

Opportunity for Natural Selection Among Four Andhra Caste Populations

B.V. Babu, Y.S. Kusuma and J.M. Naidu¹

Department of Anthropology, Andhra University, Visakhapatnam 530 003, Andhra Pradesh, India

KEY WORDS Natural Selection. Index of Fertility. Mortality, Andhra Castes.

ABSTRACT The estimates of opportunity for natural selection are reported for four endogamous Andhra castes, namely, Chakali (0.6274), Kummari (0.9572), Mangali (0.6792) and Madiga (0.6957). The contribution of fertility to the total index is greater than the contribution of mortality among four populations studied. The average estimate of opportunity for natural selection recorded for the four Andhra castes (0.7399) is slightly higher than the average index reported for Indian populations (0.6650).

The concept of Natural Selection is well recognized as a principle driving force of evolution. Natural selection operates through differential mortality and fertility among human populations. The differential mortality acts on individuals prior to their reproductive age; and determines that group of individuals who survive and may potentially produce the offspring who will constitute the next generation of a population. The differential fertility functions within this surviving group of individuals who have reached reproductive age. Crow (1958) devised an index (*I*) of the opportunity for selection to quantify the influence of selection inherent in evolutionary processes which can be partitioned into fertility and mortality components. Johnston and Kensinger (1971) modified the computation by considering prenatal mortality additionally while Crow covered only live births and prereproductive postnatal deaths. In the present study Crow as well as Johnston and Kensinger's indices were estimated among four Andhra caste populations.

MATERIALS AND METHODS

Demographic data on inbreeding, fertility and mortality based on the reproductive history

of 405 women belonging to four caste populations viz., Chakali, Kummari, Mangali and Madiga inhabiting rural areas of East Godavari district of Andhra Pradesh were published by Babu and Naidu (1989). In the present study, indices of opportunity for natural selection were computed by further analysis of earlier data using the original formula of Crow (1958) and modified formula of Johnston and Kensinger (1971).

RESULTS AND DISCUSSION

The indices of opportunity for natural selection based on the methods of Crow as well as Johnston and Kensinger, partitioned into contribution of fertility and mortality among four populations are presented in table 1. The contribution of fertility to the total index is greater than the contribution of mortality among all the four caste groups. It depicts that the present populations are evolving through fertility component of selection mechanism rather than mortality. The indices of fertility (I_d/P_s) and mortality (I_m) are relatively lower among Chakali, Mangali and Madiga while Kummari reports higher values. Slightly elevated values of total index are observed among all the four castes when prenatal mortality according to Johnston and Kensinger is considered, which are consistent. The contribution of prenatal mortality (I_{me}) ranges between 0.0226 (Madiga) and 0.0721 (Kummari).

The indices of opportunity for natural selection among Indian populations were reviewed by Reddy and Chopra (1990). The value of '*I*' among Andhra Castes varies from 0.31 re-

1. Address all correspondence

Table 1: Indices of opportunity for natural selection among Chakali, Kummari, Mangali and Madiga

Index		Chakali (n=112)	Kummari (n=69)	Mangali (n=119)	Madiga (n=105)
Crow's Method					
Mortality component	I_m	0.2013	0.3235	0.1972	0.2281
Fertility component	I_f/P_s	0.4261	0.6337	0.4820	0.4676
Total index	I	0.6274	0.9572	0.6792	0.6957
% of fertility component		67.92	66.20	70.97	67.21
Johnston and Kensinger's Method					
Prenatal mortality component	I_{me}	0.0238	0.0721	0.0351	0.0226
Childhood mortality component	I_{mc}/P_b	0.2061	0.3468	0.2041	0.2333
Fertility component	$I_f/P_b \cdot P_s$	0.4362	0.6794	0.4990	0.4782
Total index	I	0.6661	1.0983	0.7382	0.7341
% of fertility component		65.49	61.86	67.60	65.14

corded in Jalari, a backward fishing caste to 1.69 reported in Mala, a scheduled caste. The index of mortality varies from 0.13 registered among Brahmin, an upper caste in Hindu caste hierarchy, mostly living in urban areas with better health and socio-economic background, to 1.06 found among Mala, the lowest in social hierarchy of Hindu castes who live chiefly in rural areas with under nutrition and ill-health. The component of prenatal mortality varies between 0.02 among Chakali and Madiga of the present study to 0.14 among Brahmin reported by Rajani Kumari et al. (1985). Contribution of fertility is higher than mortality in a majority of Andhra caste populations. The present study populations deviate from the general trend observed among tribal and agrarian societies where the contribution of mortality is higher than that of fertility (Cavalli-Sforza and Bodmer, 1971). Although the present study populations are from rural background, the influence of family planning and accessibility of health care system may be responsible for lower contribution of mortality.

Average values of opportunity for selection are computed for the four castes and compared with averages of Indian populations (Reddy and Chopra, 1990). An average total index value of 0.7399 was observed in the present study castes which is slightly higher than the average value of 0.6650 reported for Indian

populations. The mean indices of fertility and mortality of the caste groups (0.37 and 0.35) are also slightly higher than Indian averages (0.25 and 0.33) respectively.

From the available published data (Reddy and Chopra, 1990) it is observed that the mortality and fertility components as well as total index values are higher among low socio-economic Andhra castes than upper castes. The four caste groups chosen for the present study belong to lower social strata and exhibit moderate values falling between the upper castes and scheduled castes and tribes of Andhra Pradesh.

REFERENCES

- Babu, B.V. and Naidu, J.M. : A demographic profile of four Andhra caste populations. *Ind. J. Phys. Anthropol. Hum. Genet.*, 15: 97-102 (1989).
- Cavalli-Sforza, L.L. and Bodmer W.F. : *The Genetics of Human Populations*. W.H. Freeman, San Francisco (1971).
- Crow, J.F. : Some possibilities for measuring selection intensities in man. *Hum. Biol.*, 30: 1-13 (1958).
- Johnston, F.E. and Kensinger, K.M. : Fertility and mortality differentials and their implications for microevolutionary change among Cashinahua. *Hum. Biol.*, 43: 356-364 (1971).
- Rajani Kumari, J., Srikumari, C.R. and Rao T.V. : Variability of selection opportunities with changing socio-cultural environments. *Hum. Hered.*, 35: 218-222 (1985).
- Reddy, B.M. and Chopra V.P. : Opportunity for natural selection among the Indian populations. *Am. J. Phys. Anthropol.*, 83: 281-296 (1990).