

## Determinants of bottle feeding among 0- 24 months children


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**Background:** To study various determinants of bottle feeding like factors related to children, mother and other factors. **Methods:** cross sectional study done from February 2019 to November 2019. A total 390 children were included in this study. Children who were 0-24 months & anytime bottle fed during this period and who were attending pediatric department of G.G. Govt. hospital & One private hospital, were enrolled. Data collected by interviewer & entered in case record sheet. **Results:** M:F ratio is 1.56. Bottle feeding seen in all socio-economic classes with highest rate in upper socio-economic class I. History of NICU stay was found in 25.6%. Percentage of preterm, twins & congenital anomaly are 14.4,12.3 & 3.6 respectively. Most mothers are 20-34 age & nonworking. About 30.3% had history of LSCS. About 14.4% have breast problem & 69.7% mothers had belief of "Not enough milk". Maternal death/non availability, hypothyroidism, chronic illness, smoking & psychosis seen in only 1.5,0.5,2.1,3.6 & 0.5 percentage respectively. 99.5% mothers don't have proper knowledge of breastfeeding in antenatal period. 31.8% mothers got inputs from nearby circle to start bottle feeding. 28.79% have unsupportive father & 17.48% have unsupportive family.19.02% have >2 kids. 10.8% does not have proper spacing. 14.4% shows previous h/o bottle feeding. **Conclusions:** Improper maternal knowledge regarding breast feeding, mothers' belief of "Not enough milk", inputs to start bottle from nearby circle, LSCS delivery, Male child, NICU stay, Unsupportive father & >2 kids are most eminent factors. There is a strong need for lactation guidance during antenatal period & breast-feeding counseling to mother, father and close family members.

**Keywords:** Bottle feeding, Determinants, Breastfeeding knowledge

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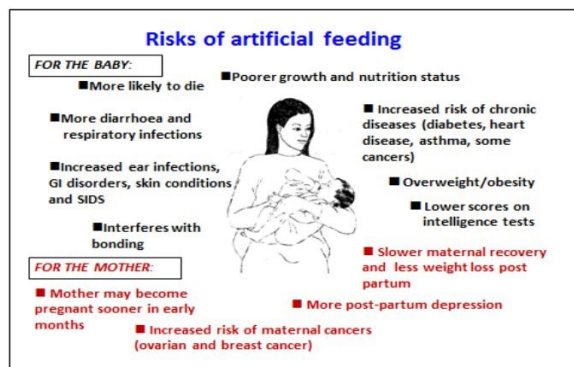


## Introduction

Exclusive breast-feeding rate among 0-6-month children in India is about 55% only [1]. Optimal breastfeeding practices include exclusive breastfeeding (breast milk with no other foods or liquids) for the first six months of life, followed by breast milk and complementary foods (solid or semi-solid foods) from about six months of age on, and continued breastfeeding for up to at least two years of age at beyond, while receiving appropriate complementary foods.

Breast milk contains all the nutrients that an infant need in the first 6 months of life, including fat, carbohydrates, proteins, vitamins, minerals and water [2]. It protects babies from diarrhoea and acute respiratory infections, stimulates their immune systems and response to vaccination, and, according to some studies, confers cognitive benefits as well [3]. Breast feeding fosters a physical & emotional bonding contact between mother & baby. It can be a means to protect, promote and support the health of both mother & the baby. Exclusive breastfeeding for 6 months has potential to reduce under-5 mortality [4]. An estimated 14% of deaths in children aged 0-23 months might be prevented by increasing breast feeding rate, and at least 6% of mortality in children under five might be prevented by adequate complementary feeding [5,6].

WHO developed recommendations for exclusive breastfeeding up to 6 months, safe complementary foods after that & avoidance of bottle feeding [7]. Rate of bottle feeding differs in various countries. There is no data from India regarding various factors responsible for bottle feeding practice. Various reasons for bottle feeding mentioned by mothers were illness, breast problems & perception of insufficient milk [8].



**Fig-1: Risks of artificial feeding. Adopted from: Breastfeeding counselling: A training course. Geneva, World Health Organisation, 1933 (WHO/CDR/93.6) [9].**

Whatever may be the reason for selection of bottle feeding by mother, WHO recommends avoidance of bottle feeding & breastfeeding in all mothers including HIV positive mother.

As shown in above figure, artificial feeding in any form is harmful for baby and mother. Study done by Chen et al suggests that oxygen saturation and body temperature of the preterm infants were significantly higher when they were directly breastfed instead of bottle feeding [10]. So, breast feeding is more physiological feeding method for the preterm infants and may be bottle feeding is more stressful. Use of bottle, even among initially breast-fed children interferes negatively with oral development [11].

Bottles are deleterious to the establishment of breastfeeding not only because they decrease the prolactin response but also because the baby may refuse the breast completely once given a bottle. The mechanisms of suckling at the breast and sucking a bottle are completely different, and babies who are bottle fed refuse breast feeding because of nipple confusion. Therefore, this study aimed to know various determinants of bottle-feeding including children factors, maternal factors & other social factors with the hope this study will help to understand various reasons to start bottle feeding and better way to prevent it.

## Methods

**Type of study:** cross sectional study

**Duration:** 10 months duration from February 2019 to November 2019.

**Setting:** Paediatric department of G. G. govt. hospital & one private hospital

**Inclusion criteria:** All children 0-24-month

Age, with history of bottle feeding anytime after birth. Use of bottle feeding was decided based on the WHO definition for bottle feeding: 'any liquid including breast milk or semisolid food from a bottle with nipple/teat [12].

**Exclusion criteria:** Those who had not given consent were excluded.

**Sampling technique:** Convenient nonprobability sampling technique was used.

Ethical approval was taken from IEC (Institutional ethical committee), Shree M. P. shah medical college, Jamnagar. Most of the patients attending govt. hospital were from middle to lower socioeconomic class. To fetch data from upper socioeconomic class, private hospital also included. A structured questionnaire was prepared for data collection, tested among 20 mothers (not included in study) & necessary corrections done before final data collection. All data collected by two interviewers who are paediatrician. All mothers were counselled regarding optimal breast-feeding practices at the end of interview. Over 9 months of study duration, the present study got 390 children aged 0-24 months with bottle feeding from both government & private hospital. Informed written consents from parents/caretaker of all participants were taken. Data collected & stored. Data analysis was done by epi-info 7.2 & SPSS software.

## Results

A total 390 children with bottle feeding were enrolled in study. Table 1. Provides anthropometry measures of children under study (Table 1).

**Table-1: Anthropometry measures of children under study.**

	Weight (kg) (n = 390)	Height (cm) (n = 390)	HC (cm) (n = 390)	MUAC (cm) (n = 242)
Mean	6.79	65.32	41.90	13.01
Std. Deviation	2.76	12.55	4.26	1.24
Minimum	1.40	7.00	31.00	8.50
Maximum	14.50	97.00	61.00	15.00
Percentiles	Q1	4.70	56.00	39.00
	Q2	6.75	66.00	42.50
	Q3	8.35	74.00	45.00
	IQR	3.65	18.00	6.00

MUAC (mid upper arm circumference) measured in >6 months children only.

This study analysed 390 children who were bottle fed any time after birth, till 2-year age. Mean weight was 6.79 kg and mean height was 65.32 cm. Mean head circumference was 41.9 cm and mean MUAC (Mid upper arm circumference) in more than 6 months children was 13.01cm. Determinants of bottle feeding in children are shown in Table 2.

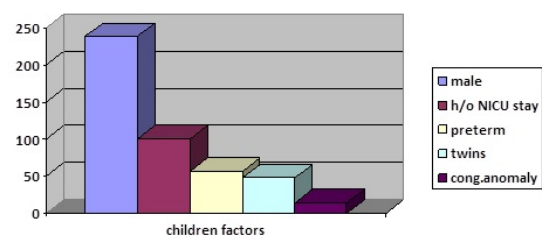
**Table-2: Determinants of bottle feeding in children**

		Frequency (n=390)	(%)
Age of child	0-6 months	150	38.5
	6 -24 months	240	61.5
Gender	Male	238	61.0
	Female	152	39.0
Socio economic class	I	104	26.7
	II	36	9.2
	III	88	22.6
	IV	96	24.6
	V	66	16.9
Place of interview	Government hospital	226	57.9
	Private hospital	164	42.1
Oedema		2	0.5
Term Delivery	Full term	334	85.6
	Preterm	56	14.4
h/o NICU stay for >24 hour		100	25.6
Singleton delivery	Single	342	87.7
	Twins/Triplets	48	12.3
Syndrome/ Cong. Anomaly		14	3.6

Modified BG Prasad’s social classification was used to classify socio economic class [13].

150 (38.5%) children were 0-6months age group and 250 (61.5%) children were 6-24 months age group. Out of 390 children, 61% were male, showing very high rate of bottle feeding in male. Maximum numbers of children with bottle feeding were from S.E. class I (26.7%), followed by S.E. class IV (24.6%), III (22.6%), V (16.9%) and II (9.2%). It suggests that socioeconomic class doesn’t improve optimal feeding practice and need to improve knowledge of breastfeeding in all classes of people.

During this 10-month duration, 42.1% children were encountered from private hospital and 57.9% children from government hospital. Only 14.4 % children were born preterm, all other were full term born. It suggests that without any obvious problem of sucking and swallowing bottle feeding was started in full term children. 25.6% had H/O NICU stay for more than 24 hours.



**Fig-2: Children factors.**

So, issue of separation of mother from baby was there in 25.6% only rest 74.6% children were there with mother only after birth. Only 12.3% children were twin/triplet (Figure 2).

Maternal factors for starting bottle feeding are shown in Table 3. (Table 3)

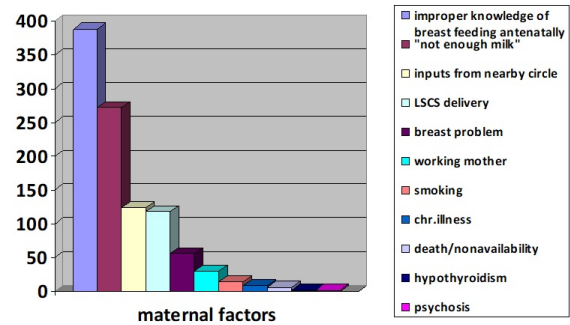
**Table-3: Maternal factors for bottle feeding**

		Frequency	(%)
Age (years)	< = 19	6	1.5
	20 - 34	376	96.4
	>= 35	8	2.1
Education*	0	110	28.2
	1	78	20.0
	2	44	11.3
	3	58	14.9
	4	100	25.6
Working mother		30	7.7
Type of delivery	Vaginal	272	69.7
	LSCS	118	30.3
Breast problems		56	14.4
"Not enough milk" according to mother		272	69.7
Maternal death/non availability		6	1.5
Hypothyroidism		2	0.5
Chronic illness		8	2.1
Smoking		14	3.6
Psychosis		2	0.5
Proper knowledge of breastfeeding in Antenatal period		2	0.5
Inputs to start bottle from nearby circle		124	31.8

\*Education- 0=illiterate, 1= up to primary school, 2= up to middle school, 3= high school, 4= graduate/higher

Most of the mothers were 20 to 34 years age. Illiterate mother and those who studied up to graduate or even higher both were showing higher rate of bottle feeding, 28.2% and 25.6% respectively. That means even educated mother require proper health education. Even I feel that Breast feeding education should be part of our routine education system. Work related issue seen in only 7.7% mother. Almost 2/3rd (69.7%) mothers had delivery by vaginal route. And 1/3rd (30.3%) had h/o L.S.C.S. Breast problems were seen in 14.4% mothers. Most of the mothers (2/3rd) had issue of "Not enough milk". Almost all (99.5%) mothers didn't get proper knowledge and understanding of breast feeding during antenatal period. That suggests weakness of our health programme and mostly during antenatal period no one cares for breastfeeding which mothers have to give during postnatal period.

31.8% mothers influenced by females from nearby circle and started bottle feeding. There is a strong need to involve gynaecologist and health care providers who are in contact with mothers for 9 months antenatal period for spreading breast feeding education (Figure 3).



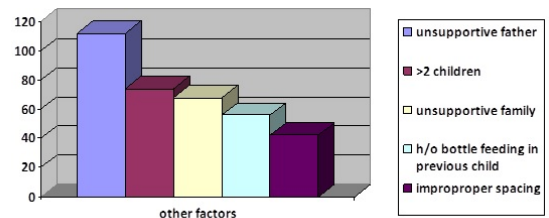
**Fig-3: Maternal factors.**

Other factors like supportive father & family, spacing of children, number of children and history of bottle feeding in previous child are shown in Table 4.

**Table-4: Other factors responsible for bottle feeding**

	Frequency	Percentage
Unsupportive father	112	28.8
Unsupportive family	68	17.5
Improper spacing between children	42	10.8
>2 children	74	19.0
H/o bottle feeding in previous child	56	14.4

28.8% fathers and 17.5% of family were not supportive as per mother. 10.8% mothers had improper spacing which increase workload of mother and hamper nutrition of mother and children. 19 % mothers had more than two children and 14.4% mothers had h/o bottle feeding in previous child also (Figure 4).



**Fig-4: Other factors**

## Discussion

This study suggests out of 390 children, 61% are male compared to 39% of female were bottle fed.

It shows quite higher rate in male children. Predominance of male was seen in the present study which was in line with study done in Brazil where 34,366 children aged under 1 year were analyzed, and observed that predominance of children with use of pacifier, bottle or artificial nipple, aged under 6 months (54.5%) and of the male gender [14]. Reason for this may be that mother's belief of high nutrition requirement of male. Cultural construction of gender can influence this decision and can lead to increase use of bottle feeding in male. However, it requires further exploration.

Distribution of bottle-feeding practice in socio economic class in descending order is Class I (26.7%), Class IV (24.6%), Class III (22.6%), Class V (16.9%) & Class II (9.2%). It suggests that bottle feeding is prevalent in all socio-economic classes but highest rate in S.E. class I, this is in line with previous studies that found higher socio-economic status to be associated with bottle feeding [15,16,17]. In this study, Second and third highest rate of bottle feeding seen in class IV and class II. It suggests involvement of even lower socio-economic class is quite higher. Reason for higher rate of bottle feeding in Class I may be affordability to buy bottle, nipple/pacifiers and formula milk powder. Reason for higher rate in lower classes may be lack of knowledge.

25.6 % children had h/o NICU stay. This explains by separation of mother from baby due to NICU admission. It suggests requirement of free entry of mother in NICU, counselling to mothers of neonates requiring NICU admission & requirement of lactation guide particularly to this target group. 14.4% children were preterm born. Rate of exclusive breast feeding at discharge varies widely among units for infants born prematurely. Early involvement of parents and kangaroo care may help to improve breast feeding rate in preterm. Further research should explore what determines the quality of protocols to implement best feeding practices and how to ensure adherence.

In this study, 12.3% children with were twin/triplets born. Studies done from Japan recorded significantly lower rate of exclusive breastfeeding and shorter duration of breast feeding among twin/triplets than among singleton babies [18,19]. Rate of bottle feeding among children with congenital anomaly were 3.6%. 96.4 % mothers are falling into 20-34 years age group.

Mothers' literacy rate in this study was 28.2% illiterate, 25.6% mothers were graduate/higher, 20% mothers studied up to primary school, 14.9% studied up to high school & 11.3% studied up to middle school. It shows that education level of mother does not help to avoid bottle feeding in contrast to study from Ethiopia [20]. This finding is in consonance with studies done by Hazir et al. And Boerme et al [21]. That showed that increasing level of education was significantly associated with higher level of bottle-feeding use. It suggests that higher mother's education status does not necessarily mean increased awareness and understanding of the advantages of bottle feeding. Health education on importance of breast feeding and avoidance of bottle use should be emphasized.

Out of all maternal determinants, 99.5% mothers did not receive proper education of breast feeding during antenatal period, it was very high proportion as compared to study done in Sudan (50%) [22]. Study from India suggests that nearly one-third of the antenatal mothers (out of 250 women) lacked awareness on breastfeeding practices. Although all intended to breastfeed, still 64% knew about exclusive breast feeding [23].

Mothers who did not receive breast feeding education sessions from healthcare personnel during pregnancy and/or after delivery had almost two times risk of bottle feeding compared to mothers who received breast feeding education [22]. Breast feeding education is efficient for promotion of exclusive breastfeeding & also helpful to avoid harmful bottle feeding practice [24,25].

69.7% mothers had perception of "not enough milk". This finding is in consonance with many study that suggests that mothers own psychological issue such as a feeling of insufficient breast milk, incomplete breast feeding has been widely recognised as the most common barrier to breastfeeding and same time most common reason to initiate formula before the age of the 6 months [26,27]. 31.8% mothers got inputs from family members like grandmother or other nearby circle to start bottle feeding. Correcting the misinformation of family & friends may provide a better opportunity for support to mother [28].

30.3 % mothers had delivery by LSCS route. Study done by Victoria et al found that woman who had caesarean delivery breastfed for a shorter period and resorted to pacifiers more frequently [29].

Other study suggests that women having caesarean deliveries showed a significant delay in the initiation of breastfeeding, which could lead to decreased frequency of breastfeeding and increased use of artificial nipples [30]. 14.4% mothers had breast problems.

Only 7.7% mothers were working mother in contrast to study done in Namibia by Anslem S. Berde. In Namibia study, 40.5% mother was working mother [17]. Rate of bottle feeding is higher in housewife. Rate of other maternal factors like smoking (3.6%), chronic illness (2.1%), maternal death or non availability (1.5%), hypothyroidism (0.5%) and psychosis (0.5%) were very less.

In other social & family factors, 28.8% mothers had unsupportive spouse and 17.5 % mothers had unsupportive family. It suggests involvement of father in breast feeding counselling will be helpful to improve optimal breast feeding, in line with study published in British Journal of Mid wifery [28].

Study done by Vivienne A. Rose also indicate that 1) support of mother's partner, 2) the breastfeeding knowledge of the partner and of the family that most influence the choice of infant feeding method, and 3) misconceptions and lack of knowledge on the part of mothers may be a barrier to breastfeeding [31]. 19% mothers had >2 children. 14.4% had h/o bottle feeding in previous child & 10.8 % mothers had improper spacing between two kids.

## Conclusion

Improper knowledge of breast feeding during antenatal period, perception of "not enough milk", inputs to start bottle from nearby circle, LSCS delivery, unsupportive father, >2 kids, male child & h/o NICU stay are major reason to start bottle feeding.

## What the study adds to the existing knowledge?

Lactation counseling should be incorporated in our education system & strong need for proper breast-feeding education from antenatal period.

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