Indian Experience of Setting a Human Milk Bank

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Human Milk Bank – The need

- 10,000 -12000 deliveries / year
- Over 60% High risk Deliveries
- 2500 – 3000 babies transferred for intensive care
- LBW babies over 60%
- High mortality rates - over 60% related to infection

Measures to decrease mortality- 1980's

- A number of low cost measures were tried
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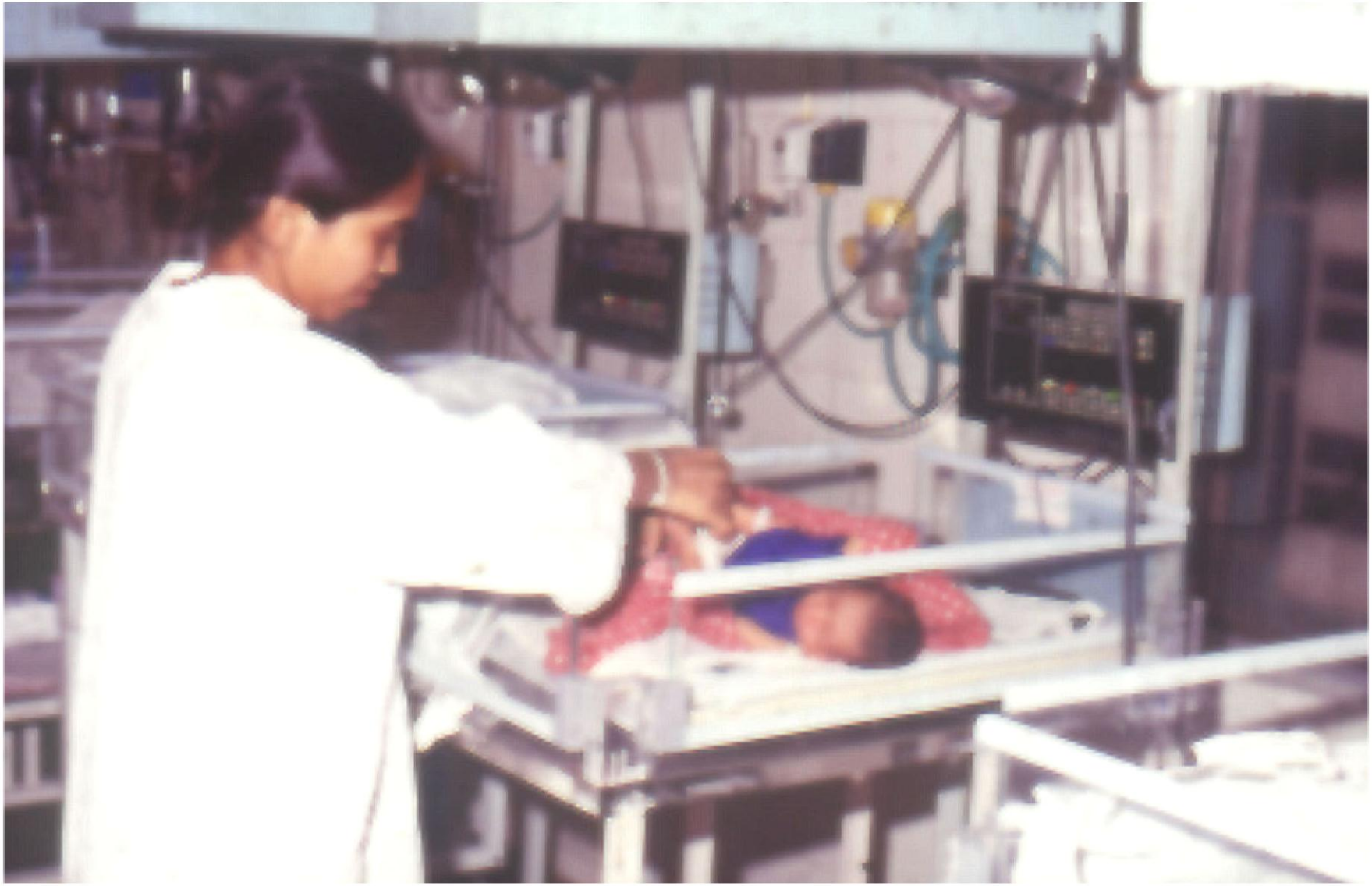
- Use of exclusive breastmilk was one such measure
- -prelacteal feeds were stopped
- -feeding bottles discarded
- -formula milk was banned

NICU : 12Beds

Transitional Care Unit
16 Beds

Well Preterm Care Unit
14Beds



Ensuring human milk for all babies in the hospital

- Normal babies nursed by their own mothers
- Babies admitted in the PU/NICU fed by their own mothers, directly or fed expressed breast milk
- Babies who could not be fed by their mothers fed banked milk
- ***These measures were not enough to provide all babies breastmilk***

How To Ensure a Constant and Safe Supply Of Human Milk To Babies?

- The answer was to establish a Human Milk Bank


HMBRC
HUMAN MILK BANK
& RESEARCH CENTRE

The basic requirements

- Administrative approval
- Finance
- Space
- Donors
- Cooperation of other departments

Objectives Of The Milk Bank

- To ensure that every baby born or admitted to the hospital receives mothers milk
- To avoid bottle, animal & formula milk
- To heighten breastfeeding awareness
- Ancillary support to breastfeeding practices
- To promote Baby Friendly Hospital care

Human Milk Bank At LTMMC (2008)

Equipment

- 2 Refrigerators
  - Receiving and Thawing Milk
- 2 Deep Freezers
  - Storing Milk At – 20 º C
- Shaker Water Bath
  - Heat Treatment of Milk
- Generator
  - SOS for Power Failure

Equipment

Shaker Water Bath

Hot Air Oven

Freezer & Containers

The Team

Donor Selection Criteria

- Healthy & well nourished
- No evidence of Tuberculosis or other infectious diseases
- Normal on physical examination
- HIV , VDRL, Hep B negative
- No H/O hepatitis, blood transfusions in recent past
- Not on any medications contraindicated while breastfeeding
- Willing to donate

Donor Population

- Hospital Based
- Mothers in PNC Wards:
  - BM in excess of baby's needs.
  - Expressing to maintain output when babies not in a position to feed.

Donor Population

Mothers following up in PNC OPD

Milk Expression Pumps

Milk Expression & Collection Procedure

Average volume donated: 50-150 cc. Milk is pooled separately as colostrum, preterm & mature milk.

Method of Banking

- Milk expressed into Autoclaved, Labeled, Steel Containers with Caps
- Babies fed own mothers' unprocessed milk
- Excess milk and milk from voluntary donors pooled in larger containers → Refrigerated→ Transferred to Bank

Holder Pasteurization of Milk

- As per recommendations of HMBANA:
  - Pasteurized at 62.5 deg C for 30 min in shaker water bath
  - Preserve >80 % of immunological factors, destroying 99% of pathogens including HIV virus

Cultures Of Milk Samples

Storage Of Heat Treated Milk

- Stored in the freezer at -20 degrees C
- Pasteurized milk can be stored for 6 months
- Freezer compartment of fridge for 48 hours
- Room temp: 6-8 hours

Distribution Of Banked Milk

- “First in first out” basis
- Milk shifted to fridge in neonatal unit as per need
- Milk thawed by standing container in lukewarm water
- Use thawed milk within 4-6hrs

Recipients

- VLBW babies especially first few days
- LSCS deliveries esp if LBW
- Multiple pregnancies
- Babies of mothers with problems:
  - Eclampsia, PPH, acute illnesses
- Necrotizing enterocolitis, GI surgeries (SNICU)
- Babies whose mothers are not in a position to feed them
- Others

Modifications

- Donors
- Supervised collection
- Stainless steel containers for storage
- Pooling of milk –colostrum, preterm, term
- Use of exclusive breastmilk for all babies in the hospital

Issues

- Donors
- Acceptance

  Personnel

  Replicability and sustainability

  Questions in Parliament

Conclusion

A breast milk bank is a feasible project

A Breast Milk Bank ensures that every baby receives breast milk while in hospital

- Milk is bacteriologically safe
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Conclusion

- Serves as a reservoir for human milk
- Every hospital with a large NICU must have a HMB
- Positive influence on breastfeeding practices in the hospital and community by underlining need for mother's milk alone for every baby


N.I.C.U.

Collection And Storage Containers

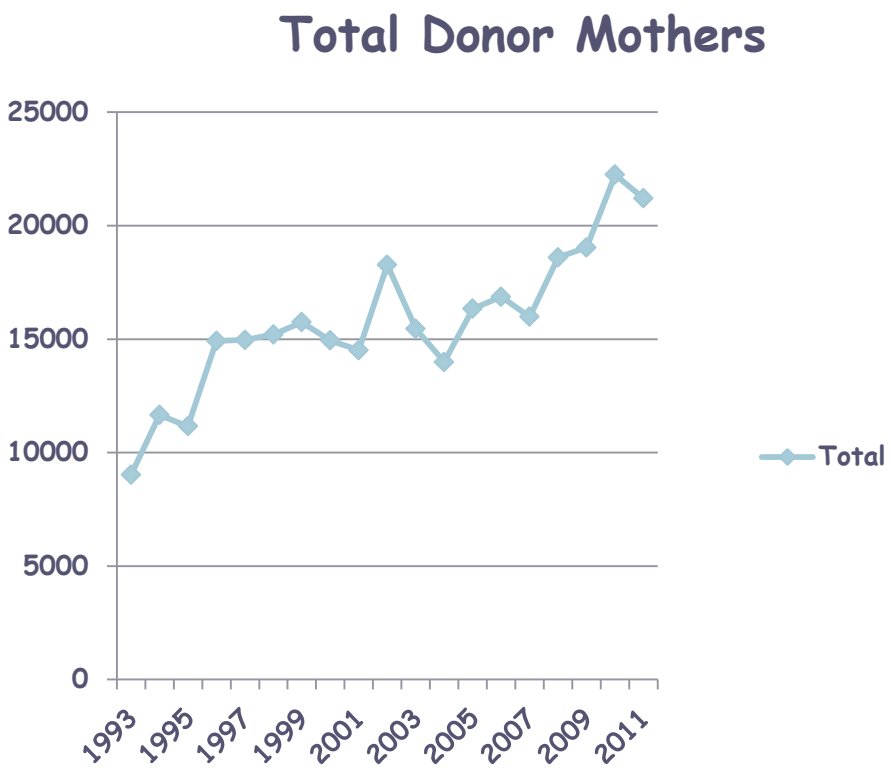
- Pyrex containers **vs** plastic containers: lactoferrin, lysozyme & S-IgA no significant difference
- Single use, hard plastic containers, preferred in West
- Poly-carbonate plastic containers, :increased migration of bisphenol A into the milk
- Stainless steel containers :Easily available, durable, easy to clean & autoclave
- Inert, nutrient composition normal on storage, cellular components reduced

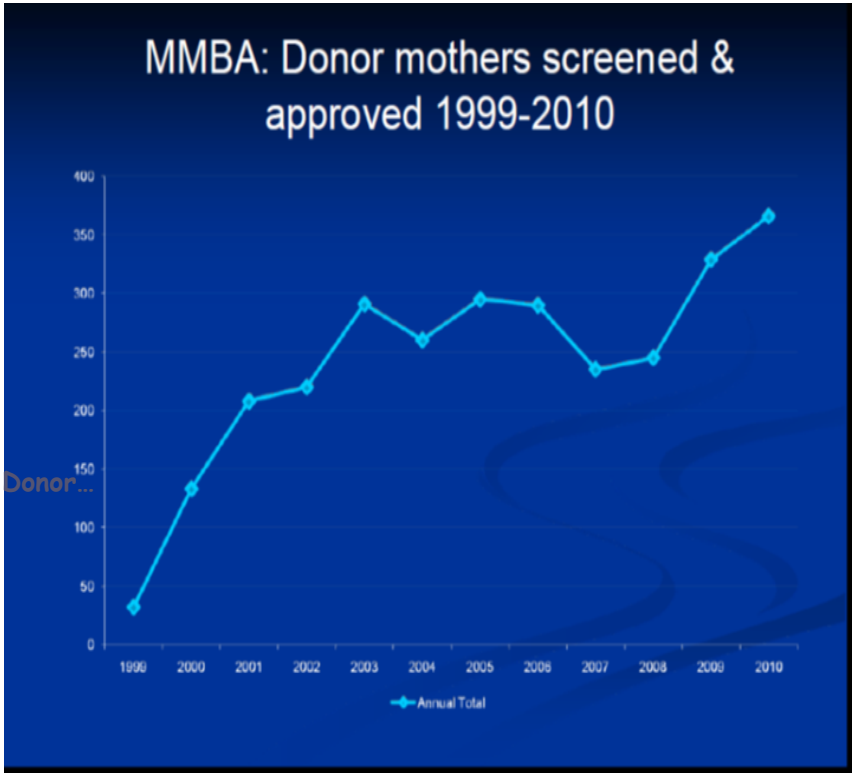
Storage Containers

HMB
Norway

Storage containers at MMB Austin Texas.

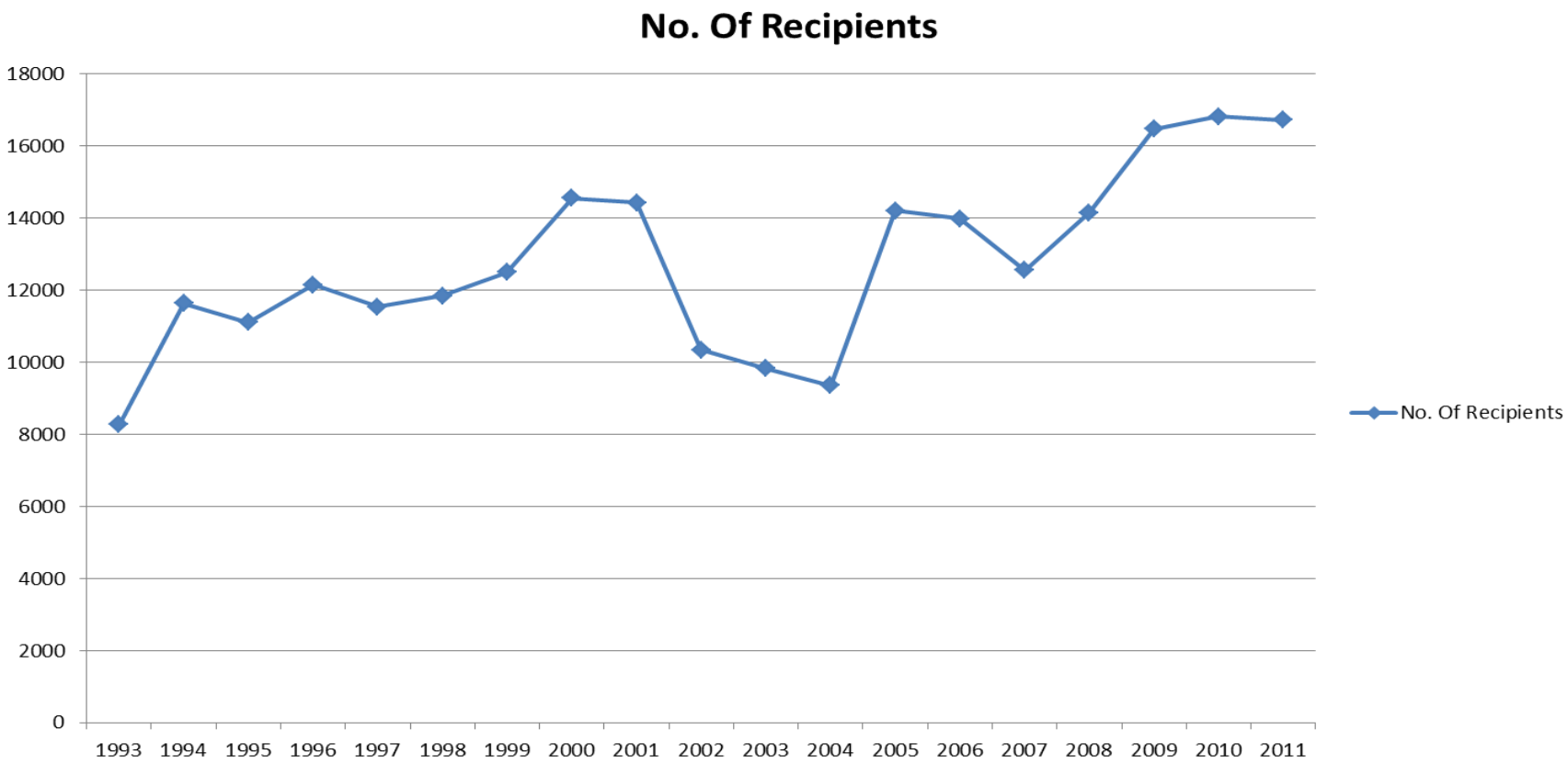
Number Of Donor Mothers LTMGH Vs MMB Austin





Average Per Day Donor Mothers:
Indoor:20 -30
OPD: 20 – 45.

Number Of Recipients



Average Recipients: 35- 40 / day

Common Organisms Cultured

- Bacillus Subtilis
- CONS
- Micrococcus
- E Coli
- Staph Aureus
- Acinetobacter
- Enterococcus
- Enterobacter
- Klebsiella

Biochemical Analysis Of Banked Milk

	Fresh Milk	Post freezing	Post Pasteurization
Total Proteins (g/dl)	1.47 ± 0.040	1.45 ± 0.03 NS	1.45 ± 0.03 NS
Lactose g/dl	6.040 ± 0.08	6.01 ± 0.06 NS	6.02 ± 0.07 NS
Total Lipids	3.49 ± 0.03	3.48 ± 0.03 NS	3.49 ± 0.03 NS
Triglycerides	2.01 ± 0.02	1.883 ± 0.01	1.896 ± 0.01*
Free fatty acids (umol/L)	1487.72 ± 42.76	1607.70* ± 37.33	1584.6 ± 35.25*

*** - Significant difference ($p < 0.05$)**

Ig A Estimation On Banked Milk (n = 50)

IgA (mg/dl)	Fresh Sample (%)	Post Freezing (%)	After Heat Treatment (%)
< 100	7 (28)	8 (32)	9 (36)
100 – 200	4 (16)	6 (24)	8 (32)
200 – 300	7 (28)	5 (20)	3 (12)
> 300	7 (28)	6 (24) (p>0.05)	5 (20) (p>0.05)

Milk secretory IgA

98%preserved post freezing,

79% preserved post pasteurization

Hamprecht et al. Pediatr Res 2004;56(4) 529-535.

Effect Of Processing on Nutritional & Anti Infective Factors In Banked Milk

- Post Freezing
  - Reduced:
  - **Vitamins B6,C**
  - **IgM, IgG,**
  - **Lipases,**
  - **Number and function of cells**
  - **Not Affected**
  - **sIgA, Lysozyme, Lactoferrin**
  - **Macronutrients**
  - **Fat soluble vitamins**
- Post Pasteuriztion
  - Reduced:
  - **IgA,IgG, IgM and complement**
  - **lysozyme,lactoferrin**
  - **Number and function of cells**
  - **Growth factors,**
  - **lipase, and lipase activity**
  - **Not Affected**
  - **Macronutrients, Fat soluble vitamins, Amylases.**

Banked Milk & Growth Of Preterm Babies

	Donor Milk Gr.	Preterm Formula Gr	MM Gr	Signif
Birth Wt (gms)	**947±233**	**957±267**	**999±259**	**NS**
Gest Age (wks)	**27±2**	**27±2**	**27±2**	**NS**
Wt Gain (g/kg/d)	**17.1±5.0***	**20.1±6.7**	**18.8±5.8**	**DM v PF P =0.001**
Length gain(cm/kg/ week)	**1.2±0.8**	**1.0±1.0**	**0.6±0.4**	**P =0.03**
HC (cm/wk)	**0.9±0.9**	**0.9±0.8**	**0.9±0.5**	**NS**

Donor Human Milk Vs Preterm Formula. Schanler.Pediatrics 2005;116(2):400-406.

Mother's Milk Essential For VLBW & ELBW Babies

Benefits - Human Milk Banking

- Ensures continuous supply of safe human milk for sick and preterm babies
- Reduces infection rates in hospitalized babies
- Frequent expression helps maintain lactation
- Reduction in long term morbidity and mortality
- Positive influence on breast feeding practices in hospital and community

Hospital Grade Electric Milk Pumps