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Article

Breastfeeding Practices in the Twin Town of India — A Cross-Sectional Study

Geeta Bhardwaj[1] and Moonjelly V. Smitha[2]

[1]Nursing College, All India Institute of Medical Sciences, Bhopal, Madhya Pradesh, India and [2]College of Nursing, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India

Abstract

The global rise in twinning rates poses health challenges due to increased risks for infants and mothers. Despite the benefits, breastfeeding rates among multiples are low, with exclusive breastfeeding (EBF) particularly scarce compared to singletons. Our study focuses on the mothers of twins in a unique population in Kodinhi village, Kerala, India, known for its high twinning rates, which aims to contribute to existing knowledge of breastfeeding practices and perspectives in a high twinning environment and offer valuable insights to promote optimal breastfeeding among mothers of twins. A retrospective cross-sectional survey was adopted. Seventy-five mothers with twins under 3 years of age from Kodinhi and neighboring areas were interviewed face to face using structured validated tools. Data collection focused on quantitative data supplemented by narrative descriptions. Most women delivered preterm (57.3%), operative delivery (58.7%), and had a late initiation of breastfeeding (32.9% within 24 hours). Colostrum feed was common (86.7%). The EBF rate was 4%, with 47.9% initiating nonexclusive breastfeeding before 3 months, and most of the twins (46.6%) were breastfed for 1−2 years. Fatigue (69.9%) and low milk supply (38.7%) were chief concerns. While 16.4% of mothers opted for a tandem breastfeeding technique, many preferred consecutive feeding as tandem was challenging. Mothers in Kodinhi demonstrated commendable efforts in breastfeeding twins; despite the low rate of EBF, breastfeeding extended to 1−2 years. Evidence-based interventions and personalized support, primarily focusing on maternal perspectives of milk insufficiency, fatigue and breastfeeding techniques, are crucial for sustaining optimal breastfeeding practices among mothers of twins.

Keywords: Human milk; Twin; Tandem breastfeeding; Exclusive breastfeeding; Preterm twin

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Over the past four decades, twinning rates have been significantly increasing (Monden & Smits, 2017; Torres et al., 2023; Whitford et al., 2017). Globally, twinning rates vary, with a cumulative rate of 11.70 per 1000 live births (Terdal & Prabhakar, 2021). In India, while the national average rate of twin births is 9 per 1000 live births (Sharma, 1997; Upreti, 2018), exceptions like Kodinhi town, situated in the Malappuram district of Kerala, India, report rates as high as 45 per 1000 live births, a trend observed since 2008 (Singh, 2021).

The surge in twinning rates can be attributed primarily to the increasing mean age of childbearing and the widespread use of assisted reproductive technologies (Delobel-Ayoub et al., 2009; Johnson & Schoeni, 2011). This demographic shift poses significant challenges to public health due to the heightened risks associated with multiple pregnancies for both infants and mothers.

Compared to singleton pregnancies, twin pregnancies usually come with more risks and complications, such as prematurity, low birth weight and high risk of infection, which necessitate enhanced healthcare interventions, including neonatal intensive care unit (NICU) admission, which significantly disrupts the initiation of breastfeeding and subsequently lowers breastfeeding rates among multiples compared to singletons.(Monden & Smits, 2017). Breastfeeding plays a crucial role in child survival, prevention of childhood infections, and birth spacing (Victora et al., 2016).

The World Health Organization (WHO, 2023) reports that only about 44% of infants aged 0–6 months worldwide were exclusively breastfed over the period of 2015−2020.

Despite its recognized benefits, exclusive breastfeeding rates among mothers of twins remain underexplored in the Indian literature (International Institute for Population Sciences, 2021); however, data about the rate of exclusive breastfeeding (EBF) among multiples are available and varies across high, middle, and low income countries. Early breastfeeding initiation varies from 38% to 80%; overall, the rate of exclusive breastfeeding is low for twins compared to singletons at 4.9% for twins and 73.2% for singletons (Odei, 2013), 14% for twins compared to 44% for singletons (Yokoyama et al., 2006); and overall ranges from 8−22% (Kim, 2016; NEOVITA Study Group, 2016; Ooki, 2008; Östlund et al., 2010; Victora et al., 2016; Wang et al., 2023; Whitford et al., 2017; Yokoyama et al., 2006).

Breastfeeding is a psychosocial and biological process, and these factors have a significant effect on breastfeeding practices, as highlighted in previous studies: factors such as maternal age, education, employment status, operative delivery, breast issues, unwillingness to breastfeed, prematurity, medical illness of twins, poor sucking ability, lack of milk supply, low breastfeeding self-efficacy, lack of support and knowledge are some of the factors of

Corresponding author: Moonjelly V. Smitha; Email: speak2smitha@gmail.com

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nonexclusive breastfeeding, and weaning (Cinar et al., 2014; Damato et al., 2005; Flidel-Rimon, 2006; Mikami et al., 2018; Tahiru et al., 2020).

In this context, our study aimed to contribute to existing knowledge by examining breastfeeding practices and perspectives among mothers of twins in Kodinhi village, Kerala, India, a well-known twin town identified as the second highest geographical area with a twinning rate after Igbo-Ora in Nigeria, as reported in Indian Newspapers. Also mentioned are environmental factors, and biological and genetic factors that may have led to this twinning phenomenon; however, the scientific reasons for the high rate of twinning have not been reported yet (International Institute for Population Sciences, 2021; Jodalli et al., 2016b) Researchers have researched the twins and their health factors in this village (Jodalli et al., 2016a; Salih, 2016) However, the breastfeeding practices of these mothers of twins are unexplored.

The study's novelty lies in its focus on offering valuable insights into breastfeeding practices and perspectives among mothers of twins conceived naturally in a population with a distinct culture and religious community, follows traditional beliefs and customs, resides in extended families in a rural setting, and with a history of twins as a natural phenomenon, implying a high twinning environment. This unique investigation seeks to find an association between demographic, clinical variables and breastfeeding practices and provide insights for policy formulation and intervention strategies to promote optimal breastfeeding as per WHO guidelines, with 6 months EBF and breastfeeding for at least 2 years among mothers of twins.

Methods

Research Design and Study Setting

We employed a retrospective cross-sectional survey approach to conduct this study in Kodinhi, a town and the areas in the nearest vicinity identified as 21 wards of the town that comes under Nannambra Panchayat in Malappuram district, Kerala, India.

Participants and Selection Process

A comprehensive list of twins under 6 years of age was acquired from the Child Development Programme Officer to recruit participants. All eligible mothers with multiple dyads who were willing to engage in the study, available during the data collection phase, and could read, write, or understand either English or Malayalam, were selected. Considering the smaller number of mothers with twins under 3 years of age, a total enumerative sampling was used to ensure comprehensive coverage and avoid omitting crucial data regarding breastfeeding practices, thus facilitating a thorough representation of the population (Figure S1). A total of 75 mothers of twins were selected.

Ethical Considerations

The study was ethically approved by the ethics committee vide reference no. IHEC-LOP/2020/ IM0399 followed the ethical standards of the Declaration of Helsinki, and administrative approvals were obtained from the administration of Women and Child Development Integrated Child Development Services (ICDS) Malappuram and Nannambra Gram Panchayat.

Tools and Data Collection

After conducting a thorough literature review, structured questionnaires with both closed-ended and open-ended items were prepared (Anjarwati et al., 2019; Tahiru et al., 2020). Interviews were conducted to collect demographic information, clinical variables and breastfeeding practices (Table 1). This study defines EBF as exclusive breastfeeding of the twins from 0–6 months of age without any other liquid or food except breastmilk. Early initiation of breastfeeding means the initiation of breastfeeding the twins within one hour of childbirth; however, the first time when mothers initiated the breastfeeding are reported in the breastfeeding variables shown in Table 2. Five experts from the field of lactation and neonatology established the tool's validity; suggestions were incorporated and the modified tool was resent for validation, resulting in a content validity index of 0.89. The English tool was translated to Malayalam and translated back.

Data were collected in December 2021 by conducting home visits. The researcher was accompanied by a native of Kodinhi who was familiar with the geographical area and proficient in English and Malayalam, to facilitate the data collection process. The data collector was given clear instructions and trained in interview techniques to ensure accurate data collection. Mothers were informed about the purpose of the study, and written informed consent was obtained. All mothers approached in the village agreed to participate and willingly shared their breastfeeding practices. Each data collection session lasted 20 minutes on an average.

The Panchayat's administrative approval imposed restrictions on capturing pictures and recordings; hence, quantitative data were collected and maternal perspectives on breastfeeding practices were derived through narrative statements using a semistructured questionnaire that further quantified the narratives, based on the similarity of responses on certain aspects.

Analysis

The collected data were entered into an Excel spreadsheet, cleaned, coded, and checked for missing values, with the completed data exported to SPSS software for analysis. Narratives on maternal perspectives were entered in separate Excel sheet and quantified. All the categorical variables were analyzed using frequency and percentages (Tables 1 and 2). The normality of data was checked using the Kolmogorov-Smirnov test. The chi-square test/Fisher's exact test was used to find the association of categorical variables. Mann-Whitney U test/Kruskal Wallis test was used to compare the continuous variables that did not follow normal distribution across two or more groups (Tables S1 and S2). Logistic regression was used to find the factors associated with the binary outcome. Factors significant in the univariate regression were taken to build the multiple logistic regression model to determine predictors of selected breastfeeding variables. Adjusted and unadjusted odds ratios (*OR*s) were reported. A p value less than .05 was considered to be statistically significant (Tables 3 and 4).

Results

Participants' Demographic and Clinical Characteristics

The study involved 75 mothers aged between 25 and 35 years, with a median age of 28, most of whom were Muslim (93.3%). The median age of the twins was 15 months, with an interquartile range of 9 to 24 months. Most mothers had completed 12th grade (38.7%) and were homemakers (94.7%).

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Most mothers were multiparous parous (64%), while mothers with five children were the least frequent (6.7%). For most participants, it was the first-time delivery of twins (98.7%), with 57.3% a preterm delivery; 70.7% of twins reported good sucking ability, and few reported both twins lacking sucking ability (17.3%). NICU admission mostly involved one twin (61.3%), while (33.3%) reported none admitted. Operative delivery was the primary mode of delivery (58.7%) (Table 1).

Results of Breastfeeding Practices and Related Variables

Most of the mothers (96%) lacked formal breastfeeding education; hence, relying on self-awareness (64.4%) and advice from mothers (28.8%) and village practice (6.8%) were less common. While 64% had prior breastfeeding experience, only 32.9% initiated breastfeeding within 24 hours postpartum. Colostrum was commonly fed (86.7%), contrasting with EBF (4%), with 47.9% initiating nonexclusive breastfeeding in less than three months. Most mothers (83.6%) breastfed both twins for the same duration, which was on-demand feeding (79.5%). Tandem (16.4%) and singleton (57.5%) feeding methods were prevalent, with some combining both (26%) and cradle hold (63.9%) being the most common position. Fatigue was reported by 69.9%, while satisfaction with breastfeeding was high at 69.3%. Notably, 46.6% of mothers breastfed the twins for 1−2 years. Milk insufficiency concerned 38.7%, often cited as the primary reason for nonexclusive breastfeeding (82.2%), and 9.6% mentioned NICU admission and twins' medical conditions as factors attributed to nonexclusive breastfeeding. Family support was significant (97.3%), yet few had difficulties in handling both twins (8.2%), and varied Kangaroo mother care provision (53.3%) were noted (Table 2). These findings underscore the multifaceted nature of breastfeeding practices, influenced by education, culture, and support systems.

Results of Association Between Breastfeeding Practices and Other Variables

The study investigated associations between five clinically significant breastfeeding practices with selected demographic characteristics (Table S1) and breastfeeding variables (Table S2).

EBF had no association with other variables. However, the initiation of nonexclusive breastfeeding before 6 months was associated with the twins' age, religion, NICU admission, total breastfeeding duration, the time point of starting complementary feed with continuation of breastfeeding or formula milk, fatigue, family support, maternal perception of milk insufficiency, and mode of Kangaroo mother care (KMC) at $p < .05$.

Breastfeeding satisfaction was associated with NICU admission ($p < .01$), which was four times higher ($OR = 4.71$; 95% CI [1.10, 20.26]) when none of the twins were admitted in NICU compared to NICU admission of both the twins. Additionally, mothers who perceived milk insufficiency since childbirth had substantially lower odds of being satisfied with breastfeeding compared to those who felt insufficiency within 6 months, with a strong and statistically significant 92% reduction in satisfaction (adjusted $OR = 0.08$; 95% CI [0.02, 0.41]; $p < .003$; Table 3).

Fatigue was associated with the time point of starting complementary feeds ($p < .03$), KMC ($p < .003$), mode of KMC ($p < .006$), and initiation of nonexclusive breastfeeding before 6 months ($p < .001$); the fatigue was 18 times higher ($OR = 18.0$:95% CI [1.48, 218.95]) among mothers who were exclusively breastfeeding when compared to mothers who initiated

Table 1. Participants' demographic and clinical characteristics, $n = 75$

Demographic variable	Category	Frequency (%)/(median, Q1, Q3)
Age of mother*		28 (25, 35)
Age of twins #		15 (9, 24)
Education	12th grade passed	29(38.7)
	Graduate	25(33.3)
	Postgraduate and above	21 (28)
Occupation	Private job	1 (1.3)
	Government job	2 (2.7)
	Business	1 (1.3)
	Homemaker	71 (94.7)
Husband's education	12th grade passed	20 (26.7)
	Graduate	25 (33.3)
	Postgraduate	30 (40)
Husband's occupation	Unemployed	15 (20)
	Government job	2 (2.7)
	Business	18 (24)
	Private job	40 (53.3)
Family monthly income	Below INR 15000	61 (81.3)
	INR 15001−30000/ and above	14 (18.7)
Religion	Hindu	5 (6.7)
	Muslim	70 (93.3)
Parity	1	27 (36)
	2	18 (24)
	3	12 (16)
	4	13 (17.3)
	5	5 (6.7)
History of twins	No	74 (98.7)
Preterm delivery	Yes	43 (57.3)
Mode of delivery	Vaginal delivery	31 (41.3)
	Cesarean section	44 (58.7)
Place of delivery	Nursing homes/private hospital	6 (8)
	Government hospital	69 (92)
Postnatal complication	Yes	8 (10.7)
Sucking ability of the Twins	Good	53 (70.7)
	Only one had good sucking ability	9 (12)
	Poor	13 (17.3)
Twins admission to NICU	Only one twin	46 (61.3)
	Both the twins	4 (5.3)
	None of the twins	25 (33.3)

Note: NICU, neonatal intensive care unit. *Age of mothers is in years. #Age of twins is in months.

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Table 2. Breastfeeding variables of participants, $n = 75^{\#}$

Breastfeeding variables	Responses	Frequency (%)
Attended breastfeeding classes	Yes	3 (4)
Source of information for breastfeeding technique (73)	Self-consciousness	47 (64.4)
	Mother's advice	21 (28.8)
	General practice adopted in village	5 (6.8)
Previous experience of breastfeeding	Yes	48 (64)
Early initiation of breastfeeding (73)	Less than 30 minutes	22 (30.1)
	30 minutes–1 hr	13 (17.8)
	1–24 hrs	24 (32.9)
	More than 1 day	14 (19.2)
Colostrum	Fed to both the twins	65 (86.7)
	Fed to one twin	10 (13.3)
Exclusive breastfeeding till six months (2 mothers had never breastfeed their twins)	Yes	3 (4)
Initiation of nonexclusive breastfeeding before 6 months (73)	Less than 3 months	35 (47.9)
	3–6 months	32(43.8)
	On exclusive breastfeeding (Babies under six months of age)	6 (8.2)
Duration of each feed (73)	Till the baby leaves its own	47 (64.4)
	Till twins sleep while breastfeeding	14 (19.2)
	10–20 minutes	8 (11)
	Different in both the twins	4 (5.5)
Duration of breastfeeding (73)	Same for both the twins	61 (83.6)
Frequency of breastfeeding (73)	On-demand	58 (79.5)
	Regular interval feeding	15 (20.5)
Breastfeeding technique (73)	Tandem	12 (16.4)
	Singleton	42 (57.5)
	Combined	19 (26)
Breastfeeding position (72)*	Cradle hold	46 (63.9)
	Football Hold	20 (27.8)
	Lying down	6 (8.3)
Total duration of breastfeeding (73)	Continuing breastfeeding	26 (35.6)
	Less than 6 months	03 (4.1)
	6 months–1 year	10 (13.7)
	1–2 years	34 (46.6)
Time point for starting complementary feed in addition to breastfeeding or formula milk	Not yet started, still under six months of age	14 (18.6)
	Six months of age	45 (60)
	Between 7–10 months	16 (21.3)
Self-perceived breastfeeding fatigue (73)	Yes	51 (69.9)
Self-perceived breastfeeding satisfaction	Yes	52 (69.3)
Maternal perspectives on reasons for unsatisfactory breastfeeding experience (21)	Perceiving insufficient milk supply	9 (42.9)
	Inability to fulfill the breastfeeding needs of twins	2 (9.5)
	Twins were on formula feed and could not breastfeed	3 (14.3)
	Could not breastfeed for an extended period till 2 years of age	2 (9.5)
	Stopped breastfeeding due to pregnancy	1 (4.8)
	Could not balance the twins while breastfeeding	1 (4.8)
	Inability to breastfeed exclusively	3 (14.3)
Family support	Yes	73 (97.3)
	Partial support	1 (1.3)
Perceived a milk insufficiency	Since childbirth	29 (38.7)
	Never felt	29 (38.7)
	Within 6 months of delivery	17 (22.6)
Maternal identifiers of milk insufficiency	Depletion of breastmilk during breastfeeding sessions	1 (1.3)
	Twins crying even after breastfeeding	74 (98.7)
Factors influencing nonexclusive breastfeeding (73)	Milk insufficiency	60 (82.2)
	Medical illness and NICU admission of twins	7 (9.6)
	Difficult in handling twins while breastfeeding	6 (8.2)
Effect of twin's sleep and behavior on breastfeeding (73)	Yes	40 (54.8)
Provided KMC	Yes	40 (53.3)
Mode of KMC (40)	One by one	31 (77.5)
	Combined method	3 (7.5)
	Gave to one twin only	6 (15)

Note: NICU, neonatal intensive care unit; KMC, kangaroo mother care. #*n* varied depending on the number of participants who had the particular breastfeeding practice. *Practiced tandem technique.

nonexclusive breastfeeding at less than 3 months (Table 4). Another significant finding was the association of perceived milk insufficiency with colostrum feed ($p < .005$).

Maternal Perspectives on Breastfeeding Techniques and Other Breastfeeding Practices

Existing researches have focused on EBF rates, duration, and factors influencing cessation of breastfeeding, yet they lack insight

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Table 3. Logistic regression for predictive factors of breastfeeding satisfaction, $n = 75$

Predictor variables	Category	Frequency (%)	Chi-square/Fisher's test statistics	*p* value	Unadjusted *OR* (95% CI)		Adjusted *OR* (95% CI)	*p* value
Twins admission to NICU	None of the twins	25 (33.3)		.01*	4.30 (1.12, 16.53)	0.03*	4.71 (1.10, 20.26)	.04*
	Only one twin	46 (61.3)			22.0 (1.69, 285.89)	0.02*	78.94 (3.94, 1582.18)	.004*
	Both the twins	4 (5.3)			Ref		Ref	
Perception of milk insufficiency	Since childbirth	29 (38.7)	10.34	.004*	0.15 (0.04, 0.54)	0.004*	0.08 (0.02, 0.41)	.003*
	Never felt milk insufficiency	29 (38.7)			0.29 (0.08, 1.09)	0.07	0.26 (0.06, 1.08)	.06
	Within 6 months of delivery	17 (22.6)			Ref		Ref	

Note: NICU, neonatal intensive care unit; *OR*, odds ratio; CI, confidence interval. *Significant at $p < .05$.

Table 4. Logistic regression for predictive factors of fatigue, $n = 75$

Predictor variables	Category	Frequency (%)	Chi-square test/Fisher's test statistics	*p* value	Unadjusted *OR* (95% CI)	*p* value
Initiation of nonexclusive breastfeeding before six months#	Less than 3 months	35 (47.9)		<.001*	Ref	
	3–6 months	32(43.8)			14.4 (1.53,135.52)	0.02*
	On exclusive breastfeeding (Babies under 6 months of age)	6 (8.2)			18.0 (1.48,218.95)	0.02*
Time point of starting complementary feed	Not yet started	14 (18.6)		.03*	Ref	
	6 months	45 (60)			0.18 (0.05,0.67)	0.01*
	Between 7–10 months	16 (21.3)			0.23 (0.05,1.13)	0.07
KMC	Yes	40 (53.3)	8.66	.003*	Ref	
	No	35(46.7)			3.25 (0.77,13.69)	0.11

Note: OR, odds ratio; CI, confidence interval; KMC, kangaroo mother care. *Significant at $p < .05$. #$n = 73$.

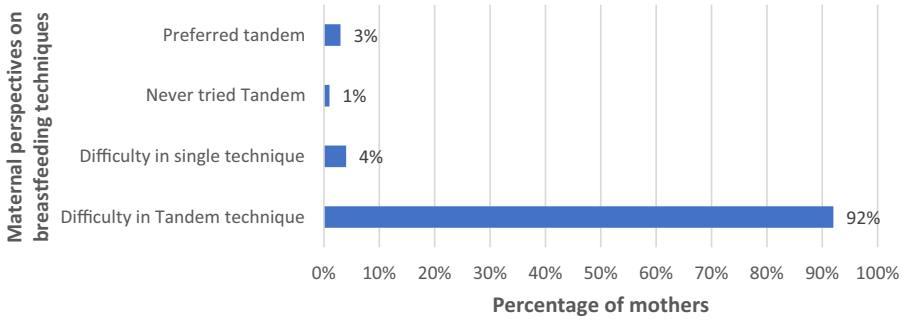

Figure 1. Mothers' perceptions of the practice of single and tandem breastfeeding techniques, $n = 73$*.
Note: *Two mothers could not breastfeed their twins.

into maternal perspectives of techniques for breastfeeding twins. This study investigated maternal perspectives on the choice of breastfeeding technique through close-ended and structured open-ended questions. Narratives were quantified, and statements were presented (Figure 1).

About 96% of mothers had practiced tandem breastfeeding technique at some point in their breastfeeding journey; 57.5% opted for consecutive breastfeeding, and a small proportion (16.4%) opted for tandem and 26% combined both techniques. However, the perceptions and practices of mothers did not match and varied with age of twins. Mothers reported numerous benefits of opting for the consecutive technique as it allowed them to focus on one baby at a time and was more comfortable than tandem feeding. Mothers primarily reported the most challenging aspect of consecutive feeding was the time it consumed.

Challenges With Tandem Breastfeeding

Mothers (shown as M in the quotes below) expressed a range of challenges related to tandem feeding (Figure 2). Mothers needed assistance from family members to support the twins to practice tandem feeding:

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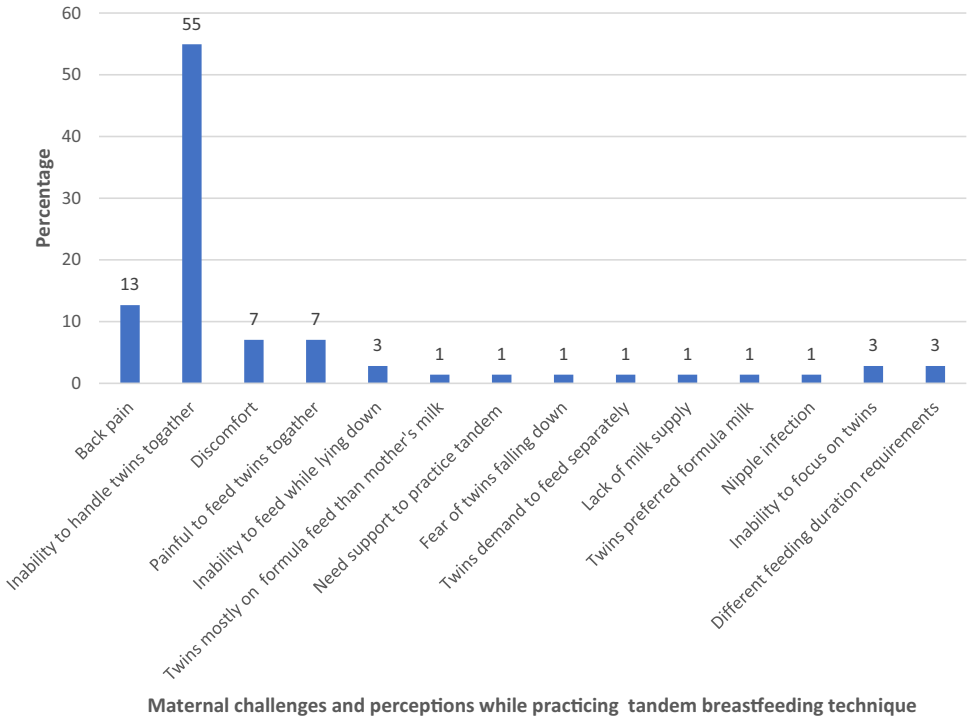

Figure 2. Challenges while practising tandem breastfeeding techniques, $n = 72$*.
Note: Numbers displayed are percentage of mothers. *Mothers who tried tandem breastfeeding at any point of time during their breastfeeding journey.

> *I tried feeding my babies together, my sister-in-law helped me in holding one so that I could feed them, alone I cannot feed them together, all time she is not available to hold my babies, I need to feed them by my own. (M1)*

While practicing tandem feeding, mothers perceived milk insufficiency and found consecutive techniques easier to meet the individualized needs of twins:

> *When I feed them together milk finish very fast, they are left hungry . . . I feed them one after the other . . . at least one gets enough milk, and I keep the bottle ready to make them full. (M2)*

> *Younger one feeds for more duration than elder one . . . they don't feed together; they both disturb each other while breastfeeding and do not allow to breastfeed. (M4)*

Mothers voiced concern about holding twins together during simultaneous breastfeeding, citing concerns over the small size of the twins and meeting twins' needs simultaneously:

> *I didn't try feeding them together; I thought it would be risky . . . I am fearful . . . What if my babies fall? (M7)*

> *I am busy with feeding, they are tiny, become hungry very soon, . . . even if I have finished feeding them just 5 minutes before . . . again they start crying out of hunger . . . sometimes I give formula. (M2)*

> *No one asked me to feed them together . . . I also didn't feel like feeding them together . . . I don't know how to hold them together . . . single feeding is good. (M6)*

Perceived Benefits of Consecutive Breastfeeding

Single breastfeeding provides a relaxed experience, enabling mothers to lie down and attend to each baby individually:

> *I get back pain, so I feed them while lying down, they keep feeding . . . it's easy for me and them also . . . But for feeding them together, I cannot lie down and feed them together. For me, feeding them separately is easy. (M5)*

Perceived Benefits of Tandem Breastfeeding

Apart from its challenges, mothers who practiced tandem breastfeeding often emphasized its efficacy, advocating its numerous benefits. Mothers reported that tandem breastfeeding promotes joint sleeping of twins and further aids in saving time for household chores and bonding among twins:

> *When I fed them together, they sleep while feeding . . . And when they sleep, I do my household work . . . Anyhow, I need to manage. (M8)*

> *When one sees other one feeding, he also comes for feeding . . . they always feed together . . . it increases their bond . . . I am happy. (M9)*

Additionally, tandem feeding became indispensable to manage hunger cues when both twins cried out of hunger simultaneously, calming both babies in one go. Mothers observed ease in the practice of tandem feeding once the twin's transition to solid and breastfeeding sessions are reduced:

> *I don't like feeding them together, but when they both cry together and don't stop even after giving a bottle, I don't have any other option to make them stop crying than by attaching them to the breast. (M10)*

> *I have breastfed my previous two children . . . I don't find any problem in feeding them together now they started eating . . . breastfeeding sessions have reduced . . . I feed once in the daytime and at one time during the night. (M11)*

A mother who breastfed her twins using both techniques remarked: 'Both the methods are easy for me. Initially, I felt feeding them simultaneously was difficult as twins were tiny . . . now they are more than one year old, and I can feed them simultaneously easily.'

Advice for Other Mothers of Twins

When asked about advice for other mothers of twins regarding breastfeeding techniques, most of the mothers (67%, of whom

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71.3% were multiparous), suggested trying tandem breastfeeding techniques: 'Breastfeeding is difficult, managing both together is difficult, mothers should opt both the ways to feed their babies, it will help mother and babies both' (M12).

The choice should be based on the individual mother's convenience. Another mother (M13) said: 'I would not suggest any particular technique, and everyone has different problems; some babies may be tiny ... For many reasons, they can feed how they are comfortable.'

Additionally, recommendations were made for tandem feeding once twins reach 1 year of age: 'I had started tandem breastfeeding once they were grown up ... I would suggest mothers try feeding the babies after one year of age. By that time, they are manageable and feed satisfactorily.' Conversely, a mother refused tandem feeding due to the physical challenges it presents (M14): 'Feeding them simultaneously gives me severe back pain. I will not suggest anyone to feed simultaneously ... it's very tiring.'

Discussion

In recent years, breastfeeding rates have risen globally, yet rates among mothers of twins remain very low due to many factors associated with twin pregnancy influencing breastfeeding practices (Wang et al., 2023). Our study has highlighted the breastfeeding practices among mothers of twins residing in a twinning environment where the twin birth rate from natural conception is the highest in India, and its influence on breastfeeding practices is reflected in the results.

In Kodinhi, even with natural conception in a twinning environment, mothers face similar pregnancy risks as any other twin mother: 58.7% had an operative delivery and 57.3% experienced preterm births, consistent with previous studies' results of 79.5% cesarean rates among 178 mothers (Allihaibi, 2020) and 42% preterm birth rates among 123 mothers (Damato et al., 2005). Preterm neonates often require NICU admission due to prematurity complications. Similarly, a NICU admission was reported in our study, primarily involving one twin (61.3%). Most twins had good sucking ability (70.7%), consistent with other studies where 40% of twins had a NICU admission (Damato et al., 2005). While twins had good sucking ability, only 32.9% had initiation of breastfeeding within 24 hours postpartum; this indicates a potential gap in knowledge or support in early initiation despite previous breastfeeding experience. Moreover, a low initiation rate could be attributed due to increased operative delivery, preterm birth, and maternal and twin separation.

Cinar et al. (2014) reported that mothers who did not breastfeed (89.4%) also did not have initiation of breastfeeding within 24 hours postpartum, while in Arabic countries, among 178 mothers, 22.1% initiated breastfeeding in less than half an hour postpartum (Allihaibi, 2020). Late breastfeeding initiation has an impact on the EBF rate. Mothers with late breastfeeding initiation are more likely to perceive milk insufficiency due to inconsistent breastfeeding, which was reflected in the EBF rate of 4%. Studies support perceived milk insufficiency as a significant factor in introducing alternative milk to twins. In our study, 47.9% switched to nonexclusive breastfeeding in less than three months. Among 1529 mothers in Japan, 5.3% exclusively breastfed and 78.7% practiced mixed feeding (Yokoyama & Ooki, 2004). In another study, most mothers (83% out of 185) did not practice EBF (Tahiru et al., 2020). Other research mentioned how prematurity affects proper sucking and in turn, latching difficulty affects EBF (Mikami et al., 2018; Nyqvist, 2002). Perception of milk insufficiency concerned 38.7%, often cited as the primary reason for nonexclusive breastfeeding (82.2%), consistent with other studies too, where milk insufficiency is reported at 40%, 61.4%, 35%, 55% (Cinar et al., 2014; Damato et al., 2005; Mikami et al., 2018; Quitadamo et al., 2021; Tahiru et al., 2020). Advice from the mother-in-law (32 %) was also given as a reason for nonexclusive breastfeeding (Basu et al., 2014). Fatigue was reported by 69.9%, consistent with previous study findings and meta-analysis (Badr & Zauszniewski, 2017; Callahan et al., 2006; Damato et al., 2005). Fatigue was associated with the initiation of nonexclusive breastfeeding before six months and findings suggested increased fatigue with EBF compared to nonexclusive breastfeeding, which varied with duration. Interestingly, a similar percentage in our study (38.7%) never experienced milk insufficiency.

Family support also played a crucial role in sustaining EBF (Demirtas et al., 2012). In our study, despite family support (97.3%), consistent with 92.9% support in another study (Mikami et al., 2018), the EBF rate was only 4.3%.

Excessive crying and irritability, even after breastfeeding, were principal identifiers by 1529 mothers for perceiving milk insufficiency (Yokoyama et al., 2006), consistent with our results of 98.7%. Maternal self-efficacy is associated with milk production: the higher the self-efficacy, the more the milk production (Allihaibi, 2020). Maternal self-confidence is vital to a mother's perception of milk sufficiency and self-efficacy, eventually reflecting upon EBF practice.

Results show the interconnection of many factors influence breastfeeding practices, including facilitators and barriers. Previous studies noted that maternal age, education and socioeconomic status regarding financial access, working status of women, rural areas, and traditional beliefs influence breastfeeding (Östlund et al., 2010; Reddy et al., 2023). In our study, most mothers were between 25 and 35 years, with a median age of 28 years, which aligns with previous study findings (Allihaibi, 2020). All the mothers in our study were educated: 33.3% were graduates, 28% were postgraduate; 94.7% were homemakers; and 93.3% were Muslim, though the influence on EBF rates was not reflected; however, 46.6% of mothers practiced extended breastfeeding for 2 years. Multiparous mothers had the highest rate of 64%; prior breastfeeding experience and the twinning environment helped 96% of mothers in practicing tandem breastfeeding at some point during their breastfeeding journey. Previous studies report that women in rural areas are more willing to breastfeed due to the influence of traditional beliefs (Demirtas et al., 2012; Wang et al., 2023). In our study, religion was also associated with breastfeeding practices ($p < .03$).

In this study, the majority were satisfied with the breastfeeding experience (69.3%). Breastfeeding satisfaction was four times more likely when neither twin required NICU care than when both required admission ($p < .01$). Rural traditions foster EBF, motivating women to prioritize it. Similarly, in our study, despite being motivated, when unable to sustain EBF, mothers expressed dissatisfaction; for example, this mother said: 'I was not able to breastfeed my babies since their birth as they were in NICU, and then there was no milk, now I don't share with anyone that I didn't breastfeed my babies ... people are judgmental ... I feel guilty about not breastfeeding my babies.'

Similarly, cultural beliefs, social learning and family members influenced breastfeeding practices in a study of Turkish women (Demirtas et al., 2012). Another study among American and African mothers reported maternal guilt over not being able to EBF (Asiodu, 2015). Mothers are sometimes pressured to breastfeed

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their babies: 'They ask you — are not you going to breastfeed? I want to, but it does not work. Then, you feel inadequate. Everyone else is breastfeeding, so why can't I? (M18).

In previous studies, mothers have reported a lack of support as the main reason for nonexclusive breastfeeding. However, in our research, family support may be assumed as one factor in the continuation of extended breastfeeding until 1 year (13.7%), and for some mothers, it was 2 years (46.6%). Literature on extended breastfeeding among mothers of twins is not available; on the other hand, previous studies among singletons report that mothers living in a rural area, marrying young, and who are assisted by family and friends tend to follow EBF (Mehta et al., 2017). Though the type of support was not explored, findings denote that mothers did not get any formal information support in terms of breastfeeding techniques for twins, which is reflected in the comments about handling twins as a significant challenge for tandem breastfeeding. Studies report practical issues, infant behavior, and sleep patterns as another challenge discouraging tandem feeding (Nyqvist, 2002).

Most of the mothers (57.5%) breastfed their twins by consecutive technique, whereas a small proportion (16.4%) opted for tandem feeding and 26% combined both techniques. The cradle hold was the most common position (63.9%), and 27.8% practiced the football hold. In another study, seven mothers out of a total of thirteen mothers, practiced the football hold (Nyqvist, 2002).

Personal preference, cultural norms and/or previous experiences may influence the choice of breastfeeding technique. Understanding these approaches will assist in providing tailored support for breastfeeding mothers of multiples.

Each technique has its limitations. Despite the benefits of the tandem breastfeeding technique, mothers faced challenges. Similar benefits of time-saving, fostering a strong bond between twins, enhanced maternal satisfaction, and challenges like the small size of babies, lack of control, pain, insufficient milk supply, and fear while practicing tandem feeding were reported in a previous study (Cinar et al., 2014). Reviews and guidelines mentioned how simultaneous feeding of two babies is likely to stimulate simultaneous let-down and can facilitate feeding if one infant has weak sucking. However, the practicalities of the tandem breastfeeding technique can be complex to manage without help in the early stages of breastfeeding, particularly if two hands are needed to encourage a satisfactory latch (Flidel-Rimon, 2006; Gromada & Spangler, 1998; Hattori & Hattori 1999; McGovern, 2014). Supported by findings of a study mentioning lack of assistance leads to the choice of the consecutive breastfeeding technique (Cinar et al., 2014).

Two research studies that have shed light on maternal guidance for mothers of twins to supplement existing guidelines from breastfeeding organizations and reviews suggest introduction to simultaneous feeding, and emphasize support, self-care, and use of comfort devices like footstools, breastfeeding pillows and chairs for breastfeeding, as well as the need to inform mothers on the production and expression of breast milk (Cinar et al., 2014; Nyqvist, 2002).

The influence of interlinked factors on breastfeeding practices emphasizes the urgent need for comprehensive support systems through practical information to address both physiological and psychosocial aspects to optimize breastfeeding outcomes and alleviate maternal perceptions of low milk supply, guilt and societal pressures with the adoption of simultaneous breastfeeding technique and enhanced self-efficacy and NICU experience.

Limitations

The inability to collect methodical qualitative data regarding maternal perspectives represents a limitation. As this is a retrospective cross-sectional study, the chances of recall bias are high and lack causal inferences. Without prospective follow-up, the change in breastfeeding practices over time could not be ascertained. Furthermore, we explored the breastfeeding experience based on the mothers' self-perspective alone, which could lead to recall bias. The verbal administration of the questionnaires in front of family members may have led to a reporting bias. Another limitation of the small sample size and homogenous demographic characteristics of participants determining significant associations posed challenges and limited its generalizability. However, the generalization is only possible in the vicinity area where mothers share the homogenous socio-demographic characteristics.

Strengths

Our study is the first of its kind to explore the breastfeeding practices among mothers of twins in this geographical area, which is well known for the highest number of twins after Igbo-Ora in Nigeria. Face-to-face interviews reduced the attrition rate. Hence, a high response rate enhanced the validity of the study findings. Efforts were taken to minimize recall bias as mothers were interviewed in the presence of family members, mostly a mother-in-law or mother, which helped mothers recall the breastfeeding practices.

Recommendation

Mothers are capable of providing sufficient milk for their multiples; however, tailored interventions to address the challenge of maternal perception of insufficient milk and breastfeeding techniques to combat fatigue and enhance satisfaction based on a better understanding of current practices are necessary, along with intensified communication to convey the adequacy of breastmilk. Providing illustrated materials, handouts, videos during the early antenatal period, and telephonic breastfeeding support can help mothers maintain motivation and continue EBF. Policies should be developed to support both these factors at the hospital and community levels.

Conclusion

Our study sheds light on breastfeeding practices and some challenges among mothers of twins. Despite the challenges, commendable efforts are noted to maintain extended breastfeeding. While EBF remains difficult, any amount of maternal milk benefits twins, considering their prematurity. Evidence-based interventions to address twins' breastfeeding challenges are lacking; hence, trials are necessary to sustain optimal breastfeeding practices among mothers of twins.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/thg.2024.31.

Availability of data and materials. The data on this research study is available from the corresponding author upon reasonable request.

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