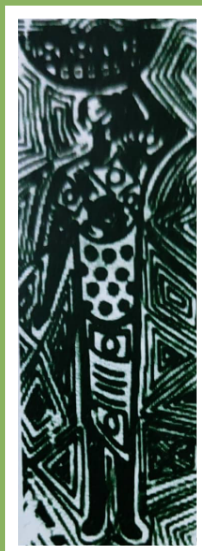


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Knowledge and Attitude of Mothers Towards Donor Breast Milk in Makurdi, Nigeria

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Abstract

Background: Breastfeeding is one of the most effective ways to ensure a child's health and survival. Improving breastfeeding practices could save the lives of more than 800,000 under-five children every year, the vast majority of whom are under six months of age. Early exposure to maternal antibodies, lactoferrin, oligosaccharides and other protective components in breast milk may improve neonatal and infant immune function. Mother's milk is widely recognized as the optimal feeding for term infants but also provides vital health benefits for sick and preterm infants. When mother's milk is unavailable, or in short supply, donor human milk is the second best alternative.

Objective: To determine mothers' knowledge of and attitudes toward donor breast milk.

Methods: A cross-sectional, descriptive study of 403 mothers attending antenatal/immunization clinics was conducted from September 2022 to January 2023. Data was collected using an interviewer-administered questionnaire.

Results: While 36.5% (n = 147) of mothers had heard about donor breast milk, 67.2% (n = 271) of the mothers were willing to donate their breast milk, but only 37.2% (n = 150) agreed to accept donor breastmilk for their baby. Knowledge about donor breast milk was significantly associated with educational status (p = 0.036), and the willingness to donate was significantly associated with knowledge (p = 0.015).

Conclusion: Mothers' education is a key factor influencing both knowledge and willingness to donate breastmilk.

Keywords: Breastmilk, Breastfeeding, Donor milk, HIV, Milk bank, Nursing mothers.

Introduction

Breastfeeding is one of the most effective ways to ensure a child's health and survival.¹ Beyond survival, there is growing evidence that breastfeeding boosts children's brain development and provides protection against overweight and obesity.² Improving breastfeeding practices could save the lives of more than 800,000 under-five children every year, the vast majority of whom are under six

months of age.² Breastfeeding decreases the risk of mothers developing breast cancer, ovarian cancer, Type 2 Diabetes mellitus and heart diseases. It is also estimated that increased breastfeeding could avert 20,000 maternal deaths each year due to breast cancer.³

Human milk presents the optimal nutrition for infants and is key to sustaining health and building the foundation for growth and cognitive

development.⁴ Early exposure to maternal antibodies, lactoferrin, oligosaccharides and other protective components in breast milk may improve neonatal and infant immune functions.⁵ Studies and meta-analyses have confirmed the association of six months of exclusive breastfeeding with decreased rates of lower respiratory tract infections, severe diarrhoea, otitis media, and obesity.⁶

The World Health Organization (WHO) recommends that infants be exclusively breastfed for the first six months of life. After this initial period, suitable complementary foods should be introduced, while breastfeeding can continue until 24 months of age or longer.^{4,7,8} However, only two out of five newborns worldwide are breastfed within the first hour of life, and only 41% of infants are exclusively breastfed. Initiating breastfeeding within the first hour after birth not only saves lives but also provides benefits that can last a lifetime.^{2,5,9} In Nigeria, breastfeeding rates are low, with 34% of children being exclusively breastfed while only 23% initiated breastfeeding within the first hour of life.¹⁰ Not breastfeeding is associated with lower intelligence and economic losses of about \$302 billion annually or 0.49% of the world's gross national income.¹¹

Mother's milk is widely recognized as the optimal feeding for term infants but also provides vital health benefits for sick and preterm infants.¹² Mother's expressed milk for very low birth weight infants (≤ 1500 g) in the NICU provides short- and long-term health benefits, including reduction of necrotizing enterocolitis, late-onset sepsis, chronic lung disease, retinopathy of prematurity, and improved neurodevelopment.¹³ When mother's milk is unavailable or in short supply, donor human milk represents the second-best alternative, and even though some nutritional elements are inactivated by pasteurization, it still has documented advantages compared to infant

formula.¹² The benefits of human milk are evident, such that the World Health Organization recommends that low birth weight (LBW) infants, including those with VLBW who cannot be fed mothers' milk, should be fed donor human milk.¹⁴ The American Academy of Pediatrics (AAP) also recommends pasteurized donor human milk when a mother's milk is not available or contraindicated.⁶ Moreover, the National Policy on Infant and Young Child Feeding (IYCF) in Nigeria also recommends that for motherless/adopted infants, re-lactation of a wet nurse (foster mother or caregiver) who is HIV-negative should be encouraged.¹⁵

Studies conducted in the various regions of the country indicated low awareness of donor human milk and its acceptance among mothers.¹⁶⁻¹⁸ Therefore, this study aimed to assess the knowledge and attitudes of mothers in Makurdi regarding donor breast milk. The findings will provide valuable data for policymakers and support efforts to create awareness.

Methods

This cross-sectional study was conducted at the Paediatric Outpatient Clinic, Immunization/Well-baby Clinic, and Antenatal and Postnatal Clinics of the Benue State University Teaching Hospital from September 1st 2022, to January 31st 2023. The hospital is a tertiary health facility located in Makurdi, the Benue State capital, and it provides general care and specialist services for patients within the state and its surrounding communities. It also serves as a referral centre. Ethical approval for this study was obtained from the Benue State University Teaching Hospital's Health Research Ethics Committee, while informed consent was obtained from the participants.

The study population consisted of mothers attending the various clinics listed above who were either pregnant or breastfeeding and

provided informed consent. Mothers who withheld consent were excluded from the study. The sample size of 403 was determined using a single population proportion formula. The proportion of mothers who have ever heard about donor breast milk (39%) was taken from a previous study.¹⁸ The participants were recruited randomly during hospital visits until the calculated sample size was attained.

Data was collected using an interviewer-administered structured questionnaire including the mother's biodata, level of education, parity, occupation, source of knowledge, knowledge about donor milk, and attitudes towards donor milk in infant nutrition.

The data was analyzed using IBM SPSS version 23 and presented in tables, frequencies and means. The Chi-Squared test was used to test for associations where appropriate, and the significance level was set at $p < 0.05$.

Results

The total number of mothers sampled was 403. The mean age was 29.78 ± 5.11 years with a higher percentage ($n=141$, 35.0%) of mothers aged 26-30 years and the least were aged ≤ 20 years ($n=4$, 1.0%). Almost all the mothers ($n=394$, 97.8%) were married. More than half ($n=216$, 53.86%) of the mothers had parity between 1-2, and the least ($n=22$, 5.4%) were those with parity greater than or equal to five. The majority ($n=249$, 61.8%) of the mothers had tertiary education, and the least were those who had primary education ($n=7$, 1.7%), as shown in Table I.

About two-thirds ($n = 256$, 63.5%) of the participants had not heard about donor breast milk, while ($n = 147$, 36.5%) had heard about donor breast milk. Out of 147 mothers who had heard about donor breast milk, a higher proportion ($n = 70$, 47.6%) heard about it from healthcare workers. The majority of respondents ($n = 253$, 62.8%) were unaware of the existence of a breastmilk bank in Nigeria, while only a

small number ($n = 22$, 5.5%) reported that they knew such a bank existed. More than half ($n = 231$, 57.3%) of the participants were aware of the national policy on infant feeding, and a greater percentage ($n = 222$, 55.1%) agreed that donor breast milk is more beneficial than infant formula, as shown in Table II.

A larger percentage of mothers ($n = 271$, 67.2%) agreed to donate their breast milk. Among these mothers, the primary motivation for donating was the satisfaction of helping another baby ($n = 129$, 47.6%). A small percentage of mothers ($n = 18$, 4.5%) had previously donated their breast milk. Among those who had donated, the majority (66.7%) were not screened for infections such as HIV and most donations (72.2%) were made at home as shown in Table III.

Most mothers who had heard about donor breast milk were married; however, there was no statistically significant association between marital status and knowledge about donor breast milk ($p = 0.229$). Knowledge about donor breastmilk had a statistically significant association with educational status ($p = 0.036$), religion ($p = 0.022$), and occupation ($p = 0.032$), as shown in Table IV.

The willingness to donate was associated with knowledge, which was statistically significant ($p = 0.015$). However, there was no significant association between knowledge and desire to accept donor breast milk ($p = 0.052$). Among those who had heard about donor breast milk, 36.5% would require spousal consent if they were to donate, as shown in Table V. There was no statistically significant association between willingness to donate and educational status ($p = 0.050$). The association between the willingness to donate and the age of the mothers ($p = 0.135$) or their occupation ($p = 0.554$) was not statistically significant, as shown in Table VI.

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Table I: Sociodemographic characteristics of mothers (n = 403)

Parameter	Frequency	Percentage
Age (in years)		
≤20	4	1.0
21-25	94	23.3
26-30	141	35.0
31-35	109	27.0
36-40	49	12.2
>40	6	1.5
Marital status		
Married	394	97.8
Single	9	2.2
Parity		
0	58	14.4
1-2	216	53.6
3-4	107	26.6
≥5	22	5.4
Educational status		
Informal education	13	3.2
Primary	7	1.7
Secondary	124	30.8
Tertiary	249	61.8
Others	10	2.5
Religion		
Christianity	395	98.0
Islam	8	2.0
Occupation		
Civil Servant	56	13.9
Farming	56	13.9
Trading	121	30.0
Artisan	10	2.5
Others	160	39.7

Discussion

This study reveals that 36.5% of mothers were aware of donor breast milk in infant feeding. This figure is higher than the rate (12.4%) reported by Demisse *et al.*¹⁹ in Ethiopia, 25.8% by Abbulimen-Iyoha *et al.*¹⁶ in Benin, 29.3% by Huang *et al.*²⁰ in China and 34% by Pal *et al.*²¹ in the USA. However, it is lower than the rate of 46% reported by Ogundare *et al.*²² from Ondo State and 39% by Iloh *et al.*¹⁸ from southeastern Nigeria. The primary sources of awareness about donor breast milk among mothers were health workers, friends and the mass media, and this is consistent with previous reports from Benin,¹⁶ Ondo,²² South East Nigeria,¹⁸ and India.²³ This

could be due to the practice of health education provided by health workers during hospital visits which provides an opportunity for more awareness if health workers are armed with the right knowledge about donor breast milk to facilitate its acceptance.²⁴

The knowledge about infant feeding policies was lacking, as many mothers were not aware of these policies. This finding aligns with the research findings reported by Iloh *et al.*¹⁸ from southeastern Nigeria, highlighting a gap in government efforts. While significant resources may be invested in formulating important policies, the intended outcomes are unlikely to be realized without proper dissemination. Some mothers recognized the significance of donor breast milk, while others were unaware of its benefits. A preference for donor breastmilk over infant formula was reported at 59.6%, which is lower than the 77% preference reported by Iloh *et al.*¹⁸ In contrast, Pal *et al.*²¹ from the USA found a higher preference for infant formula at 62%. Nonetheless, knowledge about the processing and handling of donor breast milk was generally good, aligning with the findings reported by Demisse *et al.*¹⁹ in Ethiopia. This could be attributed to the level of education of the mothers, as the majority of them had either secondary or tertiary education. A higher percentage (62.8%) of the mothers were unaware of breast milk banking in Nigeria, and this was similar to the report of Abbulimen-Iyoha *et al.*¹⁶ in Benin, who reported that 74.2% of mothers were unaware of breastmilk banking. This showed that breast milk banking is not yet common in Nigeria. Most mothers expressed willingness to donate breast milk, with 67.2% indicating their readiness. This rate is significantly higher than the 11% reported by Gelano *et al.*²⁵ and the 31.1% reported by Demisse *et al.*¹⁹, both studies conducted in Ethiopia.

Table II: Knowledge of mothers about donor breastmilk (n=403)

Variables	Frequency	Percentage
Have you heard about donor breast milk		
Yes	147	36.5
No	256	63.5
Source of information on breast milk (n=147)		
Health care worker	70	47.6
Mass media	21	14.3
Friend	33	22.5
Others	23	15.6
Is there a breast milk bank in Nigeria		
Yes	22	5.5
No	128	31.8
I Don't Know	253	62.8
Are you aware of the national policy on infant feeding		
Yes	231	57.3
No	172	42.7
Is donor milk more beneficial than infant formula?		
Yes	222	55.1
No	115	28.5
I don't know	66	16.4
Can donor breastmilk be given without disinfection		
Yes	70	17.4
No	231	57.3
I don't know	102	25.3
Disinfection/pasteurization destroys nutrients in donor milk		
Yes	123	30.5
No	113	28.0
I don't know	167	41.4
Should donors undergo a medical examination		
Yes	370	91.8
No	4	1.0
I don't know	29	7.2
Donor milk is preferred for preterm infants		
Yes	240	59.6
No	77	19.1
I don't know	86	21.3
Donated breast milk has a shelf life		
Yes	231	57.3
No	35	8.7
I don't know	137	34.0

In southeast Nigeria, Iloh *et al.*¹⁸ found that 60% of mothers were willing to donate, and Ighogboja reported a similar percentage (60%) from Jos.¹⁷ Irelosen *et al.*²⁶ also reported 56% willingness in Edo State, Nigeria. This contrasts sharply with an earlier report by Abbulimen-Iyoha *et al.*¹⁶ in the same Edo State, which found that 84.8% of the

mothers were not willing to donate breastmilk. The higher percentage of willing mothers in this study may be attributed to increased awareness through health campaigns. Notably, Yilmaz *et al.*²⁷ reported an even higher rate (79.8%) of mothers in Turkey who were willing to donate their milk. Mothers' willingness to donate was

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based on the motivation that they will be helping another baby, and most of the mothers who agreed to donate did so with spousal consent,

which was similar to the report by Iloh *et al.*¹⁸, who reported 80% requiring spousal consent for milk donation.

Table IIIa: Attitude of mothers towards donor breastmilk (n=403)

Variables	Frequency	Percentage
Yes	271	67.2
No	120	29.8
I don't know	12	3.0
If yes above, why		
Satisfaction of helping a child in need	129	47.6
Promotion of the health of children	80	29.5
To support other mothers	55	20.3
Others	7	2.6
If no above, why (n=120)		
Fear of not having enough for my baby	23	19.2
I don't like the idea	68	56.7
Against tradition/customs	2	1.7
Spouses/family may not like the idea	7	5.8
Others	20	16.7
Have you ever fed your breastmilk to your neighbour/relative's baby		
Yes	18	4.5
No	385	95.5
If yes above, were you screened for infections? (n=18)		
Yes	6	33.3
No	12	66.7
Where did the milk donation happen? (n=18)		
Hospital	5	27.8
Home	13	72.2

This points to men's important role in infant feeding practices, as their consent is required before mothers make certain decisions. While most mothers will accept to donate breast milk without financial inducement, 8.4% required financial inducement for donation, which was lower than the 13% requiring financial remuneration as reported by Iloh *et al.*¹⁸ from southeast Nigeria. A small percentage of the mothers had donated their breastmilk to other babies without screening for infections such as HIV, and this was mostly done at home. This was similar to the report of Yilmaz *et al.*²⁷ in Turkey, who reported 5%, but less than the 8.5% reported by Demisse *et al.*¹⁹ This could imply that the culture of wet nursing is acceptable in the society

amongst some people. Most mothers were not willing to accept donor breast milk for their babies because of the risk of transmitting infections, and this was similar to the report of Ogala in Zaria,²⁸ Abbulimen-Iyoha *et al.*¹⁶ in Benin, Ighogboja *et al.*¹⁷ in Jos, and Yilmaz *et al.*²⁷ in Turkey.

The knowledge about donor breast milk and the willingness to donate breast milk was found to be related to the mother's educational status, and this was similar to the findings by Iloh *et al.*¹⁸ from southeast Nigeria, Demisse *et al.*¹⁹ from Ethiopia, Huang *et al.*²⁰ in China, and Pal *et al.*²¹ in the USA. This shows that maternal education provides a great platform for advocacy, as the

more educated the mothers are, the more they are willing to take health-appropriate decisions such as donation of breast milk. The willingness to donate breast milk was also noticed to be

associated with the knowledge about donor breast milk in keeping with the findings by Gelano *et al.*,²⁵ and Iloh *et al.*¹⁸

Table IIIb: Attitude of mothers towards donor breastmilk (n=403)

Variables	Frequency	Percentage
Will you accept donor milk for your baby?		
Yes	150	37.2
No	239	59.3
I don't know	14	3.5
If yes above, why (multiple response)		
Milk not flowing	81	37.5
Mother not around	33	15.3
Mother sick and cannot breastfeed	62	28.7
Baby not gaining weight	4	1.9
Donor milk is safe	14	6.5
Infant formula is expensive	7	3.2
Others	15	6.9
If no above, why (multiple responses)		
Not religiously acceptable	2	0.6
Not culturally acceptable	2	0.6
Risk of transmitting infection	171	53.8
Risk of transmitting bad genetic traits	22	6.9
Societal stigma	11	3.5
Unsure of hygiene	68	21.4
Others	42	13.2
Would you require monetary remuneration to donate		
Yes	34	8.4
No	343	85.1
I don't know	26	6.5
Would you require spousal consent before donating/accepting?		
Yes	342	84.9
No	41	10.2
I don't know	20	5.0

Conclusion

Mothers in Makurdi were found to be aware of breast milk donation for infant feeding, though most mothers were not willing to accept donor breast milk for their babies. The educational status of mothers is a strong determinant of mothers' attitudes toward breast milk donation. Therefore, continual maternal education about infant feeding practices and policies should be prioritized.

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Table IV: Association between sociodemographic characteristics and knowledge about donor breast milk

Variables	Have you heard of donor breast milk		Test statistics	p-value
Age (in years)	Yes n = 147 n (%)	No n = 256 n (%)		
≤20	2 (50.0)	2 (50.0)	Fisher's exact=5.69	0.327
21-25	29 (30.9)	65 (69.1)		
26-30	46 (32.6)	95 (67.4)		
31-35	47 (43.1)	62 (56.9)		
36-40	21 (42.9)	28 (57.1)		
>40	2 (33.3)	4 (66.7)		
Marital status				
Married	142 (36.0)	252 (64.0)	$\chi^2=1.44$	0.229
Single	5 (55.6)	4 (44.4)		
Parity				
0	19 (32.8)	39 (67.2)	Fisher's exact=2.54	0.466
1-2	77 (35.6)	139 (64.4)		
3-4	45 (42.1)	62 (57.9)		
≥5	6 (27.3)	16 (72.7)		
Educational status				
Informal education	3 (23.1)	10 (76.9)	Fisher's exact=9.87	0.036*
Primary	3 (42.9)	4 (57.1)		
Secondary	33 (26.6)	91 (73.4)		
Tertiary	103 (41.4)	146 (58.6)		
Others	5 (50.0)	5 (50.0)		
Religion				
Christianity	141 (35.7)	254 (64.3)	$\chi^2=5.22$	0.022*
Islam	6 (75.0)	2 (25.0)		
Occupation				
Civil Servant	29 (51.8)	27 (48.2)	Fisher's exact=10.41	0.032*
Farming	19 (33.9)	37 (66.1)		
Trading	49 (40.2)	72 (59.5)		
Artisan	2 (20.0)	8 (80.0)		
Others	48 (30.0)	112 (70.0)		

Percentages were calculated across rows.

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Table V: Association between knowledge and attitude towards donor breast milk

Variables	I have heard of donor breast milk		Test statistics	p-value
	Yes n = 147 n (%)	No n = 256 n (%)		
Will you donate your milk?			Fisher's Exact = 8.38	0.015
Yes	112 (41.3)	159 (58.7)		
No	32 (26.7)	88 (73.3)		
I don't know	3 (25.0)	9 (75.0)		
Have you ever fed your breastmilk to your neighbour/relative's baby?			$\chi^2 = 2.96$	0.085
Yes	10 (55.6)	8 (44.4)		
No	137 (35.6)	248 (64.4)		
Will you accept donor milk for your baby?			Fisher's Exact = 5.90	0.052
Yes	64 (42.7)	86 (57.3)		
No	76 (31.8)	163 (68.2)		
I don't know	7 (50.0)	7 (50.0)		
Would you require monetary remuneration to donate			Fisher's Exact = 1.11	0.596
Yes	15 (44.1)	19 (55.9)		
No	122 (35.6)	221 (64.4)		
I don't know	10 (38.5)	16 (61.5)		
Would you require spousal consent before donating or receiving donor milk?			Fisher's Exact = 0.46	0.795
Yes	125 (36.5)	217 (63.5)		
No	16 (39.0)	25 (61.0)		
I don't know	6 (30.0)	14 (70.0)		

Percentages were calculated across rows.

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Table VI: Association between sociodemographic characteristics and willingness to donate

Variables	Will you donate breast milk		Test statistics	p-value
	Yes n = 271 n (%)	No n = 132 n (%)		
Age (in years)			Fisher's Exact = 8.05	0.135
≤20	2 (50.0)	2 (50.0)		
21-25	59 (62.8)	35 (37.2)		
26-30	89 (63.1)	52 (36.9)		
31-35	83 (76.1)	26 (23.9)		
36-40	35 (71.4)	14 (28.6)		
>40	3 (50.0)	3 (50.0)		
Marital status			$\chi^2 = 0.46$	0.496
Married	264 (67.4)	130 (32.6)		
Single	7 (77.8)	2 (22.2)		
Parity			Fisher's Exact = 1.75	0.634
0	36 (62.1)	22 (37.9)		
1-2	147 (68.1)	69 (31.9)		
3-4	71 (66.4)	36 (33.6)		
≥5	17 (77.3)	5 (22.7)		
Educational status			Fisher's Exact = 9.08	0.050
Informal education	9 (69.2)	4 (30.8)		
Primary	5 (71.4)	2 (28.6)		
Secondary	72 (58.1)	52 (41.9)		
Tertiary	180 (72.3)	69 (27.7)		
Others	5 (50.0)	5 (50.0)		
Religion			$\chi^2 = 1.52$	0.218
Christianity	264 (66.8)	131 (33.2)		
Islam	7 (87.5)	1 (12.5)		
Occupation			Fisher's Exact = 3.03	0.554
Civil Servant	38 (67.9)	18 (32.1)		
Farming	32 (56.9)	24 (42.9)		
Trading	84 (69.4)	37 (30.6)		
Artisan	7 (70.0)	3 (30.0)		
Others	110 (68.8)	50 (31.2)		

Percentages were calculated across rows.