Rural-Urban Differentials in Consanguinity*

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Parental consanguinity has been implicated in the manifestation of traits considered to have been transmitted through recessive genes and in some of the causes of perinatal morbidity and mortality (Stern, 1960). The latter aspect, however, needs further investigation. India, particularly the southern part, ranks among the top few countries where there is still a marked preference for consanguineous marriages and thus affords an opportunity to delineate the risks associated with inbreeding. It is also important to identify any changes towards preference of consanguineous marriages in view of the increasing urbanization or emancipation in a developing country. A previous study in an urban area (Rao, Inbaraj, and Kalia-perumal, 1971) estimated the proportion of consanguineous marriages to be 30.1% of all marriages. Indications that this frequency would be higher in the rural areas were suggested in a study of one village by Centerwall *et al* (1969). Detailed analyses for rural areas on the extent of consanguinity, types preferred, and their relationship to specific demographic factors have not been reported so far.

In an attempt to investigate the correlates of infant mortality, a longitudinal research project was begun in 1969 covering large samples of urban and rural areas. As part of the base-line data, information on parental consanguinity was also obtained. In this paper the differential rates of consanguineous marriages in the urban and rural areas are described and discussed in relation to specific demographic characteristics.

Material and Methods

Vellore is the regional capital town of the North Arcot District in Tamil Nadu, southern India. In the 1961 census the population of this town was 113,742 in an area of 10.8 km² (Madras State Census, 1961).

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Representative segments of the town containing a population of about 40,000 comprised the urban sample. An adjoining contiguous rural area containing a population of about 50,000 constituted the rural sample. Both the samples represent reasonably the urban and rural sections of Tamil Nadu. Women interviewers, who were fluent in the local language (Tamil) and who had undergone the auxiliary-nurse midwives' course or some other basic course in health science were appointed and given intensive orientation towards the research project and in interview methods. Interview schedules were designed and subjected to feasibility. The interviewers were given adequate training and standardizations of assessment were made. All married women in the selected area were contacted by the interviewers in an attempt to collect data on the socioeconomic and demographic aspects. Information on consanguinity of marriages and on past reproductive performance, including the outcome of each pregnancy, was also recorded. If a marriage was reported as consanguineous, the family pedigree was drawn up and the type of consanguinity determined. Women absent at the first visit were revisited, thus the response rate was 100%.

Five per cent of the women were reinterviewed by the supervisory personnel. There was practically no difference in the interview-reinterview information on uncle-niece and first cousin matings or on non-consanguineous marriages, but minor variations were noticed in the classification of consanguineous marriages of more distant type. The data were coded, transferred to 80-column punch cards, and processed mechanically.

Findings

Altogether 16,040 married women were interviewed, of whom 8889 belonged to the rural area and 7151 to the urban. Consanguinity of marriage was classified into 4 types: (1) uncle-niece matings, (2) first-cousin matings, (3) consanguinity more distant than first-cousin matings, and (4) no consanguinity.

The number and frequency of each type of consanguineous marriage among the women is shown in Table I.

Of all marriages, nearly 50% in the rural area and 30% in the urban area were consanguineous.

TABLE I
NUMBER AND FREQUENCY OF CONSANGUINEOUS
MARRIAGES BY TYPE AND REGION

Type of Consanguinity	Region	
	Rural	Urban
Uncle—niece	1532 (17.3%)	506 (7.1%)
First-cousin	2291 (25.8%)	1280 (17.9%)
More distant than first cousin	534 (6.0%)	317 (4.4%)
No consanguinity	4532 (50.9%)	5048 (70.6%)
Total	8889	7151

The most frequent type of consanguinity in both rural and urban areas was the first-cousin mating, which accounted for 52.6% of all consanguineous marriages in the rural area and 60.9% in the urban area. Uncle—niece marriages were more common in the rural area than in the urban; 35.2% of all consanguineous marriages in the rural and 24.1% in the urban areas. There were 12.2% of all consanguineous marriages in the rural and 15.0% in the urban area which were consanguineous more distant than first-cousin mating.

Among the first-cousin marriages, marked preference for certain types of first-cousin marriages were observed (Table II). The most popular type in both rural and urban areas was for a woman's son to marry her brother's daughter, the next most common being the marriage of a man's

TABLE II
DISTRIBUTION OF FIRST-COUSIN MARRIAGES

Marriage Between	Region	
	Rural	Urban
Children of brothers	16 (0.7%)	57 (4.4%)
Children of sisters	26 (1.1%)	65 (5.1%)
Brother's son with sister's daughter	783 (34.2%)	399 (31.2%)
Sister's son with brother's daughter	1466 (64.0%)	759 (59.3%)
Total	2291	1280

son to his sister's daughter. Marriage between children of 2 brothers or of 2 sisters was very uncommon (about 1% in the rural and about 5% in the urban area).

The frequencies of various types of consanguinity in relation to major religious groups for the rural and urban areas are shown in Table III. In both the rural and urban areas the proportion of consanguineous marriages among the Hindus is significantly higher than the proportion among Muslims or Christians ($p < 0.01$). The major difference between the rural and urban areas is noticed first in uncle—niece matings which is least among the Muslims and subsequently in the first-cousin marriages which are still the most common type of consanguineous mating preferred.

In the urban area the percentage of consanguinity among different communities in the Hindus varied from less than 10% to a maximum of 71.4%, while in the rural areas the frequency varied between 30% and 64.8%. Analysis by the type of consanguinity revealed a significant reduction in both the uncle—niece as well as the first-cousin marriages.

Taking only the major Hindu communities where sufficient number of women were studied in both the rural and urban areas, the percentage of consanguinity was calculated and compared (Table IV).

The changes have not occurred in all communities. The first part of Table IV lists those communities which show a significant decline of consanguineous marriages in the urban as compared to the rural region. Communities where no significant changes are observed between the urban and rural areas are shown in the second part of Table IV.

The educational status of the husband was studied in relation to the type of consanguinity and these findings for the rural area are shown in Table V.

The percentage of consanguineous marriages decreased from 50% among illiterates to 29.3%

TABLE III
PERCENTAGE FREQUENCY OF DIFFERENT TYPES OF CONSANGUINITY
BY RELIGION

Type of Consanguinity	Region					
	Rural			Urban		
	Hindu	Muslim	Christian	Hindu	Muslim	Christian
Uncle—niece	17.8	7.5	10.2	9.0	0.4	3.2
First-cousin	25.6	24.5	20.5	18.8	16.4	12.0
More distant than first cousin	5.9	5.7	2.6	5.0	2.6	2.9
No consanguinity	50.7	62.3	66.7	67.2	80.6	81.9
All consanguineous	49.3	37.7	33.3	32.8	19.4	18.1
Total studied	8723	120	44	5422	1445	277

TABLE IV
PERCENTAGE FREQUENCY OF CONSANGUINEOUS
UNIONS IN SPECIFIED HINDU COMMUNITIES

	Community	
	Rural	Urban
<i>Communities showing significant difference between urban and rural</i>		
Mandhiri	57.1	44.6
Nadar	56.3	21.0
Naidu	53.2	39.4
Gounder	51.6	32.4
Naicker	50.4	32.4
Harijan	46.8	24.0
Mudaliar	43.2	31.3
Brahmin	30.3	17.5
<i>Communities which show no significant difference between urban and rural</i>		
Barber	64.8	59.4
Dhobi	52.0	54.4
Potter	51.4	58.3
Reddiyar	44.5	42.7
Achari	43.9	42.3
Karunika (Pillai)	42.5	46.5
Chettiar	24.6	32.4

among those with high school or more advanced education. The maximum reduction is observed in the uncle-niece matings.

The educational level of husband in relation to the type of consanguinity preferred in the urban areas is shown in Table VI.

While a decline in consanguineous marriages is observed with an increase in schooling, it is also

observed that there is a lower percentage of consanguineous matings among those who have no formal education or are illiterate. A majority of this group in the urban area were working as casual labourers. Here the maximum reduction was also noticed in both uncle-niece matings and in first-cousin marriages.

The women were grouped into 3 cohorts according to their year of birth: (1) those born in 1930 or before, (2) those born between 1931-45, and (3) those born in 1946 or after. The frequency of consanguinity in each of these groups is shown in Table VII.

There is practically no difference in the extent of consanguinity among these 3 groups. The significant differences between the rural and urban areas are, however, maintained.

In each consanguinity type, the percentage of women who were below 14 years of age at marriage was calculated for each birth cohort in the rural and urban areas separately and is shown in Table VIII.

While significant differences between various types of consanguinity are noticed for all these groups in the urban area, the same changes are seen in the rural area only for women born in the later years. The median ages at the consummation of marriage in various birth cohorts did not show any significant differences.

TABLE V
PERCENTAGE FREQUENCY OF CONSANGUINEOUS MARRIAGES IN RURAL AREA BY
HUSBAND'S EDUCATION

Level of Education	No. Studied	Type of Consanguinity			
		Uncle—Niece	First-cousin	More Distant than First-cousin	No Consanguinity
Illiterate or no formal schooling	6097	17.1	27.3	5.6	50.0
Elementary school	2273	18.9	22.7	6.6	51.8
Middle school	472	18.4	19.8	6.3	55.5
High school and above	47	4.9	19.5	4.9	70.7
Total	8889	16.7	22.2	3.3	57.8

TABLE VI
PERCENTAGE FREQUENCY OF CONSANGUINEOUS MARRIAGES IN URBAN AREA BY
HUSBAND'S EDUCATION

Level of Education	No. Studied	Type of Consanguinity			
		Uncle—Niece	First-cousin	More Distant than First-cousin	No Consanguinity
Illiterate or no formal schooling	2396	5.7	17.4	3.1	73.8
Elementary school	2789	8.3	20.4	5.8	65.4
Middle school	1494	7.7	15.5	3.6	73.2
High school and above	472	4.7	14.5	5.6	75.3
Total	7151	7.2	16.7	4.4	71.7

TABLE VII
PERCENTAGE OF CONSANGUINEOUS MARRIAGES BY TYPE OF
CONSANGUINITY, BIRTH COHORT OF THE WOMEN, AND REGION

Type of Consanguinity	Year of Birth					
	1930 or Before		1931-1945		1946 or After	
	Rural	Urban	Rural	Urban	Rural	Urban
Uncle-niece	16.1	7.2	17.7	6.7	18.2	7.6
First-cousin	25.8	18.6	26.0	16.5	25.3	20.4
More distant than first cousin	5.3	4.1	6.8	4.5	5.5	4.9
No consanguinity	52.8	70.1	49.5	72.3	51.0	67.1
Total studied	3022	2084	3920	3571	1947	1496

TABLE VIII
PERCENTAGE OF WOMEN UNDER 14 YEARS OF AGE AT MARRIAGE
IN EACH TYPE OF CONSANGUINITY BY BIRTH COHORT AND REGION

Type of Consanguinity	Year of Birth					
	1930 or Before		1931-1945		1946 or After	
	Rural	Urban	Rural	Urban	Rural	Urban
Uncle-niece	32.7	28.5	16.0	12.4	11.9	14.4
First-cousin	32.2	25.3	15.3	14.5	13.4	13.1
More distant than first cousin	30.6	24.7	14.6	16.4	9.3	15.1
No consanguinity	36.8	17.1	10.1	8.9	9.7	9.2

Discussion

A previous study (Rao *et al*, 1971) covering the entire town of Vellore (24,587 households) gave the prevalence of consanguineous marriages as 30.1%. The present study confirms these findings and also indicates the significantly higher frequency of consanguinity in the rural areas. The frequencies of consanguinity observed in this study is much higher than that reported so far in southern Indian communities (Dronamraju and Khan, 1963; Centerwall *et al*, 1969).

The high prevalence of uncle-niece marriages in the rural areas, constituting nearly 35% of all consanguineous marriages, should be noted. The marked preference for certain types of first-cousin marriages also indicates the non-random nature of these matings. In a study of consanguineous marriages in Japan, Schull and Neel (1965) have reported that among first cousins, the most common marriages involved a woman's son with her sister's or her brother's daughter; and the former much more often than the latter. While the latter is preferred in south India the former seems to be rather rare.

Most countries have tended to show a significant decline in consanguineous marriage as urbanization

continued and isolates were broken up. That this decline has not been substantial over the past few decades can be seen from the lack of any trends between the different birth cohorts. However, there appears to be significant relationship between educational status and consanguinity of marriage. It is interesting to note the significant decline in first-cousin marriages but not in the uncle-niece matings; perhaps the cultural element in preferring certain types of consanguineous marriages is still fairly strong.

Prolonged inbreeding may have both a good as well as a bad effect in terms of the gene pool. Consanguineous matings may result in homozygosity of lethal or sub-lethal genes thereby resulting in offspring who becomes non-viable in the prenatal or perinatal period. Thus the gene responsible for this disorder may be eliminated. Non-consanguineous marriages on the other hand increase the number of carriers. The preference for a man to marry his maternal uncle's daughter has implications for promoting disorders which involve a sex-linked recessive gene. A knowledge of the extent and type of consanguinity prevalent in a community aids in proper genetic counselling, especially in child health. The actual effects of inbreeding

need further investigation. These relationships are being studied and will be reported in a future communication.

Summary

Representative samples from an urban and a rural area in Tamil Nadu, south India were chosen and all married women residing in the chosen areas were interviewed for data on consanguinity of marriage. Nearly 30% of all marriages in the urban and 50% of all marriages in the rural area were consanguineous. The most common type was the first-cousin marriage, followed closely by the uncle-niece mating. The frequencies of consanguinity by type were studied according to religion, communities among Hindus, educational status of husbands, and birth cohorts of the women. The implications of the findings are discussed.

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