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Research Article

**DETERMINATION OF OUTCOMES IN VLBW NEONATES  
GETTING VOLUME ADVANCEMENT & FREQUENCY  
ADVANCEMENT PROTOCOLS OF FEEDING**

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**Abstract:**

**Objective:** This research work aimed to find out the results of VLBW (Very Low Birth Weight) neonates obtaining frequency advancement (FA) and volume advancement (VA) protocols of feeding.

**Methodology:** This research work carried out in the Children Hospital, Multan in a duration of six months from March 2019 to October 2019. VLBW newborns present with weight of less than 1500 grams at birth time were the part of this research work. Protocol for group of FA was to give one ml/kg human or pre-formula milk after eight hours and group of VA after every three hours in the initial stage. After the completion of 3 days, in the group of FA, we decreased the feeds duration from eight to two hours and volume of feed of ten ml.kg-1.day-1 until the dose of feeding was according to full-recommendation as 150.0 ml.kg-1.day-1 touched. Whereas in the group of VA, we gave volume of 20.0 ml.kg-1.day-1 until it touch the value which was full-recommended. The main primary outcome of the research work were the total days to achieve full feed, gain of weight and total duration of the stay in hospital.

**Results:** Baseline neonatal weight was  $1148 \pm 111$  grams in the group of VA and  $1179 \pm 106$  grams in the group of FA (p-value 0.180). In the group of VA, we achieved the full feed in  $11.040 \pm 2.38$  days versus  $15.760 \pm 2.48$  days in the group of FA (P-value  $< 0.0010$ ). The total durations of IV fluid treatment were  $13.50 \pm 8.40$  days in the group of FA versus  $9.40 \pm 7.60$  in the group of VA (p-value  $< 0.0010$ ). Moreover, the gain of weight at the end of the protocol of feeding was much high in the group of VA as  $1440.0 \pm 78.0$  grams versus  $1284.0 \pm 99.0$  grams in the group of FA (P-value  $< 0.0010$ ). There was occurrence of necrotizing enterocolitis in one single patient that was in the group of VA.

**Conclusion:** VA feeding is much better in comparison with the FA feeding in VLBW neonates.

**Keywords:** VLBW< protocol, VA, FA, methodology, occurrence, feeding, per-formula, IV fluid treatment.

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**INTRODUCTION:**

Development and advancements in skills and practice of neonatologists have decreased the rate of mortality of premature VLBW neonates. There is still not known rate of growth in VLBW neonates [1]. In accordance with the guidelines of European society, the rate of growth of these neonates should be correspondent to intrauterine growth rate of fetal [2]. No success in the achievement of this very growth rate results in retardation of growth at discharge time and even this retardation in growth persist in remaining age [3-5]. Impaired neuro-motor as well cognitive outcomes are the results of the slow growth rate in VLBW neonates [6, 7]. There also some bad impacts on the cardiovascular and metabolic issues due to these complications [8, 9]. There is high recommendation of the milk of human breast which is best nutritional product in children at least age of 6 months [10].

Some specialists viewed that standard feeding through breast milk for VLBW neonates re not able to fulfill the demands of metabolism and leads to retardation of growth [11]. In most developed countries, the fortification of the human milk carried out by supplementation normally obtained from milk of cows [12]. A research work concluded that fortified milk of breast is the cause of high growth in neonates [13]. Some research works have stated that high amount of the breast milk (greater than 200.0 ml/kg/day) in comparison to normal dose (150.0 ml/kg/day) of breast milk is the requirement in these neonates but some research work stated that there is no need of the extra feeding [14, 15]. In this research work, we compared the outcomes of VA and FA feeding protocols in neonates with VLBW in our institute.

**METHODOLOGY:**

This research work carried out in Children Hospital, Lahore in the duration of six months from March 2019 to October 2019. The neonates with VLBW present with the body weight of less than 1500 grams were the part of this research work. Initially, we included ninety neonates in this research work, three patients missed the follow-up so total eighty seven patients completed the study. Neonates present with any other serious

complication were not the participants of this research work. Ethical committee of the institute gave the permission to conduct this research work. We took the written consent from parents of this research work. We divided the neonates in VA and FA groups. In all newborns, at least enteral feeding was initiated after 24 hours of birth and this continued for 3 days either utilization of breast milk or preterm formula for milk. The FA group protocol was to give 1.0 ml/kg female or pre-formula milk after each eight hours and Group of VA after every three hours [16]. After complete 3 days, in the groups of FA, frequency feeds was reduced gradually from eight hours to two hours with at least rise in volume of feed only 10.0 ml.kg-1.day-1 until the feeding dose reached to full-recommended value of 150.0ml.kg-1.day-1.

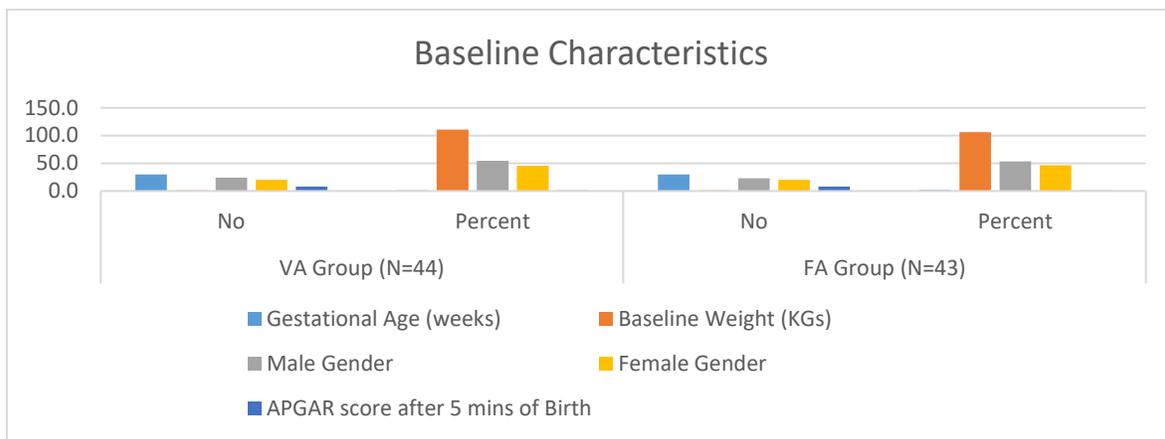
We started the nutrition within twenty four hours after the child birth. We started the protein intake at 2 g.kg-1.day-1 to 3.0 g.kg-1.day-1 & then 4.0 g.kg-1.day-1 if neonate tolerated the dose. We also gave the intra-lipids to newborns to fulfill daily intake of calories. We stooped the intra- lipids after getting 15.0% of total feed of neonates in the participants of both groups. Whereas we stooped the intake of protein after achievement of 50.0% of total feed of neonates. Days for the achievement of full feed, gain of body weight gain and total duration of stay in hospital were the main outcomes of the research work. SPSS V. 23 was in use for the statistical analysis of the collected information. We used the T-test for the comparison of the gain in weight, amount of days to obtain full feed and total stay in hospital.

**RESULTS:**

The average age of gestation of newborns was same in both groups. The baseline body weight of neonates was  $1148 \pm (111)$  g in the group of VA and  $1179 \pm 106$  g in the group of FA (P-value 0.180). Male neonates in the group of VA were 54.50% (n: 24) and 53.50% (n: 23) male neonates in the group of FA (P-value 0.920). APGAR score after five minutes of child birth was  $8.310 \pm 0.98$  in group of VA and  $8.320 \pm 0.960$  in group of FA (P-value 0.960) as presented in Table-1.

**Table-I: Baseline characteristics of neonates.**

Variable	VA Group (N=44)		FA Group (N=43)		P-value
	No	Percent	No	Percent	
Gestational Age (weeks)	29.7	1.37	29.8	1.71	0.9
Baseline Weight (KGs)	1.2	111.00	1.2	106.00	0.18
Male Gender	24.0	54.50	23.0	53.50	0.92
Female Gender	20.0	45.50	20.0	46.50	
APGAR score after 5 mins of Birth	8.3	0.98	8.3	0.96	0.97

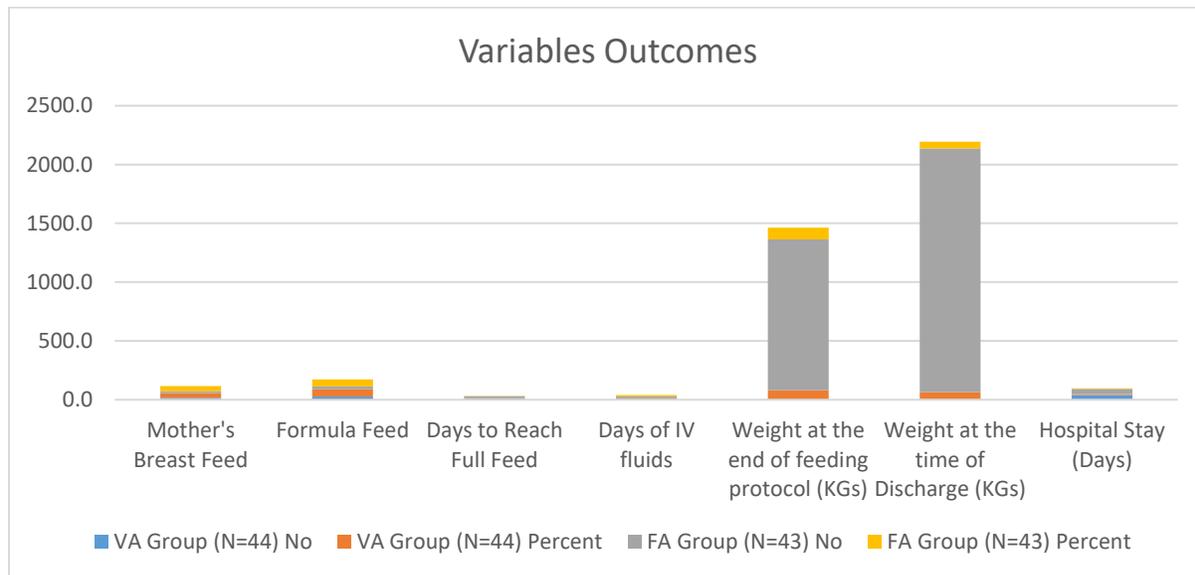


We gave the mother milk in 38.60% (n: 17) neonates of VA group and 41.90% (n: 18) neonates of FA group and other all neonates obtained the pre-formula milk. In the group of VA, we achieved the full feed in 11.040 ± 2.38 days whereas in group of FA we achieved the full feed in 15.76 ± 2.48 days (P-value of less than 0.0010). The total duration of IV fluid treatment was

also long in the group of FA as 13.50 ± 8.40 days versus 9.40 ± 7.60 days in the group of VA (P-value < 0.0010). The weight of gain at the end of feed protocol was much high in the group of VA group as 1440 ± 78 g versus 1284 ± 99 g in the group of FA (P-value < 0.0010). The duration of the stay at hospital was similar between both groups as presented in Table-2.

**Table-II: Study outcome variables.**

Variable	VA Group (N=44)		FA Group (N=43)		P-value
	No	Percent	No	Percent	
Mother's Breast Feed	17.0	38.60	18.0	41.90	0.7500
Formula Feed	27.0	61.40	25.0	58.10	
Days to Reach Full Feed	11.0	2.38	15.8	2.48	<0.001
Days of IV fluids	9.4	7.60	13.5	8.40	<0.001
Weight at the end of feeding protocol (KGs)	1.4	78.00	1284.0	99.00	<0.001
Weight at the time of Discharge (KGs)	2.1	63.00	2072.0	56.00	0.2900
Hospital Stay (Days)	41.2	7.93	42.6	5.94	0.3400



### DISCUSSION:

In this research work, we were unable to discover any important adverse impacts of VA in the neonates present with VLBW. There was short duration taken to achieve the full feeds in the group of VA and short duration of IV fluids necessities in the group of VA. We found only one neonate in the complete research work in whom there was occurrence of NEC, but there was not much importance of this single event. Various works showed that VA has no association with the increase of the danger of NEC and it is a secure procedure [17, 18]. Research works found that increase in the duration of feeding and delay of the enteral feeding has the association with the long stay at hospital and it have no impacts on the prevention of NEC [19]. Additionally, parenteral nutrition also enhances the danger of catheter related infections of blood stream infections [20]. Bombell [21] stated that primary enteral feeding enhances the motility of GIT, avoid the normal flora and decreases the danger of infections.

Karagol [22] in his study discovered short duration to touch the full feed and short duration of the IV fluid necessities in the group of VA which is similar to this research work. Krishnamurthy also found the similar findings about the gain of body weight in the neonates of group of VA [23]. Zubani was not able to find any significant disparity about the stay in hospital and body weight at discharge time [16]. Caple discovered the same results in his research work [24]. Another review declared the VA feeding as much better than the FA feeding and it has no bad impacts on the NEC [25]. Furthermore, some research works have

discovered that there are beneficial impacts of VA feeding on the development of outcomes related to neurology [26, 27].

### CONCLUSION:

The results of this research work concluded that VA feeding is much better and suitable in comparison to the FA feeding in neonates present with VLBW.

### REFERENCES:

1. Stein AD, Barros FC, Bhargava SK, Hao W, Horta BL, Lee N, et al. Birth status, child growth, and adult outcomes in low-and middle-income countries. *J Pediatr.* 2013;163(6):1740-1746. doi: 10.1016/j.jpeds.2013.08.012.
2. Lima PAT, de Carvalho M, da Costa ACC, Moreira MEL. Variables associated with extra uterine growth restriction in very low birth weight infants. *J Pediatr.* 2014;90(1):22-27. doi: 10.1016/j.jpeds.2013.05.007.
3. Neubauer V, Griesmaier E, Pehbock-Walser N, Pupp-Peglow U, Kiechl-Kohlendorfer U. Poor postnatal head growth in very preterm infants is associated with impaired neurodevelopment outcome. *Acta Paediatr.* 2013;102(9):883-888. doi: 10.1111/apa.12319.
4. Leppanen M, Lapinleimu H, Lind A, Matomaki J, Lehtonen L, Haataja L, et al. Antenatal and postnatal growth and 5-year cognitive outcome in very preterm infants. *Pediatrics.* 2014;133(1):63-70. doi: 10.1542/peds.2013-1187.
5. Embleton ND. Early nutrition and later outcomes in preterm infants. *Nutrition and Growth.* Karger Publishers. 2013;106:26-32.

6. Lapillonne A, Griffin IJ. Feeding preterm infants today for later metabolic and cardiovascular outcomes. *J Pediatr.* 2013;162(3):S7-S16. doi: 10.1016/j.jpeds.2012.11.048.
7. Johnston M, Landers S, Noble L, Szucs K, Viehmann L. Breastfeeding and the use of human milk. *Pediatrics.* 2012;129(3):e827-e41.
8. Embleton ND. Optimal protein and energy intakes in preterm infants. *Early Hum Dev.* 2007;83(12):831-837. doi: 10.1016/j.earlhumdev.2007.10.001.
9. Cormack B, Sinn J, Lui K, Tudehope D. Australasian neonatal intensive care enteral nutrition survey: implications for practice. *J Paediatr Child Health.* 2013;49(4):340-347. doi: 10.1111/jpc.12016.
10. Brown JV, Embleton ND, Harding JE, McGuire W. Multinutrient fortification of human milk for preterm infants. *Cochrane Library.* 2016;(5):CD000343. doi: 10.1002/14651858.CD000343.pub3.
11. Doege C, Bauer J. Effect of high volume intake of mother's milk with an individualized supplementation of minerals and protein on early growth of preterm infants < 28 weeks of gestation. *Clin Nutr.* 2007;26(5):581-588. doi: 10.1016/j.clnu.2007.06.002
12. Christensen RD, Street JL. Randomized, controlled trial of slow versus rapid feeding volume advancement in preterm infants. *J Pediatr.* 2005;146(5):710-711. doi: 10.1016/j.jpeds.2005.03.024.
13. Zubani A, Mersal A, AlSaedi S, AlAhmadi K, AlDeek A, bin Sadiq B. Comparison of volume and frequency based feeding protocols in very low birth weight infants: A prospective randomized study. *J Clin Neonatol.* 2016;5(4):233. doi: 10.4103/2249-4847.194167.
14. Morgan J, Young L, McGuire W. Delayed introduction of progressive enteral feeds to prevent necrotising enterocolitis in very low birth weight infants. *Cochrane Database Syst Rev.* 2013;(5):CD001970. doi: 10.1002/14651858.CD001970.pub4.
15. Culpepper C, Hendrickson K, Marshall S, Benes J, Grover TR. Implementation of Feeding Guidelines Hastens the Time to Initiation of Enteral Feeds and Improves Growth Velocity in Very Low Birth-Weight Infants. *Adv Neonatal Care.* 2017;17(2):139-145. doi: 10.1097/ANC.0000000000000347.
16. Chauhan M, Henderson G, McGuire W. Enteral feeding for very low birth weight infants: reducing the risk of necrotising enterocolitis. *Arch Dis Child Fetal Neonatal Ed.* 2008;93(2):F162-F166. doi: 10.1136/adc.2007.115824.
17. McGuire W, Henderson G, Fowlie PW. Feeding the preterm infant. *ABC of preterm birth.* 2009;95:26.
18. Bombell S, McGuire W. Delayed introduction of progressive enteral feeds to prevent necrotising enterocolitis in very low birth weight infants. *Cochrane Database Syst Rev.* 2008;(2):CD001970. doi: 10.1002/14651858.CD001970.pub2.
19. Karagol BS, Zenciroglu A, Okumus N, Polin RA. Randomized controlled trial of slow vs rapid enteral feeding advancements on the clinical outcomes of preterm infants with birth weight 750–1250g. *J Parenteral Enteral Nutr.* 2013;37(2):223-238. doi: 10.1177/0148607112449482.
20. Krishnamurthy S, Gupta P, Debnath S, Gomber S. Slow versus rapid enteral feeding advancement in preterm newborn infants 1000–1499 g: a randomized controlled trial. *Acta Paediatr.* 2010;99(1):42-46. doi: 10.1111/j.1651-2227.2009.01519.x.
21. Caple J, Armentrout D, Huseby V, Halbardier B, Garcia J, Sparks JW, et al. Randomized, controlled trial of slow versus rapid feeding volume advancement in preterm infants. *Pediatrics.* 2004;114(6):1597-1600. doi: 10.1542/peds.2004-1232.
22. Morgan J, Young L, McGuire W. Slow advancement of enteral feed volumes to prevent necrotising enterocolitis in very low birth weight infants. *Cochrane Database Syst Rev.* 2014;(12):CD001241. doi: 10.1002/14651858.CD001241.pub5.
23. Franz AR, Pohlandt F, Bode H, Mihatsch WA, Sander S, Kron M, et al. Intrauterine, early neonatal, and postdischarge growth and neurodevelopmental outcome at 5.4 years in extremely preterm infants after intensive neonatal nutritional support. *Pediatrics.* 2009;123(1):e101-e109. doi: 10.1542/peds.2008-1352.
24. Ramel SE, Demerath EW, Gray HL, Younge N, Boys C, Georgieff MK. The relationship of poor linear growth velocity with neonatal illness and two-year neurodevelopment in preterm infants. *Neonatology.* 2012;102(1):19-24. doi: 10.1159/000336127.
25. Higgins RD, Devaskar S, Hay Jr WW, Ehrenkranz RA, Greer FR, Kennedy K, et al. Executive summary of the workshop "Nutritional challenges in the high risk infant". *J Pediatr.* 2012;160(3):511-516. doi: 10.1016/j.jpeds.2011.12.024.

26. Agostoni C, Buonocore G, Carnielli V, De Curtis M, Darmaun D, Decsi T, et al. Enteral nutrient supply for preterm infants: commentary from the European Society of Paediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition. *J Pediatr Gastroenterol Nutr.* 2010;50(1):85-91. doi:10.1097/MPG.0b013e3181adaee0.
27. Horbar JD, Ehrenkranz RA, Badger GJ, Edwards EM, Morrow KA, Soll RF, et al. Weight growth velocity and postnatal growth failure in infants 501 to 1500 grams: 2000–2013. *Pediatrics.* 2015;136(1):e84-e92. doi: 10.1542/peds.2015-0129.