GENETIC DEMOGRAPHY AMONG PENGU TRIBE OF VISAKHAPATNAM AGENCY IN ANDHRA PRADESH, INDIA

CHETTI SRINIVAS

ABSTRACT

The integral efforts of demographers and geneticists have filled numerous lacunae and led to a better understanding of the factors operating on human populations. The present paper illustrates the genetic demography of Pengu tribal community in the context of differential fertility, mortality, natural intensity and co-efficient inbreeding. The average number of live birth is 3.08 whereas the average number of surviving children per woman is 2.55. The Pengu have some traditional beliefs and considered some foods as aborting. The index of selection due to prenatal mortality is found to be lesser than that of the index of selection due to postnatal mortality in the Pengu population.

Keywords: *Genetic, Demography, Pengu, Natural Intensity, Co-efficient Inbreeding.*

INTRODUCTION

The relationship between demography and evolution is close and long-standing. Anthropological genetics, concerned with understanding the patterns and causes of genetic variation within and among populations, depends on anthropological demography to provide data on population size and fluctuations, mating structure, and migration patterns and histories that are crucial for understanding the demographic picture of fertility. It is not only biological, as opposed to social, but also historically and culturally specific, structured by a particular set of social assumptions. The fertility and mortality depend upon the age at menarche, age at marriage, age at menopause, type of marriage, family type, socio-economic status, cultural practices, ecology, marital distance, etc.

Genetic variations among human populations may be studied through genetic markers such as blood groups, serum proteins and enzymes, phenyl thio-carbamide taste sensitivity (PTC), colour blindness, dermatoglyphics, etc. These genetic markers make possible the delineation of populations in terms of gene frequencies and phenotypic proportions and enable one to study the role

Chetti Srinivas, Department of Anthropology, Andhra University, Visakhapatnam-530003, Andhra Pradesh, E-mail: srinivas@andhrauniversity.edu.in, chetti.srinivas98@gmail.com.

of chance, selection, mutation, migration and hybridization in bringing about changes in the genetics structure of a population with the passage of time (Kirk, 1973).

MATERIALS AND METHODS

Present study has been conducted among one of the most vulnerable tribal group (MVTG) Pengu. It is an isolated tribal community concentrated in two panchayats namely Laxmipuram, and Barada of Munchingput Mandal of Visakhapatnam District agency tracts. A total of 139 married couples were selected using both representative and purposive sampling procedures from the population distributed in six villages of Laxmipuram panchayat and two villages in Barada panchayat. Anthropological field techniques like schedule, interview participation, observation, case studies, and pedigree were employed for data collection among Pengu of the study area. The total intensity of selection (I) was calculated by employing formulae of Crow's and Johnston and Kensinger's. Coefficient inbreeding statistical test was performed, following Rao (1980). Analysis of collected data has been processed through SPSS.

RESULTS AND DISCUSSION

The population composition of the sample indicates that 0-4 years age group accounts for 15.48% while 55-59 years age group 2.61%, while 15-19 years reproductive age group represents a large percent of the population (Table-1). The data indicates that the Pengu show a feature of 'young' with a potentiality of growing population. Males are higher in number than females in the reproductive age. The Total Dependency Ratio (TDR) is found to be 78.44% for males and 64.88% for females. The overall sex ratio of Pengu tribe is slightly favourable towards males (930).

Table-1: Age and Sex-wise Population Distribution of the sample

Age intervals	Male	Female	Total
0-4	47 (8.17)	30 (5.22)	77 (13.39)
5-9	44 (7.65)	45 (7.83)	89 (15.48)
10-14	27 (4.70)	22 (3.83)	49 (8.52)
15-19	36 (6.26)	27 (4.70)	63 (10.96)
20-24	16 (2.78)	21 (3.65)	37 (6.43)
25-29	26 (4.52)	19 (3.30)	45 (7.83)
30-34	15 (2.61)	18 (3.13)	33 (5.74)
35-39	19 (3.30)	24 (4.17)	43 (7.48)
40-44	14 (2.43)	17 (2.96)	31 (5.39)
45-49	20 (3.48)	21 (3.65)	41 (7.13)
50-54	14 (2.43)	13 (2.26)	27 (4.70)
55-59	7 (1.22)	8 (1.39)	15 (2.61)
60+	13 (2.26)	12 (2.09)	25 (4.35)
Total	298 (51.83)	277 (48.17)	575 (100.00)

Table-2 indicates that the girls menstruate at an early age (12.1±0.97 years), which may be attributed to environment, heredity, health and nutritional status.

The mean age at marriage among females is 16.48±0.01 years. The majority of women had their first child at the age bracket of 18-20 years (44.6%) and the least frequency of women for age at first conception was found in the age group of 30+ years (0.72%).The mean age at first conception is 19.12±0.01 years, while that of the last conception was found to be 26.73±0.0 years. The mean age at menopause was found to be 44.15±0.02.

Table-2: Factors of Fertility Performance among the Pengu Women

	Pengu
Mean age at Menarche	12.1±0.97
Mean age at Marriage	16.48±0.01
Mean age at first conception	19.12±0.01
Mean age at last conception	26.73±0.03
Age at onset of Menopause	44.15±0.02

Table-3 shows fertility performance among the women of completed fertility. There are 44 women who have completed their fertility. They have a total of 187conceptions and live births. The average number of conception per woman is 4.25, whereas the average number of live birth per woman is 3.79. The frequency of wastage (abortion and still birth) among them is 10.69%. The table also indicates that the frequency of postnatal mortality among the women of completed fertility is 17.96% and the average number of surviving children per woman is 3.11.

Table-3: Fertility Performance a mong the Women of Completed Fertility

Total number of Women	44
Total number of conception	187
Total number of wastage (miscarriage + still births)	20
Total number of live births	167
Total number of premature deaths	30
Total number of surviving children	130
Average number of conception	4.25
Average number of live births	3.79
Average number of surviving children	3.11
Percentage of wastage	10.69
Percentage of post-natal deaths (neonatal + Infant + child)	17.96

The parameters used in calculating index of selection intensity are shown in Table-4. The proportion of child death before reaching the reproductive age (Pd) is 0.2307 and the proportion of survival up to the reproductive age (Ps) is 0.7693. It can also be noticed in the table that the proportion of death before birth (Ped) is 0.1086 and the proportion of survivors up to birth is (Pb) 0.8914 in the population.

Table-4: Parameters used in calculating Index of Selection Intensity

According to Crow's Formula (1958)	According to Johnston and Kensinger's formula (1971)
Total number of women with completed fertility = 44	Total number of women with completed fertility = 44
Total number of live birth among the women with completed fertility = 167	Total number of live birth among the women with completed fertility = 167
Average number of live birth per woman =3.79	Average number of live birth per woman =3.79
Variance of mean live birth = 1.65	Variance of mean live birth = 1.65
Total number of premature death = 30	Proportion of death before birth, P_{ed} = 0.1086
Proportion of pre reproductive deaths (P_d) = 0.2307	Proportion of survivors up to birth, = P_b = 0.8914
Proportion of surviving up to reproductive age, (Ps) = 0.7693	Total number of child death before reaching the reproductive age '$P_{d'}$ = 0.2307
	Proportion of survival up to reproductive age, (Ps) = 0.7693

In the Johnston and Kensinger's formula, embryonic or prenatal mortality, in addition to postnatal mortality, is taken into account. The proportion of child death before reaching the reproductive age (Pd) is 0.2307 and the proportion of survival up to reproductive age, (Ps) is 0.7693.

Table-5 indicates the indices of selection intensity. The total intensity of selection (I), according to Crow's formula, was found to be 0.4618, whereas as per Johnston and Kensinger's formula it was found to be 0.6399. The total intensity of selection (I) as per Johnston and Kensinger's is slightly higher than that according to Crow's formula (I), which could be because of taking into account the embryonic mortality, in addition to postnatal mortality up to 15 years of age. In the table it can be noticed that the index of selection due to prenatal mortality (I me) is 0.1218, index of selection due to child mortality (Imc) is 0.2998 and index of selection due to fertility (If) is 0.1247. Thus the table reveals that, in the present population, selection operates primarily through differential fertility rather than the differential mortality or in other words the index of selection due to fertility is playing a major role in the total selection intensity. The index of selection due to prenatal mortality is found to be lesser than that of the index of selection due to postnatal mortality in the Pengu population.

Table-5: Indices of Selection Intensity

Crow's formula (1958)	Jonston and Kensinger's formula 1971
Index of selection due to mortality, I_m = 0.2998	Index of total selection due to prenatal mortality, I_{me} = 0.1218
Index of selection due to fertility, (I_f) = 0.1247	Index of total selection due to child mortality, I_{mc} = 0.2998
Index of total selection intensity, I = 0.4618	Index of selection due to fertility, (I_f) = 0.1247
	Index of total selection intensity, I = 0.6399

Table-6 reveals displays values of the Coefficient Inbreeding among Pengu

tribe. The Pengu prefer Father's Sister's Daughter (FSD) type (34.53%) rather than Mother's Brother's Daughter (MBD) (13.67%). The co-efficient inbreeding was noticed for both autosomal (0.039) and sex linked genes (0.026). The consanguineous and non-consanguineous marriages are almost equally distributed among the Pengu tribe.

Table-6: Coefficient Inbreeding

Total marriages	Affinal	Consanguineous				Coefficient inbreeding	
		UN	MBD	FSD	Total	Fa	Fs
139	71 (51.08)	1 (0.72)	19 (13.67)	48 (34.53)	68 (48.92)	0.039	0.026

CONCLUSIONS

The average number of conceptions per woman was 4.25, whereas the average number of live births was 3.79. The frequency of wastage (abortion and still birth) among them was 10.69%. The frequency of postnatal mortality of completed fertility was 17.96% and the average number of surviving children per woman was 3.11. The total intensity of selection (I), according to Crow's formula was found to be 0.4618, whereas the same using Johnston and Kensinger's formula was 0.6399. The index of selection due to prenatal mortality was found to be lesser than that of the index of selection due to postnatal mortality in Pengu population. The co-efficient inbreeding was noticed for both autosomal (0.039) and sex linked genes (0.026). It is inferred that the cultural practices and traditional beliefs of food restrictions seem to have some impact on fertility parameters. Due to this reason the required nutrients are not being consumed by the pregnant and lactating mothers, which have resulted in the mortality.

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