International Journal of Research in Medical Sciences
*Kumari P et al. Int J Res Med Sci. 2019 Dec;7(12):4715-4722*
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20195544

**Original Research Article**

# Nurse's knowledge regarding importance of human milk and milk banking

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**Received:** 01 October 2019
**Revised:** 01 November 2019
**Accepted:** 08 November 2019

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## ABSTRACT

**Background:** Breast milk is the complete nutrition for the babies during first 6 months of life. It is very important to feed the baby with breast milk during that crucial period of growth. Unavailability of breast milk can put the baby in life threatening conditions. In order to resolve the problem and to improve the mortality rate of neonates, nurses should have up to date information regarding the breast milk and its storage. Aim of this study was to assess the knowledge of nurses regarding importance of human milk and milk banking.
**Methods:** Quantitative, descriptive research approach was used to assess the knowledge of 150 purposively selected nurses working in obstetric, gynae and pediatric wards in selected hospitals of Punjab by using socio-demographic sheet and self-structured questionnaire. Both descriptive and inferential statistical methods were used for the analysis of data.
**Results:** Study findings revealed that majority of nurses 66% have adequate knowledge regarding importance of human milk and milk banking. Knowledge of nurses regarding importance of human milk and milk banking is significantly associated with working department.
**Conclusions:** Study concluded that knowledge of nurses regarding importance of human milk and milk banking is satisfactory. But for the further improvement in knowledge of nurse's in-service programs should be provided to them after regular intervals of time. So that they perform their work efficiently.

**Keywords:** Descriptive study, Human milk, Human milk banking, Knowledge, Nurses

## INTRODUCTION

***Milk banks: mining the precious 'Liquid Gold'*[1]**

The primary source of nutrition for newborns is breast milk. Breast milk can also be supplied by a woman other than the baby's mother, either via donated pumped milk (generally from a milk bank or via informal milk donation), or when a woman nurses a child other than her own at her breast, a practice known as Wetnursing.[2]

A wet nurse is a woman who breast-feeds a child that is not her biological child.[3] Cross-nursing or co-nursing is an act where mothers nurses each other's babies. Although the practice poses a risk of infections such as HIV, wet nurses is still common in many developing countries. In China, Indonesia, and the Philippines, a wet-nurse may be employed in addition to a nanny as a mark of aristocracy, wealth, and high status.[4]

A joint statement made by WHO and UNICEF: "Where it is not possible for the biological mother to breast feed, the first alternative, should be the use of human milk from other sources, if available.[1] Breastfeeding is recommended exclusively for the first six months of life.[5] Composition of breast milk is complex. It consists of over 200 different substances, including protein, fat, carbohydrates, vitamins, minerals, other nutrients,

enzymes, and hormones.[6] Colostrum is the first milk produced immediately following delivery of the newborn. It contains antibodies to protect the newborn and has a mild laxative effect, encouraging the passing of the baby's first stool, which is called meconium.[7]

In 2001 World Health Organization report found that infant formula was a safe complementary food and a suitable breast milk substitute. Infant formula, is a food designed for feeding to babies and infants, usually prepared for bottle-feeding or cup-feeding.[8]

Formula feed is a great option for families. Formula feed makes moms independent, and even takes away stresses of what to eat and what to wear. It just needed a couple of scoops, some water, and a bottle. No more lugging around a pump and all its part, no more searching the house for a pumping bra. Formula feed lets moms to gets a break and share feeding duties with dads, grandparents, siblings, friends, etc.[9] In developing countries, formula is frequently prepared improperly, resulting in high infant mortality due to malnutrition and diseases such as diarrhea and pneumonia. This is due to lack of clean water, lack of sterile conditions, lack of refrigeration, illiteracy, poverty and lack of education of mothers.[8]

When the mother's own milk is unavailable for the sick and hospitalized newborn, donor breast milk should be made available as an alternative feeding. Despite advances in infant formulas, benefits of human breast milk cannot be replicated by any other source of nutrition.

***The demand for human donor breast milk***

The critical demand for human donor breast milk is for the most vulnerable neonates who are preterm and low birth weight. When a child is born preterm, due to physical barriers, mother may not be able to produce an adequate breast milk supply due to stress. At that time donor breast milk is acceptable and provides a tremendous relief knowing that infant can still receive human breast milk.[10]

Human milk banks play an essential role by providing human milk to infants who were not able to receive human milk. Main function of milk banks is to collect, screen, store, process, and distribute human milk. Standardized algorithms are followed in the milk bank for handling, storing, processing, pooling, and bacterial screening of donor milk.

The first human milk bank was in 1909 in Vienna, Austria. Wet nursing was widely in practice during 19$^{th}$ century. Human milk banking is an alternative to wet nursing. The main function of milk banks is to supply donated milk, so it is available when needed. Milk banks serve a vital function by providing human milk for premature infants who, have no access to human milk. As human milk confers major protective effects to premature infants, the availability of human milk is an important quality of care issue.[11]

India has a special significance of milk banks. The government of India has acknowledged the role that human milk banking in reducing neonatal mortality and morbidity, and with a vision to make breast milk universally available for all infants, launched the "National Guidelines on Lactation Management Centers in Public Health Facilities" in 2017. The government is now working on an implementation strategy to scale up the lactation management center model (promotion of breastfeeding, kangaroo mother care, and donor human milk) for all newborn care units and delivery centers in the country.[12]

First human milk bank of Asia 'Sneha' was founded in 1989 in Mumbai, but there is still insufficient number of milk banks in India.[13] On 27$^{th}$ November 2014, Sion Hospital, Mumbai celebrated the 25$^{th}$ anniversary of the First Human Breast Milk bank in India by felicitating its founder Dr. Armida Fernandez. Sion hospital lose babies in the Neonatal Intensive Care Unit (NICU) when fed formula or other supplements.

Feeding formula milk and use of bottles can be a source of infection for infants. Breast milk is not only better digested but has a number of anti-infective substances that prevent diarrhoea and other infections in premature and sick babies." She then decided to do away with formula and established the first human breast milk bank in India.[14]

The capital city of our nation has a non-profit foundation fighting against these odds, Amaara, an initiative by Breast Milk Foundation and Fortis La Femme. It focuses on providing donor's milk (a new mother) to a needy highly sensitive and life risked newborns.[15] Presently, there are around 14 such banks in India.

As the infant mortality is very high in India the best way to control is to increase the number of breast milk banks. The role of optimizing nutrition is of critically important in promoting their health and improving outcome. The breast milk banks are really essential, as they are cost effective and can be easily managed. The role of Government and communities are very important in encouraging the hospitals and NGO's to work towards opening a greater number of breast milk banks.[16]

## METHODS

A Quantitative, non-experimental, descriptive research approach was used for the study. The present study was conducted at obstetric, gynae and pediatric department of tertiary care hospital of India from December 2018-January 2019. Total sample size was 150 nursing personnel working in obstetric, gynae and pediatric departments. Tools used for the study consists of two parts.

***Part A: Socio-demographic data***

This part of tool consists of 7 items which includes demographic information of the study objects such as age, gender, professional qualification, working area, working department, working experience and neonatal ward/ICU experience.

***Part B: Structured questionnaire to assess the knowledge of nurses regarding importance of human milk and milk banking working in obstetric, gynae and pediatric wards***

This part of tool consists of 40 items which were structured multiple choice questions having one correct answer among four options to assess the knowledge of nurses regarding human milk and milk banking. Each item had a score of one (1) mark for correct answer and zero (0) for incorrect answer with overall score range from (0-40). Reliability of the tool was established by split-half method which is 0.83 (highly reliable).

***Inclusion criteria***

- The study includes the nurses who are working in obstetric, gynae and pediatric wards. Available during the period of data collection.

***Exclusion criteria***

- The study excludes the nurses who are Not willing to participate in the study Nurses included in pilot study

***Ethical considerations***

Ethical approval was taken from Institutional Ethical Committee. A written informed consent was taken from each participant.

***Statistical methods***

The data was analyzed by using the descriptive statistics by calculating mean, median and standard deviation and inferential statistics by applying chi-square to assess the association of level of knowledge with selected demographic variables under study and karl pearson correlation is used to calculate the reliability of the tool.

## RESULTS

***Section I: Socio-demographic characteristics of subjects***

Table 1 reveals the frequency and percentage distribution of subjects as per their socio demographic characteristics.

Almost half of the nurses (55.3%) were from the age group of 31-40 years and only (1.3%) nurses were from the age group 51 years and above. Majority of nurses (88%) were females whereas (12%) were males. More than half of nurses (64%) had professional qualification GNM Course followed by (32%) Post Basic BSc. Nursing. Only (4%) nurses had professional qualification Basic BSc. Nursing.

**Table 1: Frequency and percentage distribution of the subjects according to their demographic variables n=150.**

| Demographic variable | | Frequency (n) | Percent (%) |
|---|---|---|---|
| Age | 20-30 years | 37 | 24.7 |
| | 31-40 years | 83 | 55.3 |
| | 41-50 years | 28 | 18.7 |
| | 51years and above | 2 | 1.3 |
| Gender | Male | 18 | 12.0 |
| | Female | 132 | 88.0 |
| Professional qualification | GNM course | 96 | 64.0 |
| | Post basic BSc. nursing | 48 | 32.0 |
| | Basic BSc. Nursing | 6 | 4.0 |
| | MSc. nursing | 0 | 0 |
| Working Area | Rural | 0 | 0 |
| | Urban | 150 | 100.0 |
| Working department | Paediatric ward | 30 | 19.9 |
| | Neonatal ICU/ Paediatric ICU | 46 | 30.5 |
| | Gynae ward | 39 | 25.8 |
| | Obstetric ward | 35 | 23.2 |
| Working experience | Less than 1 year | 9 | 6.0 |
| | 1-5 years | 73 | 48.7 |
| | 6-10 years | 54 | 36.0 |
| | More than 10 years | 14 | 9.3 |
| Do you have any neonatal ward/ICU experience | Yes | 87 | 58.0 |
| | No | 63 | 42.0 |

All (100%) nurses were working in urban area. As per their working department (30.5%) nurses were working in neonatal ICU /paediatric ICU department followed by (25.8%) working gynae ward. (23.2%) and (19.9%) nurses were working in obstetric and paediatric ward respectively.

Majority of nurses (48.7%) had working experience of 1-5 years followed by (36%) of nurses with working experience of 6-10 years. (9.3%) and (6%) of nurses had working experience more than 10 years and less than 1 year respectively. Nearly more than half of the nurses (58%) had neonatal ward /ICU experience whereas (42%) of nurses doesn't had neonatal ward / ICU experience. Hence, concluded that majority of nurses were females of age group of 31-40 years having professional

qualification GNM Course and working in urban area. Maximum of nurses were working in neonatal ICU/Paediatric ICU having working experience of 1-5 years along with neonatal ward/ICU experience.

***Section II: To assess the knowledge of nurses regarding importance of human milk and milk banking.***

Table 2 shows the frequency and percentage distribution of level of knowledge of nurses. More than half of the nurses (66%) had adequate knowledge whereas, (34%) nurses had inadequate knowledge. Thus, more than half of nurses had adequate level of knowledge.

**Table 2: Frequency and percentage distribution of level of knowledge of nurses.**

| Level of knowledge | Criteria/Range | Frequency (n) | Percent (%) |
|---|---|---|---|
| Inadequate knowledge | Below mean <17.41 | 51 | 34.0 |
| Adequate knowledge | Equal to or above mean ≥17.41 | 99 | 66.0 |

Nurse's knowledge score regarding human milk and milk banking: Mean, Median, Standard Deviation of knowledge score of nurses were calculated and histogram was plotted, and data is represented in Table 3 displays that the distribution of knowledge score ranged from 5 to 27. Maximum possible score is 40. Maximum and minimum obtained score is 5 and 27 respectively. In both the side the mean score was found to be 17.41, SD 3.914 and median of the distribution was 18 (slightly higher than the mean).

The skewness was calculated by using formula [3(mean - median)/SD] and found to be -0.45 suggesting the distribution is slightly –ve skewed. This implies that number of nurses having adequate knowledge is more towards the right side of the curve than to left, signifying more number of nurses have adequate knowledge that is (66%). Thus, it can be concluded that the more than half of the nurses have adequate knowledge regarding human milk and milk banking.

***Section III: To determine the association between knowledge of nurses regarding importance of human milk and milk banking with selected demographic variables.***

Table 4 shows that 23 (15.3%) nurses in the group 20-30 years had adequate knowledge regarding importance of human milk and milk banking while 14 (9.3%) had inadequate level of knowledge. On the other hand, only 02 (1.3%) nurses in age group 51 years and above had adequate knowledge. 54 (36%) and 20 (13.3%) nurses in age group 31-40 years and 41-50 years had adequate knowledge respectively while 29 (19.3%) and 08 (5.3%) nurses in age group 31-40 years and 41-50 years had inadequate knowledge respectively. To explore the association of level of knowledge with age, Chi-square $\chi 2$, test was computed, the value of which was found to be 1.674 with p-value 0.643 which was non-significant at p-value <0.05.

Hence, it is concluded that level of knowledge has no association with age.

Table 5 depicts that 12 (8%) male nurses had adequate level of knowledge while 06 (4%) of male nurses had inadequate level of knowledge. On the other hand, 87 (58%) female nurses had adequate level of knowledge while as 45 (30%) of female nurses had inadequate level of knowledge. To explore the association of level of knowledge with gender, Chi-square $\chi 2$, test was computed, the value of which was found to be 0.004 with p-value 0.949 which was non-significant at p-value <0.05.

Hence, it is concluded that level of knowledge has no association with gender.

Table 6 reveals that 63 (42%) nurses with professional qualification GNM Course had adequate knowledge regarding importance of human milk and milk banking while 33 (22%) of them had inadequate level of knowledge. There was no nurse with professional qualification MSc. Nursing. 32 (21.3%) and 04 (2.7%) nurses with professional qualification Post Basic BSc. Nursing and Basic BSc.

Nursing respectively had adequate knowledge while 16 (10.7%) and 02 (1.3%) nurses with professional qualification Post Basic BSc. Nursing and Basic BSc. Nursing respectively had inadequate knowledge respectively. To explore the association of level of knowledge with professional qualification, Chi-square $\chi 2$, test was computed, the value of which was found to be 0.17 with p-value 0.992 which was non-significant at p-value <0.05.

Hence, it is concluded that level of knowledge has no association with professional qualification.

Table 7 depicts that 99 (66%) nurses working in urban area had adequate level of knowledge whereas 51 (34%) nurses working in urban area had inadequate level of knowledge.

Table 8 shows that 16 (10%) nurses working in paediatric ward had adequate knowledge regarding importance of human milk and milk banking while 14 (9.3%) of them had inadequate level of knowledge. 41 (27.3%) nurses working in neonatal ICU/paediatric ICU had adequate knowledge while as 05 (3.3%) nurses working in neonatal ICU/paediatric ICU had inadequate knowledge. On the other hand, 22 (14.7%) and 20 (13.3%) of nurses working in gynae and obstetric ward respectively had

adequate knowledge while as 17 (11.3%) and 15 (10%) nurses working in gynae and obstetric ward respectively had inadequate knowledge. To explore the association of level of knowledge with working department, Chi-square $\chi 2$, test was computed, the value of which was found to be 15.934 with p-value 0.001 which was highly-significant at p-value <0.001.

Hence, it is concluded that level of knowledge had strong association with working department.

**Table 3: Mean, median and standard deviation of knowledge score of nurses N=150.**

| Area | Maximum possible score | Maximum obtained score | Minimum obtained score | Mean | Median | Standard deviation (SD) |
|---|---|---|---|---|---|---|
| Knowledge regarding human milk and milk banking | 40 | 27 | 05 | 17.41 | 18 | 3.914 |

**Table 4: Association of level of knowledge with age N=150.**

| Age group | Level of knowledge | | Total n | Chi-square $\chi 2$ | p-value |
|---|---|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | | | |
| 20-30 years | 14 (9.3%) | 23 (15.3%) | 37 | 1.674a df=3 | 0.643NS |
| 31-40 years | 29 (19.3%) | 54 (36.0%) | 83 | | |
| 41-50 years | 8 (5.3%) | 20 (13.3%) | 28 | | |
| 51 years and above | 0 (0.0%) | 2 (1.3%) | 2 | | |
| Total | 51 | 99 | 150 | | |

NS stands for non-significant

**Table 5: Association of level of knowledge with gender N=150.**

| Gender | Level of knowledge | | Total n | Chi-square $\chi 2$ | p-value |
|---|---|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | | | |
| Male | 6 (4.0%) | 12 (8.0%) | 18 | 0.004a df=1 | 0.949NS |
| Female | 45 (30.0%) | 87 (58.0%) | 132 | | |
| Total | 51 | 99 | 150 | | |

NS stands for non-significant

**Table 6: Association of level of knowledge with professional qualification N=150.**

| Professional qualification | Level of knowledge | | Total n | Chi-square $\chi 2$ | p-value |
|---|---|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | | | |
| GNM Course | 33 (22.0%) | 63 (42.0%) | 96 | 0.017a df=2 | 0.992NS |
| Post Basic B.Sc. Nursing | 16 (10.7%) | 32 (21.3%) | 48 | | |
| Basic BSc. Nursing | 2 (1.3%) | 4 (2.7%) | 6 | | |
| MSc. Nursing | 0 (0.0%) | 0 (0.0%) | 0 | | |
| Total | 51 | 99 | 150 | | |

NS stands for non-significant

**Table 7: Association of level of knowledge with working area N=150.**

| Working area | Level of knowledge | | Total n | Chi-square $\chi 2$ | p-value |
|---|---|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | | | |
| Rural | 0 (0.0%) | 0 (0.0%) | 0 | - | - |
| Urban | 51(34.0%) | 99 (66.0%) | 150 | | |
| Total | 51 | 99 | 150 | | |

**Table 8: Association of level of knowledge with working department N=150.**

| Working department | Level of knowledge | | Total n | Chi-square$\chi 2$ | p-value |
|---|---|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | | | |
| Paediatric ward | 14 (9.3%) | 16 (10.0%) | 30 | 15.934a df=3 | 0.001HS |
| Neonatal ICU/ Paediatric ICU | 5 (3.3%) | 41 (27.3%) | 46 | | |
| Gynae ward | 17 (11.3%) | 22 (14.7%) | 39 | | |
| Obstetric ward | 15 (10.0%) | 20 (13.3%) | 35 | | |
| Total | 51 | 99 | 150 | | |

HS stands for highly significant

**Table 9: Comparison of level of knowledge of nurses on the basis of working department.**

| Working Department | Level of knowledge | | Total n |
|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | |
| Paediatric ward or neonatal/paediatric ICU | 19 (12.6%) | 57 (37.3%) | 76 |
| Gynae and obstetric ward | 32 (12.3%) | 42 (28%) | 74 |
| Total | 51 | 99 | 150 |

**Table 10: Association of level of knowledge with working experience N=150.**

| Working experience | Level of knowledge | | Total n | Chi-square $\chi 2$ | p-value |
|---|---|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | | | |
| Less than 1 year | 4 (2.7%) | 5 (3.3%) | 9 | 0.634a df=3 | 0.889NS |
| 1-5 years | 25 (16.7%) | 48 (32.0%) | 73 | | |
| 6-10 years | 18 (12.0%) | 36 (24.0%) | 54 | | |
| More than 10 years | 4 (2.7%) | 10 (6.7%) | 14 | | |
| Total | 51 | 99 | 150 | | |

NS stands for non-significant

**Table 11: Association of level of knowledge with neonatal ward / ICU experience N=150.**

| Neonatal ward / ICU experience | Level of knowledge | | Total n | Chi-square$\chi 2$ | p value |
|---|---|---|---|---|---|
| | Inadequate knowledge n (%) | Adequate knowledge n (%) | | | |
| Yes | 22 (14.7%) | 65 (43.3%) | 87 | 7.007a df=1 | .008NS |
| No | 29 (19.3%) | 34 (22.7%) | 63 | | |
| Total | 51 | 99 | 150 | | |

NS stands for non-significant

Table 9 reveals 57 (37.3%) nurses working in Paediatric ward/ ICU had adequate knowledge whereas 42 (28%) nurses working in Gynae and Obstetric ward had adequate level of knowledge. On the other hand, 19 (12.6%) nurses working in Paediatric ward/ ICU had inadequate knowledge as compare to 32 (12.3%) nurses working in Gynae and Obstetric ward had inadequate level of knowledge.

Hence, data shows that nurses working in paediatric department had more knowledge regarding human milk and milk banking as compare to nurses working in Gynae and Obstetric department.

Table 10 depicts that 05 (3.3%) nurses having working experience less than 1 year had adequate knowledge regarding importance of human milk and milk banking while 04 (2.7%) had inadequate level of knowledge. 10 (6.7%) nurses having working experience more than 10 years had adequate knowledge while as 04 (2.7%) nurses having working experience more than 10 years had inadequate knowledge. On the other hand, 48 (32%) and 36 (24%) nurses having working experience 1-5 years and 6-10 years respectively had adequate knowledge while as 25 (16.7%) and 18 (12%) nurses having working experience 1-5 years and 6-10 years respectively had inadequate knowledge. To explore the association of level of knowledge with working experience, Chi-square $\chi 2$, test was computed, the value of which was found to be 0.634 with p-value 0.889 which was non-significant at p-value <0.05.

Hence, it is concluded that level of knowledge had no association with working experience.

Table 11 shows 65 (43.3%) nurse having experience of neonatal ward/ICU had adequate level of knowledge whereas 22 (14.7%) nurse having experience of neonatal ward/ICU had inadequate level of knowledge. On other hand, 34 (22.7%) nurse not having experience of neonatal ward/ICU had adequate level of knowledge whereas 29 (19.3%) nurse having experience of neonatal ward/ICU had inadequate level of knowledge. To explore the association of level of knowledge with experience of neonatal ward/ICU, Chi-square $\chi 2$, test was computed, the value of which was found to be 7.007 with p-value 0.008 which was non-significant at p-value <0.001.

Hence, it is concluded that level of knowledge had no association with Neonatal ward /ICU experience.

## DISCUSSION

The findings of the present study reveal that 66% of nurses had adequate knowledge while 34% had inadequate knowledge regarding human milk and milk banking. These findings are consistent with the results of the study conducted by Renuka (2018) worked up on an explorative study to assess the knowledge and attitude regarding the storage of breast milk for the infants among staff nurses at selected hospitals.[12] Findings revealed that 15% staff nurses had poor knowledge, 66.66% had average knowledge and 18.37% had good knowledge. In case of attitude 68.33%, 3.33%, 28.33% have positive, negative and neutral attitude respectively among the staff nurses regarding storage of breast milk. Religion had a significant relationship with knowledge whereas age and source of knowledge had a high degree of significance with attitude. It was concluded that staff nurses had average knowledge with a positive attitude towards the storage of breast milk.

Another similar study conducted by Bhat Asha Vinod (2017) to assess the knowledge and attitude of B.Sc.[13] Nursing students regarding breast milk banking and to determine the association of knowledge and attitude with selected demographic variables. Descriptive design was adopted. Data was collected by using a self-administered questionnaire. 110 final year nursing students studying in three different nursing colleges of Belagavi. Out of the total students, 64% students had average Knowledge, 33% had good knowledge and 3% had poor knowledge. Regarding the attitude, majority of students had positive attitude (88.2%) and (11.8%) had neutral attitude.

## CONCLUSION

Majority of nurses having adequate knowledge regarding human milk and milk banking. Knowledge of nurses is significantly associated with Working Department. Number of nurses working in Pediatric Department having adequate knowledge than the number of nurses working in gynae and obstetric department having adequate knowledge.

There should be in-service workshop and seminars to enhance the knowledge of nurses regarding human milk and milk banking. Nurses should be supported to practice milk banking by providing standard guidelines and protocols. There should be provision of written manuals on milk banking provided to the nurses so that they can refer them during their work. Milk banking can be initiated by nurses through storage of biological mother milk for the neonate in situations where milk is available, but mother is not available to breast feed the baby directly. A similar type of study may be conducted regarding the factors contributing to the lack of preference of breast milk over formula feed.

## ACKNOWLEDGEMENTS

Mr. Baltej Singh, Statician, GGSMC and H, Faridkot, Punjab and Mr. S. K Maheshwari Sir, Lecturer, University College of Nursing, Faridkot, Punjab, India

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Kumari P, Vandna. Nurse's knowledge regarding importance of human milk and milk banking. Int J Res Med Sci 2019;7:4715-22.