

Fertility and Mortality Trends Among Inbred and Outbred Sunni Muslims of Anantapur, Andhra Pradesh

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ABSTRACT A survey was carried out among Sunni Muslims of Anantapur, Andhra Pradesh, to determine the incidence and prevalence of consanguinity and its effects on fertility and mortality consequent to family planning adoption by couples. Of the 410 marriages investigated 24.88% were consanguineous with predominant proportion of first cousin (21.95%) marriages. The average inbreeding coefficient for autosomal and sex-linked genes were found to be 0.0152 and 0.0226, respectively. Statistically significant differences were found with regard to fertility and mortality between inbred and outbred women of all ages. Further, the fertility and mortality trends were also observed taking into account of family planning adoption.

INTRODUCTION

Marriage between two individuals having at least one common ancestor in common is known as consanguineous marriage and the resulting offspring of such marriage is said to be inbred. This type of marriages are most common in South Indian Society and quite negligible in North India (Roychoudary, 1976). However, cousin marriage is quite common in many parts of the world. In India, Sanghvi (1966) was the first to report the quantitative data on consanguineous marriages. South India attracted the attention of human population geneticists for the last 30 years because of high inbreeding levels. The mean inbreeding coefficient varied from 0.013 to 0.041 in Andhra Pradesh, Kerala (0.002 to 0.012); Tamil Nadu (0.07 to 0.035), Karnataka (0.001 to 0.022); Maharashtra and Madhya Pradesh (0.03 to 0.037). Thus the coefficient of inbreeding is found to be the highest in Andhra Pradesh (Dronamraju and Meerakhan, 1960, 1963; Sanghvi, 1966; Chakravarthi, 1968; Veeraj, 1973; Mukherjee and Bhaskar, 1974; Pingle, 1975; Papa Rao and Mukherjee, 1975; Chengal Reddy, 1983; Govinda Reddy, 1985, 1987; Mohan Reddy, 1983). Further, studies throughout the country reveal a wide range of

variation in the intensity of inbreeding characterized by religion, region and occupation. On the other hand, while there is an evidence of a secular decline in inbreeding throughout the world (Stern, 1960), only a few Indian populations show such trend (Dronamraju, 1967; Sreenivasan and Mukherjee, 1976). The studies available on Muslim population of India, show highest inbreeding coefficient among Muslims of Madhya Pradesh (0.036) (Goswamy, 1970) and the lowest (0.00025) (Das and Ghosh, 1992) among Sunni Muslims of Anantapur (Latheef et al., 1997).

Different trends were observed with regard to the effect of inbreeding on fertility and mortality in different populations. Dronamraju and Meerakhan (1963), Centerwall and Centerwall (1966), Kumar et al. (1967) and Murthy and Jamil (1972), have found higher frequency of congenital malformations, total mortality and reduced fertility among the offsprings of consanguineous marriages. However, Sanghvi (1975), Rao (1976) and Jacob and Jayabal (1971) observed no significant difference in malformation rates, whereas, Sundar Rao (1978), Puri et al. (1978), Rami Reddy and Padhmanabha Naidu (1978) and Basu (1978) obtained no such consistent trends. This may be due to the differential history of inbreeding in different populations, lack of proper reliable non-inbred controls and difference in the ethnicity of the groups (Chengal Reddy, 1983). There are no previous studies on inbreeding and its effects among Sunni Muslims of Anantapur, Andhra Pradesh. Sanghvi's only study of 1966 reports inbreeding coefficients for general populations for autosomal and sex linked genes as 0.037 and 0.042 in Anantapur district of Andhra Pradesh. Thus, the present paper seeks to investigate the fertility and mortality trends among inbred and non-inbred Sunni Muslims in view of changing demographic profiles due to

modernisation, urbanization and socio-economic improvements. Further, the study also covers the influence of family planning on reproductive performance of couples.

MATERIALS AND METHODS

The data for the present study are drawn from Sunni Muslims of Anantapur town, Andhra Pradesh. They constitute about 12% of town's total population and most of them live as merchants, labourers, tailors and other job holders. The Sunni Muslims of the present study can be classified into Sayyads, Sheiks, Pathans, Moghuls and Labbais. The Sheiks are reported to be numerous than others. The data have been collected from 410 couples, of which 308 are non-consanguineous and the rest 102 couples are consanguineous of various types (Table 1).

RESULTS AND DISCUSSION

Table 1 shows the prevalence of consanguineous marriages and coefficient of inbreeding. Altogether 102 couples (25%) are consanguineous in a total of 410 marriages. The most frequent one is matrilineal cousin marriages (16.34%) followed by patrilineal cousin marriages (3.65%). This is in agreement with the common trend among South Indian populations. However the uncle-niece type of Marriages are less frequent among muslims and constitute only 0.73%. The other distant type of marriages like first cousin once removed (1.46%) and second cousin marriages (0.73%) occur less frequently. The mean inbreeding coefficients (α) for autosomal and sex linked genes were found to be 0.0152 and 0.0226, respectively.

Table 1 : Consanguineous marriages and inbreeding coefficients (α) among the Sunni Muslims of Anantapur

Type of marriage	Number of marriages	Percentage	Inbreeding coefficient (F)	
			Autosomal	Sex-linked
I. Non-consanguineous	308	75.12	0.0000	0.0000
II Consanguineous	102	24.88	0.0152	0.0226
a. Uncle-niece	3	0.73	0.0009	0.0009
b. First cousins	90	21.95	0.0137	0.0212
Cross Cousin:				
1. Matrilineal	67	16.34	0.0102	0.0204
2. Patrilineal	15	3.65	0.0023	0.0000
Parallel Cousin:				
1. Matrilineal	5	1.21	0.0008	0.0008
2. Patrilineal	3	0.73	0.0005	0.0000
c. First Cousins once removed	6	1.46	0.0005	0.0004
d. Second cousins	3	0.73	0.0001	0.0001
Total	410	100.00	(α) 0.0152	0.0226

The couples forming the subjects of the present investigation are following Hanafi School of theology and ritual. They are good in education and employed in various jobs and thus can be considered as mainstream population.

The study has been carried out with the help of schedule method. The subjects are enquired about their relation prior to marriage to ascertain their consanguinity and details of family planning measures adopted by the couples. The details of women's reproductive history are carefully noted. The average autosomal and sex-linked inbreeding coefficient was calculated using the formula $\alpha = \sum p_i F_i$.

Table 2 shows fertility and mortality trends of contraceptive and non-contraceptive inbred and non-inbred women of above 40 years of age. A total of 63 and 96 pregnancies among contraceptive and non contraceptive consanguineous women have been recorded. Whereas, among non-consanguineous contraceptive and non-contraceptive women, a total of 114 and 303 pregnancies have been recorded. We can find from this table that there is a significant reduction of pregnancies in case of women who have undergone contraception. In the same manner, mortality (pre and post-natal) are found to be low in contraceptive couples in both consanguineous

and non-consanguineous marriages. Further, the χ^2 values for total pregnancies and pre-natal mortality and between live births and post natal mortality (0.6263 and 1.7968) are found to be insignificant.

Table 3 shows the fertility and mortality trends among contraceptive and non-contraceptive inbred and outbred women of all ages. It can be surmised from the table that reduced pregnancies, increased live births and survivals, and decreased pre and post-natal deaths have been observed in women who have undergone contraception than women who have not undergone. The χ^2 values for total pregnancies and pre-natal

mortality and for total live births and post-natal mortality are found to be highly significant (17.322 and 9.639). At the same time the data are analysed separately for 40+ years of women according to family planning status. No significant difference is recorded between consanguineous and non-consanguineous especially in the mortality rates. The significant differences are found between consanguineous, when women of all ages are grouped. The reason may be due to the fact that there are only 102 couples (consanguineous) as against 308 non-consanguineous. If the data are analysed for women of 40+ years according to family planning status sample

Table 2 : Fertility and mortality of the consanguineous and non-consanguineous women aged 40+ years in relation to family planning adoption

Particulars	Consanguineous (34)			Non-consanguineous (89)		
	Contra- ceptive (16)	Non-contra- ceptive (18)	Total (34)	Contra- ceptive (23)	Non-contra- ceptive (66)	Total (89)
Fertility						
Pregnancies	63	96	159	114	303	417
Live Births	63	95	158	114	297	411
Survivals	56	82	138	108	269	377
Mortality						
Pre-natal mortality						
Still births	0	1 (0.6)	1 (0.6)	0	4 (1.3)	4 (0.9)
Abortions	0	0	0	0	2 (0.6)	2 (0.4)
Post-natal mortality						
Neonatal (<28 days)	2 (8.1)	5 (5.2)	7 (4.4)	3 (2.6)	6 (2.0)	9 (2.1)
Early child deaths (< 2 years)	2 (3.1)	3 (3.1)	5 (3.1)	0	4 (1.3)	4 (0.9)
Late child deaths (<14 years)	2 (3.1)	5 (5.2)	7 (4.4)	3 (2.6)	17 (5.7)	20 (4.8)
Other deaths (>15 yrs)	1 (1.5)	0	0	0	0	0

Table 3 : Fertility and mortality of the consanguineous and non-consanguineous women of all ages in relation to family planning adoption

Particulars	Consanguineous (102)			Non-consanguineous (308)		
	Contra- ceptive (39)	Non-contra- ceptive (63)	Total (102)	Contra- ceptive (119)	Non contra- ceptive (189)	Total (308)
Fertility						
Pregnancies	145	187	332	446	540	896
Live births	143	185	328	442	527	969
Survivals	134	162	296	426	497	923
Mortality						
Pre-natal mortality						
Still births	0	2 (1.0)	2 (0.6)	2 (0.4)	9 (1.6)	11 (1.1)
Abortions	2 (1.3)	0	2 (0.6)	2 (0.4)	4 (0.7)	6 (0.6)
Post-natal mortality						
Neonatal (<28 days)	3 (2.0)	14 (7.5)	17 (5.1)	5(1.1)	8 (1.5)	13 (1.3)
Child deaths (<2 years)	2 (1.3)	3 (1.6)	5 (1.5)	2 (0.4)	4 (0.7)	6 (0.6)
Late child deaths (<14 years)	4 (2.7)	9 (4.8)	13 (3.9)	9 (2.0)	18 (3.4)	27 (2.7)
Other deaths (>15 years)	0	0	0	2 (0.4)	0	2 (0.2)

size differs significantly. Thus, the present study clearly shows that non-significant difference between consanguineous and non-consanguineous couples may be due to the continued practice of consanguinity over several generations which could have narrowed down the differentials of reproductive wastage as reported earlier by Rao and Inbaraj in 1977. Sanghvi (1966) is of the opinion that continued practice of inbreeding for a long period of time may ultimately reduce the lethal genes considerably due to constant expression. Such trend seems true even in the present study among Sunni Muslims.

The results of the present analyses indicate that consanguineous type of marriages among Muslims are on the decrease. This is evident from the samples that only 25% of them are consanguineous (Table 1). Owing to improved conditions of life, modernization, emerging trend in establishment of nuclear families, and overcoming of the religious dogmas have led Muslim women to undergo contraception. This is seen in the present study where 197 women out of 410 have undergone contraception. This is the latest trend and may lead to compelling changes in the demographic structure of the population.

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