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Bisexual Variation in Anthropometric Measurements of Tribes of Eastern Ghats, Andhra Pradesh

Anthropology

KEYWORDS : Anthropometry. Bagatha, Kondadora, Kondareddi, Koyadora

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ABSTRACT

An attempt has been made to study the anthropometric measurements of four tribal groups that include anthropometrically measurable attributes and indices of the human body. A cross-sectional study of 1213 persons consisting of 607 males and 606 females belonging to the tribes namely Bagatha, Konda Dora, Konda Reddi, and Koya Dora situated in Vizianagaram district, Visakhapatnam, East Godavari and West Godavari districts respectively. The measurements such as stature, relative weight, muscularity, frame size, various weight/height indices, waist circumference have been used to quantify the physical activity and patterns of change among males and females individually as well as population groups. The tribes in principle vary in the mean values of all the somatometric measures of body weight, height vertex, biacrominal breath, bicristal breadth, waist circumference and hip circumference. The mean values of weight among men from tribes of Eastern Ghats shows that the Koya Dora men of current survey are the heaviest (52 kg), tallest (160.29cm), with broader shoulders (36.97 cm), and maximum hip circumference (85.54 cm). Various breadths of the body indicate thin physical frame of the tribes.

INTRODUCTION

Anthropometry deals with the measurement of man and provides scientific methods and techniques for taking various measurements and observations on the living man and on the skeleton. Anthropometry under many circumstances can be a highly suitable method for body composition assessment, especially for population-based studies (Cameron, 2006). Thurston was the pioneer in surveying different caste and tribal populations from South India which were presented in his book "Castes and Tribes of South India", published in the year 1909. Risley (1969) and Guha (1941, 1944) have mainly focused their anthropometric investigations to develop racial classification and find out the racial affinities of several Indian populations. These early studies revealed enormous anthropometric variation among different populations. Growth is a product of the continuous and complex interaction of heredity and environment (Tanner, 1978). Several studies of physical growth in tribal populations have observed that with the increase in age, there is a tendency for increase in all the physical traits (Kapoor and Kapoor, 1991; Dharma Rao and Busi, 1994, 1995).

Based on this literature, an attempt is made to survey the tribes inhabiting Eastern Ghats, Andhra Pradesh to document similarity and diversity between tribes for somatometric characters.

MATERIAL AND METHODS

Anthropometric measurements are taken from adult men and women belonging to four tribes inhabiting Eastern Ghats. The Bagatha from Vizianagaram district; Konda Dora from Visakhapatnam; Konda Reddi from East and West Godavari and Koya Dora from West Godavari districts are surveyed during the present study. Only unrelated adult men and women are identified by sorting out one person from among brothers or sisters for anthropometric study from households to avoid homogeneity.

Six anthropometric measurements Viz., Body Weight, Height Vertex, Biacromial Breadth, Bicristal Breadth, Waist Circumference, and Hip Circumference are measured following the standard techniques and procedures of Weiner and Lourie (1969) as illustrated by Singh and Bhasin (2004). The measurements are taken to cover, linear, breadth and circumferences of the body. The tools are moderately simple, precise, portable, and inexpensive that provides an approximate representation of body composition. The instruments such as portable electronic Weighing machine, Anthropometer, first segment of Anthropometer Rod (Rod Compass), Tape are used during the investigation. The somatometric data are processed by using SPSS package to calculate mean, standard error and standard deviation, t–test, one way ANOVA, and Post HOC test. Men and women are classified depending on the value of somatometric measurement or index where ever relevant.

The tabulated results of six anthropometric measurements among men and women belonging to four tribes of Eastern Ghats are presented in tables. The instruments such as portable electronic Weighing machine, Anthropometer and Tape manufactured by M/s Una and Company, New Delhi are used. Body weight is measured in Kilograms (kg), linear, breadth and circumference measurements in centimeters (cm). While taking the measurements every effort and proper care has been taken to get most accurate readings.

RESULTS AND DISCUSSION

The data on Anthropometric dimensions of four tribes of Eastern Ghats namely Bagatha, Konda Dora, Konda Reddi and Koya Dora pertaining to minimum, maximum and mean values recorded among men and women are presented in the Table 1.

Table 1: Anthropometric measurements of present study tribes BODY WEIGHT (kg)

Tribe	MEN						WOMEN						t – Value for Bisexual Variation	
	N	Min	Max	Mean	SE	SD	N	Min	Max	Mean	SE	SD	t	p
Bagatha	157	36.2	74.0	49.96	0.58	7.24	156	30.3	64.7	42.31	0.53	6.57	9.79	0.00
Konda Dora	150	31.5	64.3	48.40	0.48	5.91	150	28.7	59.0	41.13	0.44	5.45	11.08	0.00
Konda Reddi	150	33.1	79.7	49.90	0.71	8.75	150	26.6	71.9	42.94	0.64	7.83	7.26	0.00
Koya Dora	150	33.2	83.8	52.00	0.78	9.49	150	25.3	73.1	45.01	0.69	8.46	6.74	0.00

HEIGHT VERTEX (cm)															
Bagatha	157	130.0	174.5	158.77	0.47	5.93		156	134.2	162.0	149.27	0.41	5.09	15.21	0.00
Konda Dora	150	130.8	170.1	156.61	0.51	6.22		150	130.9	161.9	148.87	0.43	5.30	11.60	0.00
Konda Reddi	150	130.1	176.0	158.55	0.60	7.36		150	135.2	166.4	148.37	0.49	5.95	13.17	0.00
Koya Dora	150	141.8	176.7	160.29	0.51	6.25		150	131.3	165.3	150.37	0.48	5.86	14.17	0.00
BIACROMAL BREADTH (cm)															
Bagatha	157	26.0	40.5	36.33	0.17	2.09		156	28.0	39.0	33.46	0.15	1.92	12.63	0.00
Konda Dora	150	27.0	42.2	36.56	0.19	2.38		150	23.4	42.5	33.67	0.18	2.19	10.99	0.00
Konda Reddi	150	23.0	41.7	36.34	0.25	3.06		150	24.9	39.4	32.95	0.19	2.28	10.90	0.00
Koya Dora	150	24.0	43.8	36.97	0.22	2.63		150	28.3	39.6	33.64	0.16	1.96	12.43	0.00

t – Value > 1.96 is Significant at 5% confidence level; p ≤ 0.05 is Significant (p value is rounded off to 2 decimals); NS = Not significant

Anthropometric measurements of present study tribes Continued…
BICRISTAL BREADTH (cm)

Tribe	Men							Women						t – Value for Bisexual Variation	
	N	Min	Max	Mean	SE	SD		N	Min	Max	Mean	SE	SD	t	p
Bagatha	157	22.0	32.0	28.33	0.14	1.76		156	23.0	32.0	27.81	0.15	1.81	2.59	0.01
Konda Dora	150	21.3	37.4	25.37	0.24	2.97		150	19.0	34.0	22.95	0.18	2.19	8.05	0.00
Konda Reddi	150	20.5	47.8	25.57	0.23	2.87		150	18.0	38.0	24.96	0.21	2.56	1.95 NS	0.05
Koya Dora	150	18.0	34.2	25.41	0.18	2.22		150	19.2	34.4	25.19	0.19	2.38	0.85 NS	0.40
WAIST CIRCUMFERENCE (cm)															
Bagatha	157	52.0	95.0	69.57	0.66	8.24		156	49.0	95.0	64.07	0.66	8.30	5.88	0.00
Konda Dora	150	45.5	88.5	70.13	0.46	5.69		150	52.5	86.4	67.04	0.50	6.14	4.53	0.00
Konda Reddi	150	55.0	103.0	70.81	0.71	8.68		150	51	89.0	66.66	0.69	8.51	4.19	0.00
Koya Dora	150	47.0	102.0	72.90	0.77	9.38		150	44	90.0	67.72	0.78	9.54	4.74	0.00
HIP CIRCUMFERENCE (cm)															
Bagatha	157	66.0	101.0	80.85	0.47	5.94		156	61.0	107.0	81.82	0.56	6.98	1.32 NS	0.19
Konda Dora	150	66.0	97.0	81.44	0.35	4.23		150	57.9	100.6	80.60	0.46	5.64	1.46 NS	0.15
Konda Reddi	150	68.0	100.0	82.72	0.52	6.31		150	50.0	114.0	84.22	0.66	8.10	1.79 NS	0.08
Koya Dora	150	66.0	106.0	84.31	0.65	7.96		150	39.6	109.0	85.54	0.86	10.54	1.15 NS	0.25

t – Value > 1.96 is Significant at 5% confidence level; p ≤ 0.05 is Significant (p value is round off to 2 decimals); NS = Not significant

Body Weight: Among men, the highest mean value of Body Weight (52.0 kg) found among Koya Dora followed by 49.96 kg among Bagatha and 49.9 kg among Konda Reddi, while Konda Dora record a relatively lower mean value of 48.4 kg. Similarly Koya Dora women record the highest mean body weight with a value of 45.01 kg followed by Konda Reddi (42.94 kg), Bagatha (42.3 kg) and Konda Dora (41.13 kg). Men are relatively heavier than women in all the tribes. The heaviest person among four tribes is a Koya Dora man with 83.8 kg, while the very thin person is a Konda Dora man weighing only 31.5 kg. Among tribal women, the light weight and the heaviest are from Koya Dora tribe whose body weights are 25.3 kg and 73.1 kg respectively. The variation in the mean body weight between men and women is significant in all the tribes. Further, Koya Dora people with a relatively higher mean body weight differ significantly from Bagatha, Konda Dora and Konda Reddi tribes.

Height Vertex (Stature): Height Vertex record the highest mean value of 160.29 cm among Koya Dora followed by 158.77 cm among Bagatha and 158.55 cm among Konda Reddi, while Konda Dora record a relatively lower mean value of 156.61 cm among men. Similarly Koya Dora women record the highest mean value of 150.37 cm followed by Bagatha (149.27 cm), Konda Dora (148.87 cm), while Konda Reddi women register the lowest mean value of 148.37 cm. The shortest person among four tribes is a Bagatha man with 130 cm of height, while the tallest man is a Koya Dora man with a height of 176.7 cm. Among tribal women, the shortest belongs to Konda Dora with a height of 130.9 cm while the tallest belongs to Konda Reddi (166.4 cm). The variation in the mean stature between men and women is significant in all the four tribes. Further, Koya Dora by recording higher (taller) mean height differs significantly from Konda Dora and Konda Reddi tribes.

Biacromal Breadth: Koya Dora men register the highest mean biacromial breadth with a value of 36.97 cm followed by 36.56 cm among Konda Dora and 36.34 cm among Konda Reddi, while Bagatha men record a slightly lower mean value of 36.33 cm. Similarly Konda Dora women record the highest mean value of 33.67 cm followed by Koya Dora (33.64 cm), Bagatha (33.46 cm) and Konda Reddi (32.95 cm). Always men exhibit broad shoulders than women. The narrowest shoulder among men is found in a Konda Reddi man with a breadth of 23 cm, while the broadest shoulder is found in a Koya Dora man with a breadth of 43.8 cm. Among tribal women, the narrowest shoulder is observed in a Konda Dora with a value of 23.4 cm, while the broadest shoulder is also recorded in a Konda Dora woman with 42.5 cm of breadth. The variation in mean biacromial breadth between men and women is significant in all the tribes. The Koya Dora people by recording relatively broader shoulders differ from Konda Reddi tribe.

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Bicristal Breadth: Bagatha men record the highest mean value for bicristal breadth (28.33 cm) followed by Konda Reddi (25.57 cm) and Koya Dora (25.41 cm), while Konda Dora report a relatively lower mean value (25.37 cm). Similarly Bagatha women record the highest mean bicristal breadth (27.81 cm) followed by Koya Dora (25.19 cm), Konda Reddi (24.96 cm) and Konda Dora (22.95 cm). Among four tribes, Konda Reddi man registered the broadest pelvis with a breadth of 47.8 cm. The narrowest pelvis is observed in a Konda Reddi woman and a Koya Dora man with a breadth of 18 cm, while the broad pelvis woman is a Konda Reddi with a breadth of 38 cm. In all the tribes, men exhibit slightly broad pelvis although women are expected to have broad pelvis. However, the variation between men and women in the mean bicristal breadth is significant in Bagatha and Konda Dora tribes, but not in Konda Reddi and Koya Dora populations which reflect an approximately closer mean bicristal breadth among Koya Dora and Konda Reddi women. However, all the tribes differ from each other for their bicristal breadth.

Waist Circumference: Koya Dora males record relatively higher mean waist circumference of 72.9 cm followed by 70.81 cm among Konda Reddi and 70.13 cm among Konda Dora, while Bagatha record a relatively lower mean value of 69.57 cm. Similarly Koya Dora women record the highest mean waist circumference (67.72 cm) followed by Konda Dora (67.04 cm), Konda Reddi (66.66 cm) and Bagatha (64.07 cm). Men record larger waist circumference than women in all the tribes. A Konda Reddi man registers the highest waist circumference (103 cm) among four tribes. The woman with the lowest waist circumference is from Koya Dora with a value of 44 cm while the largest waist circumference is recorded by a Bagatha woman with 95 cm. Among men from four tribes, the least waist circumference is 45.5 cm observed for a Konda Dora man. The variation between men and women in their mean waist circumference is significant in all the tribes. Further, Bagatha people with a relatively slim waist differ from the other three tribes.

Hip Circumference: Koya Dora women record higher mean value for hip circumference (85.54 cm) followed Konda Reddi (84.22 cm) and Bagatha (81.82 cm), while Konda Dora record a relatively lower mean value of 80.6 cm . Similarly Koya Dora men record the highest mean value (84.31 cm) followed by Konda Reddi (82.72 cm),

Table 2: Range Variation of Body Weight (kg) among Men and Women

Tribe	N	Body Weight (kg) among Men						Body Weight (kg) among Women				
		< 39.0	39 - 44.9	45 - 50.9	51 - 56.9	57 - 62.9	≥ 63.0	< 35.0	35 - 39.9	40 - 44.9	45 - 49.9	≥ 50.0
		%	%	%	%	%	%	%	%	%	%	%
Bagatha	157	2.5	24.8	32.5	24.8	8.9	6.4	11.5	26.9	38.5	9.0	14.1
Konda Dora	150	6.0	20.7	41.3	25.3	5.3	1.3	12.0	29.3	40.0	14.0	4.7
Konda Reddi	150	8.0	18.0	39.3	18.0	8.0	8.7	12.7	26.7	26.0	17.3	17.3
Koya Dora	150	5.3	18.0	27.3	23.3	10.0	16.0	12.0	17.3	26.0	20.0	24.7

Table 3: Range Variation of Height Vertex (cm) among Men and Women

Tribe	N	Height Vertex (cm) among Men						Height Vertex (cm) among Women					
		130.0 –149.9 Very short	150.0– 159.9 Short	160.0– 163.9 Lower Medium	164.0 – 166.9 Medium	167.0– 169.9 Upper Medium	170.0 –179.9 Tall	121.0 –139.9 Very short	140.0– 148.9 Short	149.0 – 152.9 Lower Medium	153.0 – 155.9 Medium	156.0 – 158.9 Upper Medium	159.0 – 167.9 Tall
		%	%	%	%	%	%	%	%	%	%	%	%
Bagatha	157	5.1	48.4	26.8	14.0	5.1	0.6	2.6	42.9	31.4	12.8	6.4	3.8
Konda Dora	150	12.7	58.7	21.3	4.7	2.0	0.7	4.7	42.0	32.7	10.7	8.0	2.0
Konda Reddi	150	9.3	46.7	19.3	14.0	6.0	4.7	4.7	54.7	20.0	8.7	6.7	5.3
Koya Dora	150	4.0	43.3	21.3	18.0	7.3	6.0	2.7	35.3	30.0	18.7	6.0	7.3

Konda Dora (81.44 cm) and Bagatha (80.85 cm). Among tribal women a Konda Reddi woman exhibits the highest hip circumference with a value of 114 cm among four tribes. While the lowest hip circumference is observed in a Koya Dora woman with 39.6 cm. The man with the lowest hip circumference is a Koya Dora with 66 cm, while the highest hip circumference is found in Koya Dora man with 106 cm. Contrary to other measurements, women from Bagatha, Konda Reddi and Koya Dora exhibit slightly higher mean hip circumference than men except Konda Dora men who record 81.44 cm and women that record 80.6 cm. However, the variation in mean hip circumference between men and women among four tribes is marginal and not statistically significant. However, the mean hip circumference between all the tribes except between Bagatha and Konda Dora differ significantly.

The range variation of body weight divided in to six classes among tribal men and five classes in women from present study tribes are listed in Table 2. Relatively higher frequency of men of four tribes particularly 41.3 % of Konda Dora men and 39.3 % of Konda Reddi men weigh between 45 and 50.9 kg followed by 51 – 56.9 kg. Similarly among women, a higher proportion that is 40 % of Konda Dora women and 38.5% of Bagatha women weigh between 40 and 44.9 kg followed by 35 – 39.5 kg. Relatively higher proportion of women is underweight and weighless than 40 kg among Konda Dora, Konda Reddi and Bagatha. In heavy weight category that weigh more than 63 kg, higher proportion is Koya Dora men and similarly higher proportion of Koya Dora women also weigh more than 50 kg compared to other three tribes. The relatively higher weight of both Koya Dora men and women is due to their relatively taller stature than others. The results indicate that Koya Dora is heavier than other people.

The range variation of height vertex is presented in Table 3. Relatively higher frequency of men from all the four tribes, that is 58.7 % of Konda Dora and 48.4 % of Bagatha fall in short stature class (150–159.9 cm) followed by lower medium class (160–163.9 cm). Very few men fall in tall stature category (170–179.9) although 6% of Koya Dora and 4.7 % of Konda Reddi men are tall. Among women also a higher proportion, that is 54.7 % of Konda Reddi and 42.9 % Bagatha fall in short stature class (140–148.9 cm) followed by lower medium stature class (149–152.9 cm). However, 7.3 % of Koya Dora women and 5.3 % of Konda Reddi women are in tall class with more than 159 cm of height. The results indicate that Koya Dora and Konda Reddi are taller than Bagatha and Konda Dora people.

The range variation of biacromial breadth among men and women is reported in Table 4. Both men and women are classified into five groups. Relatively higher proportion of men exhibit medium shoulder breadth between 36 and 39.9 cm recorded among 53.5 % of Bagatha and 49.3 % of Konda Dora followed by lower medium breadth (33–35.9 cm). However, majority of women exhibit lower medium shoulder breadth (32–34.9 cm) among 61.3 % of Konda Dora and 60.7 % of Koya Dora followed by medium shoulder breadth (35–37.9 cm). Only few men and women from all the four tribes exhibit very narrow shoulders measuring less than 28.9 cm.

The range variation of bicristal breadth among men and women from present study tribes is reported in Table 5. Relatively higher frequency of tribal men (except Bagatha) exhibit lower than medium hip breadth ranging between 25 and 26.9 cm followed by 23 – 24.9 cm. However, 49 % of Bagatha men exhibit larger hip breadth above 27 cm. Similarly majority women except Bagatha exhibit narrow bicristal breadth with only 23 – 24.9 cm. However, 40.4 % Bagatha women show larger bicristal breadth between 25 – 26.9 cm. Overall the physical frame of tribe is thin.

Table 4: Range Variation of Biacromial Breadth (cm) among Men and Women

Tribe	Biacromial Breadth (cm) among Men						Biacromial Breadth (cm) among Women					
	N	< 30	30 - 32.9	33 - 35.9	36 - 38.9	≥ 39.0	N	< 29	29 - 31.9	32 - 34.9	35 - 37.9	≥ 38.0
		%	%	%	%	%		%	%	%	%	%
Bagatha	157	0.6	3.2	29.3	53.5	13.4	156	1.3	15.4	55.1	25.6	2.6
Konda Dora	150	1.3	2.7	31.3	49.3	15.3	150	1.3	15.3	61.3	20.7	1.3
Konda Reddi	150	2.7	8.7	26.0	47.3	15.3	150	2.7	29.3	50.7	14.0	3.3
Koya Dora	150	1.3	0.7	32.7	40.7	24.7	150	1.3	16.0	60.7	19.3	2.7

Table 5: Range Variation of Bicristal Breadth (cm) among Men and Women

Tribe	Bicristal Breadth (cm) among Men						Bicristal Breadth (cm) among Women					
	N	< 23	23 - 24.9	25 - 26.9	27 - 28.9	> 29.0	N	< 23	23 - 24.9	25 - 26.9	27 - 28.9	> 29.0
		%	%	%	%	%		%	%	%	%	%
Bagatha	157	0.6	5.1	17.8	49.0	27.4	156	1.3	4.5	40.4	34.6	19.2
Konda Dora	150	12.7	39.3	38.0	3.3	6.7	150	58.7	30.0	7.3	2.0	2.0
Konda Reddi	150	13.3	29.3	38.0	14.7	4.7	150	20.0	36.7	30.0	8.7	4.7
Koya Dora	150	14.0	29.3	40.0	10.0	6.7	150	16.0	32.7	32.7	13.3	5.3

The range variation of waist circumference among present study tribes is presented in Table 6. Relatively higher frequency of men exhibit lower medium waist circumference (between 66 cm and 75 cm) including Bagatha. Similarly higher proportion of tribal women exhibits very narrow waist circumference (even less than 66 cm) which suggest a thin physical frame of tribal people.

The range variation of hip circumference is depicted in Table 7. Relatively higher percentage of tribal men and women record a medium hip circumference ranging between 81–90 cm followed by tiny hips <81 cm indicating relatively smaller hips among all the four tribes.

An attempt is made to conduct one way ANOVA between present study tribes for variation in the mean values of somatometric measurements and the values of F and P for significance are reported in Table 8. The tribes in principle vary in the mean values of all the somatometric measures namely body weight, height vertex, biacrominal breath,bicristal breadth, waist circumference and hip circumference. The analysis estimates high F – value for bicristal breadth followed by hip circumference and body weight that reflect major variation between tribes particularly in their bicristal breadth.

Post Hoc test for inter-tribal variation in somatometric measures through multiple comparisons is calculated and presented in Table 9. These tests allow finding the variation between each pair of tribes for specific measure. The Koya Dora who is heavier than other tribes differs significantly from Bagatha, Konda Dora and Konda Reddi although the differences between other three tribes namely Bagatha, Konda Dora and Konda Reddi for body weight are marginal and not significant. Similarly Koya Dora is taller than other tribes and differs significantly from Konda Dora and Konda Reddi but

Table 6: Range Variation of Waist Circumference (cm) among Men and Women

Tribe	Waist Circumference(cm) among Men					Waist Circumference(cm) among Women				
	N	< 66	66 – 75	76 - 85	>85	N	< 66	66 – 75	76 – 85	> 85
		%	%	%	%		%	%	%	%
Bagatha	157	34.4	46.5	13.4	5.7	156	65.4	23.1	10.3	1.3
Konda Dora	150	15.4	75.3	8.0	1.3	150	44	46.7	8.7	0.7
Konda Reddi	150	28.7	48.7	15.3	7.3	150	50.6	33.3	12.0	4.0
Koya Dora	150	18	48.7	23.3	10.0	150	43.3	38.0	16.0	2.7

Table 7: Range Variation of Hip Circumference (cm) among Men and Women

Tribe	Hip Circumference(cm) among Men				Hip Circumference(cm) among Women			
	N	< 81	81 - 90	> 90	N	< 81	81 – 90	> 90
		%	%	%		%	%	%
Bagatha	157	49.7	43.3	7.0	156	48.1	42.9	9.0
Konda Dora	150	34.0	64.0	2.0	150	47.3	49.3	3.4
Konda Reddi	150	40.6	47.3	12.0	150	29.4	52.0	18.6
Koya Dora	150	35.4	45.3	19.3	150	22.0	51.3	26.6

Table 8: One Way ANOVA between Present Study Tribes

Measurements	F – Value	p – Value
Body Weight	10.20	0.00

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Height Vertex	6.20	0.00
Biacromal Breadth	3.07	0.03
Bicristal Breadth	142.21	0.00
Waist Circumference	8.62	0.00
Hip Circumference	19.91	0.00

p – Value is Significant at 5% confidence level; p ≤ 0.05 is Significant (p value is round off to 2 decimals).

Table 9: Post Hoc Test for Inter-Tribal Variation in Somatometric Measures through Multiple Comparison

Measurements	p – Value between Populations					
	Bagatha Vs Konda Dora	Bagatha Vs Konda Reddi	Bagatha Vs Koya Dora	Konda Dora Vs Konda Reddi	Konda Dora Vs Koya Dora	Konda Reddi Vs Koya Dora
Body Weight	0.17	0.98	0.00*	0.07	0.00*	0.01*
Height Vertex	0.15	0.78	0.16	0.66	0.00*	0.01*
Biacromal Breadth	0.77	0.67	0.28	0.17	0.85	0.02*
Bicristal Breadth	0.00*	0.00*	0.00*	0.00*	0.00*	1.00
Waist Circumference	0.05*	0.03*	0.00*	1.00	0.06	0.11
Hip Circumference	0.95	0.00*	0.00*	0.00*	0.00*	0.07

'*' = Significant at 5% confidence level; p ≤ 0.05 is Significant (p value is round off to 2 decimals); Vs = versus.

not Bagatha. However, Bagatha do not differ from other tribes which reflect approximately similar mean stature among Bagatha, Konda Dora and Konda Reddi. Biacrominal breadth does not vary among tribes except between Konda Reddi and Koya Dora. However, bicristal breadth differs significantly between all the tribes except Konda Reddi and Koya Dora. The Bagatha people with relatively smaller waist circumference differ significantly from all the three tribes although other three tribes do not differ between each other. The Konda Dora people with their narrow hip circumference differ from Konda Reddi and Koya Dora tribes. Overall Koya Dora and Konda Reddi are relatively closer to each other not only in their habitation but also in their somatometric measures. The Bagatha and Konda Dora also do not differ between each other in four out of six measurements. The Konda Reddi does not differ from Konda Dora in four out of six somatometric measurements.

CONCLUSION

The values of mean body weight among men from tribes of Eastern Ghats show that the Koya Dora men of current survey are the heaviest (52 kg), tallest (160.29cm), with broader shoulders (36.97 cm), and maximum hip circumference (85.54 cm) shows that Koya Dora tribals have better nutritional habits. Mean bicristal breadth is significant in Bagatha (40.4% of women) between 25-26.9cm and Konda Dora tribes, but not in Konda Reddi and Koya Dora populations which reflect an approximately closer mean bicristal breadth among Koya Dora and Konda Reddi women. Majority of women exhibit lower medium shoulder breadth (32–34.9 cm).

Similarly higher proportion of tribal women exhibits very narrow waist circumference (even less than 66 cm) which suggest a thin physical frame of tribal people. The tribes in principle vary in the mean values of all the somatometric measures namely body weight, height vertex, biacromial breath, bicristal breadth, waist circumference and hip circumference. The ANOVA analysis estimates high F – value for bicristal breadth followed by hip circumference and body weight that reflect major variation between tribes particularly in their bicristal breadth. Post-Hoc test clearly reveal that Koya Dora tribe significantly differ with all the tribes not only in the body weight but also in majority of other anthropometric measures.

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