JMSCR Vol||04||Issue||05||Page 10381-10385||May 2016

www.jmscr.igmpublication.org
Impact Factor
5.244
Index Copernicus Value: 5.88
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: _http://dx.doi.org/10.18535/jmscr/v4i5.03

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Importance of Human Milk in Reducing Neonatal Mortality

Authors
Dr S.K.Valinjkar[1], Dr Pallavi Saple[2], Dr Vikas[3]
[1]Associate Professor[1], Professor[2], Chief Resident[3]
Dept of Pediatrics, Grant Medical College & Sir J. J. Group of Hospitals, Mumbai
Corresponding Author
Dr S.K.Valinjkar
Associate Professor Dept of Pediatrics, Grant Medical College & Sir J. J. Group ofHospitals, Mumbai

ABSTRACT
Aims and Objectives: *To estimate the effect of breast feeding on neonatal mortality and morbidity rates specially in low birth weight and very low birth weight babies.*
Study Design: *This was a retrospective observational study in which collection of data and analysis was done in a tertiary care center in a metropolitan city. During this study the data from 2005 to 2015 was analysed.*
Materials and Methods: *During this study collection of data about Neonatal Mortality Rate ,Disease specific mortality rate ,for neonates admitted in neonatal intensive care unit of tertiary care center in metropolitan city during the year 2005 to 2015 and utilization of human milk in corresponding years, followed by statistical analysis of data so as to estimate the effect of breast feeding on neonatal mortality and morbidity rates specially in low birth weight and very low birth weight was done.*
Results: *The establishment of human milk banking and supply of human milk to neonates especially LBW babies had a great impact on neonatal mortality and morbidity. Total number of neonatal death was found to be significantly different before & after establishment of milk bank. The mean number of neonatal deaths before 2008 (i.e 70.66) was found to be significantly higher than that after 2008 (i.e mean number of deaths = 49.37). (Independent T test p value< 0.05). Mean number of deaths due to sepsis were quite higher before establishment of milk bank. Mean number of neonatal deaths with respect to other parameters i.e death due to asphyxia, sepsis, NEC etc before and after 2008 were found not be statistically significant*
Keywords: *Human milk banking, neonatal mortaility, neonatal morbidity, prematurity.*

Introduction

The composition of human milk is the biologic norm for infant nutrition. Human milk also contains many hundreds to thousands of distinct bioactive molecules that protect against infection and inflammation and contribute to immune maturation, organ development, and healthy microbial colonization [(1)]. Some of these molecules, e.g., lactoferrin, are being investigated as novel therapeutic agents. A dynamic, bioactive fluid, human milk changes in composition from colostrum to late lactation, and varies within feeds, diurnally, and between mothers [(2)]. Feeding infants with expressed human milk is increasing [(3)]. Pasteurized donor milk is now commonly provided to high risk infants and most mothers freeze their milk at

some point in lactation for future infant feedings. Many milk proteins are degraded by heat treatment and freeze-thaw cycles may not have the same bioactivity after undergoing these treatments [4]. This article provides an overview of the composition of human milk, sources of its variation, and its clinical relevance.

Exclusive human milk feeding for the first 6 months of life, with continued breastfeeding for 1 to 2 years of life or longer, is recognized as the normative standard for infant feeding [5]. Human milk is uniquely suited to the human infant, both in its nutritional composition and in the non-nutritive bioactive factors that promote survival and healthy development.The composition of human milk includes cells, anti-infectious and anti-inflammatory agents, growth factors, and prebiotics [6]. Unlike infant formula, which is standardized within a very narrow range of composition, human milk composition is dynamic, and varies within a feeding, diurnally, over lactation, and between mothers and populations. Influences on compositional differences of human milk include maternal and environmental factors and the expression and management of milk [7].

The first fluid produced by mothers after delivery is colostrum, which is distinct in volume, appearance and composition. Colostrum, produced in low quantities in the first few days postpartum, is rich in immunologic components such as secretory IgA, lactoferrin, leukocytes, as well as developmental factors such as epidermal growth factor[8]. Colostrum also contains relatively low concentrations of lactose, indicating its primary functions to be immunologic and trophic rather than nutritional. Levels of sodium, chloride and magnesium are higher and levels of potassium and calcium are lower in colostrum than later milk [9].

Delayed onset of lactogenesis is defined as onset >72 hours after delivery and appears to occur more often with preterm delivery and maternal obesity, and may be predicted by markers of metabolic health [10].

Materials and methods

This was a retrospective observational study including collection of data about neonatal mortality rate, disease specific mortality rate ,for neonates admitted in neonatal intensive care unit of tertiary care center in metropolitan city during the year 2005 to 2015 and utilization of human milk in corresponding years, followed by statistical analysis of data .The milk bank facility in same tertiary center available from year 2008 onwards .

Results and discussion

Total number of neonatal deaths were found to be significantly different before & after establishment of milk bank. The mean number of neonatal deaths before 2008 (i.e 70.66) was found to be significantly higher Than that after 2008 (i.e mean number of deaths = 49.37) (Independent T test p value< 0.05).

Table:1 Neonatal mortality and morbidity and its relation with human milk supply.

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
NMR		90	90	32	52	37	40	51	60	55	44	56
1 Sepsis		27	19	13	19	25	14	26	14	25	16	28
2 BA		10	9	5	9	5	4	15	17	12	6	9
3 NEC		2	1	2	0	2	2	3	0	5	7	6
4 Pneumonia		11	3	1	11	2	0	3	4	2	3	4
5 LBW	2-2.5KG	8	5	4	7	8	6	8	9	3	4	5
	1-2KG	32	14	10	15	4	9	12	6	7	11	12
	<1KG	7	9	5	17	7	13	13	9	9	7	17
No. of babies provided with EBM					3124	2959	4386	2818	3367	1732	1899	1203
QTY of EBM used (in Ltrs)					168	179	264	182	126	105	106	148

Difference of mean number of neonatal deaths with respect to other parameters i.e death due to asphyxia, sepsis, NEC etc before and after 2008 were found not be statistically significant, but the mean number of deaths due to sepsis and in weight category 1-2 kg were quite higher before establishment of milk bank. It may be due to small sample size,for which further studies are needed to establish the facts.

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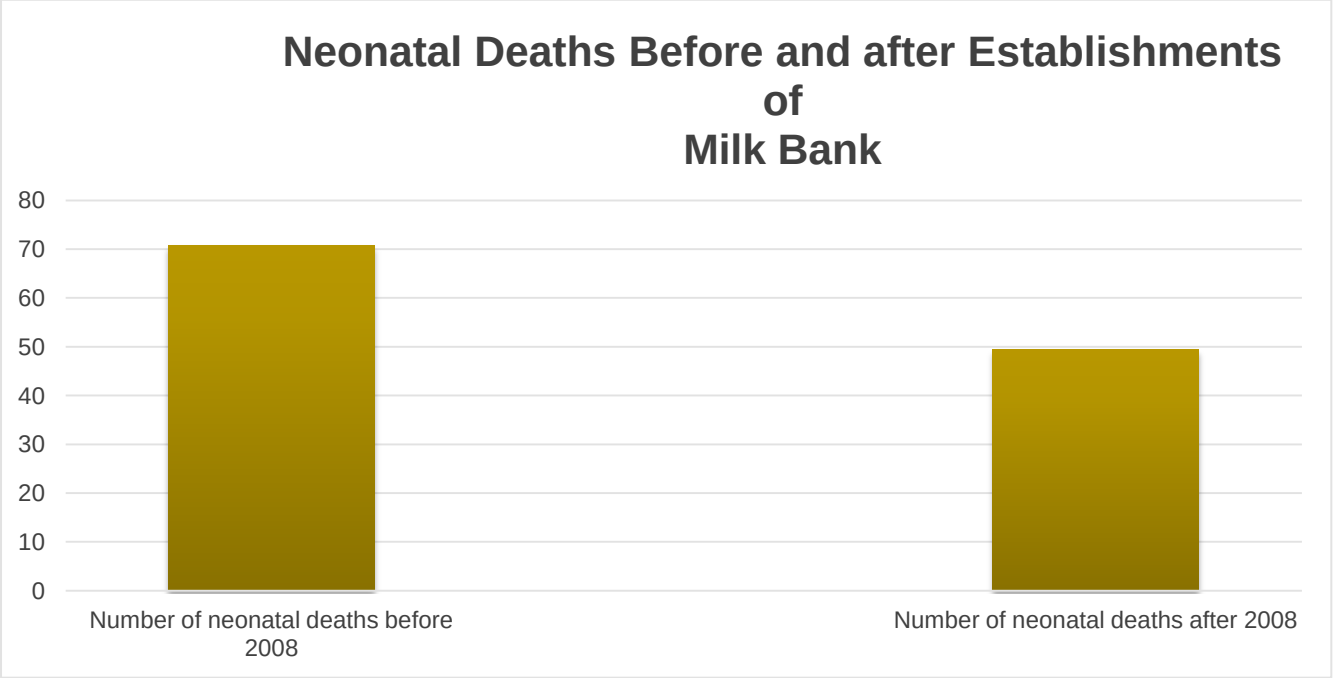
Table 2: Neonatal mortality before and after establishment of human milk bank

Type of mortality	Mean number of deaths before 2008	Mean number of deaths after 2008	Statistical difference(Independent T test)
Neonatal death	70.66	49.37	P value <0.05
NEC	1.6	3.1	P value =0.36
Death due to sepsis	19.66	5.7	P value=0.7
Asphyxia	8	9.6	P value = 0.5
Death of neonate having weight 2-2.5	5.6	6.2	P value= 0.68
Death of neonate weight 1-2 kg	18.66	9.5	P value=0.06
Death of neonate weight < 1kg	7	11.5	P value =0.10



Graph 1 : Neonatal Mortality before and after Establishment of Milk Bank.

There were many studies which tried to analyze the effects of breast feeding practices and impact of human milk in reducing neonatal morbidity and mortality[11]. The most comprehensive study from Ghana concluded that up to 22 and 16% of all neonatal deaths can be prevented with universal coverage of breast-feeding within 1 and 24 h of birth, respectively [12]. The problem with babies

admitted in NICU for various reasons is manifold not only they are deprived of breast feeding because they are weak and unable to take feeds but also in many instances their mothers are unable to feed them because of the medical conditions they themselves are suffering like eclampsia, post part hemorrhage and post part psychoses etc. The maternal conditions responsible for lost supply of human milk is one of the major cause of neonates being given formula feeds. in earlier days wet nursing was one of the ways by which these kinds of situations were dealt with [13]. But with the advent of HIV the unscreened wet nursing is not recommended [14]. Human milk banking was started for this reason. Human milk banking ensures that the babies get human milk even if their mothers'milk is not available for any reason. Donor milk banking thrives in many developing countries including india and other south east asian and african countries [15]. In countries where donor milk banking is provided to needy neonates and supported by government it can be considered as a effective implementation of national health policy [16]. Breastfeeding is addressed directly in the Convention on the Rights of the Child in Article 24. The article 24 of the convention on the right of the child clearly states "States Parties recognize the right of the child to the enjoyment of the highest attainable standard of health and to the facilities for the treatment of illness and rehabilitation of health." [17].

The effect of breast feeding directly by mother or supply of human milk to needy infants through the supply of human milk has a direct impact on neonatal mortality and morbidity [18]. Many studies have studied the effect of human milk on reduction on neonatal mortality and morbidity[19] Most of these studies have found a significant reduction in neonatal morbidity and mortality if human milk was given to neonate during initial phase of their life [20]. Our study also have similar conclusions and finds that Human milk bank significantly reduces neonatal mortality and morbidity with an immense cost–benefit ratio.

Conclusion

Human milk bank significantly reduces neonatal mortality and morbidity(specially in low birth weight and very low birthweight and also to combat sepsis in neonates)with an immense cost–benefit ratio.

Conflict of interest None

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