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Microbiological Surveillance of Human Milk from Milk Bank in Tertiary Care Hospital in Jaipur, India

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A B S T R A C T

Breast milk is the best source of nutrition as it is composed of all bio active components required for the growth and development of infant. Even after the advances in infant formula mixes, breast milk is universally accepted to be best suited to infants. The objective of this study is to ensure quality of donated breast milk as a safe end product. The study is done to determine the prevalence of potentially pathogenic micro-organism that indicates hygiene and sanitary conditions of human milk collected at milk bank. The study was conducted for a period of 5 months (Jan-May 2016) in dept of microbiology at Mahatma Gandhi hospital, Jaipur. 130 samples of human milk collected at human milk bank were taken for microbiological analysis. Among the total no. of samples collected 75 samples was of raw milk and remaining 55 was pasteurized milk. The latter were plated on blood agar and MacConkey agar. The isolated organisms were confirmed by various biochemical test and reactions. Out of 130 samples, 75 (58%) was raw milk and out of it 61 (81%) showed growth of micro organism and 14 (19%) was sterile. Among remaining 55 (42%) was pasteurized milk which showed growth in 12 (22%) and 43 (78%) were sterile. The study indicates that raw milk received is heavily contaminated. As for pasteurized milk, despite elimination of greater majority of potentially pathogenic organism, few organisms were identified.

Introduction

It is universally accepted, that breast milk is the optimum exclusive source of nutrition for infants, and also continues to be the only milk which is suited to every infant around the world. Despite advances in infant formulas, human milk provides bioactive matrix of benefits that cannot be replaced by any other source of nutrition.

If mother's milk is insufficient or unavailable, the next best option is to use pasteurised donor human milk (PDHM). In our country the burden of low birth weight babies in various hospitals is about 20% with significant mortality and morbidities (Das *et al*., 1993; Bharti, 2011). Feeding such low birth weight babies with breast milk, can significantly reduce the risk of infections. The microbiological quality of expressed milk distributed by these milk bank is a public health issue, for the children who will consume this product, as they have low resistance to neonatal infections (Law *et al*., 1989; Rosa *et al*., 1990).

The most important issue concerning human milk bank is the bacteriological control of donated milk (Ikonam *et al*., 1982). Consumption of contaminated milk may be the cause of neonatal diseases (Tyson *et al*., 1982). The purpose of this study is to investigate the prevalence of micro-organism in expressed milk being offered by human milk bank situated in Mahatama Gandhi medical college & hospital.

Materials and Methods

130 samples of expressed human milk were taken from human milk bank (named Amrit Dhara), situated in Mahatma Gandhi medical college and hospital, Jaipur.

Among the total number of samples, 75 (58%) was raw milk (unpasteurised), and remaining 55 (42%) was pasteurised samples.

The samples were packaged immediately to microbiology laboratory in dept of microbiology at medical college, where they were submitted for microbiological analysis.

The samples were plated initially on blood agar and MacConkey agar and according to the type of micro-organism isolated, posterior identification was undergone in appropriate medium (Koneman, 1997).

Bacteria pertaining to staphylococci gender were tested for their capacity to produce coagulase and resistance to novobiocin and other biochemical tests.

In order to identify gram negative organism, screening undertaken in TSI (triple sugar iron) and other biochemical reactions and tests.

Molds and yeasts were identified by means of technique of plating on SDA (Sabourauds dextrose agar) and observing growth and morphology and microscopy (Vanderzant, 1992).

Results and Discussion

In our study, the samples collected for 5 months (Jan- may 2016) duration, undergone microbiological analysis, showed following result.

Potentially pathogenic and commensal organism were identified in 75 (58%) of raw milk samples and 55 (42%) of samples of pasteurised milk.

Percentage of positive (+ve) and negative (-ve) samples found:

MICRO-ORGANISM	**RAW SAMPLES**	**PASTEURISED SAMPLES**
	N(%)	N(%)
+ve	61(81%)	12(22%)
-ve	14(19%)	43(78%)
Total	75(100%)	55(100%)

Among the 61 (81%) samples of raw milk with positive growth showed

15 (25%) samples presented with Staphylococcus aureus.
26 (43%) samples were *S. epidermidis*.
14 (23%) samples show Enterobacteriacae, with distribution of organisms as follows:
E. coli 6 (43%)
E. aerogenes 3 (21%)
K. oxytoca 5 (36%)
4 (6%) samples showed growth of Pseudomonas.
2 (3%) samples of raw milk were contaminated by molds and yeast.

Micro-organism identified in 12 (22%) samples of pasteurised milk with growth showed:
S. aureus in 3 (25%) samples
E. coli in 2 (17%) samples
Pseudomonas in 2 (16%) samples
S. epidermidis in 5 (42%) samples

Micro-organism		Raw		Pasteurized	
S. aureus		15		3	
S. epidermidis		26		5	
E. coli		6		2	
K. oxytoca		5		----	
E. aerogens		3		----	
Pseudomonas		4		2	
Candida		2		----	

Total analysed 75and 55
+ve Samples 61 and 12

In our study the presence of high level of contaminants in raw human milk, entails in a reduction of its biological benefits, thus diminishing its protective immunological qualities. This leads to the classification of this product as improper for consumption by infants.

Furthermore, the low level of presence of micro-organism, that too, potentially non pathogenic bacteria indicate good pasteurization practice at milk bank in our hospital.

As to the raw milk, the results presented in this study are similar to those reported by others too in various study at other centers (Pereira *et al*., 1995; Alvaro *et al*., 2003).

In conclusion, human milk banks are primarily focused to provide good quality of donor milk to high risk newborns.

Therefore microbiological screening of donated and pooled milk should be done after and before pasteurization according to the protocol.

Even after pasteurization, the endotoxins of organisms are still present in the milk in some cases, but they have not been found to have any clinical effect on infant.

As per experts a bacterial count of 10^4 CFU/ml for enterobacteriacae and S.aureus are threshold values which are in consonances with milk bank operating in other parts of world (National Institute for Health and Care Excellence, 2013; Hartmann *et al*., 2007).

Heavily contaminated milk is discarded because pasteurisation process is not effective on such samples. No growth is acceptable in post pasteurised samples after microbiological cultures.

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