

## Seasonal variation in birth weights of new born babies

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### Abstract

Birth-weight is recognized as a global indicator of community health, and it has been shown to increase over time in developed as well as in some developing countries. Seasonal variations of birth sizes, especially mean birth weight (MBW), have been interested for a series of researches during the last decade. The material for the study was collected from the medical record department of the KIMS Hospital, Bangalore. A thorough and detailed medical history is critical, before starting orthodontic treatment. Hence the present survey was undertaken to determine whether there was any fluctuation in the birth weight levels from season to season using continuous clinical records of Kempegowda Institute of Medical Science & Hospital, Bangalore. The mean birth weight of new born babies was 2819.85±473.89 g. There was a significant difference in the birth weight of new born babies in different seasons. The birth weight of new born babies were relatively more during summer and winter when compared to the rainy seasons.

**Keywords:** Birth Weight; New born babies; Pre-term babies; Seasonal Variation.

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### Introduction

Birth-weight is recognized as a global indicator of community health and it has been shown to increase over time in developed as well as in some developing countries.<sup>(1)</sup> This increase is speculated to be attributed to improved environmental conditions.<sup>(2-4)</sup> However, other findings suggest mean birth-weight remained constant in some places for long while socio-economic and nutritional status continues to change.<sup>(5,6)</sup> It is expected in some cases that the increase might have reached its peak and then a plateau.

Birth-weight is the first weight of the foetus or new born obtained after birth. For live births, birth-weight should preferably be measured within the first hour of life, before significant postnatal weight loss has occurred.<sup>(7)</sup>

Low birth weight has been defined by the World Health Organization (WHO) as weight at birth of less than 2,500 grams (5.5 pounds) and equal to or less than, 1500 grams for very low birth weight.<sup>(8)</sup>

The most dramatic events in growth and development occur before birth. These changes are overwhelmingly somatic: the transformation of a single cell into an infant. The uterus, although offering a degree of protection, is permeable to social, psychological and environmental influences.<sup>(9)</sup> Seasonal variations of birth sizes, especially mean birth weight (MBW), have been interested for a series of researches during the last decade.

A thorough and detailed medical history is critical, before starting orthodontic treatment. Various drugs have oral side-effects and may influence the course of the orthodontic therapy, hence a history of current medications is also valuable. Reduction in tooth movement during orthodontic therapy can be caused by

drugs such as, hormone supplements, non-steroidal anti-inflammatory drugs and vitamin D metabolites could probably cause a. Any previous medical conditions such as diabetes mellitus or previous pregnancy complications are important to know in advance before starting orthodontic treatment.

Hence the present survey was undertaken to determine the mean birth weight of new born babies, determine the mean pre-term, full-term babies and the number of babies with low birth weight and assess whether the birth weight levels fluctuated from season to season using continuous clinical records of Kempegowda Institute of Medical Science & Hospital, Bangalore.

### Subjects and Methods

The material for the study was collected from the medical record department of the KIMS Hospital, Bangalore. All the deliveries conducted in the hospital were recorded and the details for the year January 2010-December 2010 were collected and included in the present study.

Pre-term and full-term babies were included in the study. Still born babies and babies with congenital and pathological defects were excluded from our study.

At KIMS hospital soon after the delivery, the new born babies were weighed with standard scale. The parturition record register included the following details:

1. Date of parturition
2. Order of birth
3. Gestational age
4. Weight of new born babies
5. Sex of new born babies
6. Antenatal status

- 7. Age of mother
- 8. Occupation of the mother

**Results & Discussion**

Preterm delivery was defined as delivery before 37 completed weeks, full term refers to babies born between 37 to 42 completed weeks. Low birth weight has been defined by the World Health Organization (WHO) as weight at birth of less than 2,500 grams (5.5 pounds) and equal to or less than, 1500 grams for very low birth weight 8. This practical cut-off for international comparison is based on epidemiological observations that infants weighing less than 2,500 g are approximately 20 times more likely to die than heavier babies.

More common in developing than developed countries, a birth weight below 2,500 g contributes to a range of poor health outcomes.

Table 1 showed the percentage distribution of new born babies according to the month of parturition; the highest number of parturitions were seen in the month of August 170(10.72%), October 168(10.59%) and December 163(10.28%) and the lowest were recorded in the month of January, 98 (5.86%) February, 93 (5.86%) and in April, 94 (5.93%). Fig. 1 gave a graphical representation of the same.

**Table 1: Percentage distribution of new born babies according to month of parturition**

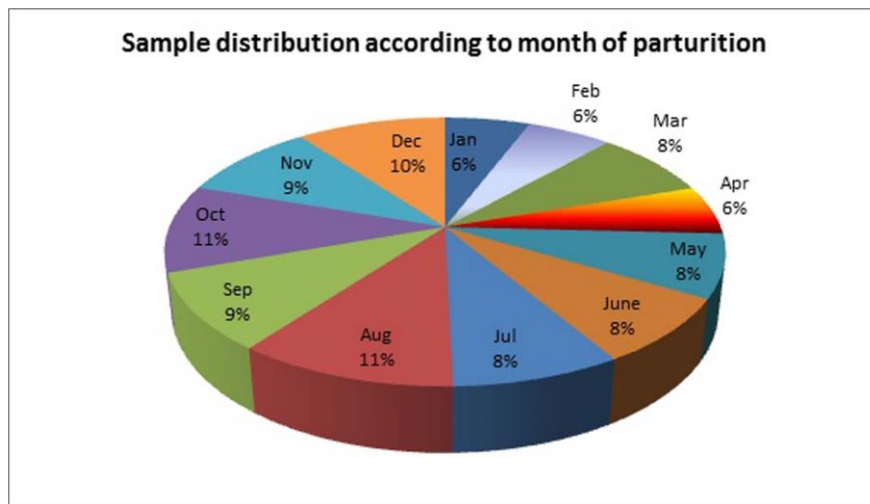
Month of Parturition	n	%
Jan	93	5.86%
Feb	93	5.86%
Mar	129	8.13%
Apr	94	5.93%
May	121	7.63%
June	126	7.94%
Jul	131	8.26%
Aug	170	10.72%
Sep	147	9.27%
Oct	168	10.59%
Nov	151	9.52%
Dec	163	10.28%
Total	1586	100%

Table 2 showed the descriptive statistics of birth weight of the New born babies. The mean birth weight is 2819.85±473.89 g.

**Table 2: Descriptive statistics of the birth weight of New born babies**

Birth Weight	n	Mean	SD	SE of Mean	Min	Max
Overall	1586	2819.85	473.89	11.90	1000	4650

Table 3 showed the comparative assessment of birth weight of new born babies according to gender. Higher mean birth weight was recorded in males (2852±471.04 g) compared to females (2781.39±474.69 g) and the difference between them was found to be statistically significant (P<0.001).



**Fig. 1**

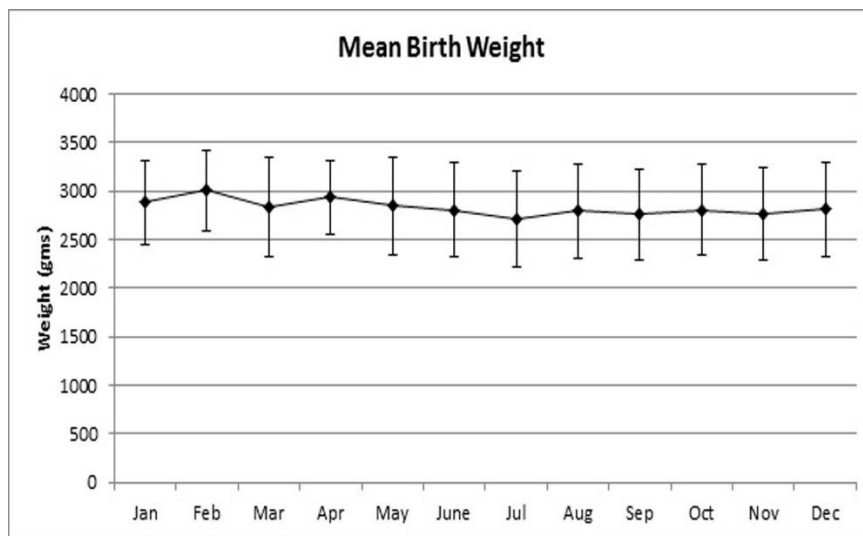


Fig. 2

Table 3: Comparative assessment of birth weight of new born babies according to Gender

Gender	n	Mean	Stddev	SE of Mean	Mean difference	t	P-Value
Male	858	2852.48	471.04	16.08	71.095	2.985	0.003*
Female	728	2781.39	474.69	17.59			

**Table 4: Parturitions categorized into months and descriptive statistics**

Month of Parturition	n	Mean	Std. dev.	SE of Mean	95% Confidence Interval for Mean		Min	Max	P-Value
					Lower Bound	Upper Bound			
Jan	93	2883.441	430.0316	44.5922	2794.877	2972.005	2000	3750	<0.001*
Feb	93	3008.817	412.866	42.81221	2923.788	3093.846	2250	4000	
Mar	129	2843.488	511.8222	45.06343	2754.323	2932.654	1700	4200	
Apr	94	2935.745	375.4209	38.72171	2858.851	3012.638	2250	4000	
May	121	2845.702	495.56	45.05091	2756.505	2934.9	1500	3900	
June	126	2805.952	489.5977	43.61683	2719.629	2892.275	1500	4200	
Jul	131	2718.321	491.5191	42.94422	2633.361	2803.281	1500	3880	
Aug	170	2793.353	483.4173	37.07641	2720.16	2866.546	1750	4000	
Sep	147	2760.816	464.4949	38.31089	2685.101	2836.532	1000	4000	
Oct	168	2804.524	469.6932	36.23762	2732.981	2876.067	1500	3900	
Nov	151	2765.364	469.5001	38.20738	2689.87	2840.858	1500	3900	
Dec	163	2810.491	479.5636	37.56232	2736.316	2884.666	1550	4650	

**Table 5: Comparative assessment of birth weight of newborn babies to seasons**

Season	n	Mean	Std. dev	SE of Mean	95% Confidence Interval for Mean		Min	Max	P-Value	Sig diff between n
					Lower Bound	Upper Bound				
1. Summer	470	2852.447	477.6718	22.03336	2809.15	2895.743	1500	4200	0.007*	1 vs 2
2. Rainy	616	2772.679	476.9382	19.21639	2734.941	2810.416	1000	4000		2 vs 3
3. Winter	500	2847.32	462.6299	20.68944	2806.671	2887.969	1500	4650		

Maximum birth weight of new born babies was recorded during February  $3008.81 \pm 412.86$ g and April  $2935 \pm 375.42$ g. Lowest birth weight of new born Babies was recorded during the month of July  $2718.32 \pm 491.51$ g. There was a statistically significant difference in birth weight of new born babies between February Vs. July and April Vs. July. Figure 2 Showed the mean birth weight of New born babies delivered during various months of 2010 at Kempegowda Institute of Medical Sciences, Bangalore.

Table 5 gave the comparative assessment of birth weight of new born babies according to seasons. Based on the local climate, we divided the year in to following seasons: Summer (March-June), rainy season (July-October), and winter (November-February). There was significant difference in birth weight of New born babies during various seasons. Among the three seasons there was statistically significant difference between summer and rainy season ( $P < 0.007$ ) and rainy and winter season ( $P < 0.007$ ).

### Summary & Conclusion

Birth weight has been shown to increase overtime in developed countries. This increase in birth weight is speculated to be attributed to improved environmental conditions. Reports on seasonal variation in birth weight are conflicting and inconclusive. A thorough and detailed medical history is critical, before starting orthodontic treatment. It is especially important to take into account the hormonal and physiological changes that will be anticipated during the course of pregnancy. Hence the present survey was under taken to record the birth weight of all new born babies born during January 2010-December 2010 and evaluate if any seasonal variation existed in birth weight during seasons. From the medical records maintained at the medical record department of Kempegowda Institute of Medical Sciences all the parturitions of January –December

2010 are recorded and details recorded were collected. From the Statistical analysis of the data the following conclusions were drawn;

1. The mean birth weight of new born babies was  $2819.85 \pm 473.89$  g
2. The number of parturitions were highest during the months of April and October and lowest during the month of January, February and April. but the maximum mean birth weight was recorded during the month of February, April and March
3. There was a significant difference in the birth weight of new born babies in different seasons. The birth weight of New born babies were relatively more during summer and winter when compared to the rainy seasons

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