

To compare gavage, cup and palady feeding methods in terms of weight gain in preterm newborn

¹Dr. Kapil Kumar Tak, Junior Specialist (MD Paediatric Medicine), District Hospital, Kekri, Ajmer.

²Dr. Mukesh Kumar Dhaker, MD Paediatric Medicine, Bhilwara

³Dr. Anurag Singh, Senior professor & HOD, Department of Paediatric Medicine, DR. S. N. Medical College, Jodhpur

Corresponding Author: Dr. Mukesh Kumar Dhaker, MD Paediatric Medicine, Bhilwara

Citation this Article: Dr. Kapil Kumar Tak, Dr. Mukesh Kumar Dhaker, Dr. Anurag Singh, “To compare gavage, cup and palady feeding methods in terms of weight gain in preterm newborn”, IJMSIR- June - 2020, Vol – 5, Issue -3, P. No. 196 – 207.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: There is no consensus for premature newborns, who cannot be breastfed or who cannot suck because of their immaturity. We tried to evaluate the different feeding methods like cup, palady, OG Tube and NG tube to ascertain their acceptability efficacy and safety.

Methods: This randomized control trial conducted at Umaid hospital, attached to Dr. S.N Medical College, Jodhpur. All preterm neonates with a gestational age between 30 to 34 weeks as defined below were included in the study after a written informed consent. A total of 100 neonates, those meeting the inclusion criteria were taken in the study. These neonates were randomized into four groups – NG group, OG group, Palady group, and Cup group by block randomization comprising of 25 neonates each.

Results: The mean weight gain by the neonates in NG, OG, PALADY and CUP groups were 12.74±5.43 mg/kg/day, 12.88±1.36 mg/kg/day, 14.48±3.66 mg/kg/day and 19.32±6.32 mg/kg/day respectively. The difference was statistically significant for NG vs CUP, OG vs PALADY, OG vs CUP and PALADY vs CUP.

The difference was highly statistically significant when CUP is compared with any of the three methods.

Conclusion- we conclude that feeding in preterm low birth weight neonates who cannot breast feed is best achieved by cup which was found to be the most convenient, acceptable and economical method. Neonates on cup feeding showed better weight gain.

Keywords: Feeding, Cup, Palady, OG.

Introduction

Breast milk provides optimal nutrition for newborn infants, and the ideal way for infants to receive breast milk is through suckling at the breast. Unfortunately, this may not always be possible, as there are numerous reasons why a newborn infant may not be able to breastfeed and, as a result, require supplemental feeding. Currently, there are a variety of ways in which newborn infants can receive supplemental feeds. Traditionally, bottles and nasogastric tubes have been used; however, more recently, cup feeding has become a popular practice in many nurseries in an attempt to improve breastfeeding rates. There is no consistency to guide the choice of supplementation.¹

Breastfeeding is the best source of nutrition for children. In addition to providing the necessary nutrients to child health, the sucking movements promote the growth and normal development of oral-facial structures. The WHO recommends that newborns are exclusively breastfed for the first six months of life.²⁻³

Is cup feeding a better way to feed babies, rather than giving bottles or feeding with a tube, when mothers are unable to fully breastfeed⁴

Four studies compared cup and bottle feeding: the results of three of these studies demonstrate that infants who were cup fed were more likely to be exclusively breastfed at hospital discharge.¹

There is no consensus for premature newborns, who cannot be breastfed or who cannot suck because of their immaturity. We tried to evaluate the different feeding methods like cup, palady, OG Tube and NG tube to ascertain their acceptability efficacy and safety.

Material and Methods

The current study was a randomized control trial conducted at Umaid hospital, attached to Dr. S.N Medical College, Jodhpur. All preterm neonates with a gestational age between 30 to 34 weeks as defined below were included in the study after a written informed consent. A total of 100 neonates, those meeting the inclusion criteria were taken in the study. These neonates were randomized into four groups – NG group, OG group, Palady group, and Cup group by block randomization comprising of 25 neonates each.

Inclusion Criteria

All the pre-terms (gestational age 30-34 weeks) born in hospitals attached to Dr. S N Medical College or born outside and referred here satisfying the following criteria will be included

1. Baby should be stable and off oxygen

2. There should be no significant respiratory distress, no apnea episodes, temperature instability, severe sepsis at the time of enrolment.

Exclusion Criteria

1. Unstable babies requiring inotropes, ventilatory support, CPAP, oxygen
2. IVH/ICH
3. Systemic dysfunctions like renal injury, liver injury
4. Gross congenital malformations
5. Syndromic/dysmorphic babies

Flow of Study

- Total enrollment
 - Randomization
 - 4 groups
1. Gavage – NG
 2. Gavage –OG
 3. Palady
 4. Cup

Feeding Protocol to Be Followed

- Starting volume – 20-60 ml/kg/day
- Frequency – 2 hourly
- Increment – up to 30 ml/kg/day as per tolerance
- Maximum – 180 ml/kg/day
- Nonnutritive sucking and trial of breast feeding will be given to all babies as early as possible.
- Good coordinated sucking for sufficient period of time in correct positioning and attachment as witnessed by at least two different observers independently over a 24hour period of time will qualify the child as breast feeding. Directly observed breastfeeding will continue to be the feeding method from here onwards.
- Maintenance of temperature, asepsis and other standard treatment protocols will be uniformly followed in all children

Feeding Methods

Gavage (NG & OG) Feeding

1. Remove the plunger of a 10 or 20 ml sterile syringe.
2. Connect the barrel of the syringe to the end of the gastric tube.
3. Fill the barrel of the syringe with the required volume of milk.
4. Let the milk run from the syringe through the gastric tube under gravity.
5. DO NOT force milk through the gastric tube by using the plunger of the syringe.
6. Hold the syringe 5-10 cm above the infant until the syringe is empty.
7. It should take a few minutes for the milk to flow into the infant's stomach. Changing the height of the syringe will also affect the speed of milk flow. Lowering the syringe slows the milk flow, raising the syringe makes the milk flow faster.
8. Observe the infant during the entire gastric tube feed. Do not leave the infant unattended. Stop the tube feed if the infant shows any of the following signs: breathing difficulty, color change (looks blue), becomes floppy or vomits.
9. Cap the end of the gastric tube after the milk has been instilled. There is no need to rinse the tube with water. Keep tube capped between feeds.

Palady Feeding



1. The infant should be awake and held sitting semi-upright on the caregiver's lap and wrapped to provide support and to keep the arms out of the way, as for cup feeding.
2. Put a measured amount of milk in the palady.
3. Hold the palady so that the pointed tip rests lightly on the infant's lower lip.
4. Tilt the palady to pour a small amount of milk into the infant's mouth gently.
5. Feed the infant slowly.
6. Make sure that the infant has swallowed the milk already taken before giving any more.
7. When the infant has had enough, will close his or her mouth and will not take any more. Do not force-feed the infant.
8. Estimate the amount of milk taken.
9. Wash the palady with soap in running water and air-dry it before and after each use

Cup Feeding



1. The infant should be awake and held sitting semi-upright on the caregiver's lap. Wrap the infant in a cloth to provide support and to keep his or her arms out of the way and put a small cloth on his or her front to catch drips of milk.
2. Put a measured amount of milk in the cup.
3. Hold the cup so that it rests lightly on the infant's lower lip.

4. Tilt the cup so that the milk reaches the infant's lips.
5. Allow the infant to take the milk himself. (A younger infant will initially lap the milk into his mouth with his tongue. A full term or older infant will suck the milk.)
6. Do not pour the milk into the infant's mouth. Hold the cup to the infant's lips so that and he or she can take it himself or herself.
7. Feed the infant slowly.
8. Make sure that the infant has swallowed the milk before offering more. When the infant has had enough, he or she will close his or her mouth and will not take any more. Do not force-feed the infant.
9. To estimate the amount of milk taken, subtract the milk left in the cup from the original amount. Also subtract the estimated spillage, if any.
10. Wash each utensil with soap in running water and air-dry it before and after each use.

Change in the feeding method

The feeding method will be changed if the baby will not be gaining the expected weight, attendant will not comfortable with it or if not doing it properly or the baby able to tolerate a more interactive method. Reason for the change will noted and progress on the new feeding method will be recorded separately and compared with progress on prior method.

End Point

Achievement of exclusive breast feeding or development of complication like hypoglycemia, aspiration or NEC.

Acceptability

A score was design to quantify the ease of use of each method by the care giver:

Quantify ease of use

Score	
01	I could not adapt to the method at all and wish to switch to another method of feeding.
02	It was difficult to adapt and required professional help from time to time.
03	It was slightly difficult to follow the method alone and I needed the support of my family.
04	I could adapt to the method easily but sometimes required help from family and professionals.
05	The method was simple, easy to use and satisfactory.

Expenditure

To quantifying the economy of feeding method following data was used

OG /NG

Number of Feeding tubes required X Rs. 15 per tube
 Number of 5 ml Syringes Required X Rs. 5 per Syringe
 Number of DW Ampoules required X Rs. 10 per vial
 Number of Man hours of trained staff required X Rs. 50/hour

Cup/Palady

Number of CUP/PALADY required X Rs. 15 per piece
 Number of Man hours of trained staff required X Rs. 50/hour

Observations

It was a randomized control trial conducted over a period of one year at UMAID hospital attached to Dr. S.N medical college, Jodhpur after approval from the institutional ethical committee. During the study period a total 100 neonates of gestational age between 30-34 weeks were enrolled in the study. These neonates were randomized into four groups – NG group, OG group,

Palady group, and Cup group by a random number table comprising of 25 neonates in each group. Feeding started in each group with assigned method according to the NICU feeding protocols. Routine neonatal examination done every day and looked for any complications (Hypoglycaemia, Apnoea, Aspiration, Feed-Intolerance, NEC, and Other Infections). Weight and temperature noted twice daily. Counselling of caregiver (Mother / Father / Maternal Grandmother / Paternal Grandmother / Maternal Aunt / Paternal Aunt / Maternal Uncle / Paternal Uncle / Other) was done about the feeding method used. Problems reported by the caregiver about use of the feeding method were verified by the paediatrician and noted and appropriate actions were taken to correct those problems in form of

counselling of the caregiver, repeat demonstration of correct method of feeding, confidence building, or other help needed. Feed was given in 2 hourly intervals, Pre and Post feed abdominal girth was monitored for feed intolerance, frequency of urine, motion was noted for adequacy of feed. If any baby required to change the feeding method, reason for the change noted and progress on the new feeding method was recorded separately and compared with progress on prior method. All the four groups were compared in terms of weight gain, volume of feed ingested, number of hours taken to achieve complete breast feed, associated complications and overlap time with breast feeding, acceptability, expenditure incurred on the method of feeding.

Table 1: Age wise distribution of cases in all groups

Age (in days)	NG	OG	Palady	Cup	Total
1-3	6 (24%)	12 (48%)	9 (36%)	9 (36%)	36
4-6	11 (44%)	13 (52%)	13 (52%)	14 (56%)	51
7-9	2 (8%)	0	1 (4%)	2 (8%)	5
>10	6 (24%)	0	2 (8%)	0	8
Mean± SD	6.12±3.97	4.08±1.32	4.76±2.20	4.32±1.42	--
Total	25	25	25	25	100

[NG vs OG p=0.018, NG vs PALADY p=0.140, NG vs CUP p=0.038, OG vs PALADY p=0.192, OG vs CUP p=0.541 and PALADY vs CUP p=0.407]

The mean age of enrolment for NG group 6.12±3.97 days, for OG group 4.08±1.32 days, for PALADY group 4.76±2.20 days and for CUP group was 4.32±1.42 days.

Maximum number of the newborns in all the four feeding methods enrolled are between 4 to 6 days of age. Total of 51 newborns out of 100 (51%) in this range.

Table 2: Gender wise distribution of cases in all groups

Gender	NG	OG	Palady	Cup	Total
Male	19 (76%)	13 (52%)	16 (64%)	17 (56%)	65
Female	6 (24%)	12 (48%)	9 (36%)	8 (32%)	35
Total	25	25	25	25	100

[NG vs OG p=0.077, NG vs PALADY p=0.354, NG vs CUP p=0.528, OG vs PALADY p=0.390, OG vs CUP p=0.248 and PALADY vs CUP p=0.765]

The number of male of male neonates were higher in all the feeding groups. Male to female ratios in NG, OG, PALADY, and CUP feeding group were 3.1:1, 1.08:1,

1.7:1, 2.1:1 respectively. Statistically no significant difference was observed between the groups based on gender distribution.

Table 3: Gestational age wise distribution of cases as per Modified Ballard Scoring

Gestational age (in weeks)	NG	OG	Palady	Cup	Total
30±2	4 (16%)	4 (16%)	1 (4%)	6 (24%)	15
32±2	21 (84%)	20 (80%)	13 (52%)	18 (72%)	72
34±2	0	1 (4%)	11 (44%)	1 (4%)	13
Mean± SD	31.68±0.74	31.76±0.87	32.8±1.15	31.6±1.0	--
Total	25	25	25	25	100

[NG vs OG p=0.730, NG vs PALADY p=0.0002, NG vs CUP p=0.750, OG vs PALADY p=0.0008, OG vs CUP p=0.550 and PALADY vs CUP p=0.0003]

Mean gestational age (in weeks) of neonates in NG, OG, PALADY and CUP groups were 31.68±0.74, 31.76±0.87, 32.8±1 and 15, 31.6±1.0 respectively.

The difference was statistically significant for NG vs PALADY, OG vs PALADY and PALADY vs CUP groups.

Table 4: Weight wise distribution of cases

Weight (kg)	NG	OG	Palady	Cup	Total
≤1.2	5 (20%)	3 (12%)	0	1 (4%)	9
1.2-1.5	18 (72%)	22 (88%)	14 (56%)	22 (88%)	76
>1.5	2 (8%)	0	11 (44%)	2 (8%)	15
Mean± SD	1.34±0.15	1.35±0.11	1.52±0.13	1.38±0.09	--
Total	25	25	25	25	100

[NG vs OG p=0.801, NG vs PALADY p<0.0001, NG vs CUP p=0.270, OG vs PALADY p<0.001, OG vs CUP p=0.322 and PALADY vs CUP p=0.0002]

Mean weight of the neonates for NG, OG, PALADY and CUP groups were 1.34±0.15 kg, 1.35±0.11 kg, 1.52±0.13 kg and 1.38±0.09 kg respectively.

Maximum number of neonates were in between weight band 1.2 to 1.5 kg.

The difference was statistically significant for NG vs PALADY, OG vs PALADY and CUP vs PALADY groups.

Table 5: Volume of feed ingested

Volume of feed (ml/kg/day)	NG	OG	Palady	Cup	Total
60-100	11 (44%)	2 (8%)	2 (8%)	1 (4%)	16
101-150	13 (52%)	23 (92%)	23 (92%)	21 (84%)	80
≥151	1 (4%)	0	0	3 (12%)	4
Mean+ SD	102.92+20.10	112.4+8.13	114.24+13.10	126.52+16.62	--

[NG vs OG p=0.033, NG vs PALADY p=0.022, NG vs CUP p<0.0001, OG vs PALADY p=0.553, OG vs CUP p=0.0004 and PALADY vs CUP p=0.005]

The mean volume of feed ingested by the neonates in NG, OG, PALADY and CUP groups were 102.92+20.10 ml/kg/day, 112.4+8.13 ml/kg/day, 114.24+13.10 ml/kg/day and 126.52+16.62 ml/kg/day respectively.

The difference was statistically significant for NG vs OG, NG vs PALADY, NG vs CUP, OG vs CUP and PALADY vs CUP.

The difference was highly statistically significant when CUP is compared with any of the three methods.

Table 6: Weight gain of the cohort

Weight gain(gm/kg/day)	NG	OG	Palady	Cup	Total
≤10	8 (32%)	0	2 (8%)	0	10
10-20	15 (60%)	25 (100%)	23 (92%)	15 (60%)	78
21-35	2 (8%)	0	0	10 (40%)	12
Mean± SD	12.74±5.43	12.88±1.36	14.48±3.66	19.32±6.32	100

[NG vs OG p=0.906, NG vs PALADY p=0.192, NG vs CUP p=0.0003, OG vs PALADY p=0.046, OG vs CUP p<0.0001 and PALADY vs CUP p=0.001]

The mean weight gain by the neonates in NG, OG, PALADY and CUP groups were 12.74±5.43 mg/kg/day, 12.88±1.36 mg/kg/day, 14.48±3.66 mg/kg/day and 19.32±6.32 mg/kg/day respectively.

The difference was statistically significant for NG vs CUP, OG vs PALADY, OG vs CUP and PALADY vs CUP.

The difference was highly statistically significant when CUP is compared with any of the three methods.

Table 7: Complication reported by care giver

Complication	NG	OG	Palady	Cup
Unable to measure the amount of feed	16(64%)	9(36%)	16(64%)	6(24%)
Unable to express enough breast milk	4 (8%)	0	0	1(4%)
unable to hold syringe properly	11(44%)	8(32%)	0	0
Missed night time feed	21(84%)	9(36%)	5(20%)	0
Unable to follow schedule	3(12%)	0	0	0
Displacement of feeding tube	2(8%)	12(48%)	0	0
Unable to handle Palady/cup properly	0	0	9(36%)	9(36%)
Difficulty in feed by Palady/cup	0	0	11(44%)	3(12%)
Spillage while feeding	0	0	7(28%)	12(48%)

In NG group main complications reported by the care giver were missed night time feed (84%) and unable to measure the amount of feed (64%).

In OG group main complications reported by the care giver were displacement of feeding tube (48%) and unable to measure the amount of feed (36%).

In PALADY group main complications reported by the care giver were unable to measure the amount of feed (64%) and difficulty in feed by Palady (44%).

In CUP group main complications reported by the care giver were spillage while feeding (48%) and difficulty in feed by cup (36%).

Table 8: Complication observed by pediatrician

Complication as observed by pediatrician	NG	OG	Palady	Cup
Unable to measure the amount of feed	5(20%)	12(48%)	0	0
Not giving in time	18(72%)	9(36%)	5(20%)	2(8%)
Not checking position pre-feed	11(44%)	16(64%)	0	0
Not closing the lid after feed	0	0	0	0
Not maintaining proper hygiene	3(12%)	4(16%)	0	0
Not able to feed	0	0	0	0
Not handle Palady/cup properly	0	0	20(80%)	23(92%)
Spillage while feeding	0	0	7(28%)	2(8%)

In NG group main complications observed by pediatrician were, not giving in time (72%) and not checking accidental displacement of tube pre-feed (44%).

In OG group main complications observed by pediatrician were, not checking accidental displacement of tube pre-feed (64%) and Unable to measure the amount of feed (48%).

In PALADY group main complications observed by pediatrician were, not handle palady properly (80%) and Spillage while feeding (28%).

In CUP group main complications observed by pediatrician were, not handle cup properly (92%) and spillage while feeding (8%).

Table 9: Other Complications

Complications	NG	OG	Palady	Cup
Hypoglycemia	0	0	0	0
Apnea	0	0	0	0
Hypothermia	0	0	0	0
Aspiration	0	0	0	0
Neonatal septicemia	0	0	0	0
NEC	2 (8%)	2 (8%)	0	0
Other complications	0	0	0	0
No complications	23 (92%)	23 (92%)	25 (100%)	25 (100%)

In NG group, 2 (8%) newborn developed NEC.

In OG group, 2 (8%) newborn developed NEC.

In other two groups (PALADY and CUP) there was no other complications observed.

Discussion

It was a randomized control trial conducted over a period of one year at UMAID hospital attached to Dr. S. N. Medical College, Jodhpur after approval from the institutional ethical committee. During the study period a total 100 neonates of gestational age between 30-34 weeks were enrolled in the study. These neonates were randomized into four groups – NG group, OG group, Palady group, and Cup group by a random number table comprising of 25 neonates in each group. Feeding was initiated as early as possible and gradually increased as per NICU feeding protocols. Routine neonatal examination was done every day and a special note was made for complications like Hypoglycaemia, Apnoea, Aspiration, Feed-Intolerance, NEC, and Other Infections. Weight and temperature noted twice daily. Counselling of caregiver (Mother / Father / Maternal Grandmother / Paternal Grandmother / Maternal Aunt / Paternal Aunt / Maternal Uncle / Paternal Uncle /

Other) was done about the feeding method used. Problems reported by the caregiver about use of the feeding method were verified by the paediatrician and noted and appropriate actions were taken to correct those problems in form of counselling of the caregiver, repeat demonstration of correct method of feeding, confidence building, or other help needed. Feed was given in 2 hourly intervals, Pre and Post feed abdominal girth was monitored for feed intolerance, frequency of urine, motion was noted for adequacy of feed. The feeding method was changed if the baby was not gaining the expected weight, attendant was not comfortable with it or was not doing it properly or the baby was able to tolerate a more interactive method. Reason for the change was noted and progress on the new feeding method was recorded separately and compared with progress on prior method.

The mean volume of feed ingested by the neonates in NG, OG, PALADY and CUP groups were 102.92+20.10 ml/kg/day, 112.4+8.13 ml/kg/day, 114.24+13.10 ml/kg/day and 126.52+16.62 ml/kg/day respectively.

The difference was statistically significant in NG vs OG, NG vs PALADY, NG vs CUP, OG vs CUP, and PALADY vs CUP, with the volume of feed being statistically significantly larger with the more interactive methods of cup and palady as compared to the restricted and fixed volume methods of NG/OG feeding. The difference was statistically highly significant when CUP is compared with rest of three methods (NG vs CUP $p < 0.0001$, OG vs CUP $p = 0.0004$ and PALADY vs CUP $p = 0.005$).

Similarly, in a study done by N Malhotra et al, volume of feed (in ml/kg) was 12.5 ± 5.4 , 16.3 ± 5.9 , 18.4 ± 3.7 in bottle, cup and Palady feeding groups respectively⁵. They also found a higher volume of feed with the more interactive methods of cup and palady as there was no fixed volume of feed in these methods and the newborns could take the desired amount of feed unrestricted till they showed satiety.

The mean weight gain by the neonates in NG, OG, PALADY and CUP groups were 12.74 ± 5.43 mg/kg/day, 12.88 ± 1.36 mg/kg/day, 14.48 ± 3.66 mg/kg/day and 19.32 ± 6.32 mg/kg/day respectively.

The difference was statistically significant for NG vs CUP, OG vs PALADY, OG vs CUP and PALADY vs CUP.

The difference was statistically highly significant when CUP is compared with rest of three methods (NG vs CUP $p = 0.0003$, OG vs CUP $p < 0.0001$, PALADY vs CUP $p = 0.001$).

In a study conducted by Rekha et al, mean weight loss was 66 ± 66 g in Palady fed group and 56.59 ± 71 g in tube feed group.⁶ Ironically the study reports a higher calorie intake in the palady group but have attributed the weight loss to energy expenditure during the active feeding method. The same is not replicated in our or any other study.

In a study conducted by Maryam Marofi et al, better weight gains were found in the Palady vs the Cup group,⁷ but in the study only the first feed in each shift was given though palady or cup and then the rest of the feeds were given by gavage so the impact of the assigned method is not definite.

In similar studies done by, Rocha et al to see impact of cup feeding or bottle feeding on weight gain, Yilmaz et al also compare the effect of cup and bottle feeding, found no statistically significant difference in newborns weight gain^{8,9}. In our study, we did not use the bottle feeding as ours is a baby friendly hospital and bottle feeding is not practiced here.

In NG group main complications reported by the care givers were missed night time feed (84%) and inability to measure the amount of feed (64%).

In OG group main complications reported by the care givers were displacement of feeding tube (48%) and inability to measure the amount of feed (36%).

In PALADY group main complications reported by the care givers were inability to measure the amount of feed (64%) and difficulty in feed by Palady (44%).

In CUP group main complications reported by the care givers was spillage while feeding (48%) and difficulty in feeding by cup (36%).

In a study conducted by A Olaogun et al, observed that only 55.6% care givers positioned the neonate correctly and just 69.4 % care givers did not position the cup properly.¹⁰ Similarly, study done by Collin et al, Problems reported included spillage, taking too much time and the infant not feeding well.¹¹

These difficulties are lower in our study as the patients were under constant observation in a facility based newborn care unit and the care givers were supported frequently.

In NG group main complications observed by the pediatrician were, not giving in time (72%) and not checking the tube for accidental displacement (44%).

In OG group main complications observed by pediatrician were, not checking position pre-feed (64%) and inability to measure the amount of feed (48%).

In PALADY group main complications observed by pediatrician were, not handling Palady properly (80%) and Spillage while feeding (28%).

In CUP group main complications observed by pediatrician were, not handling cup properly (92%) and Spillage while feeding (8%).

In a study done by Collin et al, Problems reported included spillage, taking too much time, the infant not feeding well and staff refusing to give feed to an infant using a cup.¹¹ In our study we found the main problems in form of handling the Palady or cup in the initial few feeds but by proper counseling and demonstration of feeding methods we were able to overcome these problems.

In a study done by Yilmaz et al, 8.7% were non-compliant with the cup compared to 6.8% non-compliant with a bottle (p=0.39)¹¹

And in a study done by Schubiger et al, found 9.5% assigned to a cup feeding protocol requested a bottle or had trouble with cup feeding⁸

In our study the alternate option for bottle feeding was not offered to the attendants as ours is a baby friendly hospital and the neonates are never exposed to this method.

Conclusion

we conclude that feeding in preterm low birth weight neonates who cannot breast feed is best achieved by cup which was found to be the most convenient, acceptable and economical method. Neonates on cup feeding showed better weight gain.

References

1. Flint A, New K, Davies MW. Cup feeding versus other forms of supplemental enteral feeding for newborn infants unable to fully breastfeed. *Cochrane Database of Systematic Reviews* 2007, Issue 2. Art. No.: CD005092.
2. World Health Organization (WHO) Beyond Survival. 2013. Pan America Health Organization (PAHO)
3. Horta BL, Victora CG World Health Organization (WHO) Short-term effects of breastfeeding: A systematic review on the benefits of breastfeeding on diarrhoea and pneumonia mortality. 2013
4. National neonatology forum NNPD Network, National Neonatal Perinatal Database. New Delhi. Evidence based clinical practice guidelines. October 2010
5. Malhotra N, Vishwambaran L, Sundaram KR, Narayanan I. A controlled trial of alternative methods of oral feeding in neonates. *Early Hum Dev* 1999;54: 29-38.
6. Rekha S, Rao SD, Fernandez M. Two different methods for feeding low birth weight babies. *Indian Pediatr.* 1996;33:501-3.
7. Marofi M, Abedini F, Mohammadzadeh M, Talakoub S. Effect of palady and cup feeding on premature neonates' weight gain and reaching full oral feeding time interval. *Iranian J Nursing Midwifery Res* 2016;21:202-6
8. Schubiger G, Schwarz U, Tonz O. UNICEF/WHO baby-friendly hospital initiative: does the use of bottles and pacifiers in the neonatal nursery prevent successful breastfeeding? Neonatal Study Group. *Eur J Pediatr.* 1997;156(11):874-7.
9. Howard CR, Howard FM, Lanphear B, et al. Randomized clinical trial of pacifier use and bottle-

- feeding or cupfeeding and their effect on breastfeeding. *Pediatrics*. 2003;111(3):511–8.
10. Olaogun AA, Olatubi MI, Oluwatosin AO, Faremi AF, Ogini MO, Adeyemo F. Cup feeding practices among caregivers in a neonatal intensive care unit. *Int J caring sciences* 2015;Volume 8:Issue 3:603
11. Collins CT, Ryan P, Crowther CA, McPhee AJ, Paterson S, Hiller JE: Effect of bottles, cups, and dummies on breast feeding in preterm infants: A randomized controlled trial. *BMJ*. 2004, 329: 193-198.