-EBF, their chances of suffering from the three diseases also increased.

### Breastfeeding Practices in Relation to RTI Incidences

The participants were asked to state if their children had suffered from RTI. The frequency of illness from RTI were recorded and analysed as below.

	Outcome +	Outcome -	Total	Inc risk*	Odds
Exposed +	81	134	215	37.7	0.604
Exposed -	35	185	220	15.9	0.189
Total	116	319	435	26.7	0.364
Risk ratio	2.37 (1.67, 3.36)at 95% CI				
Chi-square	X-squared = 25.24, df = 1, p-value = 5.063e-07				

**Table 2:** Breastfeeding Practices in Relation to RTI Incidences

From table 2, 81 NON-EBF and 35 EBF respondents had children who had suffered from RTI. Majority of the respondents (185 responses) from the EBF group reported that their children had not suffered from RTI. The risk ratio was 2.37 which is greater than 1 indicating that the exposed group (NON-EBF) were 2.37 times more likely to suffer from RTI than their relative unexposed group. The chi - square test was significant at  $p < 0.05$  indicating an association between the Breastfeeding practices and RTI. RR showed that as the children were exposed to NON-EBF, their chances of suffering from RTI also increased.

### Breastfeeding Practices in relation with Number of Hospitalizations due to RTI

The participants were asked to state if their children had been hospitalized because of RTI. The frequency of hospitalization from RTI were recorded and analysed as below.

	Outcome +	Outcome -	Total	Inc risk *	Odds
Exposed +	2	213	215	0.00	0.00000
Exposed -	0	220	220	0.93	0.00939
Total	2	433	435	4.60	0.00462
Risk ratio	0.00 (0.00, NaNs)at 95% CI				
Chi-square	X2 test statistic: 2.056 p-value: 0.152				

**Table 3:** Breastfeeding Practices in relation with Number of Hospitalizations due to RTI

From table 3, two (2) children of NON-EBF respondents had been hospitalized for RTI while none of EBF respondents had their children hospitalized with RTI. Majority of the respondents (220 responses) from the EBF group reported that their children had not been hospitalized because of RTI. The risk ratio was 0.00 indicating no change in suffering between the exposed group (NON-EBF) and non-exposed group (EBF) concerning RTI hospitalization. The chi - square test was insignificant at  $p > 0.05$  which indicates an insignificant association between the breastfeeding practices and RTI hospitalization.

**Breastfeeding Practices in Relation to GE Incidences**

The participants were asked to state if their children had suffered from GE. The frequency of illness from GE were recorded and analysed as below.

	Outcome +	Outcome -	Total	Inc risk*	Odds
Exposed +	59	156	215	27.44	0.3782
Exposed -	19	201	220	8.64	0.0945
Total	78	357	435	17.93	0.2185
Risk ratio	3.18 (1.96, 5.14)at 95% CI				
Chi-square	X-squared = 24.869, df = 1, p-value = 6.137e-07				

**Table 4:** Breastfeeding Practices in Relation to GE Incidences

From table 4, 59 NON-EBF and 19 EBF respondents had children who had suffered from GE. Majority of the respondents (201 responses) from the EBF group reported that their children had not suffered from GE. The risk ratio was 3.18 which is greater than 1 indicating that the exposed group (NON-EBF) were 3.18 times more likely to suffer from GE than their relative unexposed group. The chi-square test was significant at  $p < 0.05$  indicating an association between the Breastfeeding practices and GE. RR showed that as the children were exposed to NON-EBF, their chances of suffering from GE also increased.

**Breastfeeding Practices in relation to OM incidences**

The participants were asked to state if their children had suffered from OM. The frequency of illness from OM were recorded and analysed as below.

	Outcome +	Outcome -	Total	Inc risk*	Odds
Exposed +	15	200	215	6.98	0.0750
Exposed -	5	215	220	2.27	0.0233
Total	20	415	435	4.60	0.0482
Risk ratio	3.07 (1.14, 8.30)at 95% CI				
Chi-square	X-squared = 4.4654, df = 1, p-value = 0.03459				

**Table 5:** Breastfeeding Practices in relation to OM incidences

From table 6, 15 NON-EBF and 5 EBF respondents had children who had suffered from OM. Majority of the respondents (220 responses) from the EBF group reported that their children had not suffered from OM. The risk ratio was 3.07 which is greater than 1 indicating that the exposed group (NON-EBF) were 3.07 times more likely to suffer from OM than their relative unexposed group. The chi-square test was significant at  $p < 0.05$  indicating an association between the Breastfeeding practices and OM. RR showed that as the children were exposed to NON-EBF, their chances of suffering from OM also increased.

**Qualitative summary of The Relationship Between Breastfeeding Practices and Infant Morbidity**

All the above findings on the relationship between Breastfeeding Practices and infant morbidity concur with the Focused Group Discussions (FGD) where all the participants said that EBF children are less likely to have morbidities in the first 2 years compared to NON-EBF children because EBF increases children’s immunity, one said “...my first born was not exclusively breastfed and had frequent morbidities compared to the other two who were exclusively breastfed...”.

## Discussion

The results revealed that the exposed group (NEBF) were 2.37 times more likely to suffer from RTI than their relative unexposed group and the association was significant at  $p < 0.05$ . These findings support N Fatoumata, *et al.* [15] on specific morbidities in relation to feeding which found that EBF seems to protect infants against RTI (OR: 0.27; 95% CI: 0.14 - 0.50) compared with non-EBF. Kramer, *et al.* [7] found that infants from the intervention sites were significantly more likely than control infants to be breastfed to any degree at 12 months (19.7% vs 11.4%; adjusted odds ratio [OR], 0.47; 95% confidence interval [CI], 0.32 - 0.69), were more likely to be exclusively breastfed at 3 months (43.3% vs 6.4%;  $P < .001$ ) and at 6 months (7.9% vs 0.6%;  $P = .01$ ) but no significant reduction in RTI hospital visits (intervention group, 39.2%; control group, 39.4%; adjusted OR, 0.87; 95% CI, 0.59 - 1.28) which contradicts the findings. Nevertheless, our findings showed that the exposed group (NEBF) were 3.18 times more likely to suffer from GE than their relatively unexposed (EBF) group and the association was significant at  $p < 0.05$  indicating existence of an association between the feeding practices and GE which agrees with a review study by Golding, *et al.* [16] on GE and breastfeeding which found the OR were generally in excess of 3.0 for non-breast milk feeds. In contrast, Ayisi and Wakoli [17] found no relationship between EBF and GE leading to hospital visits for those infants who had experienced diarrhoea in the previous two weeks prior to the study. In the present study, we found that the exposed group (NEBF) were 3.07 times more likely to suffer from OM than their relative unexposed group and the was significant at  $p < 0.05$  indicating existence of an association between the feeding practices and OM which concurs with a systematic review study by Mary, *et al.* [6] which showed that the adjusted OR quantifying the effect of EBF on risk of OM at 95% CI for hospital visits was 0.50 (0.37 - 0.70) and 0.40 (0.21 - 0.75) among the NON-EBF group.

In contrast to this study, Ermis, *et al.* [18] suggests that breastfeeding for a period of up to 11 months can play a significant preventive role against AOM (odds ratio and lower 90% CI  $> 1$ ). More so, significantly the risk ratio was 0.00 which indicates no change in suffering between the exposed group (NEBF) and non-exposed group (EBF) as per hospitalization of RTI was concerned. The chi-square test was also insignificant indicating no significant association between the feeding practices and RTI hospitalization. The findings matched a cohort study by Sinha, *et al.* [19] on reduced risk of neonatal RTI hospitalizations among breastfed girls but not boys found no meaningful association between breastfeeding and risk of neonatal RTI among neonatal boys, for whom the unadjusted ORs associated with EBF only and mixed feeding were 1.1 (95% CI: 0.63 - 1.8) and 1.3 (95% CI: 0.74 - 2.1), respectively. On the contrary, a Prospective Observational Study by Amarpreet, *et al.* [20] showed the effect of EBF on Hospital Stay and Morbidity due to Various Diseases in Infants under 6 Months of Age found that Prolonged hospital stay, that is,  $> 7$  days, was lesser in exclusively breastfed infants and results were statistically significant in case of RTI ( $p$  value = 0.0012) [21,22].

## Conclusion

In summary, we found that, majority of the nurses were of age between 30-34 years, majority (40%) were married and most of them had one child. 214 nurses' children had experienced disease incidences (RTI, GE and OM) and association between diseases incidences and feeding practice was significant  $p < 0.05$ .

## Recommendations

Based on the WHO/UNICEF recommendations of EBF (baby feeds on breast milk only without adding any solid or liquid foods, not even water in the first 6 months of life 0-6 months), the study recommends a change in the Kenyan maternity leave policy from three to six months for nurses to enable them achieve desirable EBF levels, which will reduce their infant morbidities and in turn reduce both direct costs of care to their households and indirect cost of healthcare to the employer.

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