A Study on Anthropological Demography among the Koya Doras of West Godavari District, Andhra Pradesh

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ABSTRACT: All human populations show variations among themselves. In India, many distinct populations with clear variations are present in a limited physical boundary with large number of populations showing differences in their morphological, physical, cultural and genetic traits provide good opportunity for biological anthropologists to study variation in demographic parameters. The present study aims to study the population structure, fertility, mortality trends and co-efficient inbreeding of the Koya Dora population. The mean age and last conception age are seems to be very young and early age (12.48 ± 0.06 & 25.92 ± 0.37) and menopause age 45.18 ± 0.44 years. Fertility performance measured mean number of total conceptions (2.94), live births (2.79) and living children (2.26) per couple is moderate. The coefficient value of 0.0273 for autosomal genes and 0.0243 for sex linked genes and the Index of Total Selection (I) is 1.8469.

INTRODUCTION

Evolution is nothing but the conversion of variability among individuals within a population to variability between populations. The evolutionary process is therefore best understood through knowledge of the major influence on genetic variability. Selection and inbreeding as influencing factor takes on evolution. Variations in the frequencies of consanguineous marriages and the inbreeding coefficients are determined by biological as well as socio-economic and cultural factor. The role of selection and co-efficient inbreeding has been extremely important in genetic demography.

Demographic anthropology is an interdisciplinary policy oriented science concerned with understanding and measuring population change. Demographic research focuses on fertility, mortality and migration.

Fertility is defined as reproductive performance measured, for example, as the average number of live birth as to women of childbearing age for a specific population. Fertility differs from fecundity, which are the potentiality to bear children. Mortality rate is a measure of the numbers of deaths in a particular population (Bernardi and Hutter, 2007). Anthropological demography is emerging out of a combination between two individual disciplines: demography and anthropology. Whether this endeavor is multidisciplinary or interdisciplinary (or indeed, some further form of collaboration) remains to be seen but to begin with it is necessary to sketch out the key aspects of each of these traditions. Basu and Aaby describe the lack of attention paid by demographers to ethnographies as an important short-coming (Basu and Aaby,'98).

The Koya Dora tribe is one of the most particular tribal groups of Andhra Pradesh. They are mainly found in the picturesque Papi hill

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ranges (part of Eastern Ghats) on either side of the Godavari gorge, in West and East Godavari, besides the hilly tracts of Khammam district. They are also found scattered in the districts of Visakhapatnam (Andhra Pradesh) and Warangal of Telangana State. Koya Dora speaks both Koya and Telugu languages.

They are both vegetarian and non-vegetarians. The staple food is rice, jowar and millets and change in their food habits is observed. In Koya Dora society father is the head of the family. Descent is patrilineal. Inheritance of property is also through father line. The rule of residence is patrilocal. Traditionally, joint families were common, but nowadays the nuclear families are predominant among the Koya Dora. They have both affinal and consanguineal relationships. Kinship relations among Koya Dora are broad based and hence it is called broad range of kinship. Agriculture, especially *podu* or shifting cultivation is the mainstay of this tribe. Many of them are engaged in weaving bamboo baskets and making ropes which are sold in weekly markets as supplementary income sources.

The Koya Dora follows strict endogamy at community level. One does not marry outside the community. In marriage, endogamy is allowed at village and community level but not at lineage/gotra/surname level. Exogamy is allowed at village, level, gotra level, clan level and surname level but exogamy is strictly restricted at community level. Any breach of the above marriage rules may lead to sanctions by society head. There is no dowry or bride price in this tribe but nowadays due to constant interaction with caste and cultural change, dowry become common and overrides the traditional bride-price concept. Dowry is in both cash and kind. Cultivable land and cattle include major part in the list of dowry in kind.

MATERIALS AND METHODS

An anthropological demography survey is attempted is the present study among Koya Dora tribal population inhabiting Polavaram Mandal of West Godavari. Present study is a small contribution to the field of anthropological demography aims to unravel all socio-biological facts of marriage, fertility and mortality to evaluate the impact of all demographic characteristics on the level of fertility performance.

The sample of demographic data was purposively selected from the villages nearer to Kondrukota. A total of 231 households inhabiting in 13 villages belonging to Mamidi Gondu, Koruturu, Chegundapalli and Kondru Kota, the four panchayats in Polavaram mandal, were surveyed. Conveniently, random sampling method is followed although samples are selected according to the availability of subjects in the villages at the time of visit. A structured schedule was used to collect data. A structured schedule cover with all demographic parameter like family type, family income, forms of marriage and consanguineous or non-consanguineous were also noted. Age at menarche, age at marriage, age at first conception, age at last conception, age at menopause, live births, still births, mortality. Since the people are illiterate and birth records are not available, age of individuals is assessed by visual inspection as well as enquiring elderly people about seasons and important events at their birth. The family pedigree has been drawn for supplementing the information recorded. The different statistical parameters and methods used in the present study for analyzing the data. Mean, standard deviation, Coefficient of inbreeding, and Crow's ('58) Index of Total Selection (I).

RESULTS AND DISCUSSIONS

Age and sex composition statistics are the primary determinants of the demographic structure of the population. The data pertaining to age and sex composition is presented in Table 1. Proportion of males in 10-14 years of age-group (12.4%) is slightly higher to that of females (5.45%). The proportion of females is more in 20-24 age-group and males of this age-group is (11.1%). Among 45 years and above age-group people, excess of women are observed compared to men. For calculating the sex ration, all the members in the family are included. It is observed from the Table 1 that the total number of males (402) is slightly lesser than females (440) in Koya Dora. The present study results of sex-ratio among the Koya Dora (1091.5) higher than overall tribal population sex-ratio (1009) in Andhra Pradesh.

TABLE 1

Age and sex composition and sex-ratio among Koya Doras of Polavaram mandal

Age (in years)	Males		Females		Total		Sex-ratio
	Abs.	%	Abs.	%	Abs.	%	
0-4	30	7.4	30	6.8	60	7.1	1000
5-9	37	9.2	31	7.0	68	8.0	838
10-14	50	12.4	24	5.4	74	8.7	480
15-19	42	10.4	50	11.3	92	10.9	1190
20-24	45	11.1	53	12.0	98	11.6	1178
25-29	43	10.6	34	7.7	77	9.1	791
30-34	31	7.7	44	10.0	75	8.8	322
35-39	28	6.9	32	7.2	60	7.1	1143
40-44	25	6.2	27	6.1	52	6.1	960
45-49	24	5.9	25	5.6	49	5.8	1042
50-54	15	3.7	30	6.8	45	5.3	960
55-59	5	1.2	20	4.5	25	2.9	1042
60-64	17	4.2	26	5.9	43	5.1	2000
65-69	6	1.4	7	1.5	13	1.5	1529
70-74	1	0.2	3	0.6	4	0.4	1167
75-79	1	0.2	4	0.9	5	0.5	3000
80-84	2	0.4	1	0.2	3	0.3	4000
Total	402	100.0	440	100.0	843	100.0	1094.5

Among the 231, households surveyed from Koya Dora tribe the frequency of different socio-economic condition of the families is presented in Table 2. Majority of the Koya Dora (83.5%) prefer nuclear family with a wife, husband and children. However, 16.5% of joint families supporting the dependent parents along with elder or younger son are observed. The distribution of households based on the total number of family members is listed that is majority of the households (46.3%) have 3 to 4 members followed by 1 to 2 members (26.8%) and 5 to 6 members (23.4%). However, few families (3.5%) have 7 to 8 members.

The income details of Konda Dora is majority of the households (76.6%) are daily wage earners followed by people who depend on agriculture 19%. However, the introduction of Anganwadi Centers, midday meals scheme and single teacher schools as well as vidya volunteers in schools government has provided employment to 3.9% of Koya Dora who draw their monthly emoluments. The income details majority of households (50.2%) are poor who earning less than ₹30,000 per annum, although 37.7% households earning above ₹30,001 per annum. In the case of educational status 74% of women are illiterate followed by 14.7% completed primary school and very few 1.2% complete higher education.

The selection of mate among Koya Doras is usually by negotiation, elopement and exchange. The distribution of mate selection among the tribe reveals that a majority (81%) man acquire their mate by mutual negotiation, although 18.6% of cases are by elopement.

TABLE 2

Socio-economic condition of the Koya Dora households in Polavaram mandal

Type of family	No.	%
Nuclear	193	83.5
Joint	38	16.5
Distribution of household based on total family members		
1 – 2	62	26.8
3 – 4	107	46.3
5 – 6	54	23.4
7 – 8	8	3.5
Mode of income		
Salaried	9	3.9
Daily wages	178	77.1
Agriculture	44	19.0
Family income		
₹<15000	28	12.1
₹15001-30000	116	50.2
₹30001 and above	87	37.7
Education		
Illiterate	160	69.3
Primary	34	14.7
Secondary	32	13.9
Intermediate	2	0.9
Degree	3	1.2

One case of selection by exchange is observed among the tribe. Further Koya Doras, have preferential for selecting mate, the details of which are presented in Table 3.

Majority of men (64.1%) prefer to marry outside the village while 35.9% have married within the village. Further consanguineous marriages are more prevalent (51.9%) than affinal marriages (48.1%). Within consanguineous marriages cross-cousin marriages between girl and her mother's son is more frequent (19.9%) followed by second cross cousin marriages (14.2%). However, 12.9% of girls have marriage their

mother's younger brother, which is usually referred as uncle-niece marriage.

It is observed that two men (0.9%) have married twice, while 6 females (2.6%) have married more than once due to separation or death of spouse. In the present study, in the present study, 73 women (31.6%) are widows. The cause of death of husband were probed and the study revealed that many of them expressed illness as a major cause (21.9%) followed by heart ailment (16.4%). Further jaundice, tuberculosis, accidents, snake bite, diarrhoea and asthma were mentioned as the frequent cause of death.

TABLE 3

Forms of marriage among the Koya Doras

Village	Forms of marriage											
	Affinal		UN		FSD		MBD		SCC		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Endogamous	43	51.8	11	13.2	6	7.2	14	16.8	9	2.0	83	35.9
Exogamous	68	45.9	19	12.8	5	3.3	32	21.6	24	16.2	148	64.1
Total	111	48	30	12.9	11	4.7	46	19.9	33	14.2	231	100.0

Note: UN (Uncle Niece); MBD (Mothers Brothers Daughter); FSD (Fathers Sisters Daughter); SCC (Secondary Cross-Cousin).

Age at menarche is an important factor which regulates fertility to a considerable extent, since a woman's reproductive cycle starts only after menarche. Hence, the age at which it occurs forms one of the major parameters of maturation rate in female. Age at marriage is also important factor which enables a woman to initiate conception. Age at marriage is a socio-cultural factor and is an important variable that depends upon several factors including the availability of suitable mate; it may influence the total fertility of women. Table 4 reveals that the age at menarche, marriage, first conception, last conception and age at menopause.

The mean age at menarche in this tribe is 12.48±0.06 years. In the present study was observed that majority of girls (50.2%) attain menarche at the age of twelve years and 37.2% at the age of thirteen years. The mean age at marriage recorded among the tribe women is 15.53±0.15, which is relatively early. It is also observed that girls get married even between fourteen and fifteen years of age, this due to the practice of early marriages for girls among the tribe.

The age woman at her first conception is an important dimension of her fertility performance. Women with young age at first conception are endowed with a higher fertility rate. The mean age at first conception among the present study is 17.55±0.20. it is observed that majority the women (19.1%) have conceived their first child at an age of 16 years, while 17.2% women conceived at the age of 17 years followed by 13% conceived at an age of 18 years which indicate that Koya Dora women show an early age at first conception. The mean age at last conception is 25.92±0.37 years. However few cases of women who are above 30 and had children were noticed among the Koya Doras.

Menopause is another physiological variable that has bearing on woman's fertility. Onset of menopause indicates cessation of regular menstrual cycle. Majority of the women covered in the present study (65.4%) have not attained menopause. Data is available on only 80 women (34.6%) who have completed fertility period and attained menopause. The mean age at menopause is 45.18±0.44 years.

TABLE 4

Factors of fertility performance among the Koya Doras

Mean age at menarche	12.48±0.06
Mean age at marriage	15.53±0.15
Mean age at first conception	17.55±0.20
Mean age at lastconception	25.92±0.37
Age at onset of menopause	45.18±0.44

The information pertaining to fertility among the tribe such as total number of conceptions, live births and living children is presented in Table 5. As

mentioned earlier, relatively higher frequency of the women (7.4%) have never conceived who may be classified as sterile. A maximum of 9 conceptions were reported among the tribe. Most of the women have at least 2 or 3 children, some women have 4 children and sizeable households have one child. On average each women including sterile would have conceived about 3 times, with a mean conceptions of 2.94. In- spite of early age at menarche and early age at marriage, the age at mean conception is relatively lower.

TABLE 5

Fertility performance observed among the Koya Dora tribe

Women	N	Conceptions		Live Births		Living Children	
		N	Per women	N	Per women	N	Per women
Ever pregnant	214	679	3.17	645	3.01	523	2.44
Never pregnant	17	–	–	–	–	–	–
Total	231	679	2.94	645	2.79	523	2.26

Table 5 indicated that mean number 2.79 live births and 2.26 living children per women. Out of 679 conceptions, 645 resulted as live births (95%) and 523 are surviving (77%) as one the day of survey. Further, out of 645 live births, 523 are living (81.1%). Maximum number of women has 2 children followed by 3 children and one child. Further, as many as 9.9% women do not have even single surviving child. The results indicate that the fertility performance of Koya Dora women is relatively lower as compared to many tribal and caste populations of Andhra Pradesh.

The details of prenatal and postnatal mortality among Koya Dora women that cover number of abortions, still births, infant deaths, child deaths, adolescent deaths and adult deaths is presented in Table 6. Out of 237 women, 214 women had one conception while 17 have never conceived. However, while calculating mortality rate per women both fertility and sterile (231) women were considered. Out of 679 conceptions 17 abortions were reported (2.5%), followed by 22 still births (3.24%) with a total prenatal mortality of 5%. Regarding postnatal mortality, out of 645 live births 28 ended up as infant

deaths under 1 year (4.3%), 62 ended up as child deaths under 5 years (9.6%), 21 ended up as adolescent under 15 years deaths (3.3%) and 11 as adult deaths (1.7%), with a total postnatal mortality of 122 births (18.9%). The total mortality of ever born people for Koya Dora women is 24.2%. when the mortality rate is calculated per women which included sterile women also it is found that 0.07% abortions, 0.9% still births with 0.15% prenatal death ad 0.02% infantile deaths, 0.27% child deaths, 0.09% adolescent deaths, 0.05% adult deaths totally 0.53% postnatal deaths per woman. On the whole mortality rates of 0.68 per women were found among the tribe.

Out of 669 deliveries, 158 occurred at maternal home (23.6%) majority have delivered at their own home (64%) and only 12.4% have utilized the government hospital. As per the present study reported 6.8% deliveries conducted by doctor followed by 5.6% by Auxiliary Nurse Mid-wife (ANM), while a majority of deliveries have been conducted by elderly women. The major reason for neonatal deaths among children as well as maternal mortality is due to the unsafe deliveries conducted by untrained persons.

TABLE 6

Mortality among the Koya Doras

Women	N	Prenatal mortality						Post-natal mortality										Mortality rate	
		Abortions		Still births		Total		Infant		Child		Adolescent*		Adult		Total			
		N	Per women	N	Per women	N	Per women	N	Per women	N	Per women	N	Per women	N	Per women	N	Per women	N	Per women
E.P.	214	12	0.06	22	0.10	34	0.16	28	0.13	62	0.29	21	0.10	11	0.05	122	0.57	156	0.73
N.P.	17	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	231	17	0.07	22	0.09	34	0.15	28	0.12	62	0.27	21	0.09	11	0.05	122	0.57	156	0.68

Note: E.P.: Ever Pregnant; N.P.: Never Pregnant; * Age group 15 years below   (place this inside)

TABLE 7

Inbreeding coefficients autosomal (Fa) and sex linked (Fs) genes among Koya Dora tribe

Forms of marriage	N	Proportion	Autosomal genes		Sex linked genes	
			Inbreeding coefficient	Fa	Inbreeding coefficient	Fs
UN	30	0.1298	0.125	0.0162	0.125	0.0162
MBD	11	0.0476	0.0625	0.0030	0.125	0.00059
FSD	46	0.1991	0.0625	0.0059	0.000	0.000
SCC	33	0.1428	0.0156	0.0222	0.156	0.0022
Affinal	111	0.4805	0.0000	0.0000	0.0000	0.0000
	231			0.0273		0.0243

Note*:* UN (Uncle Niece); MBD (Mothers Brothers Daughter); FSD (Fathers Sisters Daughter); SCC (Secondary Cross Cousin).

Table 7 reveals that the inbreeding coefficient for sex linked genes is 0.0243 and the inbreeding coefficient for autosomal genes is 0.0273.

Fisher ('30) proved fundamental theorem of natural selection, which states the rate of increase in fitness of any organism at any stage is equal to the genetic variance in fitness at that time. Crow ('58) suggested an idea of 'opportunity for selection'/ 'Index of Total Selection' (I) on the basis of the Fisher's fundamental theorem of natural selection:

$$I = I_m + \frac{I_f}{P_s}$$

Where Im = mortality component of fitness. It is estimated as $Im = \frac{P_d}{P_s}$, where P_d = premature death, P_s (survivors) = Fertility component $(I_f) = V_f + (\bar{X})^2$

Where V_f = variance in the progeny number due to differential fertility, X = average number of birth per women.

TABLE 8

Selection intensity and relative variables among the Koya Dora tribe of of Polavaram mandal

Variables	
Total no. of mothers	231
No. of women aged of 45+ years	116
Total no. of live birth	645
No. of surviving children	523
Average no. of birth per mother (	2.79
Variance (V_f)	3.01
Proportion of pre reproductive deaths (P_d)	0.90
Proportion of surviving beyond 15 years (Ps)	0.81
Index of fertility (If)	0.386
Index of mortality (Im)	1.11
Index of Total Selection (I)	1.8469

CONCLUSION

The age structure of the Koya Dora tribe reveals that the tribe is an expanding population because the majority of the population (around 48.7%) is in 20-49

years of age group while 34.8% are between 0-19 years. The sex ratio indicates an excess of females than males. In the preset study noticed that the village exogamous marriages are more common (64.07%) than village endogamous marriages (35.93%).

The mean age of menarche of Koya Dora women is 12.48±48 years, while the mean age at marriage is 15.53±0.15 years. The mean age at first delivery is 17.55±0.20 years which irrelatively a tender age and the mean age at last delivery is 25.92±0.37 years which is also seems to be very young and early age. The mean age at menopause among Koya Dora women is also relatively at a young age i.e. 45.18±0.44 years. Fertility performance measured in terms of mean number of total conceptions (2.94), live births (2.79) and living children (2.26) per couple is moderate. Post-natal deaths are higher than the prenatal deaths. The present study of Koya Dora shows an inbreeding co-efficient value of 0.0243 for sex linked genes and 0.0273 for autosomal genes.

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