Available online at www.ijpab.com

ISSN: 2320 – 7051
Int. J. Pure App. Biosci. **2 (2):** 142-148 (2014)

Research Article

INTERNATIONAL JOURNAL OF PURE & APPLIED BIOSCIENCE

Somatometric study of a Mogoloid Community-"The Plain-Tiwas"of central Assam

Rijumoni Sarma[3]*, Santanu Sarma[1] and Tiluttoma Baruah[2]

[1]Assistant Professor, Department of Zoology, Bholanath College, Dhubri-24, Assam
[2]Associate Professor, Department of Anthropology, Cotton College, Guwahati-01, Assam
[3]Counseling officer, PPTCT Center, Dhubri Civil Hospital, Dhubri-25, Assam
*Corresponding Author E-mail: rijumoni.counsellor@gmail.com, dr.santanusarma111@gmail.com

ABSTRACT

This study dealt with some important somatometric features of the adult representatives, both male and female of "Plain-Tiwa" people inhabiting in "Sidhabari" and "Manipur" villages of the Morigaon District of Central Assam. Study includes the measurements of Stature, Height Tragus, Sitting Height, Height Acromion, Height Dectylion, Total Leg Length, Biacromial Breadth, Bicristal Breadth, Head Length, Head Breadth, Head Height, Bizygomatic Breadth, Nasal Height, Nasal Breadth, Total Facial Height, Upper Facial Height, Head Circumference, Girth of Biceps, Girth of Calf and Weight. Study covered 100 male and 100 female individuals. From the mentioned somatometric-parameters various Indices are calculated namely- Relative Upper Extremity Index, Length-Height Index of Head, Breadth-Height Index of Head, Total Facial Index, Upper Facial Index, Nasal Index, Relative Sitting Height Index, Relative Lower Extremity Index, Relative Biacromial Breadth Index, Relative Bicristal Breadth Index, Maximum Head Breadth Index, Cephalic Index and Stature index.

The study revealed an important database of the "Plain-Tiwa" community for the Physical and Forensic Anthropologists as well as Historians.

Key words: *- Somatometric, Tiwa, index, physical.*

INTRODUCTION

North-east India is the homeland of a large number of tribes and caste who speak different languages, have different cultural setup and are diverse racial origins. A population group differ from another population group in respect of certain physical characteristics through they have same biological affiliation. Various factors alike hybridization, isolation, inbreeding, mutation, genetic drift may responsible for this sort of diversity of physical anthropological investigation of the people of North-east India, was initiated by the Western scholar Waddel, L. A.[1] first undertook anthropometric study in this region in the beginning of the century. He measured some individuals belonging to different castes and tribes. After Waddle, some physical anthropological investigations were carried out by different Western and Indian Scholars viz. Dunber, G. D. S *et al.*,[2], Dixon, R. B.[3], Guha, B. S.[4], Roychoudhury, T. C.[5], Singh, S. I.[6] etc. Their findings at present are the first hand reference data for further intensive and indebt studies. The works of other authors in this respect were Das, B. M.[7], Das, B. M. and Bhagawati, A. C.[8], Das, P. B. *et al.*,[9], Hazarika, A. J.[10], Das, B. M. *et al.*,[11], Phookan, M. *et al.*,[12], Sharma, T. C[13] and 1962[14] etc. who had revealed such variations of different degrees and of different nature, in many population of India and abroad. Among the prominent investigations on physical anthropological studies of North-East India, Das, B. M. (1960[7], 1979[15] and 1981[16]) had done some pioneering works.

Though a lot of physical anthropological studies have been conducted on different populations of North-East India by different investigators at different times, no such investigation has so far been undertaken on the Tiwas of Assam (especially on Plain Tiwas).

The 'Lalungs' prefer to call themselves as Tiwa. According to Lalung language 'Ti' means water and 'Wa' means superior. As the Lalungs landed on the plains following the course of the river Brahmaputra, they introduced themselves as 'Tiwa' to the inquisitive of non-'Tiwas'. It is quite probable that 'Tiwa' derives its origin to the term 'Tibbatia' meaning people hailing from Tibbet. In course of time this 'Tibbatia' might have changed into 'Tiwa' It is believed that in ancient times the three great divisions of the Bodos namely 'Tipra', 'Tiwa' and 'Dimasa' lived along the banks of a lake near Tibbet. In course of time they entered Assam through the north-east passes. The local people could not pronounce 'Tifra' and thus in their tongue 'Tifra' became 'Tippera; 'Tiwas' introduced themselves as 'Tiwa Libing' or 'Tiwa Libung'. In course of time the prefix 'Tiwa' was eliminated and in place of 'Libing', Lalung came to be used[17].

Lalung concentrations are mainly found in the district of Nagaon and Morigaon in Middle Assam. They are spread in Kapili, Mayang, Bhurbandha, kathiatali and Kampur Development Block areas of Nagaon and Morigaon district and the Nartiang Elaka of Jowai Sub- Division of Jaintia district of Meghalaya. Besides there are a few Lalung villages in Dhemaji areas of Dhemaji Sub- Division of Lakhimpur district, Titabar areas of Jorhat Sub- Division of Jorhat district and Sonapur areas of Kamrup district. The Lalung villages of Morigaon, Nagaon, Lakhimpur and Sibsagar districts are established in the plains areas, the Lalung villages of Karbi Anlong district are situated in the hilly areas or in the foothills[18].

It is to be noted that the topography and ecology of the plains and hills have influenced the Lalungs considerably so much that certain aspects of socio-cultural life of the hill Lalungs became distinct from that of the plains Lalungs. Thus food habit, dress, pattern of houses, agricultural pattern etc. of the hill Lalungs are different from those of the plains Lalungs. The Lalung villages of Morigaon and other plain districts are not exclusive areas. They are interspread with non Lalung villages can be approached by a well organized road communication[17].

The Lalungs are divided into a number of exogamous clans (*'Wali or Kul'*) namely *'Macharang', 'Machereng', 'Magar', 'Madur', 'Ladur Puru', 'Sagara', 'Maloi', 'Fangsong', 'Puma', 'Dofoi', 'Mithi', 'Lamfoi', 'Sukai', 'Khoroi', 'Agara', 'Amsi', 'Khalar' and 'Lorong'*.[17]

The present work has been carried out for Somatometric Characterization of the "Plain Tiwas" inhabiting two villages of Central Assam- "Sidhabari" and "Manipur" (located in Morigaon District of the state); where they are still the "inbreeding (homogeneous) populations".

MATERIALS AND METHODS

Somatomatric measurements taken in this study were Stature, Height Tragus, Sitting Height, Height Acromion, Height Dectylion, Total Leg Length, Biacromial Breadth, Bicristal Breadth, Head Length, Head Breadth, Head Height, Bizygomatic Breadth, Nasal Height, Nasal Breadth, Total Facial Height, Upper Facial Height, Head Circumference, Girth of Biceps, Girth of Calf and Weight. These were taken by field works with the use of Anthropometer, Sliding Caliper, Spreading Caliper, Measuring Tape and Digital Body Weighing Machine.[18 & 19] Primary data obtained during the study were statistically analyzed [20] and based on these the some indices of Anthropological Importance have been worked-out.[19] These indices were- Length- Height Index, Breadth-Height Index, Total Facial Index, Upper Facial Index, Nasal Index, Relative Sitting Height Index, Relative Upper Extremities Index, Relative Lower Extremities Index, Relative Bicristal Breadth Index and Cephalic Index. All the data were analyzed with the help of Microsoft Excel. Depending on the percentages of ranges of these indices individuals were categorized under different Anthropological Classes.[19]

RESULTS

Computed results are presented in the following tables:

Table1: -Showing somatometric parameters obtained during the study

Somatometric parameters	Male	Female
Stature (in cm)	164.03 ± 0.562095	150.129 ± 0.456991 -8.47467% *
Height Tragus (in cm)	150.173 ± 0.584493	136.211 ± 0.471196 -9.29728% *
Sitting Height (in cm)	127.452 ± 0.378779	118.031 ± 0.48357 -7.3918% *
Height Acromion (in cm)	134.09 ± 0.550721	122.591 ± 0.426896 -8.57558% *
Height Dectylion (in cm)	59.926 ± 0.350245	57.028 ± 0.383066 -4.83596% *
Total Leg Length (in cm)	94.025 ± 0.461462	89.71 ± 0.366175 -4.5892% *
Biacromial Breadth (in cm)	39.637 ± 0.21603	36.164 ± 0.201377 -8.76202% *
Bicristal Breadth (in cm)	27.241 ± 1.550457	26.975 ± 0.19545 -0.97647% *
Head length (in cm)	18.584 ± 0.095025	17.58 ± 0.075665 -5.4025% *
Head Breadth (in cm)	14.79 ± 0.068187	14.398 ± 0.050292 -2.65044% *
Head Height (in cm)	14.548 ± 0.064721	14.401 ± 0.05098 -1.01045% *
Bizygomatic Breadth (in cm)	12.851 ± 0.070146	12.562 ± 0.064288 -2.24885% *
Nasal Height (in cm)	4.596 ± 0.034847	4.146 ± 0.024717 -9.79112% *
Nasal Breadth (in cm)	3.449 ± 0.029797	3.123 ± 0.022195 -9.45202% *
Total Facial Height (in cm)	11.098 ± 0.055258	9.813 ± 0.056222 -11.5787% *
Upper Facial Height (in cm)	6.943 ± 0.041712	6.197 ± 0.043239 -10.7446% *
Head Circumference (in cm)	34.737 ± 0.24868	34.025 ± 0.196994 -3.13794% *
Girth of Biceps (in cm)	10.672 ± 0.087237	10.057 ± 0.090757 -5.76274% *
Girth of Calf (in cm)	13.224 ± 0.111619	11.65 ± 0.113818 -11.9026% *
Weight (in kg)	55.605 ± 0.860799	44.59 ±0.661204 -19.8094% *

"*" indicates Significant at p<0.05 and "-…%" indicate percent deviations.

Table2: -Showing Somatometric Indices worked out from the Somatometric parameters

Indices	Class	Range	Male		Female	
			No.	%	No.	%
Length Height Index:	Chamaeocephal	-57.6	-	-	-	-
	Orthocephal	57.9-62.6	1	1%	-	-
	Hypsicephal	62.6 - -	99	99%	100	100%
Breadth Height Index:	Taoeinocephal	-78.9	91	91%	-	-
	Metriocephal	79.0-84.9	8	8%	-	-
	Acrocephal	85.0 +	1	1%	100	100%
Total Facial Index	Hypereuryprosopic	-78.9	9	9%	52	52%
	Euryprosopic	79.0-83.9	23	23%	20	20%
	Mesoprosopic	84.0-87.9	29	29%	14	14%
	Leptoprosopic	88.0-92.9	23	23%	3	3%
	Hyperleptoprosopic	93.0 +	16	16%	1	1%
Upper Facial Index	Hypereuryene	- 42.9	-	-	5	5%
	Euryene	43.0-47.9	7	7%	29	29%
	Mesene	48.0-52.9	31	31%	48	48%
	Leptene	53.0-56.9	37	37%	15	15%
	Hyperleptene	57.0 +	25	25%	3	3%
Nasal Index	Hyperleptorrhine	- 54.9	1	1%	1	1%
	Leptorrhine	55.0-69.9	24	24%	16	16%
	Mesorrhine	70.0-84.9	67	67%	80	80%
	Platyrrhine	85.0-99.9	5	5%	3	3%
	Hyperplatyrrhine	100.0 +	3	3%	-	-
Relative Sitting Height Index	Macroskelic or short trunk	- 51.5	-	-	-52.5	-
	Mesatiskelic or medium trunk	51.6-52.0	-	-	52.0-53.0	-
	Brachyskelic or long trunk	52.1- -	100	100%	53.1- -	100
Relative Upper Extremities Index	short arm	- 44.0	20	20%	-43.5	44
	medium arm	44.1- 44.5	10	10%	43.6-44.0	5
	long arm	44.6- -	70	70%	44.1- -	49
Relative Lower Extremities Index	short legged	-53.5	5	5%	-54.0	1
	Medium legged	53.6-54.6	4	4%	54.1-54.5	2
	long legged	54.1- -	91	91%	54.6- -	97
Relative Bicristal Breadth Index	Narrow pelvic	-16.4	46	46%	-17.4	28
	Medium pelvic	16.5-17.4	36	36%	17.5-18.4	46
	Broad pelvic	17.5- -	18	18%	18.5- -	26
Relative Biacromial Breadth Index	Narrow shoulder	-22.0	5	5%	-21.5	4
	Medium shoulder	22.1-23.0	8	8%	21.6-22.5	5
	Broad shoulder	23.1- -	92	92%	22.6- -	91
Cephalic Index	Hyperdolichocephalic	0.0-69.9	-	-	-	-
	Dolichocephalic	70.0-75.9	18	18%	8	8%
	Mesocephalic	76.0-80.9	55	55%	40	40%
	Brachycephalic	81.0-85.4	18	18%	34	34%
	Hyperbrachycephalic	85.5-	9	9%	19	19%
Stature	Short	150.0-159.9	21	21%	140.0-148.9	3
	Below medium	160.0-163.9	27	27%	149.0-152.9	10
	Medium	164.0-166.9	12	12%	153.0-155.9	6
	Above medium	167.0-169.9	24	24%	156.0-158.9	9
	Tall	170.0-179.9	16	16%	159.0-167.9	72

DISCUSSION

Significant differences ($p<0.05$) of the Somatometric Parameters were observed in between adult male and females in this study. The Stature of the Tiwa females were 8.47467% lesser than males. Height Tragus of females were 9.29728% lesser than males. Sitting Height of female were 7.3918% lesser than males. Height Acromion of female was 8.57558% lesser than males. Height Dectylion in female was 4.83596% lesser than males. Total Leg Length of females was 4.5892% lesser than males. Biacromial Breadth of females was 8.76202% narrower than males. Bicristal Breadth of females was 0.97647% narrower than males. Head length of Tiwa females was 5.4025% shorter than males. Head Breadth of

females was 2.65044% narrower than males. Head Height of females was 1.01045% shorter than males. Bizygomatic Breadth of females was 2.24885% narrower than males. Nasal Height of females was 9.79112% shorter than males. Nasal Breadth of Tiwa females were 9.45202% narrower than males. Total Facial Height of females was 11.5787% shorter than males. Upper Facial Height of females was 10.7446% shorter than males. Head Circumference of females was 3.13794% lesser than males. Girth of Biceps of females was 5.76274% lesser than males. Girth of Calf of females was 11.9026% lesser than males. Body Weight of females was 19.8094% less than males.

Both the male and female members of the Tiwa people agree with one another in having predominantly hypsicephalic head in almost equal percentage (99% in male and 100% in female). Of the other type orthocephaly was found to be 1% in male and in case of female orthocephaly was found nil. The mean length- height index of the male was 70.96±0.31cm with the range varied between 80.4 and 61.4, while that of the female was 73.85±0.26 with the range varied between 79.4 and 69.2. The mean head height of the male was 14.54±0.06 with the range varied between 16.5 and 13.5, and that of the female was 14.40±0.05 with range varied between 15.5 and 13.5.

Tapeinocephalic head was found in high percentage in case of male Tiwas (91%). On the other hand, metriocephalic head was found 8% and acrocephalic head was found only 1% in male Tiwas. In case of female Tiwas, acrocephalic head was found predominant (100%). The mean breadth height index of male was 76.56±0.34, the range varied between 86.8 and 66.3. The mean breadth height index of the female was 90.00±0.31, the range varied between96.8 and 84.3 respectively.

In case of the male, the percentage of mesoprosopic was higher (29%) than that of the females (14%). It was followed by same percentages 23% in both euryprosopic and leptoprosopic. The percentage of hypereuryprosopic and hyperleptoprosopic was 9% and16% respectively. In case of female, hypereuryprosopic percentage was found higher (52%). It was followed by euryprosopic (20%), mesoprosopic (14%), leptoprosopic (3%), hyperleptoprosopic. The mean total facial index of the male was 85.57±0.59, the range varied between103.59 and 73.9. The mean total facial index of the female was 78.28±0.5, the range varied between102.60 and 66.66. The mean maximum bizygomatic breadth of the male was 12.85±0.07, the minimum and the maximum being 15.0 and 11.2. The mean maximum bizygomatic breadth of the female was 12.56±0.06, the range varied between 14.5 and 11.5.

Mesene (31%) and leptine (37%) type of face were predominant in case of male. It was followed by hyperleptene type of face, was 25% and euryene type of face was 7%. In case of female, mesene (48%) type of face was predominant. It was followed by euryene type of face (29%), leptene type of face (15%), hypereuryene type of face (5%) and hyperleptene type of face (3%). The mean upper facial index of the male was 54.16±0.41. The minimum and the maximum being 49.8 and 39.0 respectively. The mean upper facial length of male was 6.94±0.04 which varied between 8.7 and 6.0. The mean upper facial index of the female was 49.44±0.42, the range between 64.3 and 40.7. The mean upper facial length of the female was 6.19±0.04 which varied between 7.3 and 5.1.

In both male (67%) and female (80%) mesorrhine nose was found in the highest frequency. In male, leptorrhine and platyrrhine showed 24% and 5% respectively. The frequencies of hyperleptorrhine (1%) and hyperplatyrrhine (3%) are less in male. In female, leptorrhine and platyrrhine showed 16% and 3% respectively. Only 1% hyperleptorrhine was found in female. The mean nasal index of the male was 75.46±0.86, the range varied between 109.9 and 53.3. The mean nasal height was 4.59±0.03, the range varied between 5.5 and 3.3. The mean nasal breadth of the male was 3.44±0.02, the range varied between 4.2 and 2.4. The mean nasal index of the female was 75.48±0.57 the minimum and the maximum being 92.5 and 62.2 respectively. The mean nasal height was 4.14±0.02, the range varied between4.7 and 3.6. The mean nasal breadth of the female was 3.12±0.02, the range varied between 3.7 and 2.4.

The mean relative sitting height of the male was 77.74±0.2. The range was varied between 82.7 and 72.5. The mean relative sitting height of the female was 78.66±0.34, the minimum and the maximum being 87.3 and 68.4 respectively. In both male and females brachyskelic or long trunk was seen in higher percentages (100%). Macroskelic or short trunk and mesatiskelic or medium trunk was totally absent in both males and females.

Both in male and female, long arm showed the highest frequency (70%) and (49%) respectively. In male, 20% shows short arm and 10% showed medium arm. 44% female showed short arm and only 5% showed medium arm. The mean relative upper extremity of male was 45.21±0.18, ranges varied between 49.8 and 39.0. The mean relative upper extremity of the female was 43.68±0.39 which varied between50.5 and 36.4 respectively.

In both male and female the highest frequency was seen in long legged (male91% and female97%). The mean relative lower extremity in male was 57.32±0.20 with range varied between 39.0 and 49.8. The mean relative lower extremity in female was 59.79±0.28 with range varying between 53.3 and 66.0.

In male 46% had narrower pelvic. 36% had medium pelvic and only 18% had broad pelvic, but in case of female 46% had medium pelvic. It was followed by 28% narrow pelvic and 26% broad pelvic. The mean relative bicristal breadth in males was 16.60±0.14 with range varied between 22.6 and 13.7. The mean relative bicristal breadth in female was 17.92±0.12 the maximum and the minimum between 23.0 and 13.4 respectively.

All most all males (92%) and females (91%) had broad shoulder. Only 8% males had medium shoulder and 5% had narrow shoulder. On the other hand, only 5% females had medium shoulder and 4% had narrow shoulder. The mean relative biacromial breadth in male was 24.16±0.10 with range varied between 20.8 and 25.9. The mean relative biacromial breadth in female was 24.09±0.12 with range varied between 21.0 and 27.6.

Both in male and female Tiwas, mesocephalic heads were found in higher percentages (55% in male and 40% in female). In male, dolichocephalic and brachycephalic heads were found in equal percentages (18% repectively). Hyperbrachycephalic head was found only 9% in male. On the other hand, the percentages of brachycephalic head (34%) and hyperbrachycephalic head (19%) was found in the female Tiwas. Dolichocephalic head was found only 8% in the female. Both in male and female hyperdolichocephalic head were absent. The mean cephalic index of the male Tiwa was 79.80±0.57 the maximum being 92.68 and the minimum of 76.4. The mean head length was 18.58±0.09 with the range varied between19.5 and15.5. The mean head breadth of male was 14.79±0.06 with the range varied between 13.3 and 19. The mean cephalic index of the female Tiwa was 82.04±0.44 with the range varied between 81.3 and 92.68. The mean head length of female was 17.58±0.07 with the range varied between 15.5 and 19.5. The mean head breadth was 14.39±0.05 with the range varied between13 and 16.

The mean stature of the male Tiwa was 164.03±0.56 with the range varied between 150.0 and 176.8 cm, while that of the female was 150.12±0.45 with the range varied between 146.3 cm and 174 cm. The male member of the Tiwas were below medium (27%) followed by above medium (24%) and short (21%). Only 16% male were tall. The female members of the Tiwas were tall which were followed by below medium (10%), above medium 9% and short were only 3% respectively.

CONCLUSION

This study was contemporary to Census of India, 2011. It had been observed that the Tiwa people have been facing so many stresses on keeping their originality including the ethnic issues (stress) caused by (doubtful) immigration from neighboring nation to their locality. Modernization by education and urbanization are also two important factors leading to the loss of their culture, traditions (including feeding habit), taboos and social systems which in turn leading to intra-community and cast marriages. For the reason they are losing their genetic makeup and originality and restricted to certain pockets like “Sidhabari” and “Manipur”. It is a question, that how longer these pockets will be. Prior to this study there was no authentic database regarding the anthropometry (somatometry) of the Plain Tiwas. This study will be helpful for future anthropologists, forensic experts as well as historians, will dealing the community in future.

REFERENCES

1. Waddel, L. A., The tribes of The Brahmaputra Valley, Logos Press, New Delhi, 1901, p. 65.

2. Dunber, G. D. S., Brown, J. C. and Kemp, S. W., Abors and Galong: *Memories Asc. Soc. Bengal*, **5:**88 91(1915)
3. Dixon, R. B., The Khasis and the Racial History of Assam, *Man in India*, **2**, 1-13 (1922)
4. Guha, B. S., The racial affinities of people India, in "Census of India **1:**3: A", Govt. of India Press, 1935, p. 356.
5. Roychoudhury, T. C., The Khasi, *J. Depot. Litt. Cal. Univ.*, **4:**26, 249-272 (1935)
6. Singh, S. I., A contribution on Angami and Sema somatology, *J. Royal Asiatic Soc. Bengal*, **Sc.1**:93-97 (1935)
7. Das, B. M., Ethnic affinities of Rabha, Gauhati University Press, Guwahati, 1960 p. 149
8. Das, B.M. and Bhagawati, A. C., Somatometric characters of the Khamyang, *J. Gauhati Univ.* **14(2):** 49-54 (1963)
9. Das, P. B. and Sharma, T. C., Physical characters of the Lalungs of Assam, J. Assam Sci. Soc. **11**, 51-58 (1968)
10. Hazarika, A. J., Somatometric characters of the Ahom male, *Bulletin Dept. of Anthro. Dib. Univ.* **2**, 39-43 (1973)
11. Das, B. M. and Das, R., An anthropometric study of Kalitas. *Man in India*, **45**, 170-176 (1965)
12. Phookan, M. and Das, H. L., Somatometric characters of the Hajong of Tikrikhila, Garo Hills, Meghalaya. *Bulletin Dept. of Anthro. Gau. Univ.* **2**, 12-13 (1973)
13. Sharma, T. C., Physical characters of Miris, *J. Gauhati Univ.*Sci.-**12(2):** 47-54 (1961)
14. Sharma, T. C., Physical characters of Miris, *J. Gauhati Univ.* Sci.-**13(2):** 79-88 (1962)
15. Das, B. M., Physical variation in three Assamese Castes, *Anthropologischer Anzeiger*, **37H**:3, 204-210 (1979)
16. Das, B. M., Microevolution, Concept Publication, New Delhi, 1981, p.109
17. Bordoloi, B. N., Sharmah Thakur, G. C., Saikia, M. C., Tribes of Assam, Part-I, Tribes Res. Inst. Pub., Guwahati, 1987, p.142
18. Martin, R. and Saller, K., Lehrbuch der Anthropologie, 3rd Ed., Rev. By- Bozo Skerlj in Human Biol. **33**:3, Wyne State Univ. Press Pub., 1961, pp. 271-275.
19. Wilder, H. H., A laboratory manual of Anthropometry, Blakiston's Sons & Com., Philadelphia, 1920, p 193.
20. Croxton, F. E., Elementary statistics with application in medicine and biological science, Dover Pub, New Delhi, 1953, p. 376.