

FOETAL MEASUREMENTS FROM 15TH TO 38TH WEEK IN 4595 GRAVID FEMALES IN AND AROUND LUCKNOW

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ABSTRACT

BACKGROUND

Foetal biometry is very informative. Patients have become very vigilant about the well-being of the foetus and are now comparing the ultrasound reports with their previous reports and with those on the net. Low measurements create panic in the family of the mother and for the mother also.

Aims and Objectives- To study a large number of gravid females to know if Indian foetuses are smaller in anyway than those in western countries.

MATERIALS AND METHODS

This is an observational study. Healthy pregnant ladies with a single live foetus were selected for the study. 4595 cases were selected and they were examined for BPD, HC, AC, FL and foetal weight by a single observer on a single machine.

RESULTS

All parameters were measured in 4595 pregnant females from 18 years to 35 years age for BPD, HC, AC, FL and foetal weight. It was observed that our measurements were in no way less than those of other countries and were comparable with those of Hadlock et al.

CONCLUSION

All our values were slightly more than those of other authors in the early weeks of gestation, but as pregnancy advanced our measurements were nearly the same as those of other authors.

KEYWORDS

Foetal Biometry Normal Ranges, 4595 Cases.

HOW TO CITE THIS ARTICLE: Gupta DP, Gupta RP, Saxena DK, et al. Foetal measurements from 15th to 38th week in 4595 gravid females in and around Lucknow. J. Evolution Med. Dent. Sci. 2018;7(12):1536-1542, DOI: 10.14260/jemds/2018/347

BACKGROUND

Foetal biometry is a methodology devoted to measuring several parts of foetal anatomy and their growth.¹ Standard foetal growth charts and tables are as given by previous workers in obstetric ultrasound to evaluate whether the dimensions of a particular parameter are normal for that gestational age. The prenatal measurements of foetal parameters and estimated size and weight vary among different populations depending upon their racial, demographic characteristics and nutrition as observed by various workers.¹ Biometric curves for our population may overestimate or underestimate the foetal age when used for another population with different demographic characteristics. Therefore, we felt the need for collecting the obstetrical parameters in a large population in and around Lucknow from 15 to 38 weeks of gestation, so that normal values may be obtained and compared with those found in western and developing countries and with Indian population of other regions in India.

'Financial or Other Competing Interest': None.
Submission 08-08-2017, Peer Review 04-03-2018,
Acceptance 10-03-2018, Published 19-03-2018.

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DOI: 10.14260/jemds/2018/347



In routine ultrasonography all ultrasonologists measure the biparietal diameter (BPD), head circumferences (HC), abdominal circumference (AC), femur lengths (FL) and foetal weight. We have also studied these to find out if foetuses in northern India are the same as in other developed and developing countries or are different in any manner.

MATERIALS AND METHODS

The observational study was conducted in the Department of Radiology, Era's Lucknow Medical College, Lucknow during the period from October 2011 to September 2016 on pregnant women who came for ultrasonography with a single live foetus from 15 to 38 weeks of pregnancy. All women were screened for any disease, complication, obesity, IUGR and suspected foetal anomalies. 4595 were routinely screened for BPD, HC, AC, FL and foetal weight.

The biparietal diameter (BPD) is one of the most commonly measured parameter in the foetus.^{2,3} Campbell was the first investigator to link foetal BPD to gestational age.³ BPD is imaged in the transaxial plane of foetal head at a level depicting thalami in midline, equidistant from the tempo-parietal bone and usually the cavum pellucidum anteriorly.^{4,5} The most commonly accepted method is measurement from leading edge to leading edge (outer to inner). BPD measurement from 12 - 26 weeks gestation are accurate and accuracy gradually decreases as gestational age increases till term. A number of factors may contribute to variation or inaccuracy in the BPD measurement. Biologic

variation, for example, may occur because of differences in maternal age, parity, pre-pregnancy weight, geographical location and specific population characteristics. Technical factors including interobserver error, different technique of measurement and single versus multiple measurements may likewise influence the accuracy of BPD in assessing of GA.⁶ BPD is simple to measure. It has the disadvantage of being the only one of the three measurements, i.e. BPD, corrected BPD and HC that disregards head shape. HC is length of outer perimeter of the cranium made at the same transaxial image of the foetal head. It is measured by trackball on the ultrasonic equipment or by digitizer.^{4,5}

Abdominal circumference (AC) is measured at the level of the liver and stomach including the portal vein at the umbilical region. These measurements are more appropriately used in the assessment of foetal growth, particularly in the second half of the pregnancy.⁷ It is an appropriate measurement in the second trimester to demonstrate normal foetal proportions.

Femur Length

The femur is the largest of the long bones, least moveable and easiest to image. The femur may be adequately visualised from the 14 weeks of gestation until delivery.^{8,9,10} It is measured along the axis of the bone; a straight measurement of the osseous portion is taken from one end to the other disregarding bone curvature.

Women who had any pregnancy related complication, foetal growth disorder, drug abuse, diabetes, hypertension, tuberculosis or uterine anomaly were excluded from the study. All scans were performed by a single ultrasonologist on a single ultrasound machine, an Elpro GE logic 200 and a 3.5 MHz transducer was used.

Statistical analysis was conducted by using an SPSS version 14.0 software. Descriptive statistical analysis which included frequency, percentages, mean, standard deviation, median and percentiles were used to characterise the data and report the diversity of the sample employed in this research. Comparison between the various studies for various quantitative parameters were made using independent 't' test and 'p' < 0.05 was considered statistically significant.

RESULTS

A total of four thousand five hundred and ninety five cases were examined by ultrasound. Maximum cases were in the 29

to 34 weeks of gestation (Table No. 1). 4056 cases were in the age group of 18 - 30 years and 295 cases were in the 31 - 35 years' age group. Analysing our results of BPD with those of other authors (Table No. 2), we have found that BPD measurements were the most as measured by Campbell et al. Chitty et al have observed the lowest values. Both the authors had examined gravid females in UK. Hadlock et al have reported the lowest figures.

GA (Wks.)	No. of Cases	%
15	59	1.3
16	103	2.2
17	166	3.6
18	196	4.3
19	196	4.3
20	183	4.0
21	169	3.7
22	165	3.6
23	151	3.3
24	141	3.1
25	158	3.4
26	153	3.3
27	200	4.4
28	206	4.5
29	275	6.0
30	312	6.8
31	306	6.7
32	380	8.3
33	352	7.7
34	297	6.5
35	214	4.7
36	124	2.7
37	61	1.3
38	28	.6
Total	4595	100.0

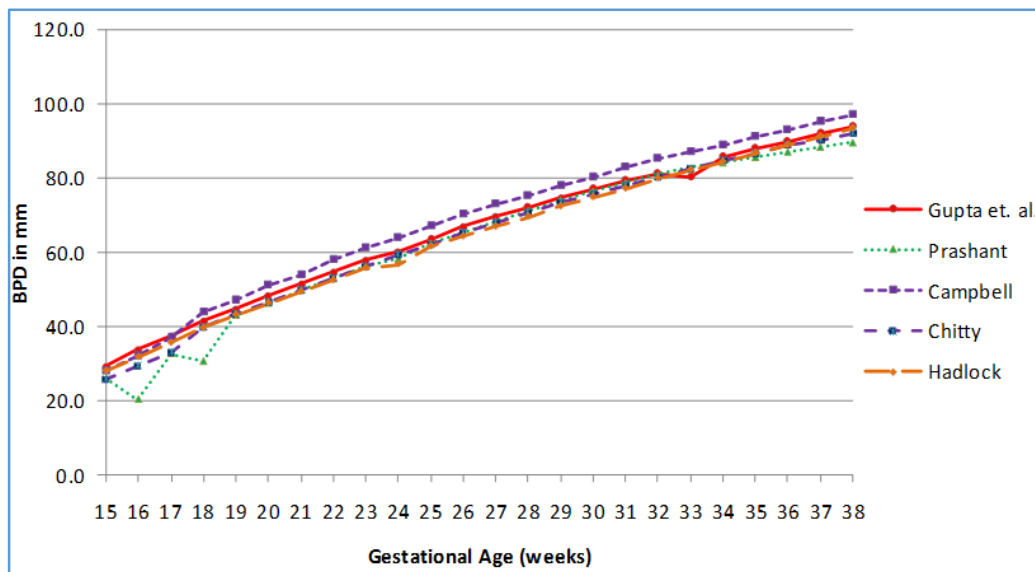
Table 1

We have observed that there is a difference of 1 mm to 3.4 mm in the measurements of Hadlock et al and our study in the early weeks of gestation. The difference decreases as the pregnancy advances, so that at 37th and 38th week there is insignificant difference (p > .05) in the Hadlock et al and our study. The same amount of difference is also seen between Chitty et al and Campbell et al. Comparing with Campbell et al, all the differences were found to be significant (p < .05) except for in 24th GA (p= .089). Measurements are more in the study of Campbell et al and less in Chitty et al (Graph No. 1).

GA	Gupta et al	Prashant			Campbell			Chitty			Hadlock		
		Mean	t-value	p-value	Mean	t-value	p-value	Mean	t-value	p-value	Mean	t-value	p-value
15	29.3 ± 4.05	26.1	4.23	<0.001	28.0	1.69	0.097	25.7	4.77	<0.001	28.0	1.69	0.097
16	33.8 ± 1.69	20.4	56.60	<0.001	32.0	7.54	<0.001	29.3	18.96	<0.001	31.8	8.39	<0.001
17	37.5 ± 2.79	32.8	15.51	<0.001	37.0	1.78	0.077	32.8	15.51	<0.001	35.6	6.36	<0.001
18	41.4 ± 2.95	30.7	36.04	<0.001	44.0	8.63	<0.001	39.8	5.48	<0.001	39.6	6.15	<0.001
19	44.6 ± 3.48	43.1	4.39	<0.001	47.0	6.72	<0.001	43.2	4.11	<0.001	43.2	4.11	<0.001
20	48.1 ± 2.30	46.4	7.28	<0.001	51.0	11.86	<0.001	46.5	6.86	<0.001	46.3	7.70	<0.001
21	51.5 ± 2.67	49.8	5.78	<0.001	54.0	8.70	<0.001	49.8	5.78	<0.001	49.4	7.16	<0.001
22	54.7 ± 2.06	53.0	7.50	<0.001	58.0	14.52	<0.001	53.0	7.50	<0.001	52.5	9.70	<0.001
23	57.8 ± 2.24	56.3	6.01	<0.001	61.0	12.24	<0.001	56.1	6.79	<0.001	55.8	7.95	<0.001
24	60.1 ± 4.32	58.3	3.46	0.001	64.0	7.62	<0.001	59.2	1.71	0.089	56.8	6.38	<0.001
25	63.4 ± 5.16	62.5	1.49	0.137	67.0	6.25	<0.001	62.2	2.01	0.046	61.6	3.04	0.003
26	66.9 ± 2.67	65.4	4.84	<0.001	70.0	10.22	<0.001	65.0	6.15	<0.001	64.3	8.44	<0.001

27	69.5 ± 5.17	68.4	2.18	0.030	73.0	6.71	<0.001	67.8	3.34	0.001	66.9	5.08	<0.001
28	72.2 ± 2.88	71.3	3.05	0.003	75.0	10.00	<0.001	70.5	5.87	<0.001	69.6	9.05	<0.001
29	74.6 ± 2.76	74.0	2.41	0.017	78.0	14.59	<0.001	73.2	5.81	<0.001	72.4	9.21	<0.001
30	76.9 ± 2.96	76.5	1.95	0.052	80.0	12.84	<0.001	75.7	5.33	<0.001	74.9	8.71	<0.001
31	79.5 ± 2.94	78.8	2.85	0.005	83.0	14.81	<0.001	78.1	5.79	<0.001	77.2	9.58	<0.001
32	81.0 ± 4.25	80.9	0.42	0.675	85.0	12.86	<0.001	80.4	2.04	0.042	80.0	3.34	0.001
33	80.3 ± 2.06	82.7	2.66	0.008	87.0	7.39	<0.001	82.6	2.55	0.011	82.2	2.11	0.036
34	85.8 ± 3.03	84.3	6.16	<0.001	89.0	12.72	<0.001	84.7	4.55	<0.001	84.4	5.76	<0.001
35	87.9 ± 2.95	85.8	7.26	<0.001	91.0	10.95	<0.001	86.7	4.11	<0.001	86.8	3.76	<0.001
36	89.7 ± 2.74	87.2	7.30	<0.001	93.0	9.37	<0.001	88.6	3.27	0.001	89.0	2.12	0.036
37	92.1 ± 2.80	88.5	7.08	<0.001	95.0	5.74	<0.001	90.3	3.53	0.001	91.3	1.56	0.124
38	93.8 ± 2.67	89.7	5.78	<0.001	97.0	4.46	<0.001	92.0	2.56	0.017	93.5	0.45	0.656

Table 2. Showing BPD Comparison with other Authors



Graph 1. Showing Comparison of BPD and Gestational Age with Other Authors

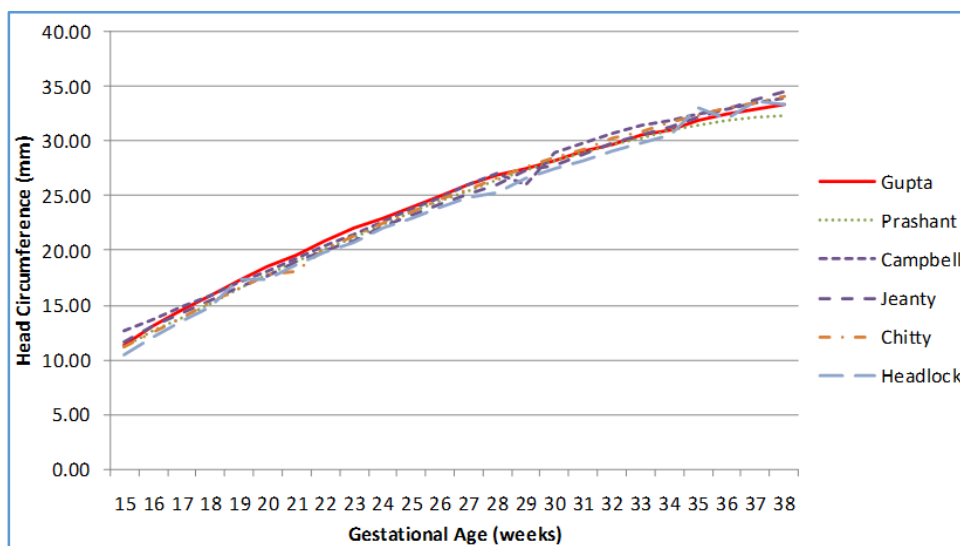
The same difference is also seen between our study and study by Prashant et al. We have observed that in early weeks of pregnancy, the difference in measurements of different authors is more. It decreases as pregnancy advances. By the 38th week, the difference in values is less. Again, all the differences were found to be significant (p < .05), except for 25th GA (p= .137), 30th GA (p=.052) and 32nd GA (p= 0.675).

In head circumference, all studies show nearly the same measurements with a difference of about 1 mm to 1.6 mm. The readings are more in our study, that also in the earlier weeks of gestation. As the gestational period advances, the difference decreases. This is also seen in the observations made by other authors. At term, the difference in our study and other studies is negligible (Table No. 3 and Graph No. 2).

GA (wks.)	Mean Head Circumference (mm)					
	Gupta	Prashant	Campbell	Jeanty	Chitty	Headlock
15	11.3 ± 0.74	11.10	12.60	11.60	11.10	10.50
16	12.9 ± 0.69	12.60	13.70	13.00	12.50	12.10
17	14.5 ± 1.01	13.80	14.80	14.20	13.80	13.60
18	15.8 ± 0.65	15.10	15.90	15.40	15.20	14.90
19	17.1 ± 0.61	16.40	17.00	16.60	16.40	17.40
20	18.5 ± 0.69	17.70	18.10	17.60	17.70	17.40
21	19.6 ± 0.72	18.90	19.20	18.90	18.00	18.70
22	20.9 ± 0.74	20.10	20.40	20.00	20.10	19.80
23	21.9 ± 0.72	21.20	21.50	20.90	21.30	20.80
24	22.9 ± 0.65	22.30	22.70	22.20	22.40	22.00
25	23.9 ± 0.75	23.50	23.80	23.20	23.50	23.00
26	24.9 ± 0.78	24.60	24.90	24.20	24.60	23.90
27	25.9 ± 0.70	25.50	26.00	25.10	25.60	24.90
28	26.8 ± 2.27	26.50	27.10	26.00	26.60	25.30

29	27.4 ± 0.77	27.40	26.10	27.30	27.60	26.60
30	28.2 ± 0.90	28.20	29.00	27.80	28.50	27.50
31	29.0 ± 0.89	29.00	29.90	28.80	29.30	28.20
32	29.7 ± 0.83	29.80	30.80	29.80	30.20	29.10
33	30.4 ± 0.89	30.40	31.50	30.50	30.90	29.80
34	30.9 ± 0.75	31.00	32.00	31.30	31.70	30.60
35	31.8 ± 0.94	31.50	32.50	32.10	32.30	33.00
36	32.3 ± 0.69	31.90	33.00	32.90	33.00	32.00
37	32.9 ± 0.89	32.20	33.60	33.70	33.50	33.60
38	33.3 ± 1.06	32.40	34.00	34.50	34.10	33.30

Table 3. Showing Head Circumference Comparison Chart with Other Authors

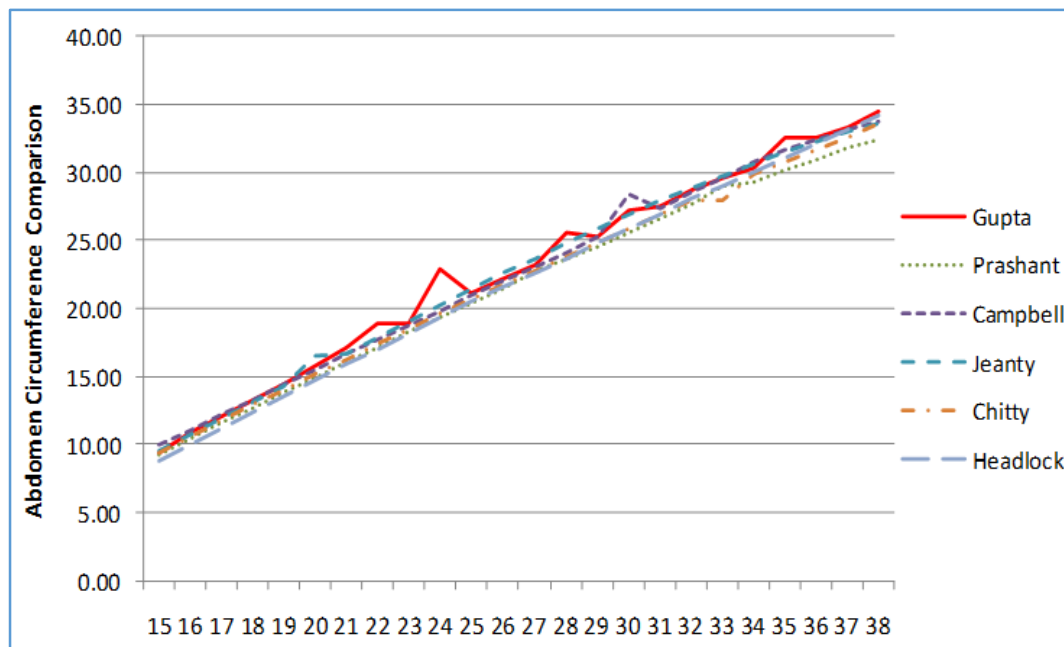


Graph 2. Showing Head Circumference Comparison with Other Authors

The measurements that were reported in abdominal circumference by Jeanty et al were slightly more than others in 22 to 26 weeks (Table No. 4). After 27th week onwards, the difference between readings of different observers decreases and by 38th week the values are nearly the same (Graph 3).

GA (wks)	Abdominal Circumference Comparison					
	Our Study	Prashant	Campbell	Jeanty	Chitty	Headlock
15	9.46±0.70	9.35	10.10	9.6	9.44	8.79
16	10.87±0.69	10.50	11.20	10.8	10.61	10
17	12.07±0.75	11.67	12.30	11.9	11.77	11.23
18	13.37±1.13	12.81	13.34	13.1	12.93	12.41
19	14.54±0.86	13.96	14.50	14.3	14.07	13.52
20	15.82±0.92	15.00	15.60	16.5	15.2	14.73
21	17.20±1.09	16.20	16.70	16.7	16.33	15.94
22	18.90±0.81	17.25	17.80	17.9	17.45	17.01
23	18.96±0.89	18.33	18.80	19.1	18.55	18.17
24	22.85±0.89	19.36	19.90	20.2	19.65	19.36
25	21.06±1.17	20.41	21.00	21.4	20.73	20.47
26	22.20±1.13	21.40	22.10	22.6	21.8	21.58
27	23.23±1.20	22.82	23.10	23.7	22.86	22.64
28	25.53±1.16	23.62	24.20	24.8	23.9	23.68
29	25.22±1.18	24.62	25.30	25.9	24.93	24.73
30	27.23±1.39	25.56	28.40	26.9	25.96	25.77
31	27.48±1.38	26.60	27.50	27.9	26.95	26.87
32	28.66±1.47	27.60	28.60	28.9	27.94	28.02
33	29.50±1.53	28.94	29.70	29.8	27.91	29.01
34	30.30±2.39	29.30	30.80	30.7	29.87	30
35	32.51±1.35	30.20	31.70	31.5	30.81	31.07
36	32.56±1.33	30.97	32.50	32.3	31.73	32.08
37	33.33±1.38	31.75	33.20	33	32.63	33.14
38	34.44±1.51	32.40	33.80	33.6	33.62	34.13

Table 4. Showing Abdomen Circumference Comparison with Other Authors

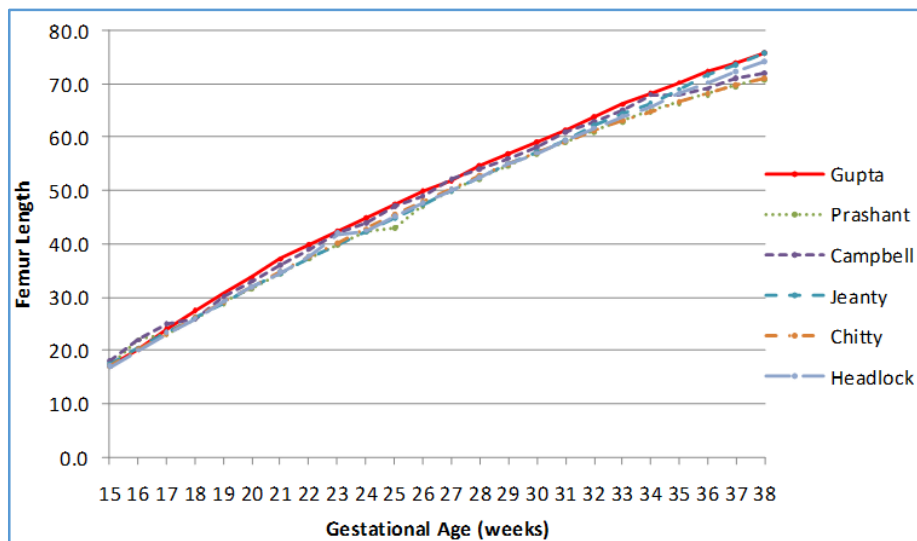


Graph 3. Showing Abdomen Circumference Comparison with Other Authors

Foetal femur length in the initial weeks of gestation from 15 to 20 weeks was nearly the same as compared to other authors (Table No. 6). The difference was negligible, but as gestational weeks increased the difference increased when compared to other authors. Our values were highest. There was a difference of 2.1 mm to 2.3 mm. The measurements of Jeanty, Chitty and Hadlock were nearly the same, but differed from those of Cambell et al. Our values were similar to those of Cambell et al. Measurements of Prashant et al were also similar to those of Campbell et al. By the 38th week, there was a difference of 1.0 to 4.9 mm in the readings of different authors (Graph No. 4). According to statistical analysis comparing our results with Prashant et al, all the differences were found to be highly significant ($p < .001$) except for 15th GA ($p = .775$). Comparing with Campbell et al, the differences were found to be significant ($p < .05$) except for the 19th, 23rd, 27th, 31st and 34th GA ($P > .05$). Comparing with Jeanty et al, all the differences were found to be significant ($p < .05$) except for the 15th, 37th and 38th GA ($p < .05$). Comparing with Chitty et al, all the differences were found to be highly significant ($p < .001$) except for the 15th and 16th GA ($p > .05$). Comparing with Hadlock et al, all the differences were found to be highly significant ($p < .001$) except for the 15th, 16th, 23rd and 38th GA ($p > .05$).

GA (wks)	Gupta	Prashant			Campbell			Jeanty			Chitty			Headlock		
	Mean	Mean	t-value	p-value	Mean	t-value	p-value	Mean	t-value	p-value	Mean	t-value	p-value	Mean	t-value	p-value
15	17.1±1.69	17.2	0.287	0.775	18.0	2.851	0.006	17.5	1.248	0.217	17.2	0.287	0.775	17.0	0.354	0.725
16	20.3±1.68	22.1	7.762	<0.001	22.0	7.334	<0.001	20.5	0.909	0.365	20.3	0.053	0.958	20.1	0.804	0.423
17	24.2±1.86	23.1	5.350	<0.001	25.0	3.970	<0.001	23.5	3.388	0.001	23.3	4.369	<0.001	23.4	3.879	<0.001
18	27.5±1.68	26.0	8.697	<0.001	26.0	8.697	<0.001	26.3	6.931	<0.001	26.3	6.931	<0.001	26.1	8.108	<0.001
19	30.5±2.70	29.0	5.624	<0.001	30.0	1.958	0.052	29.0	5.624	<0.001	29.2	4.891	<0.001	29.2	4.891	<0.001
20	33.7±2.20	31.8	8.429	<0.001	33.0	3.213	0.002	32.0	7.560	<0.001	32.1	7.125	<0.001	32.0	7.560	<0.001
21	37.2±2.38	34.5	10.376	<0.001	36.0	4.572	<0.001	34.5	10.376	<0.001	34.9	8.828	<0.001	34.7	9.602	<0.001
22	39.8±1.84	37.3	12.212	<0.001	39.0	3.832	<0.001	37.5	11.226	<0.001	37.6	10.733	<0.001	37.7	10.240	<0.001
23	42.4±1.94	39.9	11.298	<0.001	42.0	1.909	0.058	40.0	10.851	<0.001	40.3	9.510	<0.001	42.0	1.909	0.058
24	45.0±1.83	42.5	11.272	<0.001	44.0	4.398	<0.001	42.5	11.272	<0.001	42.9	9.439	<0.001	42.5	11.272	<0.001
25	47.5±2.01	43.1	19.489	<0.001	47.0	2.311	0.022	45.0	11.120	<0.001	45.5	8.918	<0.001	45.2	10.240	<0.001
26	49.9±1.90	47.3	11.884	<0.001	49.0	4.077	<0.001	47.5	10.966	<0.001	48.0	8.670	<0.001	47.7	10.047	<0.001
27	51.9±3.45	49.9	5.792	<0.001	52.0	0.293	0.770	50.0	5.502	<0.001	50.4	4.343	<0.001	50.2	4.923	<0.001
28	54.8±3.26	52.3	7.705	<0.001	54.0	2.411	0.017	52.5	7.082	<0.001	52.7	6.459	<0.001	52.5	7.082	<0.001
29	56.9±4.24	54.7	6.139	<0.001	56.0	2.547	0.011	55.0	5.310	<0.001	54.9	5.586	<0.001	55.1	5.034	<0.001
30	59.2±3.73	57.0	7.256	<0.001	58.0	3.909	<0.001	57.3	6.252	<0.001	57.1	6.921	<0.001	57.0	7.256	<0.001
31	61.3±3.62	59.2	7.193	<0.001	61.0	1.037	0.300	59.5	6.167	<0.001	59.2	7.193	<0.001	59.4	6.509	<0.001
32	63.9±4.95	61.2	7.465	<0.001	63.0	2.456	0.014	62.3	4.404	<0.001	61.2	7.465	<0.001	61.8	5.796	<0.001
33	66.2±2.93	63.0	14.601	<0.001	65.0	5.537	<0.001	64.6	7.350	<0.001	63.1	14.148	<0.001	64.0	10.069	<0.001
34	68.4±3.28	64.9	13.101	<0.001	68.0	1.583	0.114	66.5	7.157	<0.001	64.9	13.101	<0.001	65.9	9.386	<0.001
35	70.3±3.84	66.6	9.870	<0.001	68.0	6.096	<0.001	69.0	3.401	0.001	66.6	9.870	<0.001	68.2	5.557	<0.001
36	72.3±2.46	68.2	13.247	<0.001	69.0	10.690	<0.001	71.6	2.382	0.019	68.2	13.247	<0.001	70.3	6.536	<0.001
37	74.0±2.34	69.7	10.145	<0.001	71.0	7.082	<0.001	73.6	0.958	0.342	69.7	10.145	<0.001	72.3	4.020	<0.001
38	75.9±2.88	71.0	6.309	<0.001	72.0	5.008	<0.001	75.8	0.065	0.949	71.1	6.179	<0.001	74.3	2.016	0.054

Table 5. Showing Femur Length Comparison with Other Authors

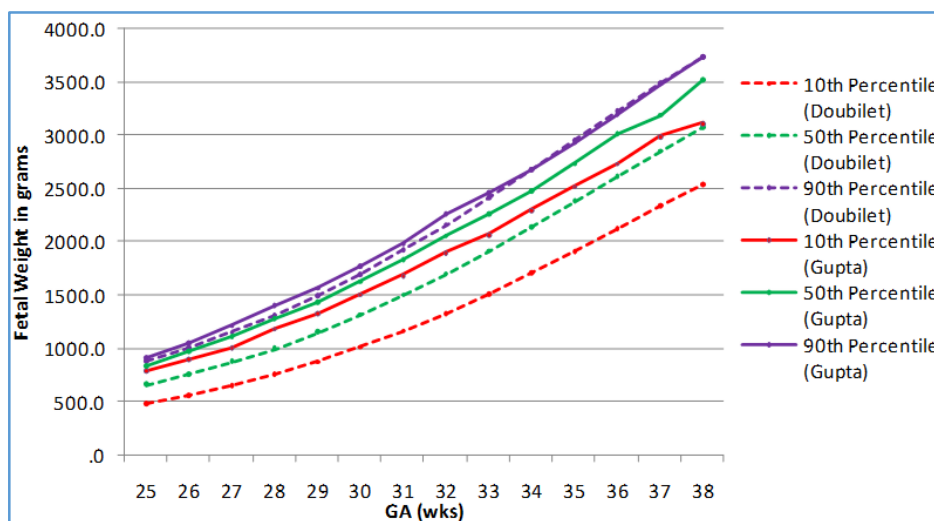


Graph 4. Showing Femur Length Comparison with Other Authors

We have compared foetal weight values with Doubilet et al and have found that measurements differ in the 10th and 50th percentile by 174 – 354 gms. Our values are higher than those of Doubilet et al. But in 90th percentile, our figures and those of Doubilet are nearly the same (Table No. 6 and Graph No. 5).

GA (wks)	Doubilet et al			Gupta et al		
	10th Percentile	50th Percentile	90th Percentile	10th Percentile	50th Percentile	90th Percentile
25	490.0	660.0	889.0	786.7	834.0	918.6
26	568.0	760.0	1016.0	898.6	973.0	1059.0
27	660.0	875.0	1160.0	1006.4	1116.0	1221.0
28	765.0	1005.0	1322.0	1182.5	1284.0	1408.0
29	884.0	1153.0	1504.0	1329.0	1435.0	1572.2
30	1020.0	1319.0	1706.0	1506.7	1628.0	1782.0
31	1171.0	1502.0	1928.0	1685.6	1829.0	1985.8
32	1338.0	1702.0	2167.0	1899.6	2056.0	2266.8
33	1519.0	1918.0	2421.0	2069.9	2259.0	2466.0
34	1714.0	2146.0	2687.0	2297.4	2472.0	2674.8
35	1919.0	2383.0	2959.0	2518.7	2731.0	2931.2
36	2129.0	2622.0	3230.0	2736.0	3008.5	3203.6
37	2340.0	2859.0	3493.0	2988.0	3190.0	3483.3
38	2544.0	3083.0	3736.0	3116.3	3522.0	3737.7

Table 6. Foetal Weight Percentiles in Third Trimester



Graph 5. Showing Foetal Weight Comparison with Other Authors

DISCUSSION

Foetal biometry is being done in all countries big or small, in all races and ethnic groups white or black, American, Asian, African, Chinese and Malaysian for the last 4 decades. Different authors have published their findings in various countries on a small group of population. Jaswar et al did a cross-sectional study to determine gestational age by foetal HC with its two standard deviations in 200 gravid patients in north Indian population. They found a discrepancy of 1.09-2.39 between HC at term in Caucasian and Indian population.⁽¹¹⁾ Sumit et al have presented their study in 330 cases in Rajasthan. Prashant et al have studied 2500 scans in Gujarat, while Fusun et al⁽¹²⁾ in Turkey have studied 1411 scans. Lachman and Shen⁽¹³⁾ have reported findings in 128 cases in Chinese population. Madan et al in 1539 cases in different races in Northern California. We have compared our results with those of Chitty (British), Campbell (British), Jeanty and Hadlock from USA. Prashant et al have reported mean values in BPD, which are lower than published standard values after 34 weeks. Our values are higher than those of Prashant et al as Campbell et al have reported higher values than Chitty et al, both from Britain. After 35 weeks, the measurements of Hadlock et al and our study are nearly the same. The same type of findings are seen in other measurements, whether it is BPD, HC, femur length or foetal weight. The difference in values range from 1 mm to 3 mm. In our study we have found that the measurements of BPD, HC, AC and FL are the same as found in other studies in later weeks of pregnancy. Foetal weight measurements when compared with those of Doubilet et al also are nearly the same from 29th week onwards and by term the foetal weight in our study and in those of Doubilet et al are the same. Our study in a large population (4595 cases) has dispelled all misbelief that the foetus are different in different countries, that foetuses are smaller in Asians, Chinese and Singapore population and that those of America are larger. By term all foetuses are the same all over the world, be it white, black, wheatish or whether the mother is small or tall, less in weight or heavy weight.

CONCLUSION

All our values were slightly more than those of other authors in the early weeks of gestation, but as pregnancy advanced our measurements were nearly the same as those of other authors. After the study of such a large sample size (4595 cases) was found that by term all foetuses are the same all over the world, be it white, black, wheatish or whether the mother is small or tall, less in weight or heavy weight.

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