RESEARCH PAPER No. 21

SOMATOLOGY OF THE KOLAM

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ASSISTANTS.

Sri V.Nagendra Kumar,
Technical Assistant

and Tabulation

Kum. T.Aruna,
Computor-cum-Field
Investigator

Sri K.V.Satyanarayana Rao, Field work.
Research Investigator.

SOMATOLOGY OF THE KOLAM

INTRODUCTION:

The Kolam is a primitive endogamous Dravidian Tribe, inhabiting the wild and mountainous tracts of the Adilabad District of Andhra Pradesh, the agency areas of the Chanda, Yeotmal and Wardha Districts in Maharashtra State, a territory known as Gondawana.

The Kolams have their own dialect called 'Kolami' which according to Grierson is akin to 'Gondi' and also related in certain respects to Telugu, Kannada and Tamil. The tribe is devided into various exogamous clans or families. They live in wooden cottages on the crest of hill slopes, and often shift their habitation into the most inaccessible part of the mountains, to avoid contact with outsiders. They subsist on the most primitive form of shifting cultivation. Of late they are taking up forest labour and plough cultivation.

Previous studies on the physical characters of the Kolam, are very limited. Karve and Dandekar

(1951) have studied the Anthropometric characters of 30 individuals, as part of a study of the people of Maharastra. But they have not dealt with the males and females separately, nor statistically treated the community individually.

The present Anthropometric and Somatoscopic investigation was carried out in the months of November-December 1974, from 10 villages namely Leingdiguda, Gouri, Panapathar, Yempalle, Shampur and Umri in Utnoor Panchayat Samithi and Choupanguda, Mowad, Ginnedhari, Manighad villages of Wankidi Panchayat Samithi of Adilabad District. Only unrelated individuals were covered.

Excepting for the average values published by Karve and Dandekar (1951) there are no other Anthropometric or Somatoscopic data on this tribe. As per the 1971 census, the population of Kolams in Andhra Pradesh was 26,498, and 26,277 of them live in Adilabad district.

The Data:

Anthropometric and somatoscopic data on 133 adult male and 35 adult female individuals were collected according to the method prescribed by Martin. Inspite of the best efforts an equal number of females could not be covered, as they were shy, superstitious, and suspicious to stand before outsiders.

AGE DISTRIBUTION:

The Age distribution of the sample covered is as follows:

Table No. 1

Age Distribution.

Age(Years)	Male		Female	
	Frequency	Percentage	Frequency	Percentage
18-20	17	12.78	6	17.14
20-25	27	20.30	5	14.28
25-30	16	12.03	5	14.28
30-35	21	15.78	8	22.85
35-40	21	15.78	5	14.28
40-45	26	19.54	3	8.57
45-50	5	3.75	3	8.57

The statistical constants of measurements for the males (Table No.1a) and females (Table No.1b) and indices for males (Table No.2a) and females (Table No.2b) with range of variation, mean with standard error, standard deviation with standard error, coefficient of variation with standard error are presented below:

Table No. 1a

Statistical Constants of Measurements

Males (133)

S.No.	Measurements in cms.	Range	Mean ± S.E.	S.D. ± S.E.	CV ± S.E.
1.	Stature	140.6-177.9	161.26±0.56	6.45±0.39	3.99±0.25
2.	Sitting height	72.3-89.0	80.14±0.31	3.53±0.22	4.41±0.27
3.	Height tragus	137.2-164.7	149.08±0.52	6.05±0.37	4.06±0.25
4.	Height acromion	121.9-146.2	132.81±0.51	5.96±0.37	4.49±0.28
5.	Height radiale	90.5-109.7	100.92±0.43	4.97±0.30	4.92±0.30
6.	Height stylion	62.4-84.9	75.58±0.32	3.70±0.23	4.89±0.30
7.	Height dactylion	48.7-68.2	57.42±0.38	4.36±0.27	7.60±0.47
8.	Height iliospinale	84.4-108.0	96.20±0.45	5.27±0.32	5.48±0.34
9.	Height tibiale	37.0-52.3	44.20±0.30	3.42±0.21	7.74±0.47
10.	Height spherion	3.8-7.3	5.57±0.04	0.52±0.03	9.33±0.57
11.	Head length	15.2-19.9	18.27±0.07	0.86±0.05	4.71±0.29
12.	Head breadth	11.4-14.7	13.78±0.07	0.79±0.05	5.76±0.35
13.	* Head height	8.3-13.9	12.04±0.09	1.05±0.06	8.72±0.53
14.	Minimum frontal breadth	9.1-12.5	10.48±0.05	0.55±0.03	5.25±0.32
15.	Bizygomatic breadth	10.3-13.7	12.15±0.07	0.83±0.05	6.84±0.42
16.	Bigonial breadth	9.1-11.6	10.28±0.06	0.74±0.05	7.21±0.44

contd....

Table 1 - contd.

S.No.	Measurements	Range
17.	Biacromial breadth	28.3-39.6
18.	Morphological facial height	9.1-11.9
19.	Morphological upper facial height	5.3-7.4
20.	External orbital breadth	9.9-12.4
21.	Nasal length	3.6-5.4
22.	Nasal breadth	3.3-5.5
23.	Ear length	5.1-7.5
24.	Ear breadth	3.1-4.2
25.(1)	Upper leg length	37.9-57.8
25.(2)	Lower leg length	27.1-46.5
25(3)*	Leg length	82.4-103.4
26*	Arm Length	64.8-89.9
26(1)	Upper arm length	26.00-45.20
26(2)	Lower arm length	16.60-46.60
27.	Arm span	150.5-189.2
28.	Fat fold thickness at triceps(mm)	0.3-1.0
29.	Weight (Kgs)	40-55

S.D. = Standard deviation, CV=Co-efficient of

Mean. ± S.E.	S.D. ± S.E.	CV ± S.E.
35.05±0.21	2.38±0.15	6.78±0.42
10.66±0.07	0.79±0.05	7.45±0.46
6.21±0.05	0.60±0.04	9.66±0.59
11.00±0.04	0.47±0.03	4.26±0.26
4.59±0.04	0.44±0.03	9.50±0.58
3.94±0.04	0.45±0.03	11.35±0.69
6.02±0.05	0.53±0.03	8.95±0.55
3.55±0.03	0.33±0.02	9.34±0.57
48.95±0.45	5.22±0.32	1.66±0.65
38.63±0.28	3.28±0.20	8.46±0.52
92.87±0.39	4.45±0.27	4.79±0.29
75.49±0.24	2.77±0.17	3.67±0.23
31.92±0.22	2.59±0.16	8.11±0.49
25.22±0.16	1.86±0.11	7.37±0.45
170.46±0.08	0.95±0.06	0.56±0.03
0.42±0.02	0.20±0.01	47.62±2.92
47.03±0.39	4.46±0.27	9.48±0.58

variation, S.E. = Standard error

Table No. 1b

Statistical constants of Measurements

Females (35)

S.No.	Measurements	Range	Mean ± S.E.	S.D. ± S.E.	CV * S.E.
1.	Stature	140.1-161.6	149.63±0.94	5.57±0.67	3.72±0.44
2.	Sitting height	72.0-82.1	76.12±0.49	2.89±0.35	3.79±0.45
3.	Height tragus	127.3-146.6	137.79±0.87	5.15±0.62	3.74±0.45
4.	Height acromion	113.7-133.9	121.61±0.89	5.28±0.63	4.34±0.52
5.	Height radiale	85.3-102.6	92.24±0.89	5.29±0.63	5.73±0.69
6.	Height stylion	63.3-80.2	71.55±0.64	3.82±0.46	5.33±0.64
7.	Height dactylion	47.5-59.9	54.41±0.63	3.74±0.45	6.88±0.82
8.	Height iliospinale	78.6-100.4	87.92±0.83	4.88±0.58	5.55±0.66
9.	Height tibiale	33.8-46.3	39.52±0.49	2.90±0.35	7.34±0.88
10.	Height spherion	4.2-6.8	5.26±0.08	0.51±0.06	9.69±1.16
11.	Head length	16.2-18.6	17.34±0.10	0.57±0.07	3.31±0.40
12.	Head breadth	12.4-14.9	13.44±0.14	0.80±0.10	5.95±0.71
13.	Head height	9.0-13.9	11.84±0.15	0.90±0.11	7.60±0.91
14.	Minimum frontal breadth	9.4-11.2	10.10±0.08	0.50±0.06	4.95±0.59
15.	Bizygomatic breadth	10.1-12.7	11.30±0.11	0.65±0.08	5.73±0.69
16.	Bigonial breadth	8.5-10.3	9.34±0.12	0.71±0.09	7.65±0.91
17.	Biacromial breadth	28.0-35.4	32.49±0.33	1.97±0.23	6.05±0.72

contd....

Table No. 1b contd....

S.No.	Measurements in cms	Range	Mean ± S.E.	S.D. ± S.E.	CV ± S.E.
18.	Morphological facial height	8.5-11.3	9.60±0.14	0.84±0.10	8.72±1.04
19.	Morphological upper facial height	5.1-6.7	5.68±0.10	0.60±0.07	10.56±1.26
20.	External orbital breadth	9.7-11.3	10.67±0.10	0.59±0.07	5.54±0.66
21.	Nasal length	3.4-4.9	4.23±0.08	0.45±0.05	10.57±1.26
22.	Nasal breadth	3.1-5.5	3.70±0.08	0.46±0.05	12.38±1.48
23.	Ear length	5.2-6.6	5.68±0.07	0.39±0.05	6.82±0.81
24.	Ear breadth	2.8-4.0	3.30±0.06	0.35±0.04	10.50±1.25
25.*	Leg length	76.0-100.7	85.9 ±0.89	5.26±0.63	6.13±0.73
25	(1) Upper leg length	36.50-59.70	46.15±0.62	3.65±0.43	7.91±0.94
25	(2) Lower leg length	29.60-41.20	35.54±0.45	2.67±0.32	7.72±0.92
26*	Arm length	59.7-76.4	67.82±0.69	4.07±0.49	5.99±0.72
26	(1) Upper arm length	21.0-48.4	29.05±0.38	2.23±0.27	7.67±0.92
26	(2) Lower arm length	14.4-25.7	20.92±0.31	1.83±0.22	8.75±1.04
27.	Arm span	144.4-170.6	156.12±1.11	6.58±0.79	4.22±0.50
28.	Fatfold thickness at triceps (mm)	0.4-1.8	0.72±0.05	0.28±0.03	39.28±4.69
29.	Weight (Kgs)	31.5-47.0	37.54±0.69	4.11±0.49	10.95±1.31

* Indirect measurement, S.D. Standard deviation, CV: Co-efficient of variation, SE: Standard error.

Table No. 2a

Statistical Constants of Indices

Males (133)

S.No.	Index	Range	Mean + S.E.	S.D. + S.E.	CV + SE
1.	Cephalic	64.77-83.52	75.52±0.28	3.25±0.19	4.30±0.26
2.	Length height	50.52-78.57	64.98±0.49	5.67±0.35	8.73±0.53
3.	Breadth height	64.28-102.20	85.91±0.63	7.31±0.45	8.51±0.52
4.	Morphological facial	71.42-98.95	86.74±0.52	6.01±0.37	6.93±0.43
5.	Morphological upper facial	43.06-60.65	50.71±9.37	4.28±0.26	8.43±0.52
6.	Jugo frontal	70.00-99.02	83.63±0.63	7.22±0.42	8.35±0.51
7.	Jugo-mandibular	72.03-96.49	85.03±0.68	7.92±0.48	9.31±0.57
8.	Biacromial breadth	17.24-24.57	22.06±0.20	2.27±0.14	10.29±0.63
9.	Total leg length stature	53.89-61.76	57.60±0.16	1.83±0.11	3.17±0.19
10.	Total arm length stature	42.91-51.57	46.49±0.24	2.82±0.17	6.06±0.37
11.	N a s a l	67.30-105.88	85.10±0.36	4.14±0.25	4.86±0.29
12.	E a r	50.00-69.64	59.38±0.44	5.09±0.31	8.57±0.53
13.	Ponderal	21.20-23.79	22.42±0.09	1.09±0.07	4.88±0.29

Table No. 2b

Statistical Constants for Indices

Females (35)

S.No.	Index	Range	Mean+S.E.	S.D. + S.E.	CV + S.E.
1.	Cephalic	71.42-84.65	77.60±0.89	5.30±0.63	6.83±0.81
2.	Length height	53.89-76.96	67.38±1.03	6.13±0.73	0.09±1.08
3.	Breadth height	74.41-96.85	87.27±1.13	7.76±0.93	8.89±1.06
4.	Morphological facial	70.58-96.06	84.66±1.15	6.81±0.81	8.04±0.96
5.	Morphological upper facial	43.58-59.04	50.41±0.73	4.31±0.52	8.55±1.02
6.	Jugo frontal	78.99-96.15	89.08±0.83	4.89±0.58	5.49±0.65
7.	Jugo mandibular	68.54-93.45	82.43±0.99	5.85±0.70	7.09±0.85
8.	Biacromial breadth	18.46-22.65	21.74±0.14	0.86±0.10	3.98±0.48
9.	Total leg length stature	53.71-62.39	57.12±0.37	2.19±0.26	3.84±0.46
10.	Total arm length stature	40.20-49.09	45.32±0.36	2.16±0.26	3.84±0.46
11.	N a s a l	67.34-103.03	85.69±1.33	7.89±0.94	9.21±1.10
12.	E a r	51.51-66.10	58.31±0.88	5.18±0.62	8.88±1.06
13.	Ponderal	20.7-24.2	22.48±0.20	1.19±0.14	5.30±0.63

SD = Standard deviation, CV = Co-efficient of variation, SE = Standard error.

Female/ male Index:

Table No. 3

Female/Male Index.

S.No.	Measurements (Cms)	Males	Females	F/M index
1.	Stature	161.26	149.63	0.93
2.	Head height	12.04	11.84	0.98
3.	Max. head length	18.27	17.34	0.95
4.	Max. head breadth	13.78	13.44	0.97
5.	Min. frontal breadth	10.48	10.10	0.96
6.	Max. Bizygomatic breadth	12.15	11.30	0.93
7.	Bigonial breadth	10.29	9.34	0.91
8.	Nasal length	4.59	4.23	0.92
9.	Nasal breadth	3.94	3.70	0.94
10.	Upper facial length	6.20	5.68	0.92
11.	Total facial length	10.66	9.60	0.90

It is apparent from the table that in all measurements the males show higher values than females. Differences of sizeable magnitude are observed in total facial length, Bigonial breadth, upper facial length, nasal length, bizygomatic breadth, nasal breadth, head length, minimum frontal breadth, in that order. The difference in head height and head breadth are relatively low.

It is observed that the female cephalic, length height, breadth height, Jugo frontal indices are relatively more than that of the males, while morphological facial and jugo-mandibular indices are less than the males. The morphological upper facial, total length stature, nasal, ear, total arm length stature, biacromial breadth and ponderal indices do not show any appreciable differences. Thus it is apparent that differences in size as well as shape between sexes exist, except in a few dimensions.

Stature:

The mean stature of the male Kolam is 161.26 ± 0.56 cms. while the mean stature of the female is 149.63 ± 0.94 cms. with the maximum and minimum varying between 177.9 and 149.6 cms for males and 161.6 cms and 140.1 cms for females, respectively. The male Kolams are therefore 11.63 cms taller than the females.

Table No. 3a

Classification of Height measurements.

(Males 133)

Classification	Range in cms	No.	%
Pygmies	Under 129.9	--	--
Very short	130.0-149.9	4	3.00
Short	150.0-159.9	46	34.59
Lower Medium	160.0-163.9	32	24.06
Medium	164.0-166.9	25	18.80
Upper Medium	167.0-169.9	21	15.79
Tall	170.0-179.9	5	3.76
Very Tall	180.0-199.9	--	--

Table No. 3b

Classification of Height Measurements.

(Females 35)

Classification	Range in cms	No.	%
Pygmies	Under 120.9	--	--
Very short	121.0-139.9	--	--
Short	140.0-148.9	18	51.43
Lower Medium	149.0-152.9	9	25.71
Medium	153.0-155.9	2	5.71
Upper medium	156.0-158.9	4	11.43
Tall	159.0-167.9	2	5.71
Very Tall	168.0-186.9	--	--

It is observed that a majority of the Kolams are medium in stature. The percentage frequency of very short people is 3.0 among the males. Short people are 34.59% among the males and 51.43% among the females. The medium people further classified show lower medium 24.06% for males and 25.71% for females. Medium stature people are 18.80% among males and 5.71% among females, while upper medium stature is observed in 15.79% of males and 11.43% of females. Tall stature is very rare being 3.76% among males and 5.71% among females. The males in general show a higher percentage of medium stature while the females exhibit a higher frequency of short stature.

Sitting Height

The mean sitting height in the case of males is 80.14 ± 0.31 cms with a varying range between 72.3 - 89.0 cms, and in the case of females it is 76.12 ± 0.49 cms with the range varying between 72.0-82.1 cms.

Table No. 4a

Classification of sitting Height

(According to Martin) Males (133)

Classification	Range in cms.	No.	%
Low	75.0-79.9	66	49.62
Below Medium	80.0-84.9	55	41.35
Medium	85.0-89.9	12	9.02
Above Medium	90.0-94.9	--	--

Table No. 4b

(Classification of sitting Height

(According to Martin) Females 35

Classfication	Range in cms	No.	%
Low	70.0-74.4	7	20.00
Below Medium	74.5-76.4	10	28.57
Medium	76.5-77.9	10	28.57
Above Medium	78.0-79.4	5	14.28
Tall	79.5 and Above	3	8.57

The male kolams fall in the low and below medium range with a frequency of 49.62% and 41.35% respectively. Only a small percentage(9.02) of them fall in the medium range.

Most of the female Kolams are of below medium and medium ranges with a frequency of 28.57% each. Low range occurs with a frequency of 20.00% and above medium occurs with a frequency of 14.28%. There are also 8.57% tall range individuals, thus the females exhibit a higher percentage of medium and tall ranges.

Cephalic Index : The distribution of cephalic index is classified according to Saller is as follows.

Table No. 5a

Classification of Cephalic Index

(Acc. to Saller) (Males 133)

Classification	Range	No.	%
Hyper dolicho Cephalic	X - 70.9	7	5.26
Dolicho Cephalic	71.0-75.9	79	59.39
Mesocephalic	76.0-80.9	38	28.57
Brachy Cephalic	81.0-85.4	9	6.76
Hyper Brachy Cephalic	85.5-90.9	--	--

Table No. 5b

Classification of Cephalic Index (Females 35)

Classification	Range	No	%
Hyper Dolicho Cephalic	X - 71.9	1	2.86
Dolicho Cephalic	72.0-76.9	15	42.86
Meso Cephalic	77.0-81.9	16	45.71
Brachy Cephalic	82.0-86.4	3	8.57
Hyper Brachy Cephalic	86.5-91.9	--	--

The mean cephalic index of the male and female Kolam is 75.52±0.28 and 77.60±0.89 respecitvely, the range varying between 64.77-83.52 for males and 71.42-84.65 for females. Table No. 5a & 5b shows that 59.39% of the males and 42.86% of the females are dol cephalic with a small percentage of Hyperdolicho cep 5.26% among males and 2.86% among females. 28.57% ma and 45.71% females are mesocephalic, while the brach phalic element is very low being 6.76% for males and for females. Thus the males exhibit a relatively hi percentage of dolichocephals than the females.

The mean head length of the male Kolam is 18.27± 0.07 cms with a varying range between 15.2-19.9 cms., while the same for females is 17.34±0.10 cm with the range varying between 16.2-18.6 cms. The mean head breadth for males is 13.78±0.07 cms with the maximum of 14.7 cms, and minimum of 11.4 cms. The mean female head breadth is 13.44±0.07 cms, with the varying range between 12.4 - 14.9 cms. The male head is therefore 0.93 cms, longer and 0.34 cms, broader in the average than the female.

Table No. 6a

Classification of Head Length

(Acc. Lebzelter & Saller) Males(133)

Classification	Range in cms	No.	%
Very short	X - 16.9	3	2.25
Short	17.0-17.7	18	13.53
Medium	17.8-18.5	70	52.63
Long	18.6-19.3	37	27.82
Very long	19.4 - X	5	3.76

Table No. 6b

(Females 35)

Classification of Head length.

Classification	Range in cms.	No.	%
Short	16.2-16.9	7	20.00
Medium	17.0-17-6	20	57.14
Long	17.7-18.4	5	14.28
Very long	18.5- X	3	8.57

/according to The head length classified a/c.Labzelter and Saller, reveal that both the male (52.63%) and female (57.14%) Kolams are predominantly of medium head length. Short head length people are 13.58% among males and 20.00% among females, that of long head length 27.78% among males and 14.28% among females. Very short and very long types are found in low percentage.

Head Breadth: The mean head breadth in the case of the male Kolams is 13.78 ± 0.07 cms with the range varying between 11.4 - 14.7 cms. while among the females it is 13.44± 0.14 cms with a varying range between 12.4 - 14.9 cms. The difference between the mean male and female head breadth is only 0.3 cms.

Table No. 7a

Head breadth (Acc.Lebzelter & Saller) (Males 133)

Classification	Range in cms.	No.	%
Very Narrow	X - 13.9	88	66.16
Narrow	14.0-14.7	43	32.33
Medium	14.8-15.5	--	--
Bread	15.6-16.3	2	1.50

Table No. 7b

Classification of head breath (Females 35)

Classification	Range in cms.	No.	%
Very narrow	X - 13.4	21	60.00
Narrow	13.5-14.1	9	25.71
Medium	14.2-14.9	5	14.28

The classification of head breadth acc. Lahzelter and Saller show that the head breadth of both male (66.16%) and female (60.00%) Kolam are very narrow, followed by narrow type (32.33) for males and (25.71%) for females. Medium head breadth occurs in (14.25%) of the females, while Broad head breadth occurs in a negligible sample of (1.50%) males.

Height Tragion:

The mean tragion height among the males is 149.08± 0.52 cms, with the maximum of 164.7 cms and minimum of 137.2 cms, and in the case of females it is 137.79± 0.87 cms, with a varying range between 137.3 - 146.7 cms. The male tragion height is 11.29 cms longer than that of the female.

The mean auricular height of the males is 12.04±0.09 cms, ranging between 8.3 - 13.9 cm, and of the females is 11.84±0.15 cms, ranging between 9.0 - 12.9 cms, Thus the male head appears to be 0.16 cm, higher than that of the female.

Table No. 8

Classification of Auricular Height. (Males 133)

Classification	Range in cms	No.	%
Low	11.9-11.7	59	44.36
Medium	11.8-12.5	33	24.81
High	12.6-13.6	41	30.82

The Kolam males have predominantly low auricular height(44.36%) [illegible] Medium type also occurs in [illegible] (24.81%) and high type occurs in 30.82% of them.

The mean length-height index of the male Kolam is 64.98±0.4 while that of the female is 67.38±1.03. The range varies between 50.52-78-57 in the males and between 53.89-76.96 in the females.

Table No. 9

Classification of length height ind-ex(Males 133)

Classification	Range i	No.	%
Platy cephalic	Below 57.6	21	1579
Ortho cephalic	57.7-62.6	27	20.30
Hypsi cephalic	Over 62.7	85	63.91

The classification of length height index among the male Kolams reveal that they are predominantly hypsi-cephalic (63.91%) with 20.30% orthocephalic and 15.79% platycephalic elements.

The mean breadth height index among the males is 85.91±0.63 with a varying range between 64.28-102.20 and in the case of the females it is 87.27±1.13 with the range varying between 74.41-96.85. The female index is 1.30 higher than that of the males.

Table No. 10

Classification of Length - Breadth index (Males 133)

Classification	Range	No.	%
Tapeinocephal	- 78.9	33	24.81
Metriocephal	79.0-84.9	6	17.14
Acrocephal	85.0 +	75	56.39

The males have predominantly acrocephalic heads (56.39%) Metriocephaly occurs in 18.80% and Tepeinocephaly was found among 24.81% of them.

Total Face Index :

The mean total face index for the male Kolam is 86.74±0.52 with a varying range between 71.42-98.95 cms, while the same for the females is 84.66±1.15 , with the maximum of 96.06 and the minimum of 70.58 .

Table No. 11

Morphological facial index (Acc. Martin & Saller) (Males 133)

Classification	Range	No.	%
Hyper Euryprosopic	X - 78.9	8	6.01
Euryprosopic	79.0-83.9	32	24.06
Mesoprosopic	84.0-87.9	33	24.81
Leptoprosopic	88.0-92.9	39	29.32
Hyper leptoprosopic	93.0 - X	21	15.78

Table No. 11b

(Females 35)

Classification	Range	No.	%
Hyper-euryprosopic	X - 76.9	6	17.14
Euryprosopic	77.0-80-9	6	17.14
Mesoprosopic	81.0-84.9	6	17.14
Leptoprosopic	85.0-89.9	7	20.00
Hyper-leptoprosopic	90.0 - X	10	28.57

According to Martin and Saller's classification the majority of Kolams fall in the leptoprosopic group with 29.32% for males and 20% for females. Hyperleptoprosopic element is more conspicuous among the females, (28.57%,) while the males exhibit it with a frequency of 15.78%. Among the males 24.81% are Mesoprosopic, 24.06 are Euryprosopic. The females exhibit 17.14% each of Hypereuryprosopic, Euryprosopic and Mesoprosopic elements. Thus marked sexual difference are observed in the upper facial index.

The mean total facial height is 10.66±0.07 cms with the maximum of 11.9 cms and the minimum of 9.1 cms among the males. Among the females the mean is 9.60±0.14 cms with the maximum of 11.3 cms and the minimum of 8.5 cms. The male total facial height appears to be 1.06 cms longer than the females.

Table No. 12a

Morphological facial height(Lebzelter & Saller)
(Males 133)

Classification	Range in cms	No.	%
Very low	X - 11.1	108	81.20
Low	11.2-11.7	18	13.53
Medium	11.8-12.3	7	5.26
High	12.4-12.9	--	--
Very High	13.0 - X	--	--

Table No. 12b

(Females 35)

Classification	Range in cms	No.	%
Very low	X - 10.2	26	76.47
Low	10.3-10.7	4	11.76
Medium	10.8-11.3	3	8.82
High	11.4-11.9	-	--
Very high	12.0 - X	1	2.94

According to Lebzelter and Saller's classification the male and female Kolams have predominantly very low facial height (81.20% males 76.47% females). 13.53% of the males and 11.76% of the females have low facial height; 5.26% of the males and 8.82% of the females have medium facial height and only 2.94% of females have very high morphological facial height. The differences between the two sexes are not markedly different.

Upper facial index:

The mean upper facial index for the male Kolam is 50.71±0.37 [illegible], with the maximum of 60.65 [illegible], and the minimum of 43.06 [illegible], The mean value for females is 50.41±0.73 [illegible], with the maximum of 59.04 [illegible] and minimum of 43.58 [illegible].

Table No. 13a

Morphological Superior Facial Index

(Acc. to Martin & Saller) (Males 133)

Classification	Range	No.	%
Hypereuryen	X - 42.9	2	1.50
Euryen	43.0-47.9	35	26.31
Mesen	48.0-52.9	52	39.09
Lepten	53.0-56.9	32	24.06
Hyper lepten	57.0 - X	12	9.02

Table No. 13b (Females 35)

Classification	Range	No.	%
Hypereuryen	X - 40.9	--	--
Euryen	41.0-45.9	8	22.85
Mesen	46.0-50.9	14	40.00
Lepten	51.0-54.9	7	20.00
Hyper lepten	55.0 - X	6	17.14

It is observed that 26.31% of the males and 22.85% of the females are Euryen, 39.09% of the males and 40.00% the females are mesen, 24.06% of the males and 20.00% of females are lepten ,hyper lepten type occurs in 9.02% of the Males and 17.14% of the females. Hyper eurysonttypes occur only inthe males with 1.5% frequency.

The mean upper facial height of the malesiis 6.21±0.05 cms, with the maximum of 7.4 cms and minimum of 5.3 cms while for the females it is 5.68±0.10 cms, with varying range between 5.1-6.7 cms.

The mean bizygomatic breadth of the female is 12.15±0.07 cms, with the maximum of 13.7 cms and minimum of 10.3 cms. While for the females the mean value is 11.30±0.11 cms, with the range varying between 1 10.1-12.7 cms.

The male upper face is longer (0.53 cms) and broader (0.85 cms) than the female.

Jugo-Frontal Index:

The mean jugo-Frontal index among the males is 83.63±0.63 cms, with a varying range between 70.00-99.02 cms, and in the females it is 89.08±0.83 cms, with the range varying between 78.99-96.15 cms. The female index is 5.95 more than the male index.

Both the male and female samples agree with one another in having predominantly very broad jugo-frontal indices, but the females have a relatively higher index than the males (females 68.87 males 48.87) Broad types occur among 36.84% of the males and 22.85% of the females. Medium type occurs in 11.27% of the males and 8.57% the females. Narrow type occurs only in 2.25% of the males.

The mean minimum frontal breadth of the male is 10.48±0.05 cms, with the range varying between 9.1-12.5 cms, and in the females it is 10.10±0.08 cms, with a varying range between 9.4-11.2 cms. Thus the difference between the male and female is only 0.38 cms.

Table No. 15a

Minimum Frontal Breadth (Males 133)

Classification	Range in cms	No.	%
Narrow	Below 9.4	3	2.25
Below medium	9.5-9.9	15	11.28
Medium	10.0-10.4	51	38.34
Above medium	10.5-10.9	50	37.59
Broad	11.0 and above	14	10.53

Among male Kolam medium and above medium types of minimum frontal breadth occur in almost equal frequencies and are more predominant (38.34% and 37.59% respectively) Below medium type (11.28%) and Broad type (10.5% are relatively low. Narrow type is insignificant (2.25%).

Bizygomatic Arch:

The mean bizygomatic breadth among the males is 12.15±0.07 cms, with a maximum of 13.7 cms, and minimum of 10.3 cms, while among the females it is 11.30±0.11 cms, with the maximum of 12.7 cms and minimum of 10.1 cms. Thus the male Bizygomatic arch is 0.85 cms broader than the female.

Table No. 16a

Classification of Breadth of Bizygomatic Arch (Males 133)

Classification	Range in cms.	No.	%
Very narrow	X - 12.7	100	75.19
Narrow	12.8-13.5	29	21.80
Medium	13.6-14.3	4	3.01
Broad	14.4-15.1	--	--
Very broad	15.2 - X	--	--

Table No. 16b (Females 35)

Classification	Range in cms	No.	%
Very narrow	X - 12.0	33	94.28
Narrow	12.1-12.7	2	5.71
Medium	12.8-13.5	--	--
Broad	13.6-14.2	--	--
Very broad	14.3 - X	--	--

The table reveals that both the male and female Kolams have predominantly very narrow (75.19% males and 94.28 % females) bizygomatic arch. Most of the females have very narrow type with the exception of 5.71% narrow type, while the males have 21.80% narrow and 3.01% medium bizygomatic arches.

Jugo Mandibular Index:

The mean Jugo Mandibular index for the male is 85.03±0.68 with a varying range between 72.03-96.49 and in the case of the females, it is 82.43 ±0.99 with a varying range between 68.54-93.45 ms. The male index is 2.60 more than the female.

Table No. 17 a

Jugo Mandibular Index: (Males 133)

(Acc. Lundborg, Linders & Saller)

Classification	Range	No.	%
Very narrow	X - 69.9	--	--
Narrow	70.0-74.9	4	3.00
Medium	75.0-79.9	28	21.05
Broad	80.0-84.9	51	38.34
Very broad	85.0 - X	49	36.84

Table Ni. 17 b

(Females 35)

Classification	Range	No.	%
Very narrow	X - 67.9	--	--
Narrow	68.0-72.9	2	5.71
Medium	73.0-77.9	4	11.42
Broad	78.0-82.9	15	42.86
Very broad	83.0-X	14	40.00

It is observed that both the male and female agree with one another in having predominantly broad type (38.34%) males and 42.86% female) Very broad type occurs in 30.84% among the males and 40.00% among the females Medium type occurs in 21.05% of the males and 11.42% of the females. A small percentage of (3.00)among the males and 5.71 among the females exhibit narrow type.

The mean bigonial breadth among the males is 10.28±0.06 cms with the range varying between 9.1-11.6 cms and in the case of females it is 9.34±0.12 cms with the range varying between 8.5-10.3 cms. The male bigonial breadth appears to be 0.94 cms more than the female.

Nasal Index: The classification of Kolams according to frequency of nasal index is presented in table No.18a&18b.

Table No. 18a

(Acc.to Martin & Saller) (Males 133)

Classification	Range	No.	%
Hyper leptorhine	X - 54.9	--	--
Leptorhine	55.0-69.9	2	1.50
Mesorhine	70.0-84.9	66	49.62
Chamerhine	85.0-99.9	65	48.87
Hyper chamerhine	100.0- X	--	--

Table No. 18b

(Females 35)

Classification	Range	No.	%
Hyper leptorhine	X - 54.9	--	--
Leptorhine	55.0-69.9	2	5.71
Mesorhine	70.0-84.9	13	37.14
Chamaerhine	85.0-99.9	19	54.29
Hyper Chamaerhine	100.0- X	1	2.85

The mean nasal index of the male Kolam is 85.10±0.36 cms with the maximum of 105.38 cms and minimum of 67.36 cms. The female mean is 85.69±1.33 cms with the range varying between 67.34-103.03 cms. The majority of Kolams are chamaerhine. Mesorhine noses also occur in a high frequency among the males (49.62%) and 37.14% among the females. Leptorhine noses occur in a very low percentage, the females having a relatively higher occurance than the males. Mesorhine noses are relatively less among the females.

The mean nasal height of the male Kolam is 4.59±0.04 cms, with a varying range between 3.6-5.4 cms, and for the females it is 4.23±0.08 cms, the maximum being 4.9 cms and minimum being 3.4 cms. The mean nasal breadth of the males is 3.94±0.04 cms, with the range varying between 3.3-5.5 cms., while it is 3.70±0.08 cms, with a maximum of 5.5 cms minimum of 3.1 cms for the females.

The sexual difference is apparent in the high frequency of chamaerhine noses among the females (57.14%) in contrast to 48.87% among the males.

Ear Index: The mean ear index among the male and female Kolam is almost equal being 59.38 ± 0.44 ranging between 550.00 - 69.54 in the case of males and 58.31 ± 0.88 ranging between 51.51 - 66.10 in the case of females.

Height acromion: The mean acromial height among the males is 132.81 ± 0.51 cms with the range varying between 121.90 - 146.20 cms. In the case of females it is 121.61 ± 0.89 cms with the maximum of 133.9 and the minimum of 113.7 cms. The difference between the two sexes is insignificant.

Relative Biacr mial Breadth Index: The mean biacromial breadth index in the case of the male is 22.06 ± 0.20 with a varying range between 17.24 - 24.57 and in the case of females it is 21.74 ± 0.14 with the maximum of 22.65 and minimum of 18.46. The difference between the two sexes is insignificant.

Table No. 19a

Classification of Relative Biacromial Breadth Index

(Acc. to Bruge Ah) (Males 133)

Classification	Range	No.	%
Narrow shoulders	X - 22.0	71	53.38
Medium shoulders	22.1-23.0	47	35.33
Broad shoulders	23.1 - X	15	11.27

Table No. 19b (Females 35)

Classification	Range	No.	%
Narrow shoulders	X - 21.5	14	40.00
Medium shoulders	21.6-22.5	17	48.57
Broad shoulders	22.6 - X	4	11.42

The male and female Kolam differs with one another in the shape of their shoulder. While the male Kolams have predominantly narrow shoulders (53.28%) the females have predominantly medium shoulders. The males are found to have 35.33% of medium shoulders and the female have 40.00% narrow shoulders. Broad shoulders occur in a low percentage without any appreciable difference in both the sexes (11.27% males and 11.42% of females).

The mean biacromial breadth in the case of the male is 35.05 ± 0.21 Cms. with a maximum of 39.6 Cm. and a minimum of 28.3 Cms. and in the case of the females it is 32.49 ± 0.33 Cms. with a varying range between 28.0 - 35.4 Cms. The male Kolams appear to have 2.56 Cms. more biacromial breadth than the females.

Height Radiale: The mean radial height is 100.92 ± 0.43Cms. with maximum of 109.7 and minimum of 90.5 Cms. in the male and it is 92.24 ± 0.89 Cms. with a maximum of 102.6Cms. and minimum of 85.3 Cms. in the females.

Height Stylion: The mean stylion height in the male is 75.58 + 0.32 Cms. with a varying range between 62.4 - 84.9 Cms. and in the case of the females it is 71.55 ± 0.64 Cms. with the range varying between 63.3 - 80.2 Cms.

Height Dactylion: The mean dactylionic height in the male is 57.42 ± 0.38 Cms. with a maximum of 68.20 Cms. and minimum of 48.70 Cms. and in the case of females it is 54.4 ± 0.63 Cms. with the range varying between 47.5-59.9Cms.

Arm Span: The mean arm span of the male Kolam is 170.46 ± 0.08 Cms. with the range varying between 150.5 and 189.2 Cms. and in the female it is 156.12 ± 1.11 Cms. with the varying range of 144.4 - 170.6 Cms.

Total Arm Length Stature Index: The mean arm length stature index in the case of the males is 46.49±0.24 with a varying range between 42.91 - 51.57 and in the case of females it is 45.32±0.36 with the range varying between 40.20-49.09 .

Table No. 20a

Total Arm Length Stature Index

(Acc. to Brugesch) (Males 133)

Classification	Range	No.	%
Short arm	X - 44.0	14	10.52
Medium arm	44.1-44.5	8	6.01
Long arm	44.6 - X	111	83.45

Table No. 20b

(Females 35)

Classification	Range	No.	%
Short arm	X - 43.5	6	17.14
Medium arm	43.6-44.0	2	5.71
Long arm	44.1 - X	27	77.14

Both the male and female Kolams agree with one another in having predominantly long arms (83.45% males and 77.14% females), Short arms occur among 10.25% of males and 17.14% of females. A small percentage of(6.01%) males and(5.71%) females are found to have medium arms.

The mean total arm length among the males is 75.49±0.24 cms with the range varying between 64.8-89.5 cms and among the females it is 67.92±0.69 cms with varying range between 59.7-76.4 cms. The male arm appears to be 7.67 cms longer than the female.

The mean upper arm length is 31.92±0.22 cms with a varying range between 26.00-45.20 cms among the males and 29.05±0.38 cms with a varying range between 21.0-48.4 cms in the case of the females.

The mean lower arm length is 25.22±0.16 cms with the range varying between 16.60-46.00 cms in the males and 20.92±0.31 cms with maximum of 25.7 and minimum of 14.4 cms. The upper arm is relatively longer than the lower arm in both the male and female Kolams. The male upper and lower arms are longer than the females.

Total Leg Length Stature Index:

The mean total leg length stature index in both the sexes is almost equal with 57.60±0.16 among males ranging between 53.89-61.76 and with 57.12±0.37 among females ranging between 53.71-62.39.

Table No. 21 a

Total Leg Length Stature Index:

(acc. to Brügsch) (Males 133)

Classification	Range	No.	%
Short legged	X - 53.5	--	--
Medium legged	53.6-54.0	5	3.75
Long Legged	54.1-X	128	96.24

Table No. 21 b

(Females 35)

Classification	Range	No.	%
Short legged	X - 54.0	--	--
Medium legged	54.1-54.5	3	8.57
Long legged	54.6-X	32	91.42

All the Kolams are long legged, saving 3.75% of the males and 8.57% of the females who are medium legged.

The mean leg length among the males is 92.87± 0.39 cms with the range varying between 82.4-103.4 cms and in the case of female it is 85.91±0.89 cms with a varying range between 76.0-100.7 cms. The male leg appears to be 6.96 cms longer than the female leg.

The mean upper leg length in the case of the male Kolams is 48.35±0.45 cms with the range varying between 37.9 and 57.8 cms while among the females it is 46.15±0.62 cms, with the range varying between 36.50 and 59.70 cms.

The lower leg length in the male Kolams is 38.63±0.28 cms with a maximum of 46.5 cms and the minimum of 27.10 cms; while among the females it is 34.54±0.45 cms with a varying range between 29.6-41.2 cms. The upper leg length is relatively longer than the lowder leg length in both the male and female samples. In general the Kolams have longer legs than arms.

Height Ilio spinale:

The height ilio-spinale in the case of males is 96.20±0.45 cms with the range varying between 84.4-108.0 cms and in the females it is 87.92±0.83 cms with the maximum of 100.4 cms and minimum of 78.6 cms.

Height Tibiale:

The mean height tibiale among the male is 44.20±0.30 cms, with the maximum of 52.3 cms and minimum of 37.0 cms and among the females it is 39.52±0.49 cms with a varying range between 33.8 - 46.3 cms.

Height Spherion: The mean height spherion among the males is 5.57 ±0.04 cms with the range lying in between 3.80-7.30 cms and in the case of the females it is 5.26± 0.08 cms with the range lying in between 4.20-6.80 cms.

Fat Fold Thickness at Triceps:

The mean fat fold thickness at triceps in the males is 0.42±0.02 cms with the range varying between 1.0 and 0.3 cms and in the females it is 0.72±0.05 cms with the range varying between 0.4 - 1.8 cms. The wide variation in both the sexes indicate widespread malnutrition and depletion of body fat.

Weight:

The mean weight of the male Kolam is 47.03±0.39 kgs with the range varying between 40-55 Kgs and in the case of female it is37.54±0.69 Kgs with the range varying between 31.5-47.00 Kgs. The mean ponderal index for the males is 22.42±0.09 and for the females it is 22.48±0.2 indicating that the Kolams have low body build.

MORPHOLOGICAL OBSERVATIONS:

The morphological observations on the Kolams are presented below:

Skin Color:

Table No. 22

Skin color.

Classification	Males		Females	
	No.	Percentage	No.	Percentage
Light brown	18	13.53	5	14.28
Brown	15	11.28	7	20.00
Dark brown	80	60.15	13	37.14
Black	20	15.03	10	28.57

The color varies from light brown to black. Majority being dark brown (60.15%) among males and (37.14%) among females, Black and brown skins are also more predominant among the females.

Hair : The frequency of hair form is as follows

Table No. 23

Hair Form

Classification	Males		Females	
	No.	%	No.	%
Straight	50	37.59	16	45.71
Low waves	62	46.62	13	37.14
Deep waves	12	9.02	5	14.28
Curly	8	6.01	1	2.86
Frizzly	-	-	-	-
Wooly	1	0.75	-	-

The hair form in both the male and female Kolams is usually straight to wavy. Straight hair occurs among 37.59% of the males and 45.71% of the females, while low waves occur in 46.62% of the males and 37.14% of the females. Deep waves occur in 9.02% of the males and 14.28% of the females. The male Kolams appear to have relatively more low waves in contrast to the relatively more straight hair among the females. Curly hair appears in a very small percentage(6.01) among the males and 2.86% among the females. No cases of frizzly hair are observed but, 0.75% of wooly hair is observed among the male Kolams only.

The frequency of hair texture among Kolams is presented in table No. 24

Hair Texture

Table No. 24

Classification	Male		Female	
	No.	%	No.	%
Course	42	31.58	9	25.71
Medium	82	61.65	26	74.28
Fine	9	6.77	--	--

The hair texture is predominantly medium with a frequency of 61.65% among the males and 74.28% among the females. Coarse hair occurs in 31.58% of the males and 25.71% of the females. Fine hair is observed in 6.77% of the males only.

The frequency of hair quantity is shown below.

Table No. 25

Hair quantity

Classification	Males		Females	
	No.	%	No.	%
Scanty	25	18.80	3	8.57
Medium	72	54.13	20	57.14
Thick	36	27.06	12	34.28

Quantitatively a majority of both the male (54.13%) and female (57.14%) Kolams have medium hair distribution. Thick haired people are 27.06% among the males and 34.28% among the females. Scanty haired people are 18.80% among the males and 8.57% among the females. The relatively higher percentage of more scanty haired people among the males is due to a higher incidence of baldness among the males.

The distribution of hair on various parts of the body among the male kolam is shown below.

Table No. 26

Hair on beard and moust-che.

(Males 133)

Classification	No.	%
Slight	123	92.48
Medium	10	7.51
Thick	--	--

Table No. 26a

Body hair

(Males 133)

Classification	Hair on chest		Hair on arms		Hair on le	
	No.	%	No.	%	No.	%
Slight	133	100.00	133	100.00	133	100
Medium	--	--	--	--	--	--
Thick	--	--	--	--	--	--

The distribution ofhair on various parts of the body reveals that the beard and moustache hair is exclu sively scanty saving 7.51% of the male sample. The hair quantity on chest, arm and legs is scanty without any exception.

Occipital hair whorls:

The distribution of occipital hair whorls shows markedly high percentage of single clockwise pattern in both the male (66.16%) and females (77.14%) samples Single anticlockwise pattern is observed among 20.30% of the males and 14.28% of the females. Double whorls are relatively few. Double clockwise whorls occur in 8.27% of the males and 5.71% of the females, while double anti-clockwise pattern is observed in 2.26% of the males only. Double clockwise anticlockwise type occurs among 2.26% of the males and 2.86% of the females. Multiple whorls occur in a small percentage of 0.75 among the males and they are invariably of clockwise anticlockwise pattern.

Table No. 27

Frequency of Occipital hair whorls

Classification	Male		Female	
	No.	%	No	%
Single Clock Wise (+)	88	66.16	27	77.14
Single anticlock wise (- +)	27	20.30	5	14.28
Double clock wise (++)	11	8.27	2	5.71
Double anticlock wise(--)	3	2.26	--	--
Double clockwise-anticlock wise(+-)	3	2.26	1	2.86
Many clockwise, anticlock wise	1	0.75	--	--

The distribution of the Kolams on the basis of hair colour is presented in table No. 28.

Table No. 28

Hair Colour

Classification	Males		Females	
	No.	%	No.	%
Red	1	0.75	--	--
Black	114	85.71	25	71.43
Dark brown	9	6.77	2	5.71
Reddish brown	3	2.25	4	11.43
Light brown	2	1.50	1	2.85
Gray	4	3.01	3	8.57

The hair colour is predominantly black in both the sexes (Males 85.71% and Females 71.43%). Dark brown hair occur among 6.77% of the males and 5.71% of the females. Reddish brown (11.43%) and Gray hair (8.57%) are also important among the females. Other types in both the sexes occur in a small percentage.

Eyes:- The distribution of different types of eyes colo among Kolams is as follows.

Table No.29
Eye Colour

Classification	Males		Females	
	No.	%	No.	%
Black	25	18.79	7	20.00
Dark brown	59	44.36	17	48.57
Light brown	42	31.58	9	25.71
Brown	7	5.26	2	5.71

On the basis of classification of Iris, the Kolams fall into the following categories by frequency distributi

Table No. 30

Iris

Classification	Males		Females	
	No.	%	No.	%
Homogeneous	98	73.68	25	71.43
Speckled	16	12.03	4	11.42
Rayed	17	12.78	6	17.14
Zoned	2	1.50	--	--

The colour is mostly dark brown. Light brown and black eyes are next in order. There is a small element of brown eyes also. The iris is mostly homogenous with some speckled and rayed types in both sexes.

Table No. 31

Sclera

Classification	Males		Females	
	No.	%	No.	%
Clear	52	39.10	15	42.86
Speckled	65	48.87	19	54.28
Yellow	13	9.77	1	2.85
Dull	3	2.25	--	--

The sclera is speckled in a majority of the cases, probably due to vitamine 'A' deficiency.

Table No. 32

Eye Lid

Classification	Males		Females	
	No.	%	No.	%
Fissures	6	4.51	--	--
Straight	84	63.15	28	80.00
Oblique	43	32.33	7	20.00

The eyelids are predominantly straight (63.15%) for males and (80.00%) for females. Oblique eyes are found among 32.33% of the males and 20.00% of the females. A small percentage of fissured eylids are found among the males only.

Table No. 33

Eve brows

Classification	Males		Females	
	No.	%	No.	%
Thin	36	27.07	15	42.86
Thin slightly connected	4	3.01	2	5.71
Thin markedly connected	--	--	--	--
Medium	49	36.84	10	28.57
Medium slightly connected	33	24.81	6	17.14
Medium markedly connected.	2	1.50	--	--
Thick	5	3.76	1	2.86
Thick slightly connected	3	2.25	1	2.86
Thick markedly connected	1	0.75	--	--

The eyebrows are predominantly of medium thickness among the males(63.15%) while among the females thin eyebrows are more than medium eyebrows. A small percentage of males (8.26%) and females (5.72%) have thick eyebrows.

The eyebrows are not connected in a majority of both the sexes. Medium unconnected eyebrows are 36.84% among the males. The females exhibit the maximum percentage of 42.86% thin unconnected eyebrows, while they are only 27.07%

among the males and medium connected eyebrows are 3.76% among the males and 2.86% among the females. The connected eyebrows are present in the following order. Thin slightly connected 3.01% and 5.71%;Medium slightly connected eyebrows are 24.81%and 17.14%. Thick slightly connected eyebrows are 2.25% and 2.86% respectively for the males and the females. Markedly connected eyebrows are present only among the males.

Supra Orbital Ridges:

Table No. 34

Supra Orbital Ridges

Classification	Males		Females	
	No.	%	No.	%
Imperceptible	89	66.91	30	25.71
Trace	38	28.57	5	14.28
Moderate	6	4.51	--	--

The supra orbital ridges are usually imperceptible. A small percentage of males and females exhibit the ridges in trace. A low percentage of males exhibit (4.51) moderate supra orbital ridges.

Nose: The frequency of Kolams by the shape of Nasal bridges is as follows.

Table No. 35

Nasal Bridge

Classification	Males		Females	
	No.	%	No.	%
Straight	54	40.60	9	25.71
Concave	45	33.83	22	62.86
Convex	27	20.30	4	11.42
Concavo-Convex	7	5.26	--	--

The nasal bridge is predominantly straight (40.60%) among males and concave among the females (62.86%). Concave noses among the males are (33.83%). Convex noses are found in 20.30% of the males and 11.42% of the females, while concave-Convex noses are found only among the males (5.26%).

Nasal Depression:

Table No. 36

Nasal Depression

Classification	Males		Females	
	No.	%	No.	%
Shallow	79	59.40	18	51.43
Medium	35	26.31	9	25.71
Deep	19	14.28	8	22.85

The nasal depression of Kolams is mostly shallow. About a quarter of the males and females have medium depression while deep depression is observed in 14.28% of the males and 22.85% of the females.

Nasal Septum:

Table No. 37

Classification of Nasal Septum

Classification	Males		Females	
	No.	%	No.	%
Horizontal	47	35.34	16	45.71
Upwards	24	18.05	10	28.57
Down wards	62	46.61	9	25.71

The nasal septum exhibits marked sexual dimorphism. While the males have 46.61% down-ward septum, the females have it among 25.71% only. Where as the females have 45.71% of horizontal septums, the males have it among 35.34% only. Upward septum was observed among 18.05% of the males and 28.57% of the females.

Lips:

Table No. 38

Classification of Lips

Classification	Males		Females	
	No.	%	No.	%
Thin not everted	31	23.31	13	37.14
Thin slightly everted	31	23.31	10	28.57
Thin medium everted	5	3.76	--	--
Thick not everted	1	0.75	--	--

contd.....

Table No. 38 Contd...

Classification	Males		Females	
	No.	%	No.	%
Medium not everted	5	3.76	5	14.28
Medium slightly everted	42	31.58	5	[illegible]
Medium everted	17	12.78	2	5.72
Thick markedly everted	1	0.75	-	-

The lips of the Kolams are mostly thin to medium and rarely thick. Thin (50.38%) and medium (48.87) lips occur almost in equal percentages among the males, while among the females 65.71% have thin lips and 34.28% have medium lips. Thick lips occur only in a negligible percentage of 0.75% of the males only. A majority of the males show slig eversion of their lips, while the eversion among the femal is relatively low.

Among the males 23.31% have thin lips without eversion, 0.75% thick lips without eversion and 3.76% medium lips without eversion, while among the females 37.14% have thin lips without eversion and 14.28% medium lips without eversion. The distribution of everted lips are thin, slightly everted23.31% thin-medium everted 3.76% among males and thin slightly everted 28.57% medium slight of everted lips occur among the females in 31.58% of the males and 14.28% of the females, medium

mediumly everted lips occur among 12.78% of the males and 5.72% of the females. Thick markedly everted lips occur only among 0.75% of the males.

Prognathism:

Table No. 39

Classification of Prognathism

Classification	Males		Females	
	No.	%	No.	%
Alveolar slight	68	51.13	16	45.71
Alveolar medium	23	17.29	2	5.71
Facial slight	1	0.75	--	--
Facial medium	1	0.75	--	--
No prognathism	28	21.05	14	40.00

A majority of the male as well as female Kolams exhibit alveolar prognathism. Slight alveolar prognathism is observed among 51.13% of the males and 45.71% of the females; medium alveolar prognathism is observed among 17.29% of males and 5.71% of the females, while marked alveolar prognathism is observed among 9.02% of the males and 8.57% of the females.

Facial prognathism is completely absent among the females, while a few males exhibit slight and medium prognathism with a percentage of 0.75 each.

The percentage of males without any prognathism are 21.05, while among the females 40.00% have no prognathism. This reveals that the male Kolams exhibit relatively higher percentage of prognathism particularly alveolar prognathism.

Forehead:

Table No. 40

Classification of Fore Head

Classification	Males		Females	
	No.	%	No.	%
Marked slope	56	42.10	11	31.43
Medium slope	41	30.83	11	31.43
Straight	36	27.07	13	37.14

The male Kolams have a markedly sloping fore head among 42.10%; medium sloping fore head among 30.83% and straight forehead among 27.07%; while the females have 31.43% each of markedly sloping forehead and medium sloping forehead, straight foreheads are more predominant among the females with a percentage of 37.14%.

Chin:

Table No. 41

Chin

Classification	Males		Females	
	No.	%	No	%
Prominant	30	22.56	7	20.00
Medium	52	39.10	7	20.00
Receeding	51	38.34	21	60.00

Among the female Kolams receeding chins are more predominant with 60.00%, while medium and prominent chins are 20.00% each.

Among the male Kolams receedding and medium chins are more common with 38.34% and 39.10% respectively. Prominant chins occur among 22.56% of them.

Chin Shape

Table No. 42
Chin Shape

Classification	Males		Females	
	No.	%	No.	%
Oval	8	6.01	2	5.71
Round	42	31.58	22	62.86
Square	61	45.86	4	11.42
Pointed	22	16.54	7	20.00

The male Kolams have 45.86% square chins, 31.58% round chins and relatively lower percentage of pointed (16.54%) and oval (6.01%) chins, while the female Kolams have predominantly round chins (62.86%). Square chins are 11.42% and pointed chins are 20.00%. Oval chins are found among a neglibible percentage of 5.71% only. Marked sexual diversity of predominant round chins are observed among the females.

Ear:

Table No. 43

Ear Lobe

Classification	Males		Females	
	No.	%	No.	%
Separate small	66	49.62	13	37.14
Seperate large	25	18.80	6	17.14
Attached small	40	30.08	16	45.71
Attached large	2	1.50	--	--

Separate ear lobes are relatively high in both males (68.42%) as well as females (54.28%) of the sample. Among the males 49.62% have separate small ear lobes, 18.80% have separate large ear lobes while among the females 37.14% have seperate small ear lobes and 17.14% have seperate large ear lobes. Almost all attached ear lobes are small saving 1.50% of the males, who have attached large ear lobes.

Table No. 44

Darwin's Tubercle.

Classification	Males		Females	
	No.	%	No.	%
Present	16	12.03	6	17.14
Absent	117	87.96	29	82.85

Darwin's tubercle is observed on the ears of 12.03% of the males and 17.14% of the females.

Hand Clasping, Arm Folding, and Handedness:

The male and female samples do not show any marked diversity in hand clasping. 'R' type hand clasping is more frequent in both sexes. (Males 69.93%, females 74.29%). However in arm folding marked sexual diversity was observed. While the males have the R & L types in nearly equal frequencies(R 51.13% L 48.87%), the females exhibit a very high frequency of R type (77.14%) and relatively lower frequency of L type(22.86%)

Except a small percentage of males (3.76) and females (8.57) all the Kolams are right handed. The relatively higher frequency of left handed individuals among females may be due to the small number covered.

Table No. 45(a)

Arm Folding.

Classification of Classification	Male		Female	
	No.	%	No.	%
Right	68	51.13	27	77.14
Left	65	48.87	8	22.86

Table No. 45 (b)

Classification of Hand Clasping.

Classification	Male		Female	
	No.	%	No.	%
Right	93	69.93	26	74.29
Left	40	30.07	9	25.71

Table No. 45(C)

Classification of Handedness

Classification	Males		Females	
	No.	%	No.	%
Right	128	96.24	32	91.43
Left	5	3.76	3	8.57

Mid-Phalangeal Hair:

The occurence of mid-phalangeal hair is low with 33.08% among males and 25.71% among the females.

Table No. 46

Classification of Mid- Phalangeal hair.

Classification	Males		Females	
	No.	%	No.	%
Present	44	33.08	9	25.71
Absent	89	66.91	26	74.28

Foot

Table No. 47

Classification of Foot

Classification.	Males		Females	
	No.	%	No.	%
1st toe longer than 2nd toe	50	37.59	14	40.00
2 nd toe longer than 1st toe	83	62.40	21	60.00

In a majority of the Kolams the second toe is longer than the great toe (Males 62.40%, females 60.00%)

Body Form:

The Kolams have generally thin bodies. 53.55% of males and 71.43% of the females have asthenic body type. Athletic type of body is found among 42.10% of the males and 20.00% of the females. Fatty or Pycnic type is very rare with a frequency of 4.51% among males, and 8.57% among the females.

Table No. 48

Body Form

Classification	Males		Females	
	No.	%	No.	%
Asthenic	71	53.38	25	71.42
Athletic	56	42.10	7	20.00
Pycnic	6	4.51	3	8.57

Comparison with Karve and Dandekar's Measurements:

In table No. 49, the 30 Kolams measured by Karve and Dandekar have been compared with the male sample of the present study. Karve and Dandekar measured the Kolams from the neighbourhood of the city of Wun in Maharashtra; while the present data is collected from Adilabad district of Andhra Pradesh. Except for auricular height, stature, and maximum bizygomatic breadth where Karve's data shows slightly higher mean values, both the samples are very similar in their measurements. The length breadth, and Nasal indices do not show any appreciable differences, while length height and breadth height indices, are more among the Karve's sample. The Jugo-frontal, jugo-mandibular, upper facial and Total facial indices are more in the present sample. The differences does not appear to be due to any physical diversity as the method followed in the two samples for the collection of the data is different. While Karve and Dandekar have taken the middle of the tragus as tragion point, the point was taken on the upper margin of the tragus in the present study. In the present study upper facial length and total facial length were measured from nasion point, while Karve and Dandekar measured, them from Sellion point. Inspite of these differences and the sample covered by Karve and Dandekar the two samples show close similarity with each other. Hence the Kolams of the present study and the Kolams of Maharashtra may be treated

Table No. 49

Comparison of the Anthropometry of Kolams of the present study with the Kolams studied by Karve and Dandekar.

	Karve and Dandekar	Present study.
Stature (mm)	1627.26	1612.6
Auricular height (mm)	139.46	120.4
Max. head length (mm)	182.40	182.7
Max. head breadth (mm)	133.86	137.8
Min. frontal breadth (mm)	102.30	104.8
Max. bizygomatic breadth (mm)	133.10	121.5
Bigonial breadth (mm)	101.40	102.8
Nasal length (mm)	44.16	45.9
Nasal breadth (mm)	38.16	39.4
Upper facial length (mm)	60.33	62.1
Total facial length (mm)	108.96	106.6

Table No. 50

Comparison of the Anthropometric Indices of the present study with Karve and Dandekar's study.

	Karve and Dandekar	Present study
Length breadth index	76.13	75.52
Length height index	76.46	64.98
Breadth height index	100.43	85.91
Nasal index	86.41	85.10
Upper facial index	45.32	50.71
Total facial index	81.36	86.74
Jugo frontal index	76.86	83.63
Jugo mandibular index	76.18	85.03

to belong to the same stock.

COMPARISON WITH SOME PROTO-AUSTRALOID TRIBES OF INDIA AND SOME TRIBES AND CASTES OF ANDHRA PRADESH:

In table 51, the Stature, Cephalic index, Nasal index, and Facial index of the male sample of the present Kolam study has been listed along with some Pre-Dravidian tribes of India, and tribes and castes of Andhra Pradesh. It is evident from the table that the Kolams show close proximity to the Santal and Plain Maler in three characters i.e. Stature, Cranial index in both the groups and Facial index with Santals and Nasal index with Plain Maler. They show close proximity in two characters, Stature and Facial index with Khonds; Stature and Nasal index with Nayadis, Cranial index and Nasal index with Saoras. The Kolams are nearer to the Madiga, Bhil, Gonds, and Munda with respect to Stature; to the Juang, Telugu Brahmins, Komatis, Kannikar, Kadar, and Hill Maler, with respect to Cephalic index; to the Saora and Hill Maler with respect to Nasal index; to the Malapantaram and Kannikar with respect to Facial index.

When the mean values of the above measurements and indices are subjected to the 't' test for means, the Kolam did not show any significant differences with the Santals with reference to Stature, Cranial

index and Facial index; to the Plain Maler and Saora with reference to Cephalic index and Nasal index; to the Chenchus with reference to Cephalic index and Facial index; to the Bhil and Madiga with reference to Stature; to the Nayadi and Hill Maler with reference to Nasal index; to the Kadar, Malapantaram and Telugu Brahmins with reference to Facial index and to the Juang with reference to the Cephalic index.

Table No. 51

COMPARISON BETWEEN KOLAMS & OTHER INDIAN TRIBES

MEAN STATURE AND INDICES (MALES)

Population.	Author	No.	Stature	Cephalic index	Nasal index	Facial index
1.	2.	3.	4.	5.	6.	7.
Santal	Chatterjee B.K. & Kumar G.D. 1952.	100	160.478	75.09	78.51	85.83
Bhil	Bhargava I. & Kher G.A. 1960.	100	160.090	76.98	76.48	88.37
Khond	Ray G.S. 1949	100	159.960	73.57	77.13	86.13
Nayadi	Aiyappan A. 1937	62	159.74	73.73	85.68	82.10
Gonds	Majumdar D.N. 1940.	50	158.74	--	--	--
Maler Plain	Sarkar S.S. 1936	54	158.18	74.65	84.62	84.61
Munda	Basu P.C. 1933	250	158.152	74.34	--	84.90
Munda	-do-(Unpublished)	215	--	--	83.29	--
Gadaba	Majumdar D.N. 1941.	52	158.040	--	--	--
Juang	Ray A.K. 1958.	160	157.57	75.29	89.96	81.34
Soara	Majumdar D.N. 1950	100	157.28	74,50	85.20	95.30
Hill Maler	Sarkar S.S. 1936	189	156.64	74.54	84.30	83.74
Kadar	Ray G.S. etal 1959	42	155.75	74.32	83.19	87.71
Mala Pantaram	Chatterjee B.K. & Kumar G.D. 1957	37	155.50	77.09	71.96	86.28
Urali	" 1956	125	154.452	72.09	76.23	110.99
Kannikar	" 1952	140	153.173	74.26	80.11	85.35

contd....

Tabke 51 contd....

Population	Author		No.	Stature	Cephalic index	Nasal index	Facial index
Andhra Pradesh							
Kolams	Present study		144	161.26	75.52	85.10	86.74
[illegible]							
Telugu Brahmins	B.S.Guha,	1933	50	164.59	74.39	73.70	87.30
Komatis	"	"	X	165.08	74.27	74.93	--
Chenchus	"	"	23	164.95	72.89	81.38	85.26
Lambadi	Gupta & Basu P.C.	1962	102	164.86	78.25	70.88	84.88
Madiga	"	1960	102	161.95	77.36	73.75	82.97

Table No. 52

't' VALUES BETWEEN KOLAMS AND OTHER INDIAN POPULATIONS.

FOR MEAN STATURE (MALES)

Population	No.	Mean	S.E.	't' Value	Author
Santal	100	160.478	0.679	0.89	Chatterjee B.K. & Kumar G.D. 1952.
Bhil	100	160.090	0.53	1.52	Bhargava I. & Kher G.A.1960.
Khond	100	159.960	0.37	1.94	Ray G.S. 1949
Nayadi	62	159.74	0.44	*2.13	Aiyappan A. 1937
Gonds	50	158.74	0.74	*2.72	Majumdar D.N. 1940.
Maler Plain	54	158.18	0.46	*4.25	Sarkar S.S. 1936
Munda	250	158.152	0.204	*5.21	Basu P.C. 1933
Gadaba	52	158.040	0.81	*3.27	Majumdar D.N. 1941
Juang	116	157.57	0.64	*4.34	Ray A.K. 1958
Soara	100	157.28	0.37	*5.93	Majumdar D.N. 1950
Hill Maler	189	156.64	0.255	*7.51	Sarkar S.S. 1935-36.
Kadar	42	155.75	0.64	*6.48	Ray G.S. etal 1959
Malapantaram	37	155.50	0.927	*5.32	Chatterjee B.K. & Kumar G.D.1957.
Urali	125	154.452	0.618	*8.16	-do- 1956
Kannikar	140	153.173	0.427	*11.48	-do- 1952
Andhra Pradesh					
Telugu Brahmin	50	164.59	0.467	*4.57	Guha 1933
Komatis	X	165.08	0.598	*4.75	-do-
Chenchus	23	164.95	0.923	*3.42	-do-
Lambadi	102	164.86	0.553	*4.57	Gupta P.C. & Basu A. 1962
Madiga	102	161.95	0.606	0.84	-do- 1960

* Significant.

Table No. 52 contd....

CEPHALIC INDEX (MALES)

Population	No.	Mean	S.E.	't' Value	Author
Malapantaram	37	77.09	0.60	*2.37	Chatterjee B.K. & Kumar G.D. 1957.
Bhil	100	76.98	0.35	*3.26	Bhargava I. & Kher G.A. 1960.
Juang	116	75.29	0.36	0.50	Ray A.K. 1958.
Santal	100	75.09	0.31	1.03	Chatterjee B.K. & Kumar G.D.1952.
Maler Plain	54	74.65	0.29	0.35	Sarkar S.S.1936 (Unpublished)
Saora	100	74.50	0.28	1.80	Majumdar D.N. 1950.
Hill Maler	189	74.54	0.13	*3.17	Sarkar S.S.1936 (Unpublished)
Munda	250	74.34	0.12	*3.87	Basu P.C.1933 (Unpublished)
Kadar	42	74.32	0.51	*2.06	Ray G.S. etal 1959.
Kannikar	140	74.26	0.31	*3.02	Chattrjee B.K. & Kumar G.D.1952
Nayadi	62	73.73	0.23	*4.94	Aiyappan A. 1937
Khond	100	73.57	0.18	*5.86	Ray G.S.1949
Urali	125	72.09	0.22	*9.63	Chatterjee B.K. & Kumar G.D.1956
Andhra Pradesh:					
Telugu Brahmin	50	74.39	0.34	*2.57	Guha B.S.1933
Komatis	X	74.27	0.34	*2.84	-do-
Chenchus	23	72.89	0.53	*4.39	-do-
Lambadi	102	78.25	0.36	*5.78	Basu A. 1962
Madiga	102	77.36	0.30	*4.48	-do- 1960.

* Significant at 5% level of probability.

Table No. 52 contd....

NASAL INDEX (MALES)

Population	No.	Mean	S.E.	't' Value	Author
Juang	116	89.96	0.77	*4.13	Ray A.K. 1958
Nayadi	62	85.68	0.55	0.88	Aiyappan A. 1937
Sacra	100	85.20	0.47	0.17	Majumdar D.N. 1950
Maler, Plain	54	84.62	0.63	0.67	Sarkar S.S. 1936(Unpublished)
Hill Maler	189	84.30	0.43	1.43	-do-
Munda	215	83.29	0.30	*3.86	Basu P.C. 1933 (Unpublished)
Kadar	42	83.19	0.86	*2.05	Ray G.S. etal 1959
Kannikar	140	80.11	0.65	*6.72	Chatterjee B.K. & Kumar G.D. 1952.
Santal	100	78.51	0.27	*14.64	-do-
Khond	100	77.13	0.53	*12.44	Ray G.S.1949
Bhil	100	76.48	0.94	*8.57	Bhargava I. & Kher G.A.1960
Urali	125	76.23	0.82	*9.91	Chatterjee B.K. & Kumar G.D. 1956
Malapantaram	37	71.96	0.95	*12.93	-do- 1957
Andhra Pradesh					
Telugu Brahmin	50	73.70	0.68	*14.82	Guha B.S. 1933
Komatis	X	74.93	0.64	*13.85	-do-
Chenchu	23	81.38	0.95	*3.66	-do-
Lambadi	102	70.88	0.70	*18.06	Gupta P. & Basu A. 1962.
Madiga	102	73.75	1.07	*10.05	-do- 1960.

* Significant

Table No. 52 contd.... FACIAL INDEX (MALES)

Population	No.	Mean	S.E.	't' Value	Author
Urali	125	110.99	0.61	*30.25	Chatterjee B.K. & Kumar G.D. 1956.
Saora	100	95.30	0.40	*13.04	Majumdar D.N.1930.
Bhil	100	88.37	0.47	*2.33	Bhargava I. & Kher G.A. 1960.
Kadar	42	87.71	0.58	1.25	Ray G.S. etal 1959.
Malapantaram	37	86.28	0.85	0.46	Chatterjee B.K. & Kumar G.D. 1957.
Khond	100	86.13	0.40	0.93	Ray G.S. 1949
Santal	100	85.83	0.37	1.43	Chatterjee B.K. & Kumar G.D. 1952
Kannikar	140	85.35	0.45	*2.02	-do-
Munda	250	84.90	0.19	*3.32	Basu P.C. 1932-33
Maler Plain	54	84.61	0.48	*3.01	Sarkar S.S. 1936
Maller Hill	189	83.74	0.22	*5.31	-do-
Nayadi	62	82.10	0.39	*7.14	Aiyappan A. 1931
Juang	160	81.34	0.46	*7.78	Ray A.K. 1958.
Andhra Pradesh					
Telugu Brahmin	50	87.30	0.37	0.88	Guha B.S. 1933
Chenchus	23	85.26	0.61	1.85	-do-
Lambadi	102	84.88	0.52	*2.53	Gupta P & Basu P.C. 1962.
Madiga	102	82.97	0.45	*5.48	-do- 1966.

* Significant.

Summary:

The Kolams are short to medium in stature, with low sitting height, dolichocephalic to mesocephalic heads, medium head length, very narrow head breadth, low auricular height, hypsicephalic, Acrocephalic, below medium to medium minimum frontral breadth, Euryprosopic to Leptoprosopic faces, mesene type of morphological superior facial index, very low facial height, very broad jugo-frontal index, very narrow bizygomatic arches, broad to very broad jugomandibular index, very broad to medium noses, narrow to medium shoulders, long arms and long legs.

Their skin is dark brown to black in colour; hair is straight to low waved, medium to coarse in texture, medium in quantity, and black in colour, beard, body and chest hair is very scanty. The eyes are dark brown to light brown in colour, with homogeneous iris, clear or speckled sclera, straight or oblique eyelids, and medium eyebrows. Their supra-orbital ridges are mostly imperceptible. Their nasal bridge is predominantly concave, sometimes straight, nasion depression is shallow, septum is horizontal, and very broad. Their foreheads are medium to markedly sloping, low in height and narrow in breadth. They exhibit slight alveolar prognathism.

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