

Variation of Morphogenetic Characters in an Endogamous Group of Vannekula Kshatriya in Andhra Pradesh

G. Bulliyya

INTRODUCTION

Depression or a dimple in the lower border of the chin is known as cleft-chin inherited as an autosomal dominant character (Winchester, 1960; McKusick, 1968). The genotype of individual showing dimple in chin may be homozygous (DD) or heterozygous (Dd) and individual with smooth chin are homozygous for recessive gene (dd). It was Cokayne (1933) who first reported the study of hypertrichosis of the ear inherited through a dominant Y-chromosome gene. Subsequently it was reported that the trait is compatible with a single gene or a combination of genes in the Y-chromosome (Dronamraju, 1960; Gates, 1960; Gates et al., 1962; Slatois and Apelbaun, 1963). Hypertrichosis pinnae auris occur in a large number of males and no females with true hairs (Dronamraju, 1962; Stern et al., 1964). In India, studies have been reported that the incidence of cleft-chin and hypertrichosis are different from one population to another (Dronamraju and Haldane, 1962; Chattopadhyay, 1966; Bhasin et al., 1992; Reddy and Reddy, 1997).

Visual observations on morphogenetic traits have been used in anthropological studies for the classification of human races (Bhasin et al., 1992). In order to understand the variation and inter-population relationships, many populations have been studied for their morphogenetic characters (Malhotra, 1970; Bhanu and Malhotra, 1972; Pandey et al., 1997). The objective of this study is to investigate the incidence of cleft-chin and hypertrichosis among the Vannekula Kshatriya caste population in Chittoor district of Andhra Pradesh. The ethnological details of the study population have been described previously (Bulliyya and Ramachandraiah, 1999).

MATERIAL AND METHODS

The present study is based on the cross-sectional data of 215 randomly selected unrelated individuals of the both sexes (125 males and 90 females) aged between 20-60 years belonged to Vannekula Kshatriya caste population living in two villages namely Bandapalli and China-

bandapalli in Chittoor, a southernmost district of Andhra Pradesh. The study area is situated about 10 Km away from the district head quarter. Number of individuals with or without dimple or fissure or cleft on lower margin of their chin was scored. A two-fold classification of cleft-chin and non-cleft-chin used according to Bhanu and Malhotra (1972). Presence or absence of hairs on the ears was recorded for the trait of hypertrichosis (Malhotra, 1970). The gene frequencies were estimated for the trait of cleft-chin by direct gene counting method. Chi-square values were computed to determine the test of statistical significance at 5% level.

RESULTS AND DISCUSSION

Table 1 represents the frequency distribution of phenotypes and alleles for binary classification of clefted and non-clefted chin types among the Vannekula Kshatriya. It is noted that the proportion of cleft-chin individuals are more frequent among males (28.0%) than among females (18.9%) despite, the absence of statistical significance (chi-square=2.55, $p>0.05$). Earlier published reports on caste and tribal populations from Andhra Pradesh observed significant bisexual differences (Sethuraman et al., 1978; Narahari and Ramachandraiah, 1981; Reddy and Reddy, 1997). The prevalence of recessive non-cleft allele (dd) for males and females are 0.8485 and 0.9005 respectively with an average of 0.8544 for sex-combined group.

The frequency distribution of cleft-chin types among the Vannekula Kshatriya female series show homogenous nature from those among the Palli Reddis (25.9%; Reddy et al., 1984) and the Madigas of Cuddapah (18.9%) and Chittoor (36.1%) districts (Reddy and Reddy, 1997). On the other hand, it deviates significantly from the Brahmins (68.5%; Bhasha, 1982), the Madigas (74.9% and 59.1%; Reddy and Reddy, 1997) in male series and the Suryavamsam Kshatriya (72.0%; Raju, 1982) in female series. It is also evident from the literature that the incidence of cleft-chin is more common in tribal than in caste populations of the state.

Table 1: Phenotype and allele frequencies of cleft-chin among the Vannekula Kshatriya of Chittoor district

Sex	Number observed	Phenotypes (%)		Allele frequency	
		Cleft-chin	Non-cleft	Dd	dd
Male	125	28.0 (35)	72.0 (90)	0.1515	0.8485
Female	90	18.9 (21)	81.1 (69)	0.0995	0.9005
Total	215	26.0 (56)	73.0 (159)	0.1456	0.8544

Figures in parenthesis indicate number of subjects.
Chi-square value=2.5500, $p>0.05$ (d.f.=1).

The frequency distribution of hypertrichosis among the Vannekula Kshatriya is presented in Table 2. It is noted that out of 125 males, only 16.8% are found to have hypertrichosis. The observed prevalence of hypertrichosis is within the range of other caste and tribal groups of Andhra Pradesh (Narahari, 1980). The reported incidence is lower than among the Palli Reddis (18.6%; Reddy et al., 1984), the Malas of Chittoor (20.4%) as well as Cuddapah districts (23.5%; Reddy and Reddy, 1997) and the Malas of coastal districts (50.0%; Veerajulu and Satyanarayana, 1973), but higher than among the Nayi Brahmins of Chittoor district (12.9%; Bhasha, 1982).

Table 2: Frequency distribution of hypertrichosis among the Vannekula Kshatriya of Chittoor district

Sex	Number observed	Hypertrichosis of ear	
		Present	Absent
Male	125	16.8 (21)	83.2 (104)
Female	90	- (0)	100.0 (90)
Total	215	9.8 (21)	90.2 (194)

Figures in parenthesis indicate number of subjects.

Hypertrichosis is seen rather frequently in India, but occurs in Caucasians, Australian Aborigines and Japanese populations (Gates and Villa, 1960; Garg, 1980). The incidence of hypertrichosis is relatively higher in south compared to that of in north and central parts of India (Pandey et al., 1997). In some studies, for the sake of convenience, the quantity of the hypertrichosis of the ear is divided into scanty, medium and bushy types (Majumdar, 1974; Reddy and Reddy, 1997). It can be evident from this study that the incidence of cleft-chin and hypertrichosis is well within the ranges reported for other caste populations of the state.

ACKNOWLEDGEMENTS

The author wishes to express deep sense

of gratitude to his teacher Dr. T. Ramachandraiah for his constant guidance and inspiration. Thanks are also due to Dr. V. S. Deepkumar, (Mrs) D. Bhagyalakshmi and D. Lalitha for their assistance during field investigations.

KEY WORDS Morphogenetic Characters. Cleft-chin. Hypertrichosis. Caste Population. Chittoor District. Andhra Pradesh.

ABSTRACT This study reports the frequency distribution of the morphogenetic characters such as cleft-chin and hypertrichosis among the endogamous group of Vannekula Kshatriya in Chittoor district of Andhra Pradesh. The sample consisted of 215 individuals of which 125 males and 90 females in the age group of 20-60 years selected randomly. The data show that the incidence of cleft-chin is predominant in males (28.0%) than in females (18.9%) without significant sex dimorphism. The frequency of non-cleft recessive genes or alleles for males and females are 0.8485 and 0.9005 respectively. The incidence of hypertrichosis of the ear is 16.8% found only among males. The results are discussed in the light of data available from Andhra Pradesh. The incidence of cleft-chin and hypertrichosis is within the range of other caste populations of the state Andhra Pradesh.

REFERENCES

- Bhanu, B.V. and Malhotra, K.C.: A population genetic study of cleft chin in India. *Am. J. Phy. Anthropol.*, 37: 367-372 (1972).
- Bhasha, S.S.: *Morphological Characters and Colour Blindness in two Endogamous Groups of Nayi Brahmins in Chittoor district*. M.Sc. Dissertation (unpublished). S.V. University, Tirupati (1982).
- Bhasin, M.K., Walter, H. and Donker-Hopfe, H.: *The Distribution of Genetical and Behavioural Traits Among the People of Indian Region*. Kamla-Raj Enterprises, Delhi (1992).
- Bulliyya, G. and Ramachandraiah, T.: Distribution of ABO blood groups and Rh(D) factor among Vannekula Kshatriyas of Chittoor district of Andhra Pradesh. *J. Hum. Ecol.*, 10: 305-306 (1999).
- Chattopadhyay, P.K.: A note on frequency of hair rims, tragus hair and hair of the earlobe in some south Indian populations residing at Delhi. *Acta Genet. Med. Gammell.*, 3: 321-325 (1966).
- Cokayne, E.A.: *Inheritance Abnormalities of the Skin and Its Appendages*. Oxford University Press, London (1933).

- Dronamraju, K.R.: Hypertrichosis of the pinna of the human ear, Y-linked pedigrees. *J. Genet.*, **57**: 230-244 (1960).
- Dronamraju, K.R. and Haldane, J.B.S.: Inheritance of the pinnae of human ear. *Am. J. Hum. Genet.*, **14**: 102-103 (1962).
- Dronamraju, K.R.: Y-linked in man. *Nature*, **201**: 424-425 (1967).
- Garg, S.K.: Hypertrichosis of ear among the Bhoksa of Dehra Dun. *Ind. J. Phys. Anthropol. Hum. Genet.*, **6**: 143-149 (1980).
- Gates, R.R.: Y-chromosomes inheritance of hairy ears. *Science*, **132**: 145 (1960).
- Gates, R.R., Chakravarti, M.R. and Mukherjee, D.P.: Final pedigree of Y-chromosome inheritance. *Am. J. Hum. Genet.*, **14**: 363-375 (1962).
- Gates, R.R. and Villa, F.: Hairy pinnae in Malta. *Lancet*, **2**: 357-358 (1960).
- Majumdar, P.P.: Hypertrichosis of the ear: A review of its mode of inheritance, further data and comments. In: L.D. Sanghvi, V. Balakrishnan, H.M. Bhatia, P.K. Sukuraman, J.V. Undevia (Eds): *Human Population Genetics in India*. Vol.1. Orient Longman, Bombay, 269-276 (1974).
- Malhotra, K.C.: Hypertrichosis of the ear as a population marker: an assessment. *Anthropologist*, **17**: 57-64 (1970).
- McKusick, V.A.: *Mendelian Inheritance in Man*. The John Hopkins University Press. 6th Eds, 1001-1003 (1983).
- Narahari, S.: Population study of hypertrichosis in four tribal groups of Andhra Pradesh. 7th Ann. Conf. India. Soc. Hum. Genet., Ranchi, December 26-28 (1980).
- Narahari, S. and Ramachandraiah, T.: A genetic study among cleft chin in some tribal groups of Andhra Pradesh. 8th Ann. Conf. India. Soc. Hum. Genet., Pune, December 26-28 (1981).
- Pandey, B.N., Das, P.K.L., Jha, A.K. and Thakur, A.K.: Frequency of hypertrichosis among Oraons of Purnea, Bihar. *J. Hum. Ecol.*, **8**: 143-144 (1997).
- Raju, M.M.: *A, ABO and Rh(D) Blood Groups and Some Morphological Characters in Two Endogamous Groups of Kshatriyas of Chittoor District*. M.Sc. Dissertation. S.V. University (unpublished), Tirupati (1982).
- Reddy, K.R. and Reddy, V.R.: Morphological variation of certain traits among the schedule caste Madigas of Andhra Pradesh. *J. Hum. Ecol.*, **8**: 377-381 (1997).
- Reddy, V.R., Subhashini, A.B. and Gunasundaramma, K.: Morphological and behavioural genetic study among the Palli Reddis of Tirupati, Chittoor district. *Ind. J. Phys. Anthropol. Hum. Genet.*, **10**: 42-50 (1984).
- Sethuraman, M., Ramarao, K.V., Ramachandraiah, T. and Swamy, K.S.: Incidence of cleft chin in two endogamous groups of Srivaishnava Brahmins of Tirupati. *Man in India*, **58**: 71-75 (1978).
- Slatois, H.M. and Apelbaum, A.: Hairy pinnae of the ear in Israeli populations. *Am. J. Hum. Genet.*, **15**: 74-85 (1963).
- Stern, C., Centerwall, W.R. and Sarkar, S.S.: New data on the problem of Y-linkage of hairy pinnae. *Am. J. Hum. Genet.*, **9**: 147-166 (1964).
- Veeraraju, P. and Satyanarayana, M.: Hypertrichosis pinnae auris in coastal Andhra Pradesh. *Jap. J. Hum. Genet.*, **18**: 37-41 (1973).
- Winchester, A.M.: *Heredity and Your Life*. Dover, New York, 2nd Edition (1960).

Authors' Address: G. Bulliyya, Department of Physical Anthropology, Sri Venkateswara University, Tirupati 571 502, Andhra Pradesh, India

Present Address: Dr. Gandham Bulliyya, Regional Medical Research Centre, Indian Council of Medical Research, Chandrasekharapur, Bhubaneswar 751 023, India,
Fax: 91 674 301351, E-mail: rnmrodir@sanchamnet.in