

Population Structure and Genetic Demography Among the Ahalehadie-A Muslim Population of Visakhapatnam, Andhra Pradesh, India

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INTRODUCTION

Population structure and genetic demography occupy an important place in biological anthropology since the perpetuation of a species has direct bearing with its reproductive success. The nature and size of the population, its relation with environment, mating structure, composition, reproductive fitness etc., throw light on the operation of micro evolutionary forces on genetic structure or genetic variation. India provides an unique opportunity to take-up such studies as she possesses various population groups (tribes and castes) that differ widely on the basis of ethnicity, language, religion, region, endogamy and so on.

The present paper reports a comprehensive demographic picture of a Muslim group viz., the Ahalehadie from Visakhapatnam, Andhra Pradesh, India.

Muslims came to India during 18th century were divided mainly into two groups, viz., the Sunni and the Shia. The Sunni appear in sizeable number, i.e., about 60% of the Indian Muslims. It has as many as eight groups like Sheik, Sayyed, Moghul, Pathanx, Ansari, Molesalam, Labbi and Navayat (Roy, 1939; Sarkar, 1977; Klein, 1977). They believe all prophet but follow that of Hazrat Mohammad or Rasul Ullah who is believed as next to God. The 'Shia', on the other hand, constitute about 20% of the Indian Muslims has three groups—Moplah, Bhora and Khwaja (Ansari, 1960; Rahim and Begum, 1996). These people believe that Hazrat Ali is the brother-in-law of Hazrat Mohammed.

The Ahalehadie people (present study) claim a separate group status different from both Sunni and Shia. The people follow the instructions of Hedia as advice of Rasul Ullah (Hazrat Mohammed) who has resolved, at the end of 18th century, against the Turkish corruption that contaminated the Islamic morals and monotheism. Such organization is called Wahhabi or Ahalehadie group. In Visakhapatnam, it is evident from the

field work that they number about 20,000. Besides practising the Islamic rules and regulations, the Ahalehadies are well educated, not rigid in the adoption of Burkha or Purdah system for their women, who enjoy better status. The people do Hamboli type of Namaz. They speak Hyderabad-Urdu.

MATERIALS AND METHODS

Demographic data were collected on 240 ever married women from two places, viz., the Kota Veedhi and Sunnapu Veedhi of Visakhapatnam, Andhra Pradesh. Both schedule and interview methods were followed. The pedigrees were constructed following the suggestion of Rao and Inbaraj (1977). In the analysis of data, the statistical measures like mean, standard deviation, standard error, χ^2 and t-tests were used.

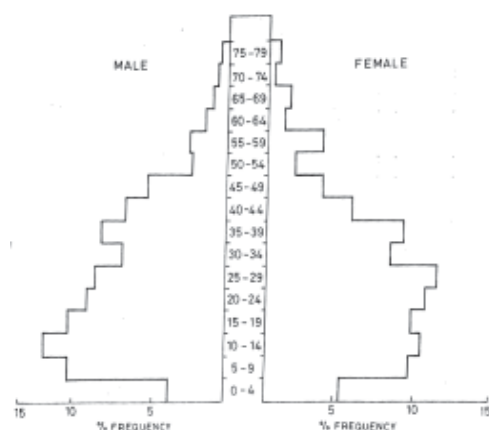
RESULTS AND DISCUSSION

Demographic data collected on 240 ever married women of the Ahalehadies are analysed for various characteristics. The results are shown in tables 1-5 and figures 1-3. Following is the brief account of the results.

Population Composition: From table 1 it is evident that there are more number of females in the age group 0-4 years, compared to males. In the age group of 5-14 years, a preponderance of males over the females is observed. There are constrictions at the base of the population pyramid indicating the possibility in fertility. Being a Muslim population, the adoption of birth control methods is to be ruled out. In the age group of 15-44 years, females outnumber the males which is almost double the frequency that decipher the prominence of reproductive vigour. The age group that fall under 45+ years, tend to show more number of males than females indicating higher longevity for males which is expected in general, due to the possibility of maternal mortality. On the whole, the population pyramid characterise

Table 1: Age, sex and marital composition of the Ahalehadies

Age Group (years)	Unmarried			Married			Sex ratio
	M	F	T	M	F	T	
00-04	29	71	70	-	-	-	71
05-09	83	77	160	-	-	-	108
10-14	95	84	179	-	-	-	113
15-19	82	70	152	-	9	9	104
20-24	60	80	140	11	6	17	83
25-29	-	5	5	68	89	157	72
30-34	-	-	-	54	68	122	79
35-39	-	-	-	66	73	139	90
40-44	-	-	-	53	47	100	113
45-49	-	-	-	41	31	72	132
50-54	-	-	-	33	15	48	220
55-59	-	-	-	19	26	45	73
60-64	-	-	-	12	8	20	150
65-69	-	-	-	8	10	18	80
70-74	-	-	-	5	3	8	167
75-79	-	-	-	2	3	5	66

**Fig. 1. Population pyramid of the Ahalehadies**

the Ahalehadies as young and growing or expanding population (Fig. 1).

Marital Status: Population composition when viewed for marital status, i.e., unmarried, married, divorced/separated/widow throws light on the importance of institution of marriage and the socio-cultural factors centering around it. The marital status (Table 1) indicates that about 24% of the unmarried individuals fall in the age group of 0-14 years. So also the age-group 15-19 (21%) and 20-24 (19%) include more number of unmarried individuals, may be due to elevated educational status besides other variables. It is worth mentioning here that the population consists of educated individuals right from primary upto collageate. Moreover, there appears lack of con-

servative attitude towards education for the women in this society.

In the married category, about 1.21% females are seen in the age group of 15-19 years. The gradual increase in the number of married females from the age 20+ years reveal that daughters will be getting married earlier than the sons, a universal phenomena in most of the Indian populations.

Consanguinity and Inbreeding: In consanguinity (marriage between blood relatives), the Ahalehadies show 46% of this type of marriage (Table 2). The cross-cousin marriages are more (30%) than the parallel cousin in contrast to the trend noted for Muslims in Northern India. Yet the present population, for this character, inclines towards Hindu communities from South India. There are no uncle-niece marriages in this community as is the case with most of the tribal populations of Coastal Andhra Pradesh. This may be due to the fact that the mother's brother (uncle) significantly play role akin to that of one's father. In parallel cousin, about 10% of the marriages are

Table 2: Data on some demographic variables among the Ahalehadies

Character	N	Frequency / Mean $\pm$ S.E.
A. Consanguineous Marriage	110	45.83
i. Cross – Cousin		
MBD	50	20.83
FBD	21	8.75
ii. Parallel Cousin		
MSD	24	10.00
FBD	8	3.33
iii. First Cousin once Removed	7	2.92
B. Non-consanguineous marriages	130	54.17
C. Inbreeding Coefficient (F)		
i. Autosomal (F_A)		0.0278 $\pm$ 0.0002
ii. Sex – linked (F_S)		0.0323 $\pm$ 0.0003
Marriage Distance: (Range – 0-300 + KM)		
i. 0 KM	C = 78.18	NC = 20.77
ii. Below 40 KM	= 10.21	NC = 45.60
Age at Menarche	240	12.9079 $\pm$ 0.8424
Age at Marriage		
i. Husband	240	23.1849 $\pm$ 1.5244
ii. Wife	240	16.6008 $\pm$ 1.0958
Multiple Marriages		
i. Once	H = 94.58	W = 98.33
ii. Twice	H = 5.00	W = 1.67
Net Reproductive Index (NRI)		2.08
Age at 1 st conception		18.5630 $\pm$ 1.2262
Age at last conception		24.4454 $\pm$ 1.8862
Age at Menopause		46.3429 $\pm$ 5.5899

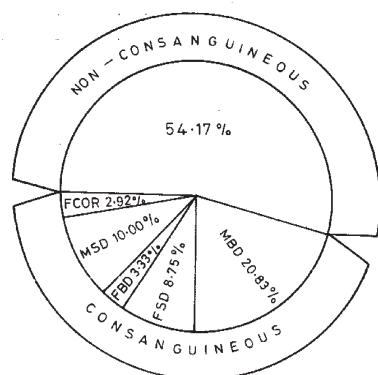


Fig. 2. Cyclogram showing marriage types (%) among the Ahalehadies

of MSD type. First cousin once removed occur with a frequency of 2.92%. Such variation in the practice of consanguinity pattern lead to assume the possibility of adoption of Islam by the native people who were Hindus earlier. However, it needs pertinent data to discuss this issue.

The coefficient of inbreeding (F) calculated for the autosomal genes (Table 2) among the Ahalehadies is 0.0278 + 0.0002 which is lesser than calculated for sex-linked genes (0.0323+0.0003). Such variation accord the composition of MBD type of marriage in this population.

Marriage Distance: It refers to the distance between the birth/native places of the spouses. This is influenced by the pattern and prevalence of consanguinity. Among the Ahalehadies (Table 2), it not only shows bimodal distribution but also significantly vary between the consanguineous unions. It is observed that most of the marriages that are consanguineous takes place within the village yielding '0' km distance (78.18%) and hardly show beyond 20 km. On the other hand, the non-consanguineous unions prefer to select the mate more frequently from outside the village. Thus consanguinity affects the marriage distance (Fig. 3).

Age at Marriage: The distribution of Ahalehadies in accordance with the age at (first) marriage is shown in table 2. It is clear from the table that about 25% are pre-pubertal marriages. The range of variation occurs from 5-39 years coincide with the trend observed for marital status in population composition. In general, girls will get married below 19 years, whereas the boys are about 20 years. The mean age at marriage for

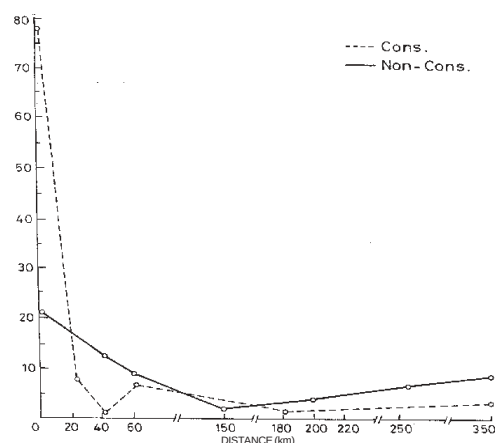


Fig. 3. Marriage distance of consanguineous and Non-consanguineous among the Ahalehadies

the men is 23.1849 + 1.5244 years and for the women it 16.6008+1.0958 years.

Multiple Marriages: A population's reproduction also depends on the number of married individuals and also number of times one married. Such multiple marriages among the Ahalehadies are shown in table 2. About 95% of men are married once and 5% who married twice. In case of women most of them (98%) are married only once and very meagre frequency (1.67%) of them are seen married twice. Thus the rule of Talaq encourages multiple marriages for men while it restricts such marriages for the women.

Net Reproductive Index: The continuation of reproductive vigour in a population is clearly evident when equal or more number of daughters are available in a generation who replace their mothers. The measure for this, known as Net Reproductive Index (NRI), calculated for the Ahalehadies, reveals that the population comprises of almost double the number of daughters who replace their mothers.

Age at First Conception: Though the population is characterised by early menarcheal age and early marriageable age for the women, it is the age at which she experience her first pregnancy can be taken as the beginning of reproductive potentiality. Hence, the age at first conception for the Ahalehadies is studied. From table 2, it is evident that the age at 1st conception ranges from 13-30 years. About 53% of the women conceive for the first time at age between 16 and 19 years, whereas about 15% fall below 15 years of age. The

mean value of age at first conception is $18.5630 + 1.2262$ years.

Age at Last Conception: The end point of reproductive span usually considered is the age at which woman had her last pregnancy. Among the Ahalehadies it ranges from 20-45 years. About $2/3^{\text{rd}}$ of the women fall under 25+ years experienced their last pregnancy. The average age at last conception for the present population is $28.4454 + 1.8862$ years.

Age at Menopause: The age at which the women ceases her reproduction is age at menopause. It ranges among the Ahalehadies from 39-53 years with a concentration of women who reached their menopausal age during 45-48 years. The average age at menopause in the present study is $46.3429 + 5.5899$ years.

Reproductive Performance: The reproductive performance among the Ahalehadie women is considered separately for all ages (WA) and for completed fertility (WCF) for consanguineous and non-consanguineous marriages to ascertain the relationship between the said variable.

Fertility: In the women of all ages, the Ahalehadies (Table 3) show an average number of $5.15 + 1.03$ pregnancies which are slightly higher in consanguineous ($5.73 + 0.89$) than the non-consanguineous ($4.64 + 1.04$), though the difference is statistically non-significant.

The live births in the present population show an average value of $4.51 + 0.99$. In consanguineous, they occur slightly higher ($5.13 + 1.00$) compared to non-consanguineous ($3.97 + 0.95$). But the difference is statistically non-significant.

The surviving offspring that show an average $4.29 + 0.93$ is also found to be greater in consanguineous ($4.75 + 0.95$) than the non-consanguineous ($3.89 + 0.89$). Statistically there is no significant difference in between them. Therefore, the women of all ages reveal a uniform trend of showing slightly higher values for the said demographic variables in consanguineous than the affinal marriage. Because of the limitations in the interpretation of the data on reproduction among the woman of all ages let us observe the trend of reproductive performance in the woman of completed fertility (WCF), i.e., 40+ year in view of the average menopausal age considered for the Indian woman (Mukharjee, 1971). For table 3, it is clear that the value of pregnancies, live births and

surviving offspring are slightly greater in WCF compared to WA. But there is no difference in the trend perceived between the consanguineous and non-consanguineous for such variable in WCF also. That means, higher values in consanguineous than the non-consanguineous are evident.

Table 3: Reproductive performance (mean values) among the Ahalehadies

Variable	Category	Consanguineous	Non-consanguineous	Total
Pregnancies	AF	5.73	4.64	5.15
	CF	6.51	5.68	6.12
Live – Births	AF	5.13	3.97	4.51
	CF	5.93	5.90	5.87
Surviving Offspring	AF	4.75	3.89	4.29
	CF	5.21	4.73	4.92
<i>Reproductive Wastage</i>				
i. Still-births	AF	0.33	0.37	0.35
	CF	1.20	0.87	1.08
ii. Abortions	AF	0.27	0.28	0.28
	CF	0.09	0.11	0.21
Total Mortality	AF	0.98	0.60	0.87
	CF	1.30	1.15	1.21

Note : AF = All Families

CF = Completed Families

dent. However, none of them reveal statistically significant difference as evident from the t-test.

Mortality: The mortality component for the Ahalehadies is presented in the categories, viz., the reproductive wastage (including still births and abortions) and total mortality (i.e., deaths from post-natal to pre-reproductive age). From table 3, it is clear that the women of all ages not only failed to show any significant trend in the occurrence of still births, abortions and total mortality between consanguineous and non-consanguineous marriages but possess lower values compared to WCF. This is to be expected because the WA include all those women who are still in the process of reproduction. Consequently, any sort of fluctuations are possible depending upon the sample size. Therefore, such information on WCF is to be considered to assess the trend. In the present population, there are more number of still births ($8 = 1.08 \pm 0.17$) compared to abortions (0.21 ± 0.01) in reproductive wastage. Again it is slightly greater in the consanguineous (1.20 ± 0.13) than the non-consanguineous (0.87 ± 0.04 for still births and abortions (1.29 ± 0.01 ; 0.21 ± 0.01), which are more in non-consanguineous than in consanguineous. The total mortality is

Table 4: Basic data on fertility and morality among the Ahalehadies

Marriage types	Mothers	Pregnancies	Survivors	Live Births		
	age 40+		up to 15 years	N	$\bar{X}$	V_f
Consanguineous	60	391	313	356	5.93	4.12
Non- Consanguineous	53	301	243	262	5.90	3.38
Total	113	692	556	618	5.47	6.81

Table 5: Indices of selection potential among the Ahalehadies

	Calculated from birth (Crow, 1958)			Calculated from early embryonic stage (Johnston & Kensinger, 1971)			
	I_m	I_f	I	I_{me}	I_{mc}	I_f	I
Consanguineous	0.1374	0.1172	0.3000	0.1197	0.1115	0.2276	0.4024
Non-Consanguineous	0.0781	0.0971	0.1828	0.1489	0.0781	0.0971	0.3589
Total	0.1150	0.2276	0.3645	0.1197	0.1115	0.2276	0.5279

slightly higher (1.30 ± 0.05) in consanguineous than the non- consanguineous. However, none of them reveal significant difference (Table 4). A glance at the data on consanguineous marriages among the Ahalehadies indicate that the population shows 46% of consanguineous marriages which include 30% of cross-cousin and 13% of parallel cousin marriages. Such practice generally leads to opine to cause more mortality either in the form of reproductive wastage or in total mortality. But the present study instead of corroborating with earlier works tend to show higher fertility and moderate mortality in consanguineous marriage. Therefore, the index of selection potential or selection intensity has been computed to ascertain the role of natural selection in this population through fertility and mortality components along with prevalence of consanguinity. Reproductive performance listed in table 3 for WA and WCF of the Ahalehadies are compared for significant test using student-t. From t values, it is learnt that none of the variables significantly deviate between WA and WCF and thereby exists homogeneous trend.

To know whether consanguinity or inbreeding influence the intensity of natural selection, as its effect is found to be greater on mortality than fertility, the required basic data used for computation of the measure is shown in table 4. The values of index of opportunity of selection according to Crow's (1958) original method and that of modified (Johnston and Kensinger, 1971) are shown in table 5. It is evident from this table 5 that the value of I , increases about 10%-20% from original method to modified method in all categories.

The index due to mortality component (I_m) is greater than that of fertility (I_f) in consanguineous while a reverse trend is observed for non-consanguineous and also for total population. The mortality component when deciphered into embryonic and child deaths (modified method) it is interesting to note that selection operates rigorously through embryonic deaths in all the categories, slightly greater in the non consanguineous group. This in turn elevates the I values. Thus, among the Ahalehadies selection operates with moderate intensity when compared to other caste populations, reported so far from different parts of India. Within the, population it appears consanguinity also contribute to intensify greatly the operation of selection by providing raw material. This corroborates with the studies of Barua (1976) and Rajaswari et al., (1992).

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KEY WORDS Ahalehadie Muslim Population. Structure. Genetic Demography.

ABSTRACT Demographic data on 240 ever married women of the Ahalehadie muslim population from Visakhapatnam district, Andhra Pradesh are presented. The population structure designates the Ahalehadies as potentially young and growing or expanding population with varied infant mortality. High frequency of cross – cousin marriages in consanguinity in the present study show deviation from North Indian Muslims but closest with Hindu castes in Andhra Pradesh, South India. In reproduction, both fertility and mortality are higher in

consanguineous than non-consanguineous thereby provide moderate opportunity to Natural Selection to play through mortality component.

REFERENCES

- Ansari, S.: Muslim castes in India. *Eastern Anthropologist*, **9**: 104-111 (1960).
- Barua, Soumitra: Selection intensity among the consanguineous and non-consanguineous groups of Muslim population of 24 Paraganas, West Bengal. *Man in India*, **56**: 359-363 (1976).
- Cavalli-Sforza, L.L. and Bodmer, W.F.: *The Genetics of Human Populations*. W.H. Freeman & Co., San Francisco (1971).
- Crow, J.F.: Some possibilities of 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 micro-evolutionary change among the Cashinahua. *Hum. Biol.*, **43**: 356-364 (1971).
- Klein, R.E. B.F.A.: *Religion of Islam*. Cosmo Publications, New Delhi (1977).
- Mukherjee, D.P.: Patterns of marriage and family formation in rural India and genetic implications of family planning. WHO Proceeding (1971) Reprinted in *J.Ind.Anthrop.Soc.*, **8**: 131-145 (1973).
- Rahim, Sk Mondal Begum, Rokaiya: Do the Muslims have caste? *J.Ind. Anthropol.Soc.* **31**: 171-178 (1996).
- Rajeswari, G.R., Busi, B.R., Murthy, J.S., Rao, V.V. and Narahari, S.: Selection intensities and consanguinity in the Yasdava and Vada Baliya of Visakhapatnam, Andhra Pradesh. *Soc. Biol.*, **39**: 316-310 (1992).
- Rao, P.S.S. and Inbaraj, S.G.: Inbreeding in Tamilnadu, South India. *Soc.Biol.*, **24**: 281-288 (1977).
- Reddy, P.C. and Lakshmanudu, M.: Indices of opportunity of selection in Mala, Madiga and other Indian Populations. *J.Ind.Anthrop.Soc.*, **14**: 245-252 (1979).
- Roy, M.N.: *The Historical Role of Islam*. Renaissance Pub.Pvt. Ltd., Calcutta (1939).
- Sarkar, J.N.: *Islam in Bengal*, Ratna Prakasan, Calcutta (1973).

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