

## To Compare the Short Term Growth between Preterm Appropriate for Date and Small for Gestational Age Babies Fed Fortified Human Milk

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| Received: 14.02.2019 | Accepted: 24.02.2019 | Published: 28.02.2019

DOI: [10.36347/sjams.2019.v07i02.045](https://doi.org/10.36347/sjams.2019.v07i02.045)

### Abstract

### Original Research Article

**Objectives:** To compare the short term growth between preterm Appropriate for gestational age and Small for gestational age babies fed fortified human milk. **Design:** Prospective cohort study. **Setting:** Special Care Newborn Unit and postnatal wards, Department of Pediatrics, M.Y. Hospital and Chacha Nehru Bal Chikitsalaya, Indore. **Participants:** 75 preterm very low birth weight babies (<1.5 kg) admitted in Special Care Newborn Unit and postnatal wards of M.Y. Hospital and CNBC, Indore. **Results:** The mean gestational age of SGA babies was significantly higher than AGA babies. Mean weight, length and head circumference of SGA babies was significantly higher than AGA babies at all time intervals. The growth of SGA babies for weight was significant only in 4<sup>th</sup> week as compared to AGA babies. Similarly, the growth of SGA was significant only in 1<sup>st</sup> and 2<sup>nd</sup> week for length and 2<sup>nd</sup> and 3<sup>rd</sup> week for head circumference. **Conclusion:** The growth of SGA babies is similar to AGA babies over the short time period of eight weeks.

**Keywords:** Short, Term, Growth, Preterm, Babies, Human Milk.

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## INTRODUCTION

The improved survival of very low birth weight neonates over last few decades, demands correct evaluation of their postnatal growth. The growth of very low birth weight infants is very different from full term infants [1]. The typical loss of 5-10% of birth weight for a full term infant may increase to as much as 15% of birth weight in infants born preterm. For optimum survival and better long term outcome, early postnatal growth should be as physiological as possible [2, 3].

Human milk is an inadequate source of proteins and minerals for the growing preterm babies. To achieve adequate catch up growth VLBW babies need higher calories, proteins and minerals. Improved growth has been reported in past in preterm babies who were fed fortified human milk [4]. Longitudinal studies are needed to evaluate the growth of this specific population [5-8]. Limited studies are available on the growth pattern of Appropriate for gestational age and small for gestational age babies fed fortified human milk. We aim to compare the short term growth between appropriate for gestational age and small for gestational age babies fed fortified human milk.

## METHODS

This prospective cohort study was carried out in Special Care Newborn Unit, Department of Pediatrics, MY Hospital and CNBC, Indore. 75 preterm very low birth weight babies weighing <1.5 kg were enrolled for the study. Babies with congenital anomalies, surgical problems and those receiving formula feeds were excluded from the study. All details including antenatal history, events during labor, baby's details at birth, APGAR score (if available), details of resuscitation, gestational age (as per New Ballard score), birth weight, general condition of the baby at the time of admission and indication of admission were recorded on a proforma.

As soon as babies reached full feeds (140ml/kg/day), babies were given expressed breast milk fortified with lactodex- human milk fortifier. 2 g sachet of lactodex-HMF was added to 50 ml of milk. Weight, length and head circumference were recorded at the beginning of intervention.

Weight was taken on digital electronic scale after removing clothes and diaper. The weighing scale was corrected for zero error before measurement. Serial measurement of weight was done on the same weighing

scale. Length was taken on an infantometer. The neonate was placed supine with head held firmly in position and keeping legs straight with toes pointing upward. Head circumference was measured by an inch tape. The maximum circumference of the head from the occipital protuberance to the supraorbital ridges on the forehead was recorded.

These babies were serially followed for a period of 8 weeks and weight, length and head circumference was noted every week.

## RESULTS

The mean gestational age of SGA babies(n=43) was significantly higher(33.047) than AGA group(n=32, mean gestational age=30.531). Mean values of weight were

significantly higher for SGA group as compared to AGA group at all time intervals. Similarly, mean length and head circumference were also significantly high for SGA group at all time intervals. The mean growth of SGA babies for weight was significantly higher in 4<sup>th</sup> week(p value=0.025) as compared to AGA babies and insignificant at all other time intervals i.e. week 1,2,3,5,6,7,8

The mean growth of SGA babies for length was found to be significant in 1<sup>st</sup>(p=0.006) and 2<sup>nd</sup> Weeks(p=0.032) while non-significant in all the Weeks from 3<sup>rd</sup> to 8<sup>th</sup> as compared to AGA babies. The mean growth of SGA for Head Circumference was found to be non-significant in 1<sup>st</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> Weeks and significant only in 2<sup>nd</sup>(p=0.010) and 3<sup>rd</sup>(p=0.047) weeks as compared to AGA

**Table-1: Comparison of mean gestational age between sga and aga babies**

Group	N	Mean	Std. Deviation	T Value	P Value
SGA	43	33.047	1.154	10.050	0.000*
AGA	32	30.531	0.950		

Independent T Test applied p<0.05, \* Significant

The mean gestational age of SGA babies was significantly higher (33.047) as compared to AGA babies (30.531)

**Table-2: Comparison of mean weight between sga and aga babies at different time intervals**

Time interval	Parameter	Group	N	Mean	SD	P value
Pre	Weight	SGA	43	1.35	0.12	0.000
		AGA	32	1.17	0.14	
After 1 week	Weight	SGA	43	1.39	0.13	0.000
		AGA	32	1.20	0.15	
After 2 week	Weight	SGA	40	1.44	0.16	0.000
		AGA	30	1.25	0.16	
After 3 week	Weight	SGA	38	1.51	0.19	0.002
		AGA	28	1.35	0.21	
After 4 week	Weight	SGA	35	1.64	0.21	0.000
		AGA	24	1.42	0.21	
After 5 week	Weight	SGA	35	1.73	0.25	0.001
		AGA	24	1.51	0.23	
After 6 week	Weight	SGA	34	1.85	0.30	0.003
		AGA	22	1.60	0.28	
After 7 week	Weight	SGA	33	1.96	0.32	0.005
		AGA	22	1.70	0.32	

Mean weight of SGA babies is significantly higher than AGA babies at all time intervals (p<0.05)

**Table-3: Comparison of mean length between sga and aga group at different time intervals**

Time interval	Parameter	Group	N	Mean	SD	P value
Pre	Length	SGA	43	39.53	1.66	0.000
		AGA	32	37.48	1.59	
After 1 week	Length	SGA	43	39.93	1.79	0.000
		AGA	32	37.63	1.62	
After 2 week	Length	SGA	40	40.40	1.99	0.000
		AGA	30	38.18	1.83	
After 3 week	Length	SGA	38	41.04	2.14	0.000
		AGA	28	38.80	1.96	
After 4 week	Length	SGA	35	41.71	2.06	0.010
		AGA	24	39.48	2.09	
After 5 week	Length	SGA	35	42.14	1.91	0.000
		AGA	24	39.54	3.14	
After 6 week	Length	SGA	34	42.75	1.83	0.000
		AGA	22	40.68	2.19	
After 7 week	Length	SGA	33	43.30	1.8	0.000
		AGA	22	41.14	2.16	

Mean length of SGA babies is significantly higher than AGA babies at all time intervals (p<0.05)

**Table-4: Comparison of head circumference between sga and aga babies at different time intervals**

Time interval	Parameter	Group	N	Mean	SD	P value
Pre	Head circumference(HC)	SGA	43	28.70	1.39	0.000
		AGA	32	27.20	1.17	
After 1 week	HC	SGA	43	29.03	1.46	0.000
		AGA	32	27.38	1.22	
After 2 week	HC	SGA	40	29.34	1.52	0.000
		AGA	30	27.63	1.39	
After 3 week	HC	SGA	38	29.79	1.68	0.000
		AGA	28	28.13	1.53	
After 4 week	HC	SGA	35	30.21	1.46	0.002
		AGA	24	28.88	1.70	
After 5 week	HC	SGA	35	30.69	1.54	0.106
		AGA	24	29.72	2.9	
After 6 week	HC	SGA	34	30.94	1.55	0.011
		AGA	22	29.75	1.81	
After 7 week	HC	SGA	33	31.55	1.57	0.008
		AGA	22	30.30	1.78	

Mean head circumference of SGA babies is significantly higher than AGA babies at all time intervals( $p < 0.05$ )

**Table-5: Comparison of differences of mean weight at different time intervals between sga and aga babies**

Time interval	Parameter	Group	N	Mean	SD	p value
Pre-after 1 week	Weight	SGA	43	0.040	0.038	0.110
		AGA	32	0.027	0.035	
Pre-after 2 week	Weight	SGA	40	0.097	0.064	0.093
		AGA	30	0.074	0.047	
Pre-after 3 week	Weight	SGA	38	0.170	0.089	0.879
		AGA	28	0.165	0.178	
Pre-after 4 week	Weight	SGA	35	0.288	0.131	0.025
		AGA	24	0.215	0.097	
Pre-after 5 week	Weight	SGA	35	0.381	0.177	0.060
		AGA	24	0.301	0.123	
Pre-after 6 week	Weight	SGA	34	0.505	0.222	0.064
		AGA	22	0.400	0.169	
Pre-after 7 week	Weight	SGA	33	0.613	0.244	0.078
		AGA	22	0.498	0.213	

The growth of SGA babies for weight was significant only in the 4<sup>th</sup> week as compared to AGA babies and insignificant at all other time intervals

**Table-6: Comparison of differences of mean length at different time intervals between sga and aga babies**

Time interval	Parameter	Group	N	Mean	SD	p value
Pre-after 1 week	Length	SGA	43	0.395	0.430	0.006
		AGA	32	0.141	0.317	
Pre-after 2 week	Length	SGA	40	0.925	0.561	0.032
		AGA	30	0.633	0.540	
Pre-after 3 week	Length	SGA	38	1.539	0.720	0.081
		AGA	28	1.232	0.659	
Pre-after 4 week	Length	SGA	35	2.143	0.879	0.202
		AGA	24	1.854	0.787	
Pre-after 5 week	Length	SGA	35	2.586	1.032	0.207
		AGA	24	1.917	2.850	
Pre-after 6 week	Length	SGA	34	3.191	1.148	0.657
		AGA	22	3.068	0.729	
Pre-after 7 week	Length	SGA	33	3.788	1.219	0.382
		AGA	22	3.522	0.866	
Pre-after 8 week	Length	SGA		4.061	1.345	0.709
		AGA		4.190	1.054	

The growth of SGA babies for length is significant in 1<sup>st</sup> and 2<sup>nd</sup> weeks.

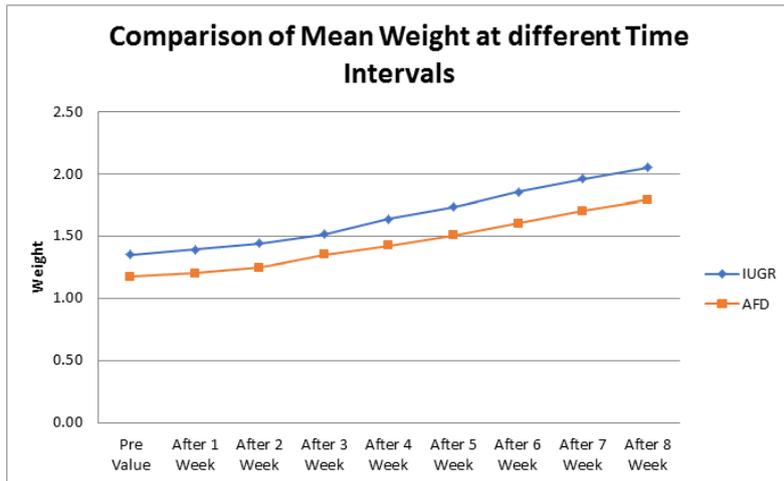


Fig-1

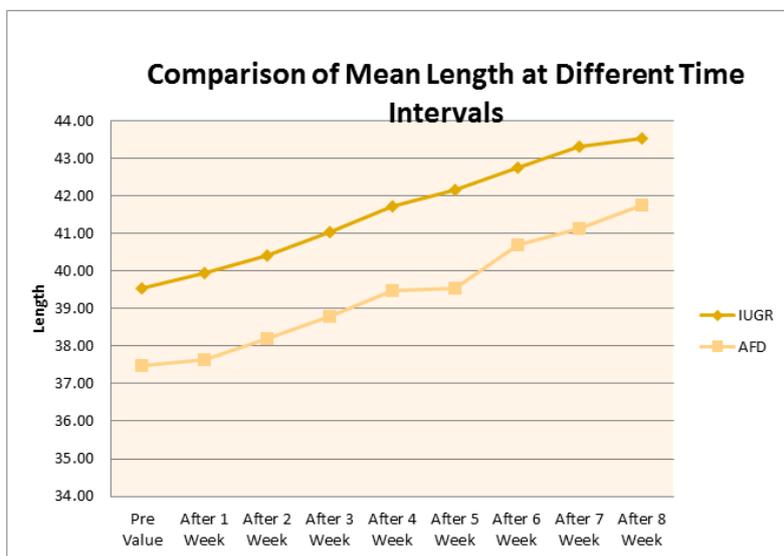


Fig-2

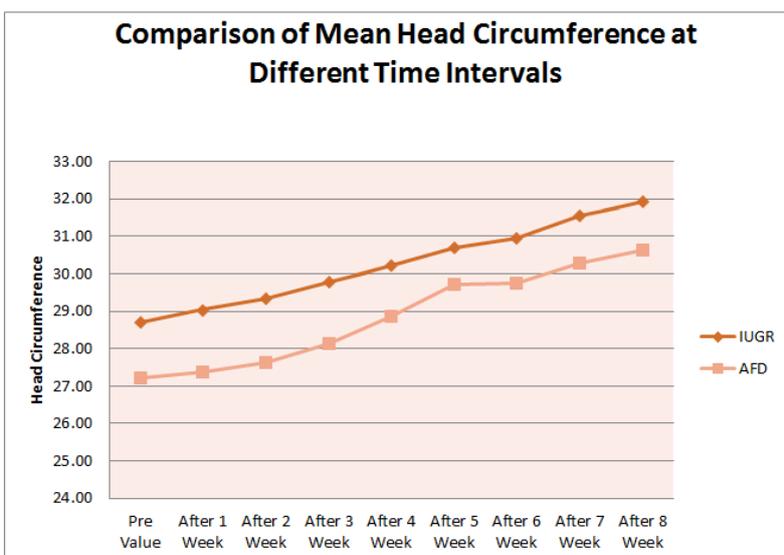


Fig-3

## DISCUSSION

Extrauterine growth restriction remains a major clinical problem in very low birth weight neonates [9]. Human milk is an inadequate source of proteins and minerals for growing premature babies [10]. The role of human milk fortification for weight gain, linear and head growth is already well established [11]. Few studies have been done to compare the growth between SGA and AGA babies fed fortified human milk. So, in this study we aim to compare the growth between SGA and AGA babies fed fortified human milk.

In our study, the mean gestational age for SGA babies was significantly higher than AGA babies. The mean weight, length and head circumference were significantly high at all time intervals for SGA babies as compared to AGA babies. The mean growth of SGA babies for weight, length and head circumference was found to be insignificant as compared to AGA babies during the study period of 8 weeks.

Earlier studies have reported maximum catch up growth of infants born SGA between 6 months to 2 years. Few studies also report catch up growth of SGA babies in 1<sup>st</sup> 6 months of life. Our study has been done on a small sample size and for short term duration of 8 weeks. We found similar growth in SGA and AGA babies receiving fortified human milk. More studies are needed in this regard.

## CONCLUSION

SGA and AGA babies on fortified human milk show similar growth in early postnatal period

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