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Consanguinity and Its Effects on Fertility, Mortality and Morbidity in the Indian Region: A Review

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ABSTRACT In this paper, a reappraisal of published studies from the Indian region on incidence of consanguinity and its effects on fertility, mortality and morbidity has been attempted. Also, various reasonings behind the practice of consanguinity and its temporal changes have been discussed.

1. INTRODUCTION

The study of any population calls for detailed investigation and interpretation of the marital structure among other parameters. Marriage, a socio-cultural custom, is the biological basis for procreation; and therefore, certain marriage practices of assortative nature deviating from panmixis-especially those between relatives received considerable attention from geneticists, anthropologists, sociologists and demographers. "Relatives", according to Vogel and Motulsky (1986), are individuals who have certain portion of their genes in common by descent. Marriage between two such individuals who have at least one traceable common ancestor is said to be consanguineous and the off-springs of such mating are inbred.

The main point of interest in pursuing studies on consanguinity is to comprehend its incidence and effects in a population. And, knowledge of these aspects is considerably important for studying the etiology of various diseases, defects, developmental disorders, genetic load and human mutation rates.

For long, the concept of inbreeding has been generating a number of theoretical and empirical treatises across the world. Extensive documentations have enriched the state of knowledge regarding inbreeding, its incidence and effects in populations where preferential mating is practiced.

The studies, though explicit, remained wanting in providing any regionally exhaustive review encompassing all important aspects of consanguinity alongwith its effect on fertility, mortality and morbidity with regard to the Indian region, except a few informative ones by Mahapatra (1966), Chakravartti (1968), Roychoudhury (1976a, b).

This paper is a conscientious attempt to put forward a comprehensive review of incidence of consanguinity and its effects on certain demographic parameters, viz., fertility, mortality, morbidity in the Indian region and other South Asian countries – Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka.

1.1 Political Division of India

The report and studies on various popula-tions from India have been placed under 25 states and 7 Union Territories (U.T.). These states and union territories may be categorized into six zones viz.

I. North India, II; West India, III; East India, IV; Central India, V; South India; and VI. Islands. Himalayan Region may be divided into three divisions, which are, A) Western Himalaya, B) Central Himalaya, and C) Eastern Himalaya as follows,

I. North India:

(A) Western Himalaya (S. No. 1, 2):

(1) Jammu and Kashmir, (2) Himachal Pradesh, (3) Punjab, (4) Chandigarh (U.T.), (5) Haryana, (6) Delhi (U.T.), (7) Uttar Pradesh *(Uttaranchal:* Previously referred as Uttarakhand or Gaganalaya): A separate state of Uttaranchal came into existence in November, 2000, comprising of the following eleven hill districts: Almora, Bageshwar, Chamoli, Champawat, Dehradun, Nanital, Pauri Garhwal, Pithoragarh, Rudra Prayag, Tehri Garhwal, Uttarkashi and two plains districts - Haridwar and Udham Singh Nagar - of Uttar Pradesh. Dehradun is the capital of the new State.

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(B) Central Himalaya (S.No.7, Eight Districts of Uttar Pradesh)

((i) Almora, (ii) Chamoli, (iii) Dehra Dun, (iv) Garhwal (Pauri), (v) Naini Tal, (vi) Pithoragarh, (vii) Tehri Garhwal, and (viii) Uttarkashi) and 8. Rajasthan

II. West India:

(1) Gujarat, (2) Maharashtra, (3) Goa*, (4) Daman and Diu* (U.T.) State of Goa and Union Territory of Daman and Diu have been listed under Goa, Daman and Diu.) and (5) Dadra and Nagar Haveli (U.T.)

III. East India:

C) Eastern Himalaya: (S. No.1 to 8 and Darjeeling District of West Bengal)

(1) Arunachal Pradesh, (2) Assam, (3) Nagaland, (4) Manipur, (5) Mizoram, (6) Tripura, (7) Meghalaya, (8) Sikkim, (9) West Bengal, (10) Bihar (*Jharkhand:* A separate state comprising the following 18 districts of Bihar came into existence in November, 2000: Bokaro, Chatra, Deoghar, Dhanbad, Dumka, East Singhbum, Garhwa, Giridih, Godda, Gumla, Hazaribagh, Kodarma, Lohardaga, Palamau, Pakur and Palamau, Ranchi, Sahebganj, West Singhbhun. Ranchi is proposed as the capital of new State), and (11) Orissa (Odisha).

IV. Central India:

(1) Madhya Pradesh (*Chhattisgarh:* A new state comprising sixteen districts of Madhya Pradesh came into existence in November, 2000: Bastar, Bilaspur, Dantewada, Dhamtari, Durg, Janjgir-Champa, Jashpur, Kanker, Kawardha, Korba, Koria (Baikunthpur), Mahasamund, Raigarh, Raipur, Rajnandgaon and Sarguja). Raipur is the capital of the new State.

V. South India:

(1) Karnataka, (2) Andhra Pradesh, (3) Tamil Nadu, (4) Kerala and (5) Pondicherry (Puducherry) (U.T.).

VI. Islands:

(1) Lakshadweep (U.T.) and (2) Andaman and Nicobar Islands (U.T.).

1.2 Ethnic Groups

An aggregation of biological and socio-cultural characteristics constitutes an ethnic group. Within the category of Ethnic Group are Castes, Scheduled Castes, Scheduled Tribes, and Communities (the names of Scheduled Castes and Scheduled Tribes after Manual of Election Law 1982, Government of India, New Delhi. Biologi-cal anthropological studies of such ethnic groups as well as "Communities" have been reported in India. By Community is referred to a group of people who may have occupational, linguistic, religious, or regional characteristics (Bhasin 1988).

The studies which have been reported from India but cannot be categorised under any State and/or Union Territory have been placed under the 'Others' heading.

For the sake of brevity, this presentation does not venture into the intricacies of analyses of individual studies but presents them in detailed tabular form for easy reference under the following broad headings:

(i) Consanguinity – Incidence, types and coefficient of inbreeding (Appendix - Table 1);
(ii) Consanguinity – Effects on fertility, mortality and sterility (Appendix - Table 2);
(iii) Consanguinity – Effects on morbidity (Appendix - Table 3).

However, a discussion has been attempted here with regard to the incidence, types, effects of consanguinity on fertility, mortality and morbidity in the Indian region and other South Asian countries. Each state has been dealt separately which, apart from portraying various aspects of consanguinity, would also point out the apparent lacunae existing in this area of research. Also, a brief account of the important studies from different parts of the world has been put forward which would be useful in elucidating various aspects of consanguinity in the global context.

2. CONSANGUINITY-INCIDENCE AND EFFECTS

2.1 Global Context

Upto 1950, the studies were few but important in putting forth incidence and measures of inbreeding and allied discussions attracting great

attention and stimulating interests for further studies.

The studies of Bemiss (1858), Pearson et al. (1899), Pearson (1902), Arner (1908) in America; Bell (1940) in Europe; Darwin (1875) in England; Neel et al. (1949) in Japan, were the earliest attempts to gauge the incidence of consanguinity and its effects, albeit with certain limitations. Besides, socio-cultural interpretations of consanguinity regulations were also discussed simultaneously by Tylor (1889), Westernmark (1921), Freud (1949), and Levi-Strauss (1949). Thenceforth, the need for measuring the degree of inbreeding among various population groups was felt necessary, and Wright's (1922) 'Coefficient of Inbreeding', and Malecot's (1948) 'Coefficient of Kinship' proved to be useful.

The successive years saw a spate of studies of wide variety from different parts of the world expanding the body of knowledge tremendously. An overview of important studies is presented here.

Incidence of consanguinity was reported from different populations of Europe (Pohlman 1951; Deraemaker 1958; Sutter 1958; Darlington 1960 Barrai et al. 1962); Italy (Conterio 1969); Sweden (Böök 1957); Northern Ireland (Stevenson and Warnock 1959); America (Freire-Maia 1952 1968; Slatis et al. 1952; Marcallo et al. 1964); Kurdistan (Goldschmidt et al. 1960); Japan (Schull 1958; Neel and Schull 1962; Schull and Neel 1965), but the levels of inbreeding were rather low with the inbreeding coefficient rarely exceeding 0.01. However, inbreeding levels were found higher in certain isolates and isolated communities, viz., among the Ramah Navaho Indians (Sphuler and Kluckhonn 1953); the Dunkers of Pennsylvania (Glass 1954); the Dinka tribe (Roberts 1956); the Susak of Northern Adriatic (Dolinar 1960); in some isolated islands off the coast of Japan, such as Hosojima (Ishikuni et al. 1960); in the Samaritan isolates of middle-east (Bonne 1963); in the island of Tristan da Cunha (Bailit et al. 1966); and more recently in a wide spectrum of traditional Muslim communities of Sudan (Ahmed 1979), Iran (Naderi 1979); Kuwait (Alfi et al. 1980; Al-Awadi et al. 1986); Uzbekistan (Ginter et al. 1980); Egypt (Shami et al. 1989). Highest frequency ranging from 22 to 54 percent has been reported from Middle Eastern Arab countries (Khlat and Khoury 1991; Al-Gazali et al. 1997; Bittles 1998; Rania Tfaily 2005; Bener and Alali 2006; Abbasi-Shavazi et al. 2008). Though experience of consanguinity cannot be related to any specific religion, it is reported to be common in almost all Muslim countries (Bittles 1998; Stoltenberg 2009).

During this period even new methods of calculating coefficient of inbreeding were forwarded (Kudo 1962; Kudo and Sakaguchi 1963).

As regards the effects of consanguinity infertility, mortality and morbidity, opinions differ and the issues still remain inconclusive. Darlington (1960) postulated that human stocks can maintain the highest fertility while regular consanguineous marriages. Elevated levels of fertility in consanguieous marriages have been revealed in populations of United States (Eaton and Mayer 1954); in European Jews and certain royal families of Europe (Darlington 1960); in populations of Japan (Schull et al. 1968, 1970a, 1972); in Egyptian Nubia (Hussein 1971); in French Canadians (Phillippe 1974); in some isolates of America like old order Amish and Hutterites (cf. Bittle 1980); in Sweden (Lindelius 1980); in populations of Pakistani Punjab cities (Shami et al. 1990).Lower fertility rates in consanguineous couples were reported in American populations (Bemiss 1858; Post 1965); in Brazillians (Marcallo et al. 1964); in an Italian population (Conterio 1969); in Goyigama caste in Sri Lanka (Reid 1976). However, few studies in America (Arner 1908; Statis et al. 1958); in Jordan (Cook and Hanslip 1956); and among Kurdistan Jews (Goldschmidt et al. 1961) did not observe any effect of consanguinity of fertility.

Likewise, elevated mortality rates in the offsprings of consanguineous couples have been reported from various countries-from America (Bemiss 1958; Arner 1908; Morton 1958; Slatis et al. 1958); Europe (Sutter and Tabah 1952, 1953, 1954a, b); Sweden (Böök 1957); Japan (Schull 1958; Neel and Schull 1962; Schull and Neel 1962, 1965, 1966; Schull et al. 1962, 1970b; Yamaguchi et al. 1970); Brazil (Marcallo et al. 1964); Italy (Conterio 1969; Bigozzi et al. 1971); Egypt (Hussein 1971); Czechoslovakia (Seemanova 1971); Pakistan (Shami et al. 1990). However, consanguinity did not exert any influence on mortality of the off-springs in Northern Ireland (Stevenson and Warnock 1959); in Kurdistan (Cook and Hanslip 1966); in Canada (Frase and Biddle 1976); in Sweden (Lindelius 1980); and in a mixed race in Brazil (Azevedo et al. 1980). Interestingly, even reduced foetal loss in consanguineous couples was reported among Kurdistan Jews (Goldschmidt et al. 1960).

Sterility is also reported to be influenced by consanguinity. Increased instances of sterility among consanguineous couples have been reported by Sutter and Tabah (1953, 1954a, b), and Slatis et al. (1960).

It has been generally observed that consanguinity leads to various deleterious diseases and disorders. Studies probing this aspect are important in understanding the aetiology of various diseases and malformations and also in estimating the genetic load. A number of treatises on the 'load' theory have been forwarded from time to time by Muller (1950), Morton et al. (1956), Crow (1958, 1963), Sanghvi (1963), Li (1963), Fraser (1962). Studies on the association of consanguinity with various diseases and disorders have been reported by Bemiss (1858), Arner (1908), Neel (1958), Neel et al. (1949), Slatis et al. (1958), Stern (1960), Sutter and Tabah (1952), Böök (1957), Tips and Lynch (1962), Hansson and Rcidin (1963), Vallanee-Owen and Ashton (1963), Shibuya et al. (1962), Bigozzi et al. (1971). However, many other studies did not find any definite association between consanguinity and the diseases and disorders among the offsprings (Stevenson and Warnock 1959; Freire-Maia and Kreiger 1971, 1973; Schull and Neel 1972; Fraser and Biddle 1976; Azevedo et al. 1980).

It is reported that better public education about genetic harms of inbreeding would decrease the prevalence of human consanguinity. But, there is little evidence that this would work, and the worldwide prevalence of consanguineous marriages has hardly changed in the last half century. In fact, it has increased in some countries while decreasing in others (Saito 1988; Al-Gazali et al. 1997; Al-Arrayed and Hamamy 2012). A number of studies have recently reviewed many aspects of human consanguinity (Bittles 2001; Bittles and Black 2010; Denic et al. 2011).

2.2 Indian Context

The Indian subcontinent-a land of profuse diversity, reflected in the vast congregation of castes, communities and tribes, too portrays varied and localized marriage customs and norms. Consanguineous marriages being one of such practices which are prescribed or preferred in some communities whereas prescribed among others.

Indian interest in consanguinity and its effects took off mainly after the publication of Sanghvi et al. (1956) on twelve endogamous groups of Bombay. This was followed by numerous studies and its various attributes during the next decades. Unfortunately, the studies are highly localized and many areas (States) are yet to be explored fully. Also, the inconclusive nature of the observations due to procedural variabilities and certain limitations of the studies, have led to contradictory theorizing. All these aspects would be discernible in the following regional overview.

INDIA

I. NORTH INDIA

This region still remains to be explored fully. Very few studies have been reported from some of the states of this region and even these are not explicit with regard to every aspect of consanguinity.

A. WESTERN HIMALAYA (S.NO. 1, 2)

I. Jammu and Kashmir

Incidence and types of consanguineous marriages, coefficient of inbreeding among various population groups of Jammu and Kashmir have been presented in Table 1. In this state, consanguineous marriages have been found prevalent among Muslims (range – 38.67 percent in Ahmediyya Muslims (Kashyap 1976) to 18.60 percent in general Muslim population groups (Roychoudhury 1976b)) and only rarely among Hindus (0.98 percent) (Roychoudhury 1976b).

The coefficient of inbreeding was found moderately high in Muslims (relative range 0.01 – 0.02), whereas in Hindus, it was extremely low (0.0006). The most frequent type of consanguineous marriage is that between first cousin (both parallel and cross-cousin) in both the communities. Parallel cousin marriages are preferred more than cross cousin marriages among Muslims, whereas among the Hindus the opposite holds true. Other types of consanguineous marriages are found only occasionally. Interestingly, the study of Roychoudhury (1976b) reported uncle-niece marriage (0.31 per cent) among Muslims though it is forbidden in Islam.

2. Himachal Pradesh

The frequency of consanguinity has been found negligible in this state. The sole study of Roychoudhury (1976b) reported the practice of consanguineous marriages among Hindus (0.10 per cent) with an extremely low coefficient of inbreeding (0.0001). First cousin (cross-cousin) marriages are the only prevalent type (Table 1).

3. Punjab

In this state, consanguineous marriages are only occasionally found across all the predominant religious groups. Table 1 highlights the incidence and types of consanguineous marriages and coefficients of inbreeding among various population groups of Punjab. The practice is found more frequent among Sikhs (1.43 per cent) and Muslims (1.23 per cent) as compared to Hindus (0.72 per cent) (Roychoudhury 1976b).

The coefficient of inbreeding varies from a low value (0.001) among Sikhs and Muslims to a still lower value among Hindus (0.0004).

The most prevalent type of consanguineous marriages in all the communities is that between first cousins, mostly of cross-cousin type. Parallel cousin marriages are observed in Hindus only. Surprisingly, marriages of uncle-niece marriages were found among the Sikhs, though the frequency is negligible (0.09) (Roychoudhury 1976b).

Very few studies have been carried out in this state to establish a relationship between various diseases and disorders with consanguinity. Table 3 presents morbidity differentials among inbred and non-inbred populations of Punjab. Studies of Mani et al. (1963) and Sloan and Fredirickson (1972) did not find any relationship between consanguinity and metabolic disorders. However, it may be noted that these studies were conducted on specific families who reported such disorders, and therefore, cannot be considered for any definite conclusion. Extensive studies are still awaited.

4. Chandigarh (U.T.)

5. Haryana

6. Delhi (U.T.)

Consanguineous marriages are fairly frequent among various Muslim groups of Delhi while other communities seem to prohibit such practice. Details of incidence and types of consanguineous marriages among various population groups of Delhi along with respective coefficient of inbreeding have been depicted in Table 1. The incidence of consanguinity is found moderately high (37.86 per cent) among pre-partition Muslims (Basu and Roy 1972), and intermediate (31.00 to 22.13 per cent) among Sunni Muslims (Krishan 1975); urban Sheikh Sunni Muslims, urban Moghul Sunni Muslims and urban Pathan Sunni Muslims (Basu 1975).

The coefficient of inbreeding is found moderately high among all the Muslim groups of Delhi (0.01 to less than 0.02).

The most preferred type of consanguineous marriages among all the Muslim groups is that between first cousins of both parallel and cross-cousin in type. The rest are the marriages between second cousins and between first cousins once removed followed by other distant types. Uncle-niece marriages, which are generally prescribed by the Muslims, were noticed, albeit with low frequently in the post-partition and pre-partition Muslims of Delhi (Basu and Roy 1972).

The reported studies regarding the association of consanguinity with fertility, mortality, net fertility and sterility in population of Delhi are negligible as highlighted in Table 2.

However, average pregnancies and live births per mother have been found positively associated with consanguinity. Among Sheikh Sunni Muslims of Delhi, average pregnancy (7.54) and average live birth (6.37) per mother were observed higher in consanguineous couples as compared to the non-consanguineous couples (the average number of pregnancies and live births per mother being 5.72 and 5.83, respectively) (Basu 1975).

Similarly, mortality among the off-springs (non-accidental deaths prior to 21 years of life) of consanguineous parents has been found higher as opposed to that of non-consanguineous ones. Basu (1975) observed higher average offspring mortality (per mother) among the consanguineous group (0.95) than the non-consanguineous group (0.68) in Sheikh Sunnis of Delhi.

The net fertility which is the resultant of the livebirths minus non-accidental deaths prior to 21 years of life has been found decreased with consanguinity. The net fertility among the

consanguineous Sheikh Sunni couples were reported lower (85.33 per cent) as opposed to their non-consanguineous counterparts (88.22 per cent) (Basu 1975).

No definite conclusion has been reached regarding the association of sterility with consanguinity except that consanguineous couples may be relatively more fertile than non-consanguineous couples. Basu (1975) reported that frequently of childless couples (1.00 per cent) were restricted to non-consanguineous mating among Sheikh Sunnis of Delhi.

7. Uttar Pradesh

Consanguinity is not a widely practiced phenomenon in the state of Uttar Pradesh. Table 3 presents incidence and types of consanguineous marriages and coefficient of inbreeding among different population groups of Uttar Pradesh. It is preferred by the Muslims, and very rarely by the Hindus, who usually prohibit such alliances. The frequency of consanguinity is found moderately high (49.40 per cent) among the urban Sayyad Shia Muslims (Basu 1975); low (5.8 per cent) among the Muslims and very low (0.04 per cent) among the Hindus (Roychoudhury 1976b). The coefficient of inbreeding varies from 0.020 to 0.004 among Muslims, while it is negligible among Hindus.

The most preferred type of consanguineous marriages in all the communities is that between first cousins (both parallel and cross-cousin types). The urban Sayyad Shias were however found to follow other types of consanguineous marriages beyond first cousins (Basu 1975). No instances of uncle-niece marriages were reported from this state.

The effects of consanguinity on fertility, mortality, net fertility, sterility have not been studies extensively in Uttar Pradesh. Nevertheless, the following account and Table 2 is expected to throw some light on the relationship. The average number of pregnancies and live birth per mother seem to be positively associated with consanguinity. Basu (1975) observed higher average pregnancy (6.70) and live birth (6.40) in consanguineous couples, whereas these parameters were actually lower in non-consanguineous couples (the average pregnancy and live birth per mother being 5.60 and 5.40 respectively) among the Sayyad Shia Muslim.

The mortality rate (all non-accidental deaths prior to 21 years) shows similar increasing trend with consanguinity thereby exerting its deleterious effects. The consanguineous Sayyad Shia Muslims register higher average off-spring mortality (0.95) than the non-consanguineous counterparts (0.63) (Basu 1975).

The resultant net fertility therefore, shows decrease in consanguineous marriages. The study of Basu (1975) among Sayyad Shia Muslims reported lower net fertility in consanguineous unions (85.11 per cent) than in non-consanguineous ones (88.20 per cent).

Although, the relationship between sterility and consanguinity is not clear, consanguineous couples are found to be more fertile than the non-consanguineous couples. Basu (1975) reported that among Sayyad Shia Muslims, the frequency of childless couples (1.50 per cent) were restricted to non-consanguineous alliances only.

Consanguinity is believed to have a positive relationship with many diseases and disorders. But any large-scale studies are conspicuously absent in this State. Chantia (2008) reported high rate of mortality and morbidity among Dhankut an endogamous group of Bahariach due to inbreeding. In a Muslim family of this state, all six sibs were found affected by Tay-Sachs disease, whose parents were consanguineous (Maniar and Arora 1966) (Table 3).

B. CENTRAL HIMALAYA
(S.NO.7, Eight Districts of Uttar Pradesh[1])

(iv) Garhwal

In this region, consanguinity and its attributes have not been widely investigated. Nevertheless, the frequency of consanguineous marriages reported from this region is one of the highest in India. Incidence and types of consanguineous marriage and coefficient of inbreeding in the Central Himalayan region have been set out in Table 1. Among the Nomadic Muslim Gujjars-a scheduled tribe, the frequency of consanguineous marriages has been reported very high (61.60 per cent) (Bandyopadhyay et al. 1986).

The coefficient of inbreeding is also one of the highest as reported in the Nomadic Muslim Gujjars – 0.037. The most preferred type of consanguineous marriages is that between first cous-

ins (mostly between cross-cousins and occasionally between parallel cousins). The rest of the marriages are between first cousins once removed, second cousins and beyond second cousins. Uncle-niece marriages, though forbidden by Islam, are found to be practiced in Garhwal among the Gujjars, though the frequency is marginal (1.79 per cent) (Bandyopadhyay et al. 1986).

8. Rajasthan

The practice of consanguineous marriages is fairly frequent in this state among the two major religious groups, viz., Muslims and Hindus. However, more studies should be undertaken for definite interpretation. Table 1 presents the incidence and types of consanguineous marriages prevalent in Rajasthan along with coefficient of inbreeding.

The consanguineous marriages were observed high (57.00 per cent) in Hindus Bhatias (Bhalla and Bhatia 1974) and low (16.25 per cent) in Hindus (Roychoudhury 1976b). The Muslims of Rajasthan fall in the intermediate range which varies from 43.03 per cent among Bohra Muslims (Basu 1976) to 41.26 per cent among general Muslims (Roychoudhury 1976b).

The mean coefficient of inbreeding ranges from a high of 0.025 to a low of 0.010 among the Hindus, while among the Muslims it fluctuates between 0.027 and 0.022.

Marriages between first cousins (both parallel and cross-cousin types) are the most preferred type of consanguineous marriages followed by other types such as – first cousin once removed, second cousin and more distant ones. Uncle-niece marriages are altogether absent amongst both the communities.

The relationship between consanguinity and fertility, morality, morbidity cannot be definitely evaluated as extensive studies are yet to be undertaken in this state. The average number of pregnancies and live births per mother though previously showing an increasing trend with consanguinity in certain state of India do not seem to show such trend in Muslim Bohras of this state (Basu 1978).

However, parental consanguinity appears to exert significant deleterious effect on off-spring mortality in this state among Muslim Bohra mothers (Basu 1978).

It is believed that parental consanguinity leads to many disease and disorders in the offsprings. Higher incidence of retinitis pigmentosa, Usher's syndrome, myopia and hypertension were observed among the off-springs of consanguineous Muslim Shia Dawoodi Bohras of Rajasthan (Basu 1978) (Table 3).

II. WEST INDIA

Studies from this region are comparatively numerous but most of these are concentrated in the state of Maharashtra. For better understanding, extensive studies should be undertaken in the other states of this region.

9. Gujarat

Tremendous gap exists in our knowledge of consanguinity and its attributes regarding this state, especially when considering the fact that in the adjacent state of Maharashtra consanguineous marriages are preferred and practiced fairly frequently.

Incidence and types of consanguineous marriages and coefficients of inbreeding have been shown in Table 1. In Gujarat, amongst both Hindus and Muslims, consanguineous marriages are observed. But Muslims show considerably higher preference (39.73 per cent) as compared to Hindus, among whom the frequency of consanguineous marriages is negligible (0.43 per cent) (Roychoudhury 1976b).

The coefficient of inbreeding varies from a high 0.025 among the Muslims to a very low 0.0003 among the Hindus. The Hindus are found to prefer first cousin marriages only (cross-cousin type). Among the Muslims also, the most frequent type of marriages is that between first cousins (both parallel and cross-cousin type). Interestingly, incidences of uncle-niece marriages (0.27 per cent) among Muslims have been reported by Roychoudhury (1976b) though it is forbidden in Islam.

10. Maharashtra

This is an interesting region as the pattern and prevalence of consanguinity conform more to the south than the north. Consanguineous marriages are fairly common across all the major communities of this state, namely among Hindus, Muslims, Parsis, Christians and various tribes as depicted in Table 1.

The overall frequencies of consanguineous marriages in the state various from very (73.03 per cent) among Bhils - a scheduled tribe (Roychoudhury 1976b), to very low (3.55 per cent) among Christians (Sandhvi et al. 1956), while other communities practicing consanguinity in varying degrees within this range.

Among the caste Hindus, preference for consanguineous marriages has been found high (61.88 per cent) among the Thellari Dhangars – a sheep rearing Backward caste group (Malhotra 1979), very low (4.6 per cent) among the Somvanshis Kshatriyas – a Hindu Upper caste group (Sanghvi et al. 1956) and intermediate (423.86 per cent to 5.70 per cent) among various Hindu High Castes, Backward Castes and Scheduled Castes.

The frequencies of consanguineous marriages in Muslims show a range of 27.10 per cent among Memons (Sanghvi et al. 1956) to 11.11 per cent among Momins (Malhotra et al. 1977) indicating comparatively lesser prevalence of consanguinity than Hindus. The intermediate frequencies have been returned by other Muslim groups like Khojas, Bohras, Iranis.

Among the Parsis, preference for consanguineous marriages is not too common. Only 18.00 per cent of the Parsis of Bombay have been reported to have married their relatives (Sanghvi et al. 1956).

Among the Christians, consanguineous marriages are preferred only marginally. Sanghvi et al. (1956) observed that only 1.66 per cent of Christians practiced consanguinity. It is interesting to note that whereas in the Scheduled Castes, this practice is found to be moderate; it is overtly preferred in the other Backward Castes and Scheduled Tribes. While the frequency of consanguineous marriages in the Scheduled Castes ranges from 22.90 per cent to 13.90 per cent (Mukherjee et al. 1978) in the Backward Castes, it fluctuates between a very high (61.88 per cent) among the Dhangar Thellaris to low (12.58 per cent) among the Dhangar Varhade (Malhotra 1979). The Scheduled Tribes of Maharashtra seem to register a very high degree of consanguinity. Among the Bhils, the incidence of consanguineous marriages ranges from very high (73.03 per cent) (Roychoudhury 1976b) to moderately high (32.26 per cent) (Malhotra 1978).

The overall coefficients of inbreeding in Maharashtra were found to vary from a very high (0.046) in a Scheduled Tribe-Bhils, to low (0.001) in the Christians. Among the caste Hindus, the coefficients of inbreeding were found to vary from high (0.039) in a Hindu Backward caste-Thellari Dhangars, to low (0.001) in a Hindu upper caste-Somvanshi Kshatriyas.

The mean coefficients of inbreeding among the Muslims of this state have been reported lower than Hindus. These vary from a moderately high value (0.012) in Memons to a low value (0.006) in Momins.

The Parsis registered a moderately high coefficient of inbreeding (<0.011 but >0.010). Among Christians, the mean coefficient of inbreeding is found to be lowest (0.001) as compared to the other communities. Whereas the Scheduled Castes showed a low mean coefficient of inbreeding (0.010), it was moderately high (0.017) in Backward Castes, and high (0.030) in the Scheduled Tribes. In all the communities, bulk of the consanguineous marriages is made up of first cousin marriages and only occasionally of other types. Preference for a particular type of consanguineous marriage has been presented in Table 1.

The caste Hindus were found to prefer first cousin marriages (mostly of the cross-cousin type and rarely of the parallel cousin type). Other types of consanguineous marriages (like those between first cousins once removed, second cousins, uncle-niece) are prevalent in varying (but lesser) degrees. Upper caste Hindus however, were found to prohibit uncle-niece marriages, whereas in the Backward Castes, these are not so uncommon. Among the Scheduled Tribes, most of the consanguineous marriages seem to be between first cousins and only negligible percentages of other types of marriages were observed. Uncle-niece marriages are conspicuously absent among them.

The Muslims, like their North Indian counterparts were found to prefer both types of first cousin marriages (between cross-cousins and parallel cousins), followed by other types such as between first cousins once removed and second cousins. Malhotra et al. (1977) observed instances of uncle-niece marriages in various Muslim groups of Maharashtra which are otherwise against the Islamic norms. But Sanghvi et al. (1956) did not come across any such instance.

Among the Parsis, most of consanguineous marriages appear to be between first cousins and only occasionally between first cousins once removed second cousins; and uncle-niece

marriages have been found altogether absent in this community.

Likewise, Christians generally seem to prefer first cousin marriages and only marginally other types beyond first cousins. Uncle-niece marriages have not been observed. The effects of consanguinity on fertility, mortality (Table 2) and morbidity (Table 3) have not received enough attention in this state too. Whereas effects of consanguinity on fertility have not been investigated at all, sporadic studies have been carried out on the association of consanguinity with off-spring mortality and mobility which are generally believed to be positively related.

Stevenson et al. (1966) observed that both still births and neonatal mortalities were higher in off-springs of consanguineous parents (5.00 and 4.50 per cent, respectively) as compared to a non-inbred off-springs (4.30 and 2.80 per cent respectively).

The issue regarding the effect of consanguinity on morbidity still remains largely inclusive although various diseases and disorders are generally believed to be associated with each other.

Stevenson et al. (1966) reported that there were significantly higher malformation frequencies in children born to related parents (1.34 per cent) than the unrelated ones (0.81 per cent). Individual case studies (as reported by them) revealed various cases with miscellaneous and multiple malformations, such as – anophthalmia; "agenesis of sclera" (the meaning of this disease is difficult to interrupt, but the condition might have been due to a recessive gene (cf. Stevenson et al. 1966); hare-lip; cleft palate; imperforate anus; Talipes; polydactyly.

However, the case studies of Ramakumar and Sood (1961) in Maharashtrian Christians (only two families) did not find any relationship between consanguinity and Tay-Sachs disease as it was found only in the non-inbred off-springs. Sanghvi's study (Sanghvi 1976) also did not find any significant difference in the incidence of major malformations in the inbred off-springs (1.49 per cent) as compared to the non-inbred ones (1.39 per cent).

Although these studies provide meaningful interpretations regarding association of consanguinity with various diseases and disorders, they remain handicapped due to certain limitations in their methodology, as the investigations have been mainly based on generalized hospital based data and on a limited number of individual case studies.

11. Goa, Daman and Diu

12. Dadra and Nagar Haveli (U.T.)

III. EAST INDIA

This region too has not been investigated properly despite the fact that there exist number of castes, communities and tribes.

C. EASTERN HIMALAYA (S.NO. 13 TO 20 AND Darjeeling District of West Bengal)

13. Arunachal Pradesh

This state, although inhabited by numerous tribes and communities, which may reveal interesting facts regarding consanguinity and its various attributes, has not been explored extensively.

Consanguineous marriages have been found prevalent in the Scheduled Tribes following Buddhism and only marginally in the other Scheduled Tribes (Table 1). The study of Roychoudhury (1976b) reported low incidence of consanguineous marriages in the Buddhists (6.48 per cent). The other Scheduled Tribes, showed still lower incidence (3.06 per cent) (Roychoudhury 1976b).

Similarly, the mean inbreeding coefficient was observed quite low in Scheduled Tribes professing Buddhism (0.006) and it was still lower in the other Scheduled Tribes (0.002). The Buddhists were reported to prefer uncle-niece marriages over the first cousin marriages (of matrilateral cross-cousin type), while other types of marriages were found absent.

Among the other Scheduled Tribes, however, first cousin marriages (both between cross-cousins and parallel cousins) were the most preferred ones followed by marginal incidence of uncle-niece and beyond first cousin marriage.

14. Assam

The incidences of consanguineous marriages are negligible in this state as ascertained from the limited number of available studies. Incidence, types of consanguineous marriages and coefficients of inbreeding in different popula-

tion groups have been set out in Table 1. The overall frequencies of consanguineous marriages varied from low (4.08 per cent) among the Scheduled Tribes to negligible (0.75 per cent) among the Hindus (Roychoudhury 1976b). Intermediate values were reported in the Bengali Muslims of Assam (3.00 per cent) (Mukherjee and Chakravarty 1977), and in Christians (2.52 per cent) (Roychudhury 1976b). Interestingly, higher incidences of consanguineous marriages in Christians than the Hindus were unlike their western and southern counterparts.

The mean coefficient of inbreeding varied from a low value of 0.003 in the Scheduled Tribes and Bengali Muslims to a still lower value of 0.002 in Christians. Among the Hindus, the mean inbreeding coefficient was found negligible (0.0005).

The bulk of the consanguineous marriages were made of first cousin marriages in all the communities and only sporadic cases of uncle-niece marriages were reported. Among the Hindus and Christians, marriages between first cousins (both between cross-cousins and parallel cousins) were found to be the most preferred ones. Uncle-niece marriages were also observed, albeit in very low frequencies. The Scheduled Tribes however, were found practicing only first cousin marriage (only between matrilateral cross-cousins).

15. Nagaland

16. Manipur

Like other eastern states, Manipur has also not been studied extensively. Practice of consanguinity seems to be confined to Christian Scheduled Tribes only (as discernible from the only available study) (Table 1).

The study of Roychudhury (1976b) reported incidence of consanguineous marriages in Christian Scheduled Tribes (10.62 per cent). The mean coefficient of inbreeding in the Scheduled Tribes (Christian) of Manipur showed an appreciable value of 0.007. The first cousin marriages were found to be the only prevalent ones (which were mostly between matrilateral cross-cousins).

17. Mizoram

18. Tripura

Practice of consanguinity is negligible in this state but further studies may change such generalization. Various aspects of consanguinity in Tripura have been shown in Table 1. Roychodhury (1976b) reported that whereas the frequencies of consanguineous marriages have not been too uncommon in the Buddhist Scheduled Tribes (11.54 per cent), they seem to be relatively more uncommon in the Muslims (5.19 per cent) and quite rare in Hindus (0.21 per cent).

The mean coefficient of inbreeding fluctuated between an appreciable value of 0.007 in the tribes professing Buddhism to a low value of 0.003 in Muslims and negligible value of 0.0001 in Hindus. All the communities were found preferring marriages between first cousins. Very few instances (0.14 per cent) of uncle-niece marriages were reported only in Muslims though it is forbidden in Islam.

19. Meghalaya

20. Sikkim

21. West Bengal

The state of West Bengal, though not explored fully shows that the practice of consanguinity is mainly confined to the Muslim community. The Hindus generally prohibit such marriages although rare instances reportedly exist. Table 1 depicts incidence and types of consanguineous marriages along with coefficients of inbreeding in different population groups of West Bengal.

Among the Muslims, the frequencies of consanguineous marriages vary from 22.16 per cent in Muslims of Murshidabad and Birdhum districts (Huq 1976) and 19.3 per cent in Muslims of 24 Parganas (Barua 1976) to 5.88 per cent in various Muslim population groups (Roychoudhury 1976b).

The coefficients of inbreeding were found moderately high (0.014) in Murshidabad and Birbhum Muslims, low (0.008) in Muslims of 24 Parganas and still lower (0.004) in various Muslim population groups. Except one case of consanguineous marriage (between second cousins once removed) reported by Sarkar (1967) recording an inbreeding coefficient of 0.008, the practice was found proscribed in the Hindus. Even an extensive study on Hindus (Roychudhury 1976b), did not report any a single instance of consanguineous marriage.

Among the Muslims, the most preferred type of consanguineous marriages was that between first cousins (both between cross-cousins and parallel cousins), followed by other types-beyond first cousins. Not a single case of uncle-niece marriage was observed in them.

The studies regarding effect of consanguinity on fertility, mortality, morbidity are very few. And, these studies failed to establish definitely a positive relationship between them. Fertility and mortality differentials with regard to consanguinity have been highlighted in Table 2. The mean numbers of live births are often believed to increase with consanguinity. But this had been contradicted by Barua (1976) who reported lower mean number of live births (4.96) in the consanguineous parents than their non-consanguineous counterparts (5.60) among the Muslims.

It is generally believed that parental consanguinity often leads of off-spring mortality. Stevenson et al. (1966) however, did not find significantly higher off-spring mortality in the consanguineous parents (8.60 per cent) than the non-consanguineous ones (5.30 per cent) although, the former means value was observed greater. Similar results were reported by Barua (1976) in Muslims of 24 Parganas (where off-spring mortality in consanguineous parents was 30.30 per cent as opposed to 23.50 per cent among non consanguineous parents).

Studies on the association of various diseases and disorders with consanguinity also often revealed positive relationship. However, the study of Stevenson et al. (1966) based on hospital data did not report any case of major malformation in the off-springs of the related group, while in the off-springs of unrelated parents such instances were observed (Table 3).

22. Bihar

In the state of Bihar, consanguinity is practiced in varying degrees by all the major communities. Table 1 presents incidence, types of consanguineous marriages in various population groups of Bihar along with coefficients of inbreeding.

The incidence of consanguineous marriages were reported high (54.95 per cent) in Muslims of Ranchi (Anjani Mani and Roy, 1989), moderate (31.62 per cent) in Scheduled Tribes, low (9.54 per cent) in various Muslim population groups and very low (0.82 per cent) in Hindus (Roychudhury, 1976b).

Likewise, the coefficient of inbreeding also varied from high (0.027) among the Ranchi Muslims and moderately high (0.020) among the Scheduled Tribes to low (0.001) among the general Muslim population groups and very low (0.0005) in the Hindus.

In all the three major communities, namely – Hindus, Muslims and Christians; and Scheduled Tribes, first cousin marriages were found to be most preferred type. Whereas, Hindus and Christians were reported to practice only cross-cousin marriages, Muslims and Scheduled Tribes preferred marriages between both cross-cousins and parallel cousins. Uncle-niece marriages seem to be prohibited in Christians while it is observed, albeit marginally, in Hindus, Muslims and Scheduled Tribes.

Differential fertility and mortality statistics with respect to consanguinity have been set out in Table 2. Consanguinity is often found to increase fertility. This has been corroborated by the study of Anjani and Roy (1989) as increased fertility rate has been observed in Muslim consanguineous parents (4.41) then in Muslim non-consanguineous ones (4.19). On the contrary, lower fertility has been observed in consanguineous marriages by Afzal and Sinha (1982) among rural and urban Ansari Muslims of Bihar (cf. Basu 1985). And in Santhal Parganas, mean number of children in inbred Muslim was observed less than that in out bred Hindu population (Ansari and Sinha 1978).

Parental consanguinity also increases off-spring mortality due to its deleterious effects. Increased off-spring mortality has been observed in Muslim consanguineous parents than in their non-consanguineous counterparts (Anjani and Roy 1989). Ansari and Sinha (1978) also reported statistically higher mortality rate of sibs of either sex in inbred than in out bred populations.

23. Orissa (Odhisha)

Practice of consanguinity in various Scheduled Tribes of this state is very high, whereas it is not so common in the Hindus and Christians. Table 1 presents incidence, types of consanguinity and coefficient of inbreeding in various population groups of Orissa. Some migrant fishermen also show quite high preference for consanguineous marriages which they might have brought with them from coastal Andhra Pradesh.

The highest incidence (52.34 per cent) of consanguineous marriages has been observed in Scheduled Tribes (Roychodhury 1976b). The frequency of such alliances in different migrant marine Fishermen also has been reported high (45.03 to 30.99 per cent) (Reddy 1983). Only occasional incidences of consanguineous marriages have been observed amongst the Hindus (4.17 per cent) and in the Christians (4.43) (Roychodhury 1976b).

The coefficient of inbreeding varied from very high (0.034) among Scheduled Tribes and high (0.025) among migrant marine fishermen of Puri to low (0.003) among Hindus and Christians. First cousin marriages seem to be quite in practice in all the major population groups (but only between cross-cousins). However, the migrant marine fishermen were also found to prefer marriages between uncle-niece and other distantly related relatives (beyond first cousins). Among Hindus and Scheduled Tribes, too, few instances of uncle-niece marriages were observed, but not any other types. Christians were not found to entertain marriages between uncle-niece or between any relations which were beyond first cousins.

Studies on the effects of consanguinity on fertility, mortality have still not been carried out extensively, although they are equally important. It is well known that consanguinity does play a role in enhancing fertility and mortality. Supportive evidence was reported in a study on migrant marine fisher folk (Reddy 1979) where both mean number of pregnancies and child deaths were found increased in consanguineous unions (5.38 and 1.01, respectively) than in non-consanguineous ones (4.94 and 0.69, respectively) (Table 2).

IV. CENTRAL INDIA

Extensive studies on consanguinity are not available from this region and a clear picture is yet to emerge.

24. Madhya Pradesh

This state despite being a vast conglomerate of various castes, communities and tribes, has hardly evoked any interest regarding consanguinity studies.

The practice of consanguinity is prevalent in many population groups of this state. Incidence, types of consanguineous marriages and coefficient of inbreeding in different population groups of Madhya Pradesh have been depicted in Table 1. The overall frequency varied from 60.12 per cent in Muslims to 2.22 per cent among Hindus (Goswami 1970).

Among the Hindus, the incidence was quite low, ranging from 28.57 per cent in Scheduled Castes and Harijans to 2.22 per cent in Hindu Brahmins (Goswami 1970). Various other caste Hindus seem to record a range of 15.04 to 3.23 per cent (Goswami 1970; Roychodhury 1976b; Basu et al. 1989).

Among the Muslims, the practice was observed quite highly frequent (range – 60.12 per cent to 52.81 per cent) in general Muslim population groups and Bohra Muslims (Goswami 1970). The Christian community, however, were found to practice consanguinity not so frequently (25.00 per cent) (Goswami 1970). Whereas among the Scheduled Castes and Harijans, the practice is moderately preferred (range – 28.57 per cent to 4.49 per cent); among the Scheduled Tribes, it is reported to be highly preferred (range – 59.04 per cent to 10.13 per cent) (Goswami 1970; Basu et al. 1989).

The coefficient of inbreeding varied from very high (0.037) in a Scheduled Tribe – Gonds to low (0.0003) in Hindu Brahmins.

Among the Hindus, coefficients of inbreeding fluctuated between moderately high (0.015) in Scheduled Castes and Harijans to very low (0.0003) in upper caste Hindu Brahmins. The mean coefficient of inbreeding was found to be quite high (0 .0287) in Muslims, whereas in Christians it was low (0.0069).

The preference for a particular type of consanguineous marriage is not very clear as most of the studies have not investigated such aspects. However, it was evident from the available studies that accept the Hindus in the study of Roychodhury (1976b) and Gonds - a Scheduled Tribe – amongst whom first cousin marriages were preferred, the Muslim and other Hindus preferred marriages between second cousins over first cousins. Uncle-niece marriages were found totally absent in two caste Hindus-Brahmins and Vaishyas and in Scheduled Tribe – Gonds. It was found in varying degrees in other communities. In this region, effects of consanguinity on certain parameters like fertility, mortality, morbidity remain unexplored till date.

V. SOUTH INDIA

It is believed that high levels of inbreeding have been practiced by Dravidian peoples for some 2,000 years (cf. Bittles et al. 1985), even among numerically large population groups. Therefore, it is not surprising that this region generated maximum number of studies regularly (Roychoudhary 1976; Rao and Inbaraj 1977; Reddy and Rao 1978; Reddy and Malhotra 1991; Reddy 1992; Sudhakaran and Vijayavalli 1998; Bittles 2002; Beegum et al. 2008; 2009; Lekshmi and Sudhakaran 2012).

25. Karnataka

The practice of consanguineous marriages in this state is widely prevalent which have been brought to notice only recently. The incidence, types of consanguinity and coefficient of inbreeding have been presented in Table 1. The overall frequency varied within a range of 60.9 per cent in a hospital population with autosomal recessive disorders (Devi et al. 1987) to 1.80 per cent in Kodavas (Saheb et al. 1981).

Religion-wise interpretation shows that consanguineous marriages are highly preferred among Hindus. The incidence varied from 52.72 per cent in generally Hindu population group (Devi et al. 1987) to 1.80 per cent in Kidavas (Saheb et al. 1981). Intermediate levels (36.8 per cent to 5.39 per cent) were reported in Hindu hospital patients, Kanarese Brahmins, general Hindu popultion groups and Amma Kodavas (Chakravartti 1968; Roychodhury 1976b; Devi et al. 1981, 1982; Saheb et al. 1981; Bittles et al. 1985, 1987; Hann 1985).

Among the Muslims, the frequency of consanguineous marriages varied from 46.51 per cent (Devi et al. 1987) to 21.96 per cent (Devi et al. 1982). Intermediate frequencies (27.69 per cent to 25.60 per cent) were reported by Roychodhury (1976b), Devi et al. (1981), Bittles et al. (1985, 1987).

Among the Christians, the incidence fluctuated between 21.49 per cent (Bittles et al. 1987) to 8.33 per cent (Devi et al. 19877). One of the main reasons behind the practice of consanguineous marriages in India is the rural background rather than urban set up. The might be substantiated by the study of Hann (1985) in rural populations (37.74 per cent) and Bhattacharya (1978) in Mysore city populations (25.89 per cent).

The coefficient of inbreeding for this state in general showed a wide range of variation – from a very high (0.0625) in hospital population with autosomal recessive disorders, to low (0.0010) in Kodavas. Among the Hindus, also, it varied from very high (0.0330) to low (0.0010); whereas Muslims and Christians showed moderate ranges of 0.0173 to 0.018 and 0.0174 to 0.012, respectively.

The picture regarding the preference for a particular type of consanguineous marriage is quite different in this state. Hindus were found to prefer marriages between uncle-niece followed by first cousin and second cousin marriages. Roychodhury (1976b) on the contrary, found higher prevalence of first cousin marriages followed by other types of marriages. Uncle-niece marriages were observed altogether absent in Kanarese Brahmins, Kodavas and Amma Kodavas.

The Christians also preferred marriages between uncle-niece over first cousins and other types. In the Muslims, however, first cousin marriages were found more prevalent than uncle-niece marriages and other types which were beyond first cousins. Studies on differential fertility, mortality (Table 3) with regard to consanguinity in Karnataka are few and none of them reported any significant association.

Consanguineous Hindu hospital patients showed slightly increased mean number of live births and living children (2.46 and 2.22, respectively) than non-consanguineous ones (2.37 and 2.14, respectively) (Devi et al. 1981).

The consanguineous Kodavas and Amma Kodavas also showed increased number of conceptions (3.69 per cent and 4.13 per cent) then non-consanguineous ones (3.20 per cent and 3.10 per cent). But, whereas the number of living off-springs were also found increased in consanguineous Amma Kodavas (3.79 per cent), as opposed to non-consanguineous couples (2.89 percent), no major difference was found regarding these estimates in consanguineous and non-consanguineous Kodavas (Saheb et al. 1981).

Mean number of live births and living offsprings were found decreased in consanguineous Muslim hospital patients (2.86 and 2.55, respectively) as compared to the non-consanguineous ones (3.06 and 2.77, respectively). While no difference was reported in mean number of live births between consanguineous and non-consanguineous Christian hospital patients; in-

creased mean number of living children was observed in the former (2.29) than in the latter group (2.11) (Devi et al. 1981).

General hospital-based studies depicted increased live births and living off-springs in consanguineous couples by Bittles et al. (1985, 1987), and decreased by Devi et al. (1981). The study of Hann (1985) reported increase in mean number of conception with consanguinity while slight decrease was noticed in the survival rate in a rural area.

Comparatively fewer studies had been attempted on the relationship between consanguinity and off-spring morality. Increased intra-uterine losses and off-spring morality were reported in consanguineous Kodava and Amma Kodava couples (Saheb et al. 1981). However, in a rural population no difference in intra-uterine losses were noticed but child mortality was found increased (Hann 1985).

Morbidity studies with regard to consanguinity are very few; nevertheless, they point out to the incidence of Tay-Sachs disease (Rao et al. 1965); phenylketonuria (Centerwall and Ittyerah 1966); mental retardation and Schizophrenia (Rao and Narayanan 1976); aminoacidaemias (Bittles et al. 1982); inbred off-springs; which contradicts Sanghvi's (1966) hypothesis of marked elimination of deleterious lethal and sub-lethal from the gene pool with prolonged inbreeding (Table 3).

26. Andhra Pradesh

So far, Andhra Pradesh is one of the most explored regions of India regarding consanguinity and its various attributes. This state reveals high incidence of consanguinity even among numerically large endogamous populations.The incidence, types of consanguineous marriages and coefficient of inbreeding in Table 1. The overall frequencies vary between very high (81.10 per cent with coefficient of inbreeding as 0.071) in Gadaba Tribe (Pratap et al. 1980) to low (5.20 per cent with coefficient of inbreeding as 0.002) in Chakalis (Mukherjee et al. 1977).

Among the Hindus, the incidence of consanguinity and coefficient of inbreeding varied from very high (70.40 per cent and 0.046, respectively) in Padmasalis – an artisan caste to low (5.20 per cent with coefficient of inbreeding as 0.002) in the Chakalis (Mukherjee et al. 1977); while the intermediate levels (range – 56.80 per cent to 9.50 per cent) were reported in various other groups (Dronamraju and Meera Khan 1960, 1963; Sanghvi 1966; Chakravartti et al. 1971; Murty and Jamil 1972; Reid 1973; Veerraju 1973; Mukherjee and Bhaskar 1974; Rao and Mukherjee 1975; Roychoudhury 1976b; Choudhury and Reddy 1977; Mukherjee et al. 1977; Nair et al. 1977; Reddy and Rao 1978; Ray 1979; Reddy and Reddy 1979; Rao and Reddy 1983; Reddy 1983, 1984, 1986, 1987; Rao and Murty 1984, 1988; Srikumari et al. 1985; Bhaskar et al. 1986).

Among the Muslims, the incidence of consanguineous marriages was found much lower which ranged between 47.50 per cent (coefficient of in breeding – 0.030) (Dube 1960) to 20.00 per cent (coefficient of in breeding – 0.0156) (Dronamraju and Meera Khan 1960).

The Christians showed still lower range of frequencies which varied from 40.50 per cent (coefficient of inbreeding-0.029) (Sanghvi 1966) to 19.23 per cent (coefficient of inbreeding – 0.0126) (Dronamraju and Meera Khan 1960).

Whereas the Scheduled Tribes showed frequency variation (of consanguineous marriages) between 81.10 per cent with a coefficient of inbreeding of 0.071 in Gadabas (Pratap et al. 1980) to 6.45 per cent with a coefficient of inbreeding of 0.012 in Mathuras (Pingle 1983); the Scheduled Castes revealed consanguinity levels fluctuating between 51.70 per cent with a coefficient of inbreeding of 0.030 in Madigas, to 10.00 per cent with a coefficient of inbreeding of 0.013 in Madiga hospital patients (Mukherjeee et al. 1977). The consanguinity trend of inbreeding varied between very high (0.0340) (Dronamraju and Meera Khan 1963) to high (0.0129) (Vishnupriya et al. 1981).

Generally speaking, in the state of Andhra Pradesh, marriages between first cousins (mostly between cross-cousins and occasionally between parallel cousins) are preferred overwhelmingly over uncle-niece marriages and marriages between other cousins, (beyond first cousins) among all the communalities. However, uncle-niece marriages were reported more prevalent in some Hindus-Vaddes-stone-breakers; Malas-Scheduled Castes; Gajulu Balija-traders; Pedakanti Reddies-farmers; Madigas-Scheduled Castes; Yadavas-shepherds (Dronamraju and Meera Khan 1960; Mukherjee et al. 1977; Rao and Reddy 1983). Contrary to this scenario, some populations totally proscribe such marriages namely, Chakalis-washermen; Brahmin

hospital patients; Pakanati, Rampala and Muirikinati Mala Scheduled Castes, etc. among Hindus; Muslims; Christians; and some Scheduled Tribes-Banjaras, Raj Gonds, Pardhans, Kolams etc. (Mukherjee et al. 1977; Roychodhury 1976b; Ramesh and Murthy 1979; Saheb and Naik 1981; Pingle 1983; Reddy 1986).

Regarding fertility rate the consensus seems to be for increment in consanguineous couples as compared to non-consanguineous couples. Table 2 depicts differential fertility and mortality in consanguineous and non-consanguineous couples. Conceptions and live births were found higher in consanguineous marriages than non-consanguineous ones among Brahmins (Srikumari et al. 1985); Devenga Desuri Kapu and Mala-Scheduled Castes (Reddy 1987); Kammas (Ray 1979); Fishermen Pattusalis (Reddy and Rao 1978a, b); Chenchus (Sirajuddin and Basu 1984). Reddies (significant at 1% level) (Reddy 1986). But among Jalaris (low caste fishermen) opposite trend seemed true as mean number of live births was reported to decrease with parental consanguinity (Srikumari et al. 1985).

The net fertility statistics, in the consanguineous Devanga Desuri Kapus and Malas (Reddy 1987); the Reddis and Malas (Reddy 1986) and Chenchus – a scheduled tribe (Sirajuddin and Basu 1984) revealed increased number of surviving off-springs. The differences however, were not statistically significant except in Desuri Kapus, Devanga and Mala population groups.

On the other hand, the Pattusalis and Fishermen (Reddy and Rao 1978a, b) showed a lower net fertility though the differences were not significant. The association of sterility with consanguinity has not been studies widely, but it is believed that they are associated with each other. Sterility was found positively, but not significantly correlated with the incidence of consanguineous marriages among the hospital inpatients (Dronamraju and Meera Khan 1963).

The trends of differential mortality with regard to consanguinity also remain inconclusive, although they are usually found to be positively associated. High statistically significant child mortality rates have been reported in consanguineous mothers when compared with non-consanguineous ones in Andhra populations (Chakravartti et al. 1971); in Pattusalis (Reddy and Rao 1978b). Increased off-springs mortality trends in consanguineous marriages, though not statistically significant have been reported among Jalari fishermen (Srikumari et al. 1985); Andhra Pradesh populations (Dronamraju and Meera Khan 1963); in Fisher folks (Reddy and Rao 1978a); in Mala Scheduled Castes (Reddy 1983b); in Reddies, Vyasyas, Malas (Rao and Murty 1984); in Reddies (Reddy and Reddy 1979); in Chenchu Scheduled Tribes (Sirajuddin and Basu 1984). However, lesser number of still births was reported in Brahmin consanguineous parents as compared to non-consanguineous ones (Srikumari et al. 1985).

Various diseases, congenital malformations are found to be positively associated with consanguinity Table 3 presents differential morbidity among inbred and non-inbred population groups. Pulmonary tuberculosis in patients having consanguineous parents (coefficient of inbreeding – 0.0329) was found significantly higher than those of controls at 5 per cent level (Dronamraju and Meera Khan 1961, 1963). Elevated congenital malformation in the off-springs of consanguineous parents were reported by Dronamraju and Meera Khan (1961, 1963), Murty and Jamil (1972), Reddy and Rao (1978b), Reddy (1983b). Incidence of congenital heart diseases was reported Riya et al. (1981), but further interpretation and investigations are still awaited. Sanghvi (1966) also recorded higher incidence of albinism, ichthyosis congenital, amaurotic idiocy in the children in first cousin marriages.

27. Tamil Nadu

Tamil Nadu is also one of the most explored regions regarding studies on consanguinity as the neighbouring Andhra Pradesh. High incidence of inbreeding is also observed here. Incidences and types of consanguineous marriages and coefficient of inbreeding in various population groups of Tamil Nadu have been set out in Table 1. The overall frequency of consanguineous marriages varied from 65.00 and 64.80 per cent in Pulayan Scheduled Tribe (Roychoudhury 1980) and rural Barbers (Rao et al. 1972), respectively, to 3.00 per cent in Christians (Ramesh et al. 1989). The coefficients of inbreeding were found varying from 0.058 (for autosomal genes) in urban Scheduled Castes (Rao 1983) to 0.0012 in Christian (Asha Bai et al. 1981).

Religion-wise interpretation shows that in Tamil Nadu too, Hindus mostly prefer consanguineous marriages followed by Muslims and

Christians. Scheduled tribes opt for such alliances in varying degrees.

Among the Hindus, the incidence of consanguinity varied from 64.80 percent in rural Barbers (Rao et al. 1972) to 3.00 per cent in Jains of Madras (Ramesh et al. 1989). The coefficient of inbreeding differed from 0.058 in urban Scheduled Castes to 0.002 in Jains of Madras.

The frequency of consanguineous marriages among the Muslims varied from 60.00 per cent (coefficient of inbreeding 0.030) (John and Jayabal 1971) to 19.56 per cent (coefficient of inbreeding – 0.012) (Rao et al. 1971).

The Christians have also been found preferring consanguineous marriages unlike other regions of India, although not overtly. The highest frequency of such marriages in this community (50.00 per cent) was recorded by John and Jayabal (1971), showing a coefficient of inbreeding of 0.031. The lowest coefficient of inbreeding of 0.0012 was reported by Asha Bai et al. (1981).

Whereas among the Scheduled Castes, the incidence of this practice varied from very high (approximately 60.00 per cent – 70.00 per cent with a coefficient of inbreeding of 0.058) (Rao et al. 1972) to low (less than 10.0 per cent with a coefficient of inbreeding of the frequencies fluctuated between 65.0 per cent (coefficient of inbreeding – 0.041) in Pulayan Scheduled Tribe (Roychoudhury 1980) to 12.7 per cent (coefficient of inbreeding – 0.005) in Kotas (Ghosh 1972a; Ghosh and Majumdar 1979).

In this state, among all the communities' marriages between first cousins appear to be the most preferred type followed by other types of consanguineous marriages like those between uncle-niece and those beyond first cousins. However, among the North Indian Brahmins and Acharis of Madras, the preference for marriages between first cousins and uncle-niece were reported to be same (Ramesh et al. 1989).

Uncle-niece marriages are mostly found in the Hindus but are not altogether absent in other communities. Some studies have reported total absence of this particular type of marriage among various Scheduled Tribes – such as Gonds, Todas, Kotas, Irulas, Kurumbas (Chakravartti 1968), Pulayans (Roychoudhury 1980); among Harijans and Muslims (Moplah) (Chakravartti 1968); Christians (Chakravartti 1968; John and Jayabal 1971) even among some South Indian Brahmins and Jains of Madras (Ramesh et al. 1989).

Although consanguinity is often believed to increase fertility rates, any clear notion is still awaited. Table 2 presents differential fertility and mortality in various inbred and non-inbred population groups. The mean number of pregnancies per woman was found elevated in consanguineous couples by John and Jayabal (1971); Rao and Inbaraj (1977b, 1979); Asha Bai et al. (1981). On the other hand, consanguinity seems to lower number of conceptions as reported by Centerwall and Centerwall (1966) in parents of pediatric outpatients and by Ghosh (1979) in Kotas - a Scheduled Tribe. Mean number of living children was also not found to be significantly different between related and unrelated couples (Rao and Inbraj 1979; Asha Bai et al. 1981).

The frequency of primary sterility appears to be lower in consanguineous couples but the differences have been found very marginal in the study of Rao and Inbaraj (1977b).

Differential off-spring mortality rates do not seem to have any consistent relationship with consanguinity and it is believed that continued practice of consanguineous marriages over several generations have narrowed down the differentials. Supportive views have been forwarded by various studies (John and Jayabal 1971; Rao and Inbaraj 1977a, 1979; Ghosh and Majumdar 1979). The study of Asha Bai et al. (1981), although endorsed the same view regarding intra-uterine losses in related and unrelated parents; reported increased child mortality ($p<0.05$) in the former group.

Presence of deleterious genes in Tamil Nadu populations is still evident in spite of the continued practice of consanguinity over many generations contradicting Sanghvi's (1966) theory. Differential morbidity statistics in various inbred and non-inbred population groups of Tamil Nadu have been reported in Table 3. Developmental anomalies were found significantly higher in the off-springs of consanguineous parents ($p<0.001$) by Asha Bai et al. (1981). Major congenital anomalies were also reported to be higher in off-springs of consanguineous parents by Centerwall and Centerwall (1966); Chandra and Harilal (1978). Congenital malformations were only marginally different in the off-springs of consanguineous and non-consanguineous parents in other studies (Rao and Inbaraj 1977, 1980; Kesavan et al. 1978). Ghosh and Majumdar (1979) also did not find any case of congenital malformations in their

study. Kesavan et al. (1978) even reported that congenital malformations in the off-springs of consanguineous parents were actually lower than their non-inbred counterparts among the Christians of Madras.

28. Kerala

In Kerala, the preference for consanguineous marriages is moderate as compared to its neighbouring state, although the practice is prevalent in almost all major castes, communities and tribes.

Table1 highlights the details of incidence, types of consanguineous marriages and coefficients of inbreeding in various population groups of Kerala. The overall frequencies of this type of marriage varied from 63.73 per cent (coefficient of inbreeding – 0.040) in the Scheduled Tribes to 0.76 per cent (coefficient of inbreeding –0.0005) in Christians (Royoudhury 1976b).

Among the Hindus, this practice is considerably low unlike those in other southern states. The frequency seems to range from 28.00 per cent (coefficient of inbreeding – 0.011) in Malyali Brahmins (Chakravartti 1968) to 4.55 per cent (coefficient of inbreeding – 0.002) among Nayars (Ray 1979).

The frequencies of consanguineous marriages in the Muslims varied from 26.67 and 30.95 per cent (coefficient of inbreeding – 0.017 and 0.014, respectively (Ali 1968) to 17.26 per cent (coefficient of inbreeding – 0.011) in general Muslim population groups (Roychoudhury 1976b).

Among the Christians, incidence of consanguineous marriage varied between 20.93 per cent (coefficient of inbreeding- 0.0109) (Ali 1968) to 0.76 percent (coefficient of inbreeding –0.0005) (Roychoudhury 1976b).

In the Jews too, consanguineous marriages seems to be quite prevalent, Goldschmidt (1961) reported moderately high practice of consanguinity (40.68 per cent) with a coefficient of inbreeding of 0.0115 in Kerala Jews.

Furthermore, consanguineous marriages have also been found quite prevalent in various tribes of Kerala. Roychoudhury (1976b) reported very high prevalence of this practice in various tribes (63.73 per cent with a coefficient of inbreeding of 0.041). Moderate to low frequencies were observed in Paniyan, Muthuvan and Pulayam tribes (Ali 1968; Chakravartti 1968).

Marriages between first cousins are overwhelmingly preferred in Kerala among all the communities. Other types of consanguineous marriages beyond first cousins are only nominally present. Interestingly, marriages between uncle-niece are almost absent in this state except among the Hindus (0.42 per cent) in the study of Roychoudhury (1976b). This may be due to the prevailing matrilineal traditions in Kerala till recent times.

Mathew et al. (2006) have reported that in Kerala, irrespective of social class, all Hindu castes and communities generally favor matrilateral cross cousin marriages. In Kerala, uncle-niece marriages were restricted to scheduled castes and tribal groups, albeit in very low frequencies.

Muslims in other parts of India found to prefer first cousin union and are reported to practice both cross cousin and parallel cousin marriages (Badaruddoza and Afzal 1997; Hussain and Bittles 2000; Bhasin and Nag 2002; Bittles 2002), but those of Kerala do not show an inclination to paternal parallel cousin unions (Sudhakaran and Vijayavalli 1997b; Beegum et al. 2008).

Lekshmi and Sudhakaran (2012) reported that relationship between consanguinity and region of residence of the couples was found conspicuously higher in rural areas relative to urban areas.

In the state of Kerala, any definite consanguinity related trend in fertility and mortality rates is not visible as the studies are very few. Differential fertility and mortality statistics among various inbred and non-inbred population groups have been depicted in Table 2. The number of conceptions (Kumar et al. 1967), as also the mean number of living off-springs (Ray 1979) were reported lower in consanguineous couples as compared to non-consanguineous ones. The study of Kumar et al. (1967) revealed that whereas intra-uterine losses were somewhat lower, child mortality were much higher in consanguineous parents than their non-consanguineous counterparts. Studies regarding differential morbidity are reportedly absent in this state.

29. Pondicherry (Puducherry) (U.T.)

The Hindus of Pondicherry also show preference for consanguineous marriages. The study of Roychoudhury (1976b) reported this practice

in Pondicherry Hindus (28.82 per cent) showing a coefficient of inbreeding of 0.024.

The predominant types of consanguineous marriages were that between first cousins (only between cross-cousins) and uncle-niece (Table 1). Studies regarding effects of consanguinity on fertility, mortality and morbidity are very few. Increased fertility and off-spring mortality have been observed in the consanguineous populations of Pondicherry by Puri and Verma (1978).

Incidence of osteoporosis were reported by Bhattacharya and Srivastava (1978) (Table 3) and higher frequency of respiratory infection, mental retardation, ichthyosis congenital, Hurler syndrome, albinism, Laurence-Moon-Biedl syndrome, Xeroderma pigmentosum were reported by Puri et al. (1978) among the off-springs of consanguineous parents in Pondicherry.

VI. ISLANDS

The islands of the Indian region are barely explored regarding consanguinity and its effects on fertility, mortality and morbidity though many tribes and numerically small communities dwell there.

30. Lakshadweep (U.T.)

The study of Roychoudhury (1977) revealed that in the islands of Lakshadweep, consanguinity rate was the highest among the Koyas-a Muslim land-owning class (33.52 per cent) with a high mean coefficient of inbreeding of 0.021; while it varied from 4.14 per cent to 6.32 per cent in Muslims (Muslim sailor class) and Melacharis (Muslim servants, toddy drawers etc.) with coefficients of inbreeding of 0.0002 and 0.004, respectively (Table 1).

The most preferred type of consanguineous marriages was that between first cousins (mostly between cross-cousins and occasionally between parallel cousins). Uncle-niece marriages were altogether absent.

31. Andaman and Nicobar Islands (U.T.)

VII. OTHERS

Unfortunately, other South Asian countries fall far behind in publishing interesting data regarding consanguinity and its various attributes.

NEPAL

BHUTAN

SRI LANKA

Practice of consanguineous marriages has been found prevalent in Sri Lanka too. Reid (1976) reported practice of consanguinity among Sinhalese-speaking Buddhist Goyigamas (30.10 per cent (Table 1). The mean coefficient of inbreeding for Sinhalese off-springs was estimated as just over 1.00 per cent putting it in the upper range described for human populations (Reid 1973).

PAKISTAN

In this Muslim dominated country, as expected consanguineous marriages are common, yet till date, very few extensive studies have been conducted. The frequencies of consanguineous marriages have been noticed varying from 91.19 per cent in Baloch of Quetta, Balochistan (Mian and Mushtaq 1994) to 56.56 per cent in Muslims of Pakistani Punjab cities (Shami et al. 1989) (Table 1). Corry (2002) has reported a high rate (50-60 percent) of consanguinity among Pakistani community in Britain.

Regarding the effect of consanguinity on fertility, Shami et al. (1990) reported more mean number of pregnancies in consanguineous couples as compared to non-consanguineous ones. Furthermore, a highly significant relationship was also found between degree of inbreeding and neonatal, infant and childhood mortality by Shami et al. (1989). However, Mian and Mushtaq (1994) reported that numbers of children per couple were not significantly different in different marriage types; but, incidence of prenatal deaths increased with consanguinity (Table 2). Further, they also mentioned that number of postnatal abnormalities seemed to be generally lower in unrelated spouses (Table 3).

BANGLADESH

MALDIVES

3. REASONS FOR THE PRACTICE OF CONSANGUINITY

As the conceptions about consanguinity vary from positive to negative, it would not be inappropriate here to discuss briefly various rea-

sons behind this practice in the Indian region, which are believed to be influenced mainly by socio-economic and cultural factors in the numerically large communities and occasionally by geographic barriers and size of the isolates in the various tribal groups and small communities like Parsis, Jews etc. However, Mian and Mushtaq (1994) reported numbers of children per couple were not significantly different in different marriage types; but incidence of prenatal deaths increased with consanguinity (Table 2).

In the northern region of India, low socio-economic status; maintenance of social status by the upper classes; strengthening of ties between families; social solidarity; conservatism and traditionalism seem to be the main reasons responsible for continuing practice of consanguinity. Similar views have been forwarded by Basu and Roy (1972), Basu (1975) in their studies among Delhi Muslims. Bandopadhyay (1986), on the other hand declared that among nomadic Gujjars, the need for a closely knit social group for better nomadic pursuits necessitated the high rate of consanguinity. Also, restrictions in the occupational areas of Gujjars subsequent to the partition of India have caused social isolation which has led to an increasing trend of consanguineous marriages in younger generations. Furthermore, Bhalla and Bhatia (1974) conjectured that high level of inbreeding in Bhatias and few other north Indian Hindu communities owe perhaps to prolonged cultural contact with the predominant Muslim populations of the area they had inhabited (now in Pakistan); prior to their displacement.

The states of the western region of India, especially Maharashtra seem to conform more to the southern states than northern ones, and is believed to be influenced by Dravidian customs of consanguineous marriages. Such reasoning has been endorsed by Karve (1953), Sanghvi (1966), Malhotra (1979). Moreover, rigid marriage customs sometimes become vulnerable to local influence which may lead to the process of cultural assimilation. Malhotra (1976) put forth such interpretation for high levels of inbreeding in Dhangar castes of Maharashtra.

The main causal factors for the practice of consanguinity in the eastern region are rural background, low socio-economic status, and conformity to Islamic customs strengthening of familial ties. Haq (1976) also offered such explanations. Whereas, Banerjee and Roy (2002) and Bittles (2002) reported that Muslims in India, do not exhibit any north-south division in the preference of consanguinity and among them 23.3% of all marriages contracted belong to consanguineous category. The highest rates of consanguinity were reported in Muslim and Buddhist communities from India (Bittles 2002).

Furthermore, low incidence of consanguineous marriages among the north-eastern tribes is believed to be due to their advanced social and educational status under the influence of Christianity. Roychodhury (1976b) expressed similar opinion in his extensive study on the incidence of inbreeding in India.

The southern region strongly supports the socio-economic and cultural reasoning for high levels of inbreeding besides backing the theory of geographic barriers and small size of the isolates. Moreover, Sanghvi (1966) opined that the consanguineous regulation which has been enforced with great rigidity in the north had to be relaxed in the south to conform to the prevailing custom of great preference for consanguineous marriages at the time of entry of the Brahman influence in the first millennium B.C.

Various reasons responsible for high prevalence of consanguineous marriages in most of the communities of the southern region are: maintenance of family property; maintenance of family status in the higher socio-economic group; maintenance of cultivable land in larger subdivisions for growing food crops especially rice; joint family system especially of patriarchal type; extension of family ties; parental domination in decision-making and arranging marriages; preference for mates within kin groups; younger age at marriage; avoidance of conflict in interpersonal relationship; avoidance of dowry; overriding of education and urbanization by traditionalism and conservatism; various religious and cultural regulations; lower educational status; socio-economic status; least urbanization and rural settings; and in some groups especially Scheduled Tribes – size of mating units; isolation by distance and low occupational mobility. Various studies endorsed similar viewpoints (among others-Dronamraju and Meera Khan 1960, 1961, 1963b; Centerwall and Centerwall 1966; Rao et al. 1971; 1972; Reid 1973; Rao and Inbaraj 1977; Reddy and Reddy 1979; Devi et al. 1982; Pingle 1983; Reddy 1983, 1984; Rao and Murthy 1984; Bittles 2002; Denica et al. 2011; Lekshmi and Sudhakaran 2012). Furthermore, the

predominant practice of marriage with elder sister's daughter (uncle-niece) had been interpreted by Centerwall et al. (1969) as the traditional way of seeing that property that went passed on to her brother. Matrilineal customs, however, were made responsible for the absence of uncle-niece marriages in Kerala by Srinivasan and Mukherjee (1976).

4. TEMPORAL CHANGES

It is apparent that there is a general tendency for the consanguinity rate to decrease with the passage of time as the western countries experienced. Several factors play a role in minimizing the trend. They are: high educational status; urbanization and industrialization; legal sanctions against child marriages; diminishing family size, increasing influence of Christianity (especially in the north-eastern states of India); weakening of ethnic ties; health consciousness and awareness of harmful effects of inbreeding; increased mobility; better communication facilities; deviation from the traditional way of mate selection. Several investigators offered such explanations (among others – Dronamraju and Meera Khan 1961, 1963; Rao et al. 1971, 1972; Basu 1975; Rao and Inbaraj 1977; Saheb et al. 1981; Devi et al. 1982; Rao 1983; Reddy 1983; Saheb and Bhanu 1984). But the studies on temporal changes in incidence of consanguinity are not numerous. And, the decreasing pace has been found to be either very slow or not clear. Similar observations were forwarded by Dronamraju and Meera Khan (1961, 1963), Ali (1968), Rao et al. (1972), Rao and Inbaraj (1977), Srinivasan and Mukherjeee (1976), Malhotra et al. (1977), Saheb et al. (1981), Rao (1983), Reddy (1983). Interestingly, Basu and Roy (1972) found increased instances of consanguinity in post-partition Muslims as compared to their pre-partition counterparts.

In some Middle Eastern countries where high rate of consanguinity was prevalent, a recent decline has been reported (Hamamy et al. 2005), while a rise in the rate of consanguinity has been reported in the United Arab Emirites and Qatar (Al-Gazali et al. 1997; El Mouzan et al. 2008) and little or no change in the rate of consanguineous unions reported in the populations of South India; Pakistan and Iran (Ahamed et al. 1992; Bittles 2002; Bittles and Black 2010).

In sum, it is discernible from the above commentary that extensive studies in the Indian region and other South Asian countries are still awaited. More so, in this region incidences of consanguineous marriages have not declined yet. Such types of marriages are preferred not only in small isolates or geographically restricted communities, but also in numerically large castes, communities and tribes (various caste Hindus, Muslims, Christians, Buddhists, Parsis, Jews, and Scheduled Tribes) mainly due to diverse socio-economic and cultural reasons. Regional appraisal shows that the states of the southern region of India overwhelmingly prefer and practice consanguineous marriages across all major religious groups and ethnic entities except Kerala, where comparatively low incidence is observed, owning perhaps to higher educational status, influence of Christianity and absence of a major type of consanguineous marriage – (prevalent especially in the southern states), those between uncle-niece. In the western region, the marriage customs of many communities of Maharashtra seem to submit to Dravidian influence thereby preferring consanguineous marriages fairly frequently. In the other states of western region; and the northern region, eastern region, Islands, and other South Asian counties, except among Muslims and certain tribal groups, consanguinity is usually proscribed or preferred occasionally. However, the scenario is not clear and many areas are yet to be fully explored.

The discussion also portrays that consanguinity is often positively related with fertility, mortality, morbidity, and sterility. But there also exist contradictory evidences leading to ambiguities, and therefore, such generalized notions many require future revision.

While concluding, it must be mentioned that this compendium aims to provide a data base for furthering research and comparison studies regarding consanguinity and its effects on fertility, mortality and morbidity among the peoples of Indian region and other Sough Asian countries, considering its practical and academic importance also, it attempts to pinpoint the apparent lacunae, inconclusive and incomplete picture regarding the practice in various regions and populations.

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APPENDIX

Table 1: Consanguinity – Incidence, types and coefficient of inbreeding
Table 2: Consanguinity – Effects on fertility, mortality and sterility
Table 3: Consanguinity – Effects on morbidity

Table 1: Consanguinity - Incidence, types and coefficeint of inbreeding

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		**INDIA**											
2		***I. NORTH INDIA***											
3		*A. WESTERN HIMALAYA (S.No. 1,2)*											
4	**1.**	**Jammu &**	Ahmediyyas	Muslim	300								
5		**Kashmir**											
6			" "		3230		0.31	7.80	2.84	3.13	4.52		
7			Hindu		713				0.14	0.14	0.28		
8	**2.**	**Himachal**	" "		980						0.10		
9		**Pradesh**											
10	**3.**	**Punjab**	Muslim		327					0.61	0.61		
11			Hindu		1958			0.05	0.05	0.20	0.41		
12			Sikhs		2168	0.09				0.14	1.20		
13	**4.**	**Chandigarh**											
14	**5.**	**Haryana**											
15	**6.**	**Delhi (U.T.)**	Muslim		200								
16			Sunni										
17			Sunnis	Urban	140	2.14	3.57	15.71	7.14	2.14	6.43		
18			(Post-Partition)	Muslim									
19			Sunni	" "	572	0.87	1.75	2.80	4.55	2.27	3.15		
20			(Pre-Partition)										
21			Sheikh	" "	1158				10.45			6.82	8.12
22			Sunnis										
23			Moghul	" "	253				15.02			0.40	4.74
24			Sunnis										
25			Pathan	" "	72			13.89				2.78	6.94
26			Sunnis										
27	**7.**	**Uttar Pradesh**											
28		Lucknow	Sayyad	Urban	1000			27.70				3.00	12.70
29			Shia	Muslim									
30				Hindus	4910					0.02	0.02		
31				Muslim	1231				4.41		1.47		
32		*B. CENTRAL HIMALAYA (S.No. 7, Eight District of Uttar Pradesh)*											
33		Garhwal	Nomadic	Muslim	112	1.79			8.9	15.18	24.11	7.14	2.68
34			Gujjars	Pastoralist									
35				(S.T.)									
36	**8.**	**Rajasthan**											
37			Bhatia	Hindu	100			29.00				8.00	16.00
38			Vohra		412			31.60				5.80	3.40
39				" "	79			17.72	6.33	5.06	13.92		
40				Hindu	363				4.41	4.68	7.16		
41	***II.***	***WEST INDIA***											
42	**9.**	**Gujarat**	Hindu		2583					0.08	0.35		
43			Muslim		753	0.27		12.79	4.35	8.71	13.88		

*L_1 : Rural-Urban/Occupational/Hirarchiacal/Religion Group; *P : Patrilateral; *M : Matrilateral
1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

Table 1: Consanguinity - Incidence, types and coefficeint of inbreeding

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1											
2											
3											
4						38.67					Kashyap, 1976
5											
6			0.03			18.60			0.012		Roychoudhury, 1976b
7			0.42			0.98			0.0006		" "
8						0.10			0.0001		" "
9											
10						1.22			0.001		" "
11						0.72			0.004		" "
12						1.43			0.001		" "
13											
14											
15						31.00			0.0136		Krishan, 1975
16											
17				0.71		37.86				62.14	Basu and Roy, 1972
18											
19				0.35	0.17	15.91			84.09	" "	
20											
21		2.85	0.86			29.10			0.0124	70.90	Basu, 1975
22											
23		1.98				22.13			0.0112	77.87	" "
24											
25						23.61			0.0112	76.39	" "
26											
27											
28		4.00	2.00			49.40			0.0199	50.60	" "
29											
30						0.04			0.0000		Roychoudhury, 1976b
31						5.88			0.004		" "
32											
33				1.79	1.79	61.60	0.037	0.037			Bandyopadhyay et al.,
34											1986
35											
36											
37			4.00			57.00			0.025		Bhalla & Bhatia, 194
38			0.49			41.26			0.022		Basu, 1976
39						43.03			0.027		Roychoudhury, 1976b
40						16.25			0.010		" "
41											
42						0.43			0.0003		" "
43						39.73			0.025		" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**10.**	**Maharashtra**											
2		Puna &	Momins	Muslim	198	1.01		1.01	2.02	2.53	2.53	2.02	
3		Bombay											
4		" "	Memons	" "	84	3.57		9.52	4.76	1.19	2.38	2.38	
5		" "	Khojas	" "	95	1.05		2.11	4.21	3.16	4.21		
6		" "	Bohras	" "	285	1.40		3.51	7.02	3.86	2.46	1.40	
7		" "	Irani	" "	57	3.51		10.53	3.51	1.75	5.26		
8		" "	All Muslim		719	9.52		22.20	27.00	16.70	16.70		
9		Thana-	Nava Budha		131								
10		Murbad											
11		Taluk											
12		Nagpur	" "		185								
13		Akola-Washim	" "		113								
14		Taluk											
15		Thana-Murbad	Maratha		147								
16		Taluk											
17		Nagpur	" "		140								
18		Akola-Washim			109								
19		Thana-Murbad	Scheduled		30								
20		Taluk	Castes										
21		Nagpur	" "		72								
22													
23		Akola-Wahim	" "		83								
24		Taluk											
25		Bombay	Memans	Muslim	443				17.40			5.20	4.50
26		" "	Bohras	" "	493				16.60			5.30	4.10
27		" "	Khojas	" "	500				9.00			1.20	2.80
28		" "	Muslims &		2014								
29			Parsis										
30			All Groups-		5282	1.5				3.35	21.51		
31			Dhangar										
32			Ahir	Sheep Rearing	473					0.21	24.31		
33				Dhangar Caste									
34			Dange	Buffalo	383	1.04				6.23	26.89		
35				Rearing									
36				Dhangar Caste									
37			Gadhari		131						19.08		
38			Dhangar								19.08		
39			Halmat		21	14.29				14.29	14.29		
40			Hande		76		6.58			2.63	31.58		
41			Hatkar	Sheep Rearing	978	2.25				4.09	23.01		
42				Dhangar Caste									
43			Hatti Kankan		47	6.38				6.38	19.15		

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1											
2						11.11	0.0066				Malhotra et al., 1977
3											
4						23.81	0.0159				" "
5						14.73	0.0098				" "
6						19.64	0.0124				" "
7						24.56	0.0175				" "
8						17.52	0.0094				" "
9						32.80			0.0200		Mukherjee etal., 1978
10											
11											
12						8.10			0.0046		" "
13						28.30			0.0170		" "
14											
15						21.80			0.0110		" "
16											
17						7.90			0.0045		" "
18						22.00			0.0140		" "
19						20.00			0.0094		" "
20											
21						13.90			0.0074		" "
22											
23						22.90			0.0140		" "
24											
25						27.10			0.0122		Sanghvi et al., 1956
26						26.00			0.0126		" "
27						13.00			0.0064		" "
28						20.70			0.010		" "
29											
30						26.39			0.017		Malhotra,1979
31											
32						24.52			0.015		" "
33											
34						34.20			0.022		" "
35											
36											
37						19.08			0.012		" "
38											
39						42.86			0.036		" "
40						40.79			0.030		" "
41						29.35			0.020		" "
42											
43						31.91			0.024		" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin

*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3: Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			Kannade	Sheep Rearing	111					2.70	35.14		
2				Weaving									
3				Dhangar Caste									
4			Khatik	Meat Selling	253					2.37	15.81		
5				Dhangar Caste									
6			Kurmar		163					1.23	20.86		
7			Ladshe		133					3.76	18.80		
8			Mendhe		333	4.80				3.30	15.32		
9			Sangar	Blanket	232	0.86				6.03	12.93		
10				Weaving									
11				Dhangar Caste									
12			Shegar		165	0.61				3.03	21.82		
13			Telangi		75						18.67		
14			Thellari	Sheep Rearing	181					2.21	59.67		
15				Dhangar Caste									
16			Unni Kankar		81	4.94				9.88	14.81		
17			Varhade		151					1.99	10.60		
18			Zende	Agriculturist	252	6.35				7.54	15.08		
19				Dhangar Caste									
20			Zade		152					4.61	13.82		
21			Gadhari		64						18.75		
22			Nikhar										
23			Khutekar	Sheep Rearing	827	0.60				2.06	18.86		
24				Weaving									
25				Dhangar Caste									
26		Bombay	Hindus		3520								
27		West Khandesh	Bhil	Tribe	1350					39.40			2.10
28		Bombay	Agri		520					7.70			
29			Bhil	Tribe	124					32.30			
30			Katkares		97					42.30			
31		" "	Desasth		490					1.40			2.90
32			Rigvedi										
33			Brahmans										
34		" "	Gaur Saraswat		510					3.70		0.80	1.40
35			Brahmans										
36		" "	Chandraseniya		484					4.30		0.60	0.80
37			Kayastha										
38			Prabhus										
39		" "	Somvanshi		476					3.20			1.30
40			Kshatriya										
41			Pathares										
42		" "	Marathas		540					10.00			1.90
43		" "	Mahars		500					8.80			2.60

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1						37.84			0.024		Malhotra, 1979
2											
3											
4						18.18			0.011		" "
5											
6						22.08			0.014		" "
7						22.56			0.014		" "
8						23.42			0.018		" "
9						19.83			0.013		" "
10											
11											
12						25.45			0.016		" "
13						18.67			0.012		" "
14						61.88			0.039		" "
15											
16						29.63			0.022		" "
17						12.58			0.008		" "
18						28.97			0.022		" "
19											
20						18.42			0.011		" "
21						18.75			0.012		" "
22											
23						21.52			0.014		" "
24											
25											
26						8.24					
27			19.90			59.20	0.025				Sandhvi et al., 1956
28			0.20			10.00	0.004	0.008		40.80	Karve, 1957
29						32.26	0.020				Sandhvi et al., 1956
30						42.27	0.026				Malhotra, 1978
31			1.40			5.70					" "
32						5.70					Sanghvi et al., 1956
33											
34			1.20			7.10					" "
35											
36			1.20			7.00					" "
37											
38											
39			0.20			4.60					" "
40											
41											
42						11.90					" "
43						11.40					" "

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Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		Bombay	Parsis		578					13.50		2.80	1.70
2		" "	Christians(i)		1063					1.15		0.85	1.35
3			Christians(ii)										
4			Hindus		952	2.73				2.50	6.20		
5			Bhils	Tribe	178			1.12	0.56	23.60	47.75		
6		**11. Goa Daman and Diu**											
7		**12. Dadra and Nagal Haveli (U.T.)**											
8		***III. EAST INDIA***											
9		*C. EASTERN HIMALAYA (S.No. 13 to 20 and Darjeling District of West Bengal)*											
10		**13. Arunachal**	Tribes		1013	0.20		0.10	0.20	0.69	1.78		
11		**Pradesh**											
12			Bhuddhists		108	3.70					2.78		
13		**14. Assam**	Hindus		1071	0.09			0.09	0.09	0.47		
14			Christians		516	0.19			0.19	0.97	1.16		
15			Tribes		49					2.04	2.04		
16			Bengali		203								
17			Muslim										
18		**16. Manipur**	Christian	Scheduled	1045			0.38	0.19	0.57	9.47		
19				Tribes									
20		**17. Mizoram**											
21		**18. Tripura**											
22			Hindus		1404				0.07	0.14			
23			Muslim		693	0.14		1.73	0.72	0.87	1.73		
24			Buddhists		104				4.80	2.88	3.85		
25		**19. Meghalaya**											
26		**20. Sikkim**											
27		**21. West Bengal**											
28		24 Parganas	Muslim		471				8.28			0.21	8.70
29		Mominabad	Mominabad		145				24.83				2.07
30			Muslim										
31		Megha	Megha Muslim		187				22.99				2.14
32		Patkel-Danga	Patkel-Danga		175				11.43				1.71
33			Muslim										
34		Kabiraj Pur	Kabiraj Pur		131				16.79				0.76
35			Muslim										
36		Ekdala	Muslim		118				26.27				1.69
37		Lalita Kundu	Muslim		79				22.78				2.53
38			West Bengal		835				20.36				1.80
39			Muslim										
40		24 Parganas	Dakshin Rarhi										
41			Kayasthas										
42			Hindu		1963								
43			Muslim		63				4.41		1.47		

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1						18.00					Sanghvi et al., 1956
2			0.40			3.55			0.001		" "
3											
4			0.20			11.66			0.009		Rochoudhury, 1976b
5						73.03			0.046		" "
6											
7											
8											
9											
10			0.10			3.06			0.002		" "
11											
12						6.48			0.006		" "
13						0.75			0.0005		" "
14						2.52			0.002		" "
15						4.08			0.003		" "
16						3.00			0.003		Mukherjee &
17											Chakravarti, 1977
18						10.62			0.007		Roychoudhury, 1976b
19											
20											
21											
22						0.21			0.0001		" "
23						5.19			0.003		" "
24						11.54			0.007		" "
25											
26											
27											
28			2.12			19.31			0.0067		Barua, 1976
29						26.90			0.0158		Haq, 1976
30											
31						25.13			0.0147		" "
32						13.14			0.0074		" "
33											
34						17.56			0.0106		" "
35											
36						27.97			0.0166		" "
37						25.32			0.0146		" "
38						22.16			0.0135		" "
39											
40									0.0078		Sarkar, 1967
41											
42									0.0000		Roychoudhury, 1976b
43						5.88			0.004		" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**22.**	**Bihar**											
2			Muslim						19.89				
3													
4			Hindu		4628	0.02				0.50	0.30		
5			Muslim		388	0.26		1.55	1.55	2.58	3.61		
6			Christians		257					1.17	1.17		
7			Tribes		215	0.47			0.47	9.77	20.93		
8	**23.**	**Orissa**											
9			Vaddabalija of	Migrants	715	11.33				7.97	17.90	4.62	3.22
10			Penticotta	Fiashermen									
11			Vadabalija of	Migrant	501	6.19				11.58	11.78	2.20	1.40
12			Vadapeta	Fishermen									
13			Jalary	Migrant	171	3.51				11.70	11.70	2.92	1.17
14				Fishermen									
15			Hindu		1008	0.30				1.59	2.28		
16			Christians		158					0.63	3.80		
17			Tribes		107	1.87				37.78	13.09		
18	***IV.***	***CENTRAL INDIA***											
19	**24.**	**Madhya Pradesh**											
20													
21			Hindus		1145								
22			Scheduled		147								
23			Castes and										
24			Harijans										
25			Muslim and		351								
26			Bohras										
27			Christians		72								
28			Gond	Tribe	293					15.70	43.34		
29		Bastar District	Ghotual	Scheduled									
30			Muria	Tribe									
31		Bastar District	Scheduled										
32			Castes										
33			Brahmins		315								2.22
34			Vaishyas		316				1.27				6.33
35			Kshatriya		248	1.61			2.42				7.26
36			Maharashtrians		266	3.38			2.63				9.02
37			Muslim		173	8.09			21.97				30.06
38			Bohras	Muslim	178	6.74			16.29				35.39
39		Indore	Rural		65								
40			Population										
41		Ujjain	" "		129								
42		Shajapur	" "		126								
43			" "		320								

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1			35.06			54.95	0.027	0.154			Anjani &
2											Roy, 1989
3						0.82			0.0005		Roychoudhury, 1976b
4						9.54			0.006		" "
5						2.33			0.001		" "
6						31.63			0.020		" "
7											
8						45.03	0.0323	0.0368		54.97	Reddy, 1983
9											
10						33.13	0.0232	0.0225		66.87	" "
11											
12						30.99	0.0201	0.0194		69.01	" "
13											
14						4.17			0.003		Roychoudhury, 1976b
15						4.43			0.003		" "
16						52.34			0.034		" "
17											
18											
19											
20											
21						8.65			0.0018		Goswami, 1970
22						28.57			0.0145		" "
23											
24											
25						59.26			0.0263		" "
26											
27						25.00			0.0069		" "
28						59.04	0.037				Yadav, 1968
29						10.13					Basu et al., 1989
30											
31						4.49					" "
32											
33						2.22			0.0003	97.78	Goswami, 1970
34						7.59			0.0019	92.41	" "
35						11.29			0.0047	88.71	" "
36						15.04			0.0073	84.96	" "
37						60.12			0.0287	39.88	" "
38						52.81			0.0241	41.57	" "
39									0.0120		
40											
41									0.0198		" "
42									0.0266		" "
43									0.0227		" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene ; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C Parallel		1C Cross		*1C1	*2C
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		Indore	Urban		260								
2			Population										
3		Ujjain	" "		112								
4		Bhopal	" "		42								
5			Total		414								
6			Population										
7			Baiga		1								
8			Hindus		2598	0.07		0.08	0.04	1.50	1.54		
9	**V.**	**SOUTH INDIA**											
10	**25.**	**Karnataka**		Rural	1913	7.74				7.76	12.34		
11		Bangalore	Hospital		3254	12.78			9.99				5.50
12			Patients										
13		" "	" "	Hindus	2329	15.71				10.43			5.58
14		" "	" "	Muslims	616	5.19				10.88			6.33
15		" "	" "	Christians	276	6.52				5.43			3.62
16					3297	12.86				9.92			5.49
17		" "	" "	Hindu	2413	15.58				10.15			5.51
18		" "	" "	Muslim	642	4.83				9.81			5.92
19		" "	" "	Christians	293	5.80				6.48			3.41
20		" "	" "	Others	2								
21		Mysore	Kanarese	Hindu	212				21.70				1.42
22			Brahman										
23				Muslims	76	1.32				9.21	17.10		
24				Hindu		18.30			11.00				2.20
25				Muslim		4.30			16.3				2.90
26				Christians		7.90			6.6				2.50
27			Kodavas	Hindu	1279					0.47	1.09	0.08	0.16
28			Amma	Hindu	297					1.01	2.36	1.68	0.34
29			Kodavas										
30		Mysore	Mysore City		282								
31			Population										
32					43968	14.53			10.98			2.17	
33			Hindu		52009	21.03			10.19				2.19
34			Muslim		10789	4.57			17.81				2.92
35			Christians		2536	10.32			6.62				2.11
36			Study										
37			Population										
38			Population										
39			with single										
40			gene disorder										
41			only										
42			Population										
43			with auto-										

*L_1 : Rural-Urban/Occupational/Hirarchiacal/Religion Group; *P : Patrilateral; *M : Matrilateral
1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1									0.0098		Goswami, 1970
2											
3									0.0193		" "
4									0.0284		" "
5									0.0198		" "
6											
7									0.0039		Sarkar, 1967
8						3.23			0.002		Roychoudhury, 1976b
9											
10			10.51			37.74				60.79	Hann, 1985
11			1.01			29.29				70.71	Devi et al., 1981
12											
13						31.73				68.27	" "
14						22.40				77.60	" "
15						15.58				84.42	" "
16			1.15			29.42				70.58	" "
17			1.04			32.28			0.02671596		" "
18			1.40			21.96			0.0131 493		" "
19			1.37			17.06			0.0118 236		" "
20									0.0000 2		" "
21						23.11			0.0130		Chakravartti, 1968
22											
23						27.63			0.018		Roychoudhury, 1976b
24			2.8			34.30			0.0301	65.60	Bittles et al., 1985
25			2.10			25.60			0.0159	74.50	" "
26			2.30			19.30			0.0143	80.70	" "
27						1.80			0.0010		Saheb et al., 1981
28						5.39			0.0027		" "
29											
30						25.89					Bhattacharya, 1978
31											
32			8.89			36.57					
33			3.47			36.80				63.43	Bittles et al., 1986
34			2.39			27.70			0.0330	63.12	Bittles et al., 1987
35			2.44			21.49			0.0173	72.31	" "
36						48.70			0.0174	78.51	" "
37									0.0414	51.3	Devi et al., 1987
38											
39						45.20			0.0513	54.8	" "
40											
41											
42						60.90			0.625	39.1	" "
43											

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene ; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%) Uncle - Niece *P	Uncle - Niece *M	1C Parallel *P	1C Parallel *M	1C Cross *P	1C Cross *M	*1C1	*2C
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			somal										
2			recessive										
3			disorders only										
4			General										
5			Newborn										
6			Population										
7			Hindu		349	25.21			11.75				4.87
8			Muslim		43	6.98			27.91				2.33
9			Christians		12								
10			Total		407	22.36			13.02				4.42
11			Hindus		1266	11.29		0.08	0.08	6.24	12.64		
12	**26.**	**Andhra Pradesh**											
13		Tirupati,	Padmasalis	Artisans	68	7.40				22.00	35.20	2.90	2.90
14		Chittor											
15		District											
16		" "	Kummari	Artisans	72	15.30				6.90	11.10	1.40	1.40
17		" "	Madiga	Harijan	29	6.90				13.80	13.80	10.30	6.90
18		" "	" "	Harijan	96	3.10				4.20	2.10	3.10	1.00
19		" "	Golla	Shepherd	20	20.00					5.00	5.00	
20		Madanapalli	Vadde	Stone	32	21.90					3.10		
21		Chittor		Breakers									
22		District											
23		" "	Mala	Harijan	7								
24		Tirupati,	" "	Harijan	49	12.30				4.10			2.10
25		Chittor											
26		District											
27		" "	Vadagalai	Brahman	104	5.80				8.70	3.80	0.90	
28			Iyengar	(Tamil)									
29		" "	Shaik &	Muslim	77			1.30	1.30	3.90	18.20		
30			Syed										
31		" "	Gajulu	Traders	63	9.60				3.20			
32			Balija										
33													
34													
35		" "	Rajulu	Farmers	56	1.80				8.80	7.20		
36		" "	Gampasati	Farmers	31	3.20				3.20	9.60		
37			Kamma										
38		4 Village*	" "	Farmers	409	4.90				2.20	4.60	2.00	0.50
39													
40		Tirupati*	Acharulu	Artisans	53	7.60				1.90			
41		Madana Palli*	Pekakanti	Farmers	34	4.20				4.20			4.20
42			Reddy										
43		Tirupati &	Chakali	Washerman	44					2.30		2.90	

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew *P	Aunt - Nephew *M	Total	Coefficeint of inbreeding *R_1	Coefficeint of inbreeding *R_2	Coefficeint of inbreeding *R_3	Non-consang-guineous marriages (%)	Authors
15	16	17	18	19	20	21	22	23	24	25	26
1											
2											
3											
4						32.20			0.0271	67.80	Devi et al., 1987
5											
6											
7			10.89			52.72				44.99	" "
8			9.30			46.51				53.49	" "
9			8.33			8.33				91.67	" "
10			10.57			52.83				46.93	" "
11						30.33			0.026		Roychoudhury, 1976b
12											
13						70.40	0.0464				Mukherje et al., 1977
14											
15											
16						36.10	0.0310				" "
17						51.70	0.0302				" "
18						13.50	0.0089				" "
19						30.00	0.0297				" "
20						25.00	0.0293				" "
21											
22											
23						0.00	0.0000				" "
24						18.50	0.0212				" "
25											
26											
27						19.20	0.0153				" "
28											
29						24.70	0.0154				" "
30											
31						12.80	0.0145				" "
32											
33											
34											
35						17.80	0.0123				" "
36						16.00	0.0120				" "
37											
38	0.30					14.50	0.0110				" "
39											
40						9.50	0.0109				" "
41						12.60	0.0085				" "
42											
43						5.20	0.0021				" "

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Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		Madana Palli*											
2		Tirupati,	Madiga[1]	Harijan	10	10.00							
3		Chittoor											
4		District											
5		" "	Mala[1]	Harijan	12	16.60			8.30			8.30	8.30
6		" "	Brahmin[1]	Brahmin	11				18.20				
7		" "	Muslim[1]	Muslim	7				28.60				
8		" "	Balija[1]	Traders	57	12.30			5.30			5.30	1.80
9		" "	Rajulu[1]	Farmers	5	20.00			20.00			20.00	
10		" "	Kamma[1]	Farmers	30	23.40			26.70			6.70	
11		" "	Reddy[1]	Farmers	41	12.20			17.10			2.40	2.40
12		" "	Urban	Harijan									
13			Madiga										
14		" "	Urban Mala	Harijan									
15		Tirupati,	Urban	Brahmin									
16		Chittor	Brahmin										
17		District											
18		" "	Urban										
19			Muslim										
20		" "	Urban Balija	Traders									
21		" "	Urban Rajulu	Farmers									
22		" "	Urban Kamma	Farmers									
23		" "	Urban Reddy	Farmers									
24			Hindu		6374								
25			Kolam	Tribe	680	5.00			15.00				
26			Hindus		984	9.86			22.36			0.61	
27			Tribes		291	17.52			30.58				
28			Telega-Kapu	Hindu	616	5.52				2.76	12.66		
29			Raj Gond	Tribe	397					40.88	59.12		
30			Kolam	Tribe	283	0.78				48.06	51.94		
31			Pardhan	Tribe	114			1.67		29.50	68.90		
32			Andhs	Tribe	99	4.50				9.10	86.40		
33			Mathuras	Tribe	93	16.70				16.70	66.70		
34			Tribes		986								
35			Malas		885								
36		Pattusali	People of	Hindus	265	0.75			44.90				2.64
37			Pattusali										
38			Telega		92								
39													
40			Yadava		76								
41			Velama		150								
42			Pattusalis		265	0.75		44.90					2.64
43			Muslims		40								
44			Konda Reddi-1		137	21.13			78.90				

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1											
2						10.00	0.013				Mukherjee et al., 1977
3											
4											
5						41.50	0.030				" "
6						18.20	0.011				" "
7						28.60	0.018				" "
8						24.70	0.022				" "
9						60.00	0.045				" "
10						56.80	0.048				" "
11						34.10	0.027				" "
12						13.50	0.009				" "
13											
14						18.50	0.021				" "
15						21.30	0.017				" "
16											
17											
18						24.70	0.015				" "
19											
20						14.40	0.015				" "
21						17.80	0.012				" "
22						14.20	0.012				" "
23						12.50	0.009				" "
24						42.96			0.033		Sanghvi, 1966
25						20.00	0.015	0.021			Chaktravartti, 1968
26						35.36			0.027		Veerraju, 1973
27						48.11			0.041		" "
28						27.44			0.021	72.56	Reid, 1973
29						34.51	0.022	0.026			Pingle, 1983
30						45.58	0.029	0.030			" "
31						53.51	0.033	0.046			" "
32						22.22	0.015	0.025			" "
33						6.45	0.005	0.007			" "
34						36.00			0.025		" "
35									0.0242		Reddy, 1983
36			0.38			48.68			0.029		Rao & Mukherjee, 1975
37											
38						18.50			0.013		Choudhury & Reddy, 1977
39											Reddy,1977
40						42.10			0.029		" "
41						47.30			0.040		" "
42			0.38			48.68			0.0299	51.32	Reddy & Rao, 1978
43						47.50			0.0296		Dube, 1960
44						51.80	0.039	0.050			Veerraju, 1973

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*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			Konda Reddi-2		152	6.38			89.40				
2			Koya Dora-1		154	45.57			54.40				
3			Koya Dora-2		140	13.13			83.80				
4			Konda Kammara		150	41.41			58.60				
5			Valmiki-1		119								
6			Valmiki-2		119	11.29			88.70				
7			Bagatha		123	9.09			90.90				
8			Gadaba		128	6.19			94.80				
9			Savera		100								
10		Vishakha-	Sudras	Hindu	182		32.26			40.32	4.84	12.90	9.68
11		patnam		Craftsmen,									
12				Agriculturist									
13		" "	Brahmans	Hindu Clerics	40					55.56	22.22	22.22	
14		" "	Komatis	Hindu	37		26.67			66.67			6.67
15				Merchants									
16		" "	Kshatriyas	Hindu Warriors,	20		5.00			10.00	5.00		
17				Agriculturist									
18		" "	Harijans	Hindu Lower	13	16.67	33.33			33.33			16.67
19				Caste									
20		" "	No Caste		4								
21		" "	Christians	Christians	26		3.85			11.54			3.85
22		" "	Muslims	Muslim	5					100.00			
23		" "	Total		327	0.98	27.45			47.06	5.88	9.80	8.82
24			Population										
25		" "	Brahman	Hindu Clerics	40								
26			Inpatients										
27		" "	Kahatriya	Hindu Warriors,	25								
28			Inpatients	Agriculturist									
29		" "	Komati	Hindu	36								
30			Inpatients	Merchants									
31		" "			35								
32		" "			16								
33		" "			47								
34		" "			22								
35		" "			14								
36		" "			26								
37		" "			17								
38		" "			15								
39		" "			20								
40		" "			21								
41		" "			12								
42		" "			5								
43		" "			16								

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1			4.26			61.84	0.040	0.060			Veerraju, 1973
2						51.30	0.047	0.054			" "
3			3.03			70.60	0.040	0.067			Veerraju, 1978
4						65.56	0.058	0.070			" "
5						69.17					" "
6						52.11	0.036	0.048			" "
7						62.70	0.043	0.060			" "
8						60.17	0.039				" "
9						72.00					" "
10						34.07				65.93	Dronamraju & Meera
11											Khan, 1960
12											
13						22.50				77.50	" "
14						40.54				59.46	" "
15											
16						20.00				80.00	" "
17											
18						46.15				53.85	" "
19											
20										100.00	" "
21						19.23				80.77	
22						20.00				80.00	" "
23						31.19			0.0228	68.81	" "
24											
25						27.50					Dronamraju & Meera
26											Khan, 1963
27						20.00					" "
28											
29						41.67					" "
30											
31						48.57					" "
32						25.00					" "
33						40.43					" "
34						40.91					" "
35						35.71					" "
36						42.31					" "
37						52.94					" "
38						26.67					" "
39						25.00					" "
40						47.62					" "
41						33.33					" "
42						40.00					" "
43						50.00					" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene ; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Vishakha-				10								
2	patnam												
3	"	"			8								
4	"	"			5								
5	"	"			167								
6	"	"			28								
7	"	"	Christian	Christian	9								
8			Inpatients										
9	"	"	Muslim	Muslim	1								
10			Inpatients										
11	Nellore		Reddy	Agriculturiest	59	1.69				3.39	11.86	3.39	3.39
12	District		(Kapus)										
13	"	"	Yadava	Shephered	82	17.07				9.76	3.66	1.22	6.10
14			(Gollas)										
15	"	"	Madiga	Scheduled	68	14.71					13.24	1.47	
16				Caste									
17	Hyderabad		Hospital Data		1091	1.01		11.09				0.73	0.73
18	Mahbubnagar		Madiga		168	4.76#				5.40[1]	23.20[2]		
19	District												
20	"	"	Mala		88	3.41#				1.10[1]	38.60[2]		
21	"	"	Reddy		321	3.12#				1.30[1]	17.80[2]		
22	"	"	Vyasyas Rural		81	1.23				1.20[1]	11.10[2]		
23	"	"	Vyasyas Urban		163	3.07#				0.60[1]	24.50[2]		
24	West Godavari		Kama	Agriculturies	241		3.73			2.90	9.96		
25	District												
26	Mahbubnagar		Rural Madiga	Farm Labourer	168								
27	District												
28	"	"	Rural Mala	Farm Labourer	88								
29	"	"	Rural Reddy	Agriculturist	321								
30	"	"	Rural Vyasya	Trader	243								
31	Chittor		Mala (SC)		551[a]	2.36				16.33	19.78	0.18	
32	District												
33	"	"	"	"	139[b]	4.32				10.07	15.11	0.72	
34	"	"	"	"	80	1.25				12.50	20.00		
35	"	"	"	"	71					9.86	16.90		
36	"	"	"	"	34					11.76	26.47		
37	"	"	"	"	10	10.00				20.00			
38	Nellore District		Telegu	Hindu	106	13.21				14.15	22.64	1.89	2.83
39				Fishermen									
40				Rural	308	17.86				1.62	37.34		
41				Fishermen									
42	Vadapalem		Jalari	Low Caste	102	13.73				7.84	25.49		
43				Fishermen									

*L_1 : Rural-Urban/Occupational/Hirarchiacal/Religion Group ; *P : Patrilateral; *M : Matrilateral
1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew *P	Aunt - Nephew *M	Total	Coefficeint of inbreeding *R_1	Coefficeint of inbreeding *R_2	Coefficeint of inbreeding *R_3	Non-consang-guineous marriages (%)	Authors
15	16	17	18	19	20	21	22	23	24	25	26
1						40.00					Dronamraju & Meera
2											Khan, 1963
3						25.00					" "
4						40.00					" "
5						43.71					" "
6						35.71					" "
7						22.22					" "
8											
9											" "
10											
11									0.0154		Rao & Reddy, 1983
12											
13	2.44								0.0312		" "
14											
15									0.0271		" "
16											
17	0.18		5.59			19.34			0.0134	80.66	Murty and Jamil, 1972
18			3.00				0.025	0.036		63.70	Rao & Murty, 1988
19											
20			2.30				0.028	0.055		54.60	" "
21			4.70				0.014	0.029		73.20	" "
22			1.20			14.73	0.010	0.017		85.20	" "
23			6.80			34.79	0.022	0.039		65.00	" "
24			23.08			21.58			0.0162	78.42	Ray, 1979
25											
26							0.0247				Rao & Murty, 1984
27											
28							0.0276				" "
29							0.0137				" "
30							0.0185				" "
31						38.66				61.34	Reddy, 1984
32											
33						30.22				69.78	" "
34						38.75				61.25	" "
35						26.76				73.24	" "
36						38.24				61.76	" "
37						30.00				70.00	" "
38						54.72	0.0405	0.0448		45.28	Reddy & Rao, 1978
39											
40						56.82	0.0470	0.0690		43.18	Sanghvi, 1966
41											
42						47.06	0.0380	0.0540		52.94	Veerraju, 1973
43											

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		Tirupati	Vadagalai	Tamil	104	5.80				12.50		0.090	
2				Brahman									
3			Telugu		82								
4			Brahmans										
5			Hindus		2396	4.05		0.17		10.20	20.20	0.04	
6			Muslims		65	1.54		6.20	1.50	13.90	23.10		
7			Christians		24					4.20	16.70		
8			Tribes		204	2.90				23.50	25.50		
9		Vishakha-	Kapu (Naidu)		230	12.61			23.91	12.61			
10		patnam											
11		East Godavari	Kapu (Telegu)		246	7.72			13.41	3.25			7.32
12		" "	Kapu (Balija)		178	6.18			10.67	3.93		1.12	
13		" "	Kapu (Telaga)		86	3.49			5.81	8.14		1.16	6.98
14			patients		740	8.38			15.14	6.89		0.41	3.24
15					2177	7.21			16.63				
16													
17			Parents of		10								
18			Patients with										
19			malformation										
20			Patients having		14								
21			Children with										
22			malformation										
23			Mothers with		55								
24			abortions										
25			Parents of		38								
26			Patients with										
27			Pulmonary										
28			T.B.										
29			Rural Reddy	Agriculturist	179	12.29				7.82	18.44	3.35	
30			Rural Mala	Scheduled	367	8.17				6.81	14.99	1.36	0.27
31				Caste									
32		Hyderabad	Reddy	Agriculturist	369	1.63			14.40				
33		City											
34		Rural Areas	" "	Agriculturist	2490	10.60			31.40				
35		of Andhra											
36		Pradesh											
37		Hyderabad	Mala	Scheduled	458	1.30			21.10				
38		City											
39		Rural Areas	" "	Scheduled	1185	6.80			32.50				
40		of Andhra		Caste									
41		Pradesh											
42		Nellore District	Desuri Kapu	Agriculturist	927	22.44			19.31				
43		" "	Devanga	Artisan Caste	866	17.78			24.60				

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1						19.20			0.0153		Mukherjee &
2											Bhaskar, 1974
3						25.60			0.0190		Sanghvi, 1966
4											
5			0.08			34.80			0.024		Roychoudhury, 1976
6						46.20			0.030		" "
7						20.80			0.013		" "
8						52.00			0.034		" "
9						49.13					Chakravartti et al.,
10											1971
11						31.71					" "
12						21.91					" "
13						25.58					" "
14						34.05					" "
15			6.71	0.05		30.59			0.0209	69.41	Dronamraju &
16											Meera Khan, 1963
17									0.0250		" "
18											
19											
20									0.0315		" "
21											
22											
23									0.0340		" "
24											
25									0.0329		" "
26											
27											
28											
29						41.90			0.0326	58.10	Reddy, 1986
30						31.60			0.0333	68.39	" "
31											
32						22.50					Nair et al., 1977
33											
34											Sanghvi, 1966
35											
36											
37											Nair et al., 1977
38											
39											Sandhvi, 1966
40											
41											
42			5.72			47.46				52.54	Reddy, 1987
43			5.89			48.27				51.73	" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		Nellor Dist	Mala	Scheduled	7.31	16.01			21.61				
2				Caste									
3		Chittoor	Pokanati		163	22.09			17.79				
4		District	Reddy										
5		" "	Pedakanti		255	28.24			22.35				
6			Reddy										
7			Chenchus	Tribe	200	1.00			20.50			5.50	8.00
8			Raj Gond	Tribe	337				30.20			1.20	9.80
9			Pardhan	Tribe	170				13.60			2.40	8.80
10			Kolam	Tribe	1282				29.30			1.20	6.40
11			Chenchu	Tribe	206	1.00			19.90			5.30	7.80
12			Koya	Tribe	316				22.40			1.10	12.20
13			Chenchu	Tribe	504	2.18			17.66			1.79	4.76
14			Savara	Tribe	109	26.60			34.88				
15			Jatapu	Tribe	116		23.28			51.72			
16			Mukha Dora	Tribe	101		20.80			59.40			
17			Godaba	Tribe	106	33.02			48.11				
18			Konda Dora	Tribe	103	13.60			49.50				
19		Vishakha-	Brahmin	Upper Class	619		22.62			77.38			
20		patnam Dist		Hindu Clerics									
21		" "	Jalari	Low Caste	498		48.21			51.79			
22				Fishermen									
23		Nelgonda &	Banjara	Tribe	280		3.93			13.57	11.43		
24		Chittoor											
25		District											
26				Rural	340								
27				Population									
28				Rural & Urban	6945	9.2				33.30			
29				Population									
30			Christians		215								
31			Hindu, A		82								
32			Hindu, B		4465								
33			Hindu, C		1493								
34			Muslims		356								
35			Others		334								
36			Parents of		486	6.38			16.87			2.06	0.62
37			School										
38			Children										
39			Parents of		746		5.63		15.15			0.94	2.55
40			Patients										
41			Patients		605		10.74		19.83			3.47	4.13
42			Patients'		340		5.29		14.41			22.94	7.65
43			Children										

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1			3.01			40.63				59.37	Reddy, 1987
2											
3						39.88	0.0413	0.0482		60.12	Redy & Reddy, 1979
4											
5						50.59	0.0493	0.0554		49.41	" "
6											
7						35.00			0.0170		Sirajuddin, 1984
8						53.90			0.0173		Ramesh & Murthy, 1979
9						30.20			0.0120		" "
10						37.60			0.0239		" "
11						35.90			0.0187		" "
12						38.00			0.0176		" "
13			2.98			29.37	0.0151			76.63	Sirajuddin & Basu, 1984
14						61.48			0.055		Pratap et al., 1980
15						75.00			0.061		" "
16						80.20			0.061		" "
17						81.13			0.071		" "
18						63.10			0.048		Veerraju., 1978
19						13.57				86.43	Sri Kumari et al., 1985
20											
21						39.16				60.43	" "
22											
23						28.93				71.07	Saheb & Naik, 1983
24											
25											
26						17.94					Dube, 1959
27											
28						42.50				57.50	Sanghvi, 1966
29											
30						40.50			0.029		" "
31						25.60					" "
32						42.80					" "
33						42.90					" "
34						36.20			0.025		" "
35						48.80					" "
36						25.93			0.0194	74.07	Dronmraju & Meera
37											Khan, 1963
38											
39	0.27	0.13	0.40			25.07			0.0175	74.93	" "
40											
41	0.66	0.17	0.33			39.34			0.0278	60.66	" "
42	0.59	0.29	0.29			33.82			0.0186	66.18	" "
43											

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			Illiterate	Rural	254								
2			Inpatients										
3			Literate	Rural	106								
4			Inpatients										
5			Illiterate	Urban	77								
6			Inpatients										
7			Literate	Urban	113								
8			Inpatients										
9			Parents of		68		7.35				16.18		
10			Patients with										
11			Cancer										
12			Pulmonary T.B.[1].		38		15.79				21.05		
13													
14			Other kind of		39		2.56				25.64		
15			T.B.[1].										
16			Diseases of		61		1.64				16.39		
17			C.V.S.[1].										
18			Diseases of		62		4.84				12.90		
19			C.N.S.[1]										
20			Respiratory		58		10.34				18.97		
21			Diseases[1]										
22			Deficiency		35		5.71				14.29		
23			Diseases[1]										
24			Injuries[1]		40		2.50				15.00		
25			Congential		24		8.33				29.17		
26			Malformations[1]										
27			Mala (Tangala)		551		2.36				16.33	19.78	0.18
28			Mala (Rampala)		139		4.32				10.07	15.11	0.72
29			Mala		80		1.25				12.50	25.00	
30			(Maladasari)										
31			Mala		71						9.86	16.90	
32			(Pakanati)										
33			Mala		34						11.76	26.47	
34			(Murikinati)										
35			Mala		10		10.00				20.00		
36			(Bommanati)										
37		Chittoor	Mala	Scheduled	885		2.37		33.67				0.23
38		District		Caste									
39			Venticular		41								
40			Septal Defect[2]										
41			Pulmonary		34								
42			Stenosis[2]										
43			Other Diseases[2]		44								

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S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1						47.24				52.76	Drnamraju & Meera Khan, 1963
2											
3						41.51				58.49	" "
4											
5						40.26				59.74	" "
6											
7						28.32				71.68	" "
8											
9			1.47			25.00				75.00	" "
10											
11											
12			5.26			42.11				57.89	" "
13											
14			2.56			30.77				69.23	" "
15											
16			4.92			22.95				77.05	" "
17											
18			3.23			20.97				79.03	" "
19											
20			6.90			36.21				63.79	" "
21											
22			11.43			31.43				68.57	" "
23											
24			2.50			20.00				80.00	" "
25			4.17			41.67				58.33	" "
26											
27						38.66	0.0257	0.0277		61.34	Reddy, 1983
28						30.22	0.0213	0.0243		69.78	" "
29						38.75	0.0250	0.0328		61.25	" "
30											
31						26.76	0.0167	0.0211		73.24	" "
32											
33						38.24	0.0239	0.0331		61.76	" "
34											
35						30.00	0.0245	0.0125		70.00	" "
36											
37						36.27			0.0241	63.73	" "
38											
39						24.39			0.0130	75.61	Vishnupriya et al., 1981
40											
41						23.53			0.0129	76.47	" "
42											
43						36.36			0.0235	63.64	" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			Pooled CHD1	119									
2													
3			Total CHD		93								
4			Group										
5			Control Group	100									
6		Sriharikota	Yanadi		64		14.06			42.20			
7		Island											
8		" "	Yanadi-1		17		3.90			29.90			
9		" "	Yanadi-2		217		12.44			29.50			
10		" "	Yanadi-3		136		9.56			30.90			
11		" "	Yanadi		422		9.34			19.30			
12		Nelgonda	Banjara-1		113					10.62			
13		District											
14		Chittoor	Banjara-2		167		6.59			34.73			
15		District											
16			Banjara		280		3.93			25.00			
17		Sriharikota	Chenchus-1		201		14.43			40.30			
18		Island											
19	**27.**	**Tamil Nadu**											
20			Hospital Data		3433								
21			(Out-Patients)										
22			Patients	All Religions	1037		13.20			17.80		2.22	2.03
23			(New Born)										
24			Asari	Hindu High	331								
25				Caste									
26			Brahman	" "	162								
27			Lingayat	" "	66								
28													
29			Mudaliar	" "	411								
30			Reddy/Reddien	" "	411								
31			Adi-Dravida	Scheduled	662								
32				Caste									
33			Chakkiliyan	" "	234								
34			Pallan	" "	904								
35			Parayan/	" "	877								
36			Sambavan										
37			Badaga	Backward	182								
38				Class									
39			Golla/Konar	" "	551								
40			Yadav										
41			Nadar	" "	1117								
42			Vannier	" "	986								
43			Vellala	" "	1315								

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1						28.57			0.0179	71.43	Vishnupriya et al.,
2											1981
3						29.03			0.0168	70.97	" "
4											
5						16.00			0.0713	84.00	" "
6			4.69			60.95	0.046				Vasula, 1980
7											
8			5.19			38.99	0.024				" "
9			5.53			47.50	0.036				" "
10			1.47			41.90	0.036				" "
11											Jauaraj & Prasad, 1977
12						10.62	0.0066	0.011		89.38	Saheb & Naik, 1983
13											
14						41.32	0.030	0.025		58.78	" "
15											
16						28.93	0.021	0.019		71.07	" "
17							0.043				Pratap et al., 1976
18											
19											
20						45.32				54.68	Centerwall &
21											Centerwall, 1966
22			2.22			37.42			0.029	62.58	" "
23											
24						18.73			0.015		Roychoudhury, 1980
25											
26						16.50			0.011		" "
27						45.45			0.043		" "
28											
29						31.11			0.023		" "
30						48.66			0.035		" "
31						39.73			0.030		" "
32											
33						29.91			0.022		" "
34						23.01			0.017		" "
35						22.69			0.016		" "
36											
37						28.57			0.019		" "
38											
39						31.58			0.025		" "
40											
41						16.56			0.012		" "
42						42.39			0.033		" "
43						19.62			0.015		" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			All Hindus		16535								
2			Muslims		983								
3			Christians		1041								
4			Irula/Villian	Scheduled	347		6.63		32.28				
5				Tribe									
6			Karalan/	" "	760		2.50		12.36				
7			Malayali										
8			Kurumba	" "	50		6.00		32.00				
9			Malayan	" "	428		5.61		30.61				
10			Pulayan	" "	60				65.00				
11		Madras	Tamil		300		3.30		20.00			6.00	3.00
12			Ayyar Vadama	Brahman	154		3.30		10.40			1.90	0.60
13													
14			Brahacharanam	Brahman	127	2.40			12.50			0.80	
15			Ayyangar		122	5.80			6.50			1.60	0.80
16			Vadagalai										
17			Ayyangar		83	3.00			18.00			1.20	
18			Thengalai										
19			Tamil		486	4.10			11.30			1.40	0.40
20			Brahmans										
21			Hindus		92	10.87			22.83			5.43	6.52
22		North Arcot	Isolated Irular	Tribe	92	8.70			19.57			22.83	
23		District											
24		" "	Exposed Irular	Tribe	124	11.29				12.10	12.90	2.42	
25		" "	Irular Pooled	Tribe	216	10.19					17.13	1.39	
26		Madras	Gond		200					14.00			5.00
27		" "	Toda		80					10.00			10.00
28		" "	Kota		112					10.71			3.57
29		" "	Irulas		290					20.69			3.45
30		" "	Kurumba		180					20.00		1.67	3.33
31		Nilgiri Hills	Kota	Tribe	449		0.45			5.57		1.34	2.45
32		Madras		Urban	3504		0.39	0.37	1.00	7.45	6.05	0.51	0.26
33				Population									
34				Urban Hindu	2861		9.16			15.97		0.56	0.24
35		" "		Urban	549		4.55			8.56		0.18	0.18
36				Muslims									
37		" "		Urban	94		7.45			18.09		1.06	1.06
38				Hindus									
39		" "	Mudaliar	Urban Caste	501		15.00			17.00		0.40	0.20
40				Hindus									
41		" "	Tamil	" "	401		5.00			13.00		0.20	0.20
42		" "	Other South	" "	72					7.00			
43													

*L_1 : Rural-Urban/Occupational/Hirarchiacal/Religion Group ; *P : Patrilateral; *M : Matrilateral
1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1						31.81			0.024		Roychoudhury, 1980
2						34.18			0.021		" "
3						17.58			0.012		" "
4						38.90			0.028		" "
5											
6						14.87			0.011		" "
7											
8						38.00			0.028		" "
9						36.21			0.026		" "
10						65.00			0.041		" "
11						29.00			0.017		Chakravartti, 1968
12						16.20			0.011		Srinivasan &
13											Mukherje, 1976
14						15.70			0.0133		" "
15						14.70			0.0119		" "
16											
17						25.20			0.0191		" "
18											
19						17.30			0.0124		" "
20											
21			2.17			47.82			0.035		Centerwall et al., 1969
22						51.09			0.0374	48.91	Saheb & Bhanu, 1983
23											
24						38.71			0.0305	61.29	" "
25						43.98			0.0334	56.02	" "
26						21.00	0.007	0.013			Chakravartti, 1968
27						20.00	0.005	0.009			" "
28						14.28	0.006	0.011			" "
29						24.13	0.012	0.021			" "
30			0.56			25.56	0.011	0.019			" "
31	0.45	0.45	2.00			12.69				87.31	Ghosh, 1972
32			3.91			27.94				72.06	Ramesh et al., 1989
33											
34			3.91			29.85				70.15	" "
35			4.01			17.49				82.51	" "
36											
37			3.91			30.85				69.15	" "
38											
39			4.00			36.50				63.50	" "
40											
41			4.20			22.60				77.30	" "
42											
43						7.00				93.10	" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			Indian										
2			Brahmins										
3		Madras	North Indian	Urban Caste	7		14.30			14.30			
4			Brahmins	Hindus									
5		" "	Naidu	" "	344		10.20			18.00		0.30	0.30
6		" "	Adidravida	" "	321		9.30			20.60		1.00	
7		" "	Naicker	" "	273		9.20			18.60		2.60	
8													
9		" "	Chettiar	" "	146		8.90			21.20		0.70	0.70
10		" "	Nair	" "	103		2.90			8.70		1.00	
11		" "	Nadar	" "	9		8.90			11.40			1.30
12		" "	Achari	" "	65		18.50			18.50			
13		" "	Pillai	" "	60		13.30			18.30		1.70	
14		Vellore			377		22.44			51.28		13.46	
15		" "		Hindus									
16		" "		Muslim									
17		" "		Christians									
18		Madras	Yadava	Urban Caste	45		6.70			20.00			2.30
19				Hindus									
20		" "	Jains	" "	33					3.00			
21		" "	Other South	" "	348		7.50			13.50		0.30	0.30
22			Indian Castes										
23		" "	North Indian	" "	63		6.30			9.60			
24			Castes										
25		North Arcot		Rural Hindus									
26		District											
27		" "		Rural Muslim									
28		" "		Urban Muslim									
29		" "		Rural									
30				Christians									
31		" "		Urban									
32				Christians									
33		" "		Rural									
34				Forward									
35				Caste									
36		" "		Urban									
37				Forward									
38				Caste									
39		" "		Rural									
40				Backward									
41				Caste									
42		" "		Urban									
43													

*L_1 : Rural-Urban/Occupational/Hirarchiacal/Religion Group; *P : Patrilateral; *M : Matrilateral
1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1													
2													
3					28.60					71.40		Ramesh et al., 989	
4													
5			3.80		32.60					67.40		" "	
6			4.30		34.60					65.40		" "	
7			4.80		35.20					64.80		" "	
8													
9			7.50		39.00					61.00		" "	
10			1.00		12.60					86.40		" "	
11			2.50		24.10					75.90		" "	
12			7.60		44.60					55.40		" "	
13			5.00		38.30					61.70		" "	
14			12.82		41.38					58.62		Asha Bai et al., 1981	
15								0.0244				" "	
16								0.0019				" "	
17								0.0012				" "	
18			4.40		33.40					66.60		Ramesh et al., 1989	
19													
20					3.00					97.00		" "	
21			3.10		24.70					75.30		" "	
22													
23					15.90					84.10		" "	
24													
25						0.0373	0.0419					Rao, 1983	
26													
27						0.0233	0.0272					" "	
28						0.0201	0.0250					" "	
29						0.0113	0.0145					" "	
30						0.0219	0.0256					" "	
31													
32						0.0119	0.0138					" "	
33													
34						0.0315	0.0350					" "	
35													
36													
37						0.0221	0.0253					" "	
38													
39													
40						0.0401	0.0446					" "	
41													
42													
43						0.0263	0.0302					" "	

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene ; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

						Consanguineous marriages Types of marriages (%)							
								1C					
S. No.	*No.*	*Place (Region)*	*Population*	**L1*	*Sample Size*	*Uncle - Niece*		*Parallel*		*Cross*		**1C1*	**2C*
						**P*	**M*	**P*	**M*	**P*	**M*		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1				Backward									
2				Caste									
3		North Arcot		Rural									
4		District		Scheduled									
5				Caste									
6		" "		Urban									
7				Scheduled									
8				Caste									
9		" "	Brahmin	Rural									
10		" "	Brahmin	Urban									
11		" "	Chettiar	Rural									
12		" "	Chettiar	Urban									
13		" "	Pillai	Rural									
14		" "	Pillai	Urban									
15		" "	Mudaliar	Rural									
16		" "	Mudialiar	Urban									
17		" "	Reddiar	Rural									
18		" "	Reddiar	Urban									
19		" "	Rural Achari	Backward									
20				Caste Hindu									
21		" "	Urban Achari	" "									
22		" "	Rural Barber	" "									
23		" "	Urban Barber	" "									
24		" "	Rural Dhobi	" "									
25													
26		" "	Urban Dhobi	" "									
27		" "	Rural	" "									
28			Gounder										
29		" "	Urban	" "									
30			Gounder										
31		" "	Rural Mandiri	" "									
32		" "	Urban	" "									
33			Mandiri										
34		" "	Rural Naicker	" "									
35		" "	Urban	" "									
36			Naicker										
37		" "	Rural Naidu	" "									
38		" "	Urban Naidu	" "									
39		" "	Rural Potter	" "									
40		" "	Urban Potter	" "									
41		" "	Rural Cobbler	Scheduled									
42				Caste									
43		" "	Urban Cobbler										

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew *P	Aunt - Nephew *M	Total	Coefficeint of inbreeding *R_1	Coefficeint of inbreeding *R_2	Coefficeint of inbreeding *R_3	Non-consang-guineous marriages (%)	Authors
15	16	17	18	19	20	21	22	23	24	25	26
1											
2											
3							0.0365	0.0401			Rao, 1983
4											
5											
6							0.058	0.0189			" "
7											
8											
9							0.0289	0.0265			" "
10							0.0113	0.0147			" "
11							0.0195	0.0197			" "
12							0.0257	0.0272			" "
13							0.0286	0.0339			" "
14							0.0329	0.0381			" "
15							0.0313	0.0330			" "
16							0.0224	0.0260			" "
17							0.0418	0.0430			" "
18							0.0277	0.0304			" "
19							0.0377	0.0381			" "
20											
21							0.0258	0.0273			" "
22							0.0547	0.0580			" "
23							0.0358	0.0379			" "
24							0.0369	0.0420			" "
25											
26							0.0395	0.0429			" "
27							0.0389	0.0442			" "
28											
29							0.0242	0.0258			" "
30											
31							0.0443	0.0504			" "
32							0.0385	0.0481			" "
33											
34							0.0384	0.0413			" "
35							0.0236	0.0253			" "
36											
37							0.0415	0.0450			" "
38							0.0268	0.0327			" "
39							0.0424	0.0463			" "
40							0.0365	0.0485			" "
41							0.0455	0.0518			" "
42											
43							0.0067	0.0080			" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		North Arcot	Rural	Scheduled									
2		District	Harijans	Caste									
3		" "	Urban	" "									
4			Harijans										
5		" "		Rural	11628		15.83[1]	0.27	0.27	8.76	15.51	3.38	2.31
6		" "		Urban	8998	6.55[1]		0.85	1.00	5.28	10.37	2.95	1.59
7		" "	Parents of	Rural									
8			Congenitally										
9			malformed										
10		" "	Parents of	Urban									
11			Congenitally										
12			malformed										
13		Madras		Harijans	450				24.00				6.00
14		" "		Muslim	500				20.00			2.00	
15				(Moplah)									
16		" "		Christians	500				0.60			1.20	2.40
17		North Arcot		Rural Hindu	11288								
18		District											
19		" "		Urban Hindu	6765								
20		" "		Rural Muslim	212								
21		" "		Urban	1960								
22				Muslim									
23		" "		Rural	126								
24				Christians									
25		" "		Urban	264								
26				Christians									
27		" "		Rural Others	2								
28		" "		Urban Others	9								
29		" "		Rural	6536								
30				Backward									
31				Communities									
32		" "		Urban	3262								
33				Backward									
34				Communities									
35		" "		Rural	1849								
36				Forward									
37				Communities									
38		" "		Urban	4210								
39				Forward									
40				Communities									
41		" "		Rural	2957								
42				Scheduled									
43				Communities									

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1							0.0353	0.0384			Rao, 1983
2											
3							0.0181	0.0207			" "
4											
5			16.43			46.95	0.0371	0.0414		53.05	Rao & Inbaraj, 1977
6			7.10			29.12	0.0205	0.034		70.88	" "
7						17[2]				26[2]	Rao & Inbaraj, 1980
8											
9											
10						15[2]				31[2]	" "
11											
12											
13			6.00			36.00					Chakravartti, 1968
14			2.00			24.00					" "
15											
16			0.40			4.60					" "
17									0.03727		Rao & Inbaraj, 1977
18											
19									0.02332		" "
20									0.02011		" "
21									0.01231		" "
22											
23									0.02186		" "
24											
25									0.01191		" "
26											
27									0.0000		" "
28									0.00347		" "
29									0.03931		" "
30											
31											
32									0.02244		" "
33											
34											
35									0.03125		" "
36											
37											
38									0.01961		" "
39											
40											
41									0.03545		" "
42											
43											

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene ; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1													
2		North Arcot		Urban	634								
3		District		Scheduled									
4				Communities									
5		Vellore		Hindu	23645		10.00				21.70	1.38	0.37
6		(North Arcot											
7		District											
8		" "		Muslim	6116		0.88				16.29	2.09	
9		" "		Christian	1257		5.25				14.48	1.03	0.32
10		" "		Others	372		4.84				8.60	1.61	
11		" "		Total	31390								
12		" "	Dhoby		349								
13		" "	Nattar		218								
14		" "	Thevar		48								
15		" "	Mandhiri		91								
16		" "	Cobbler		284								
17		" "	Barber		356								
18		" "	Pillai		1025								
19		" "	Udaiyar		214								
20		" "	Nainar		165								
21		" "	Reddiyar		239								
22		" "	Achari		960								
23		" "	Nadar		128								
24		" "	Oddar		50								
25		" "	Gounder		3094								
26		" "	Naidu		1886								
27		" "	Vanniar		116								
28		" "	Naicker		365								
29		" "	Mudaliar		7503								
30		" "	Chettiar		1898								
31		" "	Harijan		2361								
32		" "	Marata		52								
33		" "	Koravar		112								
34		" "	Nair		132								
35		" "	Raja		67								
36		" "	Pandaram		34								
37		" "	Brahmin		1310								
38		" "	Tamil		21006		9.59				21.78	1.36	0.40
39		" "	Telugu		3307		11.31				21.20	1.48	0.27
40		" "	Urdu		5920		0.91				15.91	2.13	0.22
41		" "	Other		1157		5.18				10.63	1.04	0.17
42		" "	Total		31390								
43		" "	Tamil Achari		790								

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew *P	Aunt - Nephew *M	Total	Coefficeint of inbreeding *R_1	Coefficeint of inbreeding *R_2	Coefficeint of inbreeding *R_3	Non-consanguineous marriages (%)	Authors
15	16	17	18	19	20	21	22	23	24	25	26
1											
2								0.01349			Rao & Inbaraj, 1977
3											
4											
5	0.03		0.05			33.53					Rao et al., 1971
6											
7											
8	0.26		0.03			19.56					" "
9						21.08					" "
10						15.05					" "
11						30.09					" "
12						53.87					" "
13						53.67					" "
14						52.08					" "
15						51.65					" "
16						47.54					" "
17						47.47					" "
18						46.34					" "
19						46.26					" "
20						46.06					" "
21						40.17					" "
22						39.58					" "
23						39.06					" "
24						38.00					" "
25						36.52					" "
26						36.37					" "
27						34.48					" "
28						33.97					" "
29						31.25					" "
30						30.40					" "
31						30.24					" "
32						28.85					" "
33						23.21					" "
34						21.97					" "
35						20.90					" "
36						20.59					" "
37						16.34					" "
38	0.02		0.04			33.19					" "
39	0.03		0.06			34.35					" "
40			0.05			19.22					" "
41			0.09			17.11					" "
42						30.09					" "
43						38.60					" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C Parallel		1C Cross		*1C1	*2C
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		Vellore	Telugu Achari	167									
2		(North Arcot											
3		District											
4		" "	Tamil		1046								
5			Brahmin										
6		" "	Telegu		124								
7			Brahmin										
8		" "	Tamil Harijan		2143								
9		" "	Telegu		211								
10			Harijan										
11		" "	Tamil Pillai		990								
12		" "	Telegu Pillai		30								
13		" "	Tamil Naidu		61								
14		" "	Telegu Naidu		1818								
15		" "	Tamil Reddiar		31								
16		" "	Telegu		206								
17			Reddiar										
18		" "	Tamil Barber		323								
19		" "	Telegu Barber		32								
20		" "	Tamil Chettiar		1591								
21		" "	Telegu		295								
22			Chettiar										
23		" "	Tamil Cobbler		195								
24		" "	Telegu		89								
25			Cobbler										
26		" "	Tamil Dhoby		245								
27		" "	Telegu Dhoby		97								
28		" "	Tamil		1115								
29		" "	Telugu		81								
30			Patents of		242								
31			Patients with										
32			Major										
33			Anomaly										
34			Parents of		120								
35			Patients with										
36			Mental										
37			Retardation										
38			Parents of		3071								
39			Normal										
40			Patients										
41		Vellore Town	Hindu		166	12.05		26.51					
42		" "	Muslim		15	6.67				33.33			
43		" "	Christian		2					50.00			

*L_1 : Rural-Urban/Occupational/Hirarchiacal/Religion Group ; *P : Patrilateral; *M : Matrilateral
1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1						43.70					Rao et al., 1971
2											
3											
4						16.30					" "
5											
6						17.70					" "
7											
8						30.10					" "
9						32.20					" "
10											
11						46.40					" "
12						46.70					" "
13						45.90					" "
14						36.00					" "
15						46.20					" "
16						39.30					" "
17											
18						49.80					" "
19						25.00					" "
20						31.90					" "
21						22.40					" "
22											
23						53.80					" "
24						33.70					" "
25											
26						58.80					" "
27						42.30					" "
28						20.70					" "
29						33.30					" "
30						58.68				41.32	Centerwall &
31											Centerwall, 1966
32											
33											
34						60.00				40.00	" "
35											
36											
37											
38						43.70				56.30	" "
39											
40											
41			11.45			50.00				50.00	John & Jayabal, 971
42			20.00			60.00				40.00	" "
43						50.00				50.00	" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene ; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			Hindu		16535	6.86		0.02	0.13	9.56	14.22		
2			Muslim		983	0.20		4.68	2.44	11.60	14.14		
3			Christians		1041	1.34	0.10		6.24	9.89			
4		North Arcot	Hindu	Rural	8723	17.80			25.60				
5		District											
6		" "	Muslim	Rural	120		7.50			24.50			
7		" "	Christians	Rural	44		10.20			20.50			
8		" "	Total	Rural	8889		17.23			25.77			
9			Population										
10		" "	Hindu	Urban	5422		9.00			18.00			
11		" "	Muslim	Urban	1445		0.04			16.40			
12		" "	Christians	Urban	277		3.20			12.00			
13		" "	Total	Urban	7151		7.08			17.90			
14			Mandhari	Rural									
15				Urban									
16			Nadar	Rural									
17				Urban									
18			Naidu	Rural									
19				Urban									
20			Gonder	Rural									
21				Urban									
22			Naicker	Rural									
23				Urban									
24			Harijan	Rural									
25				Urban									
26			Mudaliar	Rural									
27				Urban									
28			Brahmin	Rural									
29				Urban									
30			Barber	Rural									
31				Urban									
32			Dhobi	Rural									
33				Urban									
34			Potter	Rural									
35				Urban									
36			Reddiyar	Rural									
37				Urban									
38			Achari	Rural									
39				Urban									
40			Karunikar	Rural									
41			(Pillai)	Urban									
42			Chettiar	Rural									
43				Urban									

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1			1.02			31.81			0.024		Roychoudhury, 1976b
2			1.12			34.18			0.021		" "
3						17.58			0.012		" "
4			5.90			49.30				50.70	Rao et al., 1972
5											
6			5.70			37.70				62.30	" "
7			2.60			33.30				66.70	" "
8			6.01			49.02				50.98	" "
9											
10			5.00			32.80				67.20	" "
11			2.60			19.40				80.60	" "
12			2.90			18.10				81.90	" "
13			4.43			29.41				70.59	" "
14						57.10					" "
15						44.60					" "
16						56.30					" "
17						21.00					" "
18						53.20					" "
19						39.40					" "
20						51.60					" "
21						32.40					" "
22						50.40					" "
23						32.40					" "
24						46.80					" "
25						24.00					" "
26						43.20					" "
27						31.30					" "
28						30.30					" "
29						17.50					" "
30						64.80					" "
31						59.40					" "
32						52.00					" "
33						54.40					" "
34						51.40					" "
35						58.30					" "
36						44.50					" "
37						42.70					" "
38						43.90					" "
39						42.30					" "
40						42.50					" "
41						46.50					" "
42						24.60					" "
43						32.40					" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**28.**	**Kerala**											
2			Hindu-A		287								
3			Hindu-B		190								
4			Hindu-C		419								
5			Tribes		162								
6			(Animists)										
7			Muslim		215								
8			Christians		358								
9			Malayali		300				14.00			3.00	11.00
10			Brahman										
11			Paniyan	Tribe	300				30.00				2.00
12			Muthuvan	Tribe	225				24.44				6.67
13		Ernakulam	Hospital		102					1.96	1.96		
14			Patients										
15		Quilon	" "		189			1.06		10.05	12.70		1.59
16		Trivandrum	" "		497			8.45	0.60	1.01	12.27		1.21
17		Trivandrum	" "		101					1.98	2.97		
18			(Mental)										
19		Palghat Region	Nayar		176						2.27	2.27	
20			Aryan		77				14.29				
21			Chaliyan	Hindu Weaver	70				8.57				
22			Hindu-B										
23			Cheruman		75				6.67				
24			Izhava	Toddy Tapper	204				13.24				
25			Hindu-C										
26			Latin Catholic		60				1.67				3.33
27			Mappilla		93				11.83			1.08	2.15
28			Mukkuvan	Sea-	49				16.33			2.04	2.04
29			Hindu-C	Fishermen									
30			Mukkuvan	Sea-	43				13.95			6.98	
31			Christians	Fishermen									
32			Malayalam	Muslim	45				26.67				
33			Tamil	Muslim	35				17.14			5.71	2.86
34			Urdu	Muslim	42				16.67			9.52	4.76
35			Nambutiri		67				5.97			1.49	
36			Nayar Hindu-A	Military	136				23.53			1.47	
37			Pulayan	Tribe	87				12.64				
38			Syrian		154								
39			Catholic										
40			Tamil Brahman		84					11.90		4.76	
41			Valan	Backwater	89					5.62			
42			Hindu-C	Fishermen									
43			Vaniyan,	Trader of	87					17.24		1.15	

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1											
2						19.50					Ali, 1968
3						15.79					" "
4						12.60					" "
5						9.87					" "
6											
7						21.40					" "
8						3.90					" "
9						28.00					Chakravartti, 1968
10											
11						32.00					" "
12						31.07					" "
13						3.92			0.0024	96.08	Kumar et al., 1967
14											
15		1.06				26.46			0.0152	73.54	" "
16		1.01				24.55			0.0142	75.45	" "
17						4.95			0.0031	95.05	" "
18											
19						4.55			0.0016	95.45	Ray, 1979
20						14.29			0.0089		Ail, 1968
21						8.57			0.0054		" "
22											
23						6.67			0.0042		" "
24						13.24			0.0083		" "
25											
26			1.67			6.67			0.0016		" "
27						15.05			0.0080		" "
28						20.41			0.0112		" "
29											
30						20.93			0.0109		" "
31											
32						26.67			0.0167		" "
33						25.71			0.0130		" "
34						30.95			0.0141		" "
35			1.49			8.96			0.0042		" "
36	0.74					25.74			0.0152		" "
37						12.64			0.0079		" "
38									0.0000		" "
39											
40						16.67			0.0089		" "
41						5.62			0.0035		" "
42											
43						18.39			0.0111		" "

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C				*1C1	*2C
								Parallel		Cross			
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1			Malayalam	edible oil									
2			Vaniyan, Tamil		33					15.15		3.03	6.06
3			Total		1631					11.16		1.23	0.61
4			Congenital		18								
5			Malformations[1]										
6			Pulmonary T.B.[1]		28								
7			T.B. Meningitis[1]		30								
8			Diabetes mellitus[1]		48								
9			Liver Cirrhosis[1]		23								
10			Bronchial		32								
11			Asthma[1]										
12			Anaemia[1]		26								
13			Harijans		440					22.73			
14			Jews		59					15.25			
15			Muslims		562				0.18	6.23	10.85		
16			Christians		656						0.76		
17			Tribes		601				0.17	14.30	48.25		
18			Hindus		3566		0.42		0.03	4.09	6.90		
19	**29.**	**Pondicherry (U.T.)**											
20			Hindus		465		9.68			8.39	10.75		
21	***VI.***	***ISLANDS***											
22	**30.**	**Lakshadweep (U.T.)**											
23			Koya	Land owning	176			1.13		12.50	19.89		
24			(Muslims)	Class									
25			Malmi	Sailor Class	435			0.23		1.15	1.38		
26			(Muslims)										
27			Melachari	Servants,	1471			0.54	0.34	2.31	3.06		
28			(Muslims)	Toddy									
29				Drawers									
30	**31.**	**Andaman & Nicobar Islands (U.T.)**											
31	***VII.***	***OTHERS***											
32		Andhra	Jatapu		48								
33		Pradesh											
34		and Orissa											
35			Jatapu		326								
36													
37		**NEPAL**											
38		**BHUTAN**											
39		**SRI LANKA**											
40			Goyigamas	Upper Caste	455								
41				Sinhalese-									
42				Speaking									
43				Bhuddhists									

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1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1											
2						24.24			0.0115		Ali, 1968
3	0.06		0.012			13.18			0.0075		" "
4									0.022		Kumar et al., 1967
5											
6									0.022		" "
7									0.019		" "
8									0.019		" "
9									0.015		" "
10									0.011		" "
11											
12									0.010		" "
13			4.55			27.27					Chakravartti, 1968
14			25.42			40.68					Goldschmidt, 1961
15						17.26			0.011		Roychoudhury, 1976b
16						0.76			0.0005		" "
17			1.00			63.73			0.041		" "
18			1.23			12.68			0.008		" "
19											
20						28.82			0.024		" "
21											
22											
23						33.52			0.021		Roychoudhury, 1977
24											
25			1.38			4.14			0.002		" "
26											
27			0.07			6.32			0.004		" "
28											
29											
30											
31											
32						45.93			0.0289		Khan and Tyagi
33											(unpublished)[*c.f.*
34											Singh and Tyagi, 1987]
35						4.29			0.0029		Deka & Ghosh Maulik,
36											1977
37											
38											
39											
40						30.10				69.90	Reid, 1976
41											
42											
43											

*2C1 : Second Cousin once removed ; *3C : Third Cousin

*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene; *R_3 : Unknown Genetic Linkage

Table 1: Contd.....

S. No.	No.	Place (Region)	Population	*L[1]	Sample Size	Consanguineous marriages Types of marriages (%)							
						Uncle - Niece		1C Parallel		1C Cross		*1C1	*2C
						*P	*M	*P	*M	*P	*M		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		**PAKISTAN**											
2			Lahore City		681					47.14		5.43	4.41
3			Mianchannu		70					72.86			
4			City										
5			Muridke City		114					80.70		2.63	
6			Sheikhupura		480					79.38		6.67	
7			City										
8			Gujarat City		425					72.00		1.41	2.11
9			Jhelum City		778					50.64		5.01	0.39
10			Rawalpindi		781					54.42		3.71	0.51
11			City										
12			Quetta,	Pathans	49			16.33					4.08
13			Balochistan										
14			" "	Baloch	34			32.35					2.94
15			" "	Jats	46			36.96					6.52
16			" "	Araeen	42			23.81					7.14
17			" "	Miscellaneous	42			40.48					2.38
18			" "	Total	213			29.58					4.69
19		**BANGLADESH**											
20		**MALDIVES**											

*L_1 : Rural-Urban/Occupational/Hirarchiacal/Religion Group ; *P : Patrilateral; *M : Matrilateral
1C : First Cousin; *1C1 : First Cousin once removed; *2C : Second Cousion

S. No.	*2C1	*3C	Others	Aunt - Nephew		Total	Coefficeint of inbreeding			Non-consang-guineous marriages (%)	Authors
				*P	*M		*R_1	*R_2	*R_3		
15	16	17	18	19	20	21	22	23	24	25	26
1											
2			3.38			60.35				39.65	Shami et al., 1989
3						72.86				27.14	" "
4											
5						83.33				16.67	" "
6						86.04				13.96	" "
7											
8			8.00			83.53				16.47	" "
9			0.51			56.56				43.44	" "
10			0.51			59.15				40.85	" "
11											
12			63.27			83.67				16.33	Mian & Mushtaq, 1994
13											
14			55.88			91.18				8.82	" "
15			39.13			82.61				17.39	" "
16			54.76			85.71				14.29	" "
17			52.38			90.48				9.52	" "
18			52.11			86.38				13.62	" "
19											
20											

*2C1 : Second Cousin once removed ; *3C : Third Cousin
*R_1 : For Autosoumal Gene ; *R_2 : For Sex Linked Gene ; *R_3 : Unknown Genetic Linkage

Table 2: Consanguinity - Effects on fertility, mortality and sterlity

S. No.	No.	Place (Region)	Population	*L1	Type of Consanguinity	Pregnancies No.	Live births No. %	Live births Mean	Living children No. %	Living children Mean	Miscarriages abortion No. %	Miscarriages abortion Mean
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1		**INDIA**												
2		***I. NORTH INDIA***												
3.		*A. WESTERN HIMALAYA (S.No. 1,2)*												
4.		**1. Jammu and Kashmir**												
5.		**2. Himachal Pradesh**												
6.		**3. Punjab**												
7.		**4. Chandigarh (U.T.)**												
8.		**5. Haryana**												
9.		**6. Delhi (U.T.)**												
10			Sheikh Sunni	Urban Muslim	First Cousin	74	650	8.78	522	7.05				
11					1-1/2 Cousin	32	258	8.06	202	6.31				
12					Second Cousin	20	146	7.30	122	6.10				
13					Third Cousin	4	24	6.00	24	6.00				
14					All Consang.	130	1078	7.54	870	6.37				
15					Non Consang.	166	950	5.72	968	5.83				
16		**7. Uttar Pradesh**												
17		Lucknow	Sayyad Shia	Urban Muslim	First Cousin	82	665	8.10	613	7.50				
18					1-1/2 Cousin	19	126	6.60	117	6.20				
19					Second Cousin	24	152	6.30	144	6.00				
20					Third Cousin	4	23	5.80	23	5.80				
21					All Consang.	129	966	670	897	6.40				
22					Non Consang.	138	776	5.60	746	5.40				
23		*B. CENTRAL HIMALAYA (S.No. 7, Eight Districts of Uttar Pradesh)*												
24		**8. Rajasthan**												
25		***II WEST INIDIA***												
26		**9. Gujarat**												
27		**10.Maharashtra**												
28		**Bombay**			Uncle-Niece	52								
29														
30		" "			First Cousin	3309								
31		" "			First Cousin Once removed	176								
33		" "			Second Cousin	30								
34		" "			Beyond Second Cousin	191								
36		" "			Others	117								
37		" "			All Consang.	3875								
38		" "			Non Consang.	35620								
39		**11. Goa, Daman and Diu**												
40		**12. Dadra and Nagar Haveli (U.T.)**												
41		***III. EAST INDIA***												
42		*C. EASTERN HIMALAYA (S.No. 13 to 20 and Darjeeling District of West Bengal)*												
43		**13. Arunachal Pradesh**												

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1																
2																
3																
4																
5																
6																
7																
8																
9																
10											80			1.08		Basu, 1975
11											34			1.06		" "
12											18			0.90		" "
13											3			0.75		" "
14											135			0.95		" "
15											114			0.68	3	" "
16																
17											97			1.20		" "
18											18			0.90		" "
19											22			0.90		" "
20											3			0.80		" "
21											140			0.95		" "
22											88			0.60	4	" "
23																
24																
25																
26																
27																
28				1												Stevenson et
29																al., 1966a
30	172			159												" "
31	5			5												" "
32																
33	3															" "
34	8			5												" "
35																
36	4			4												" "
37	192			174												" "
38	1536			1011												" "
39																
40																
41																
42																
43																

* : Prior to 21 Years

Table 2: Consanguinity - Effects on fertility, mortality and sterility

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Live births No. %	Live births Mean	Living children No. %	Living children Mean	Miscarriages abortion No. %	Miscarriages abortion Mean
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**14.**	**Assam**												
2	**15.**	**Nagaland**												
3.	**16.**	**Manipur**												
4.	**17.**	**Mizoram**												
5.	**18.**	**Tripura**												
6.	**19.**	**Meghalaya**												
7.	**20.**	**Sikkim**												
8.	**21.**	**West Bengal**												
9.				Muslim	All Consang.					4.95				
10					Non Consang.					5.60				
11		Calcutta		Hospital	All Consang.	93								
12				Population										
13					Non Consang.	19025								
14	**22.**	**Bihar**												
15		Ranchi		Muslims	All Consang.					4.41				
16														
17					Non Consang.					4.19				
18		Santhal		Muslim	Consang.	476		2.13		4.19				
19		Parganas												
20		" "		Hindu	Non Consang.	123		3.14						
21	**23.**	**Orissa**												
22		Puri	Vadabalija	Marine	Consang.	177		5.38						
23				Fisherfolk										
24		" "	" "	" "	Non Consang.	305		4.94						
25		" "	" "	" "	Consang.	172								
26		" "	" "	" "	Non Consang.	295								
27	***V.***	***SOUTH INDIA***												
28	**25.**	**Karnataka**												
29				Rural	Uncle-Niece	148		4.69			404	2.73		0.38
30					Patrilateral	137		4.35			395	2.88	0.17	
31					Cross-Cousin									
32					Matrilateral	236		4.95			716	3.03	0.29	
33					Cross-Cousin									
34					Others	201		5.28			653	3.25	0.29	
35					All Consang.	722		4.87			2168	3.00	0.29	
36					Non Consang.	1163		4.45			3566	3.07	0.29	
37		Bangalore	Hospital		Non Consang.	2301			2.52			2.27		
38			Patients											
39		" "	" "		Others	33			2.27			2.12		
40		" "	" "		Second Cousin	179			2.69			2.39		
41		" "	" "		First Cousin	325			2.43			2.14		
42		" "	" "		Uncle-Niece	416			2.50			2.30		
43		" "	" "		Non Consang.	1590			2.37			2.14		

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1																
2																
3																
4																
5																
6																
7																
8																
9									30.30							Barua,1976
10									23.50							" "
11													8.60			Stevenson et
12																al., 1966
13													5.80			" "
14																
15														0.67		Anjani
16																and Roy, 1989
17														0.85		" "
18									35.8							Ansari & Sinha,
19																1978
20																
21									26.2							" "
22																Readdy, 1979
23																
24																" "
25										1.01						" "
26										0.69						" "
27																
28																
29		0.08								1.30						Hann, 1985
30		0.04								1.07						" "
31																
32		0.07								1.16						" "
33																
34		0.07								1.17						" "
35		0.07								1.18						" "
36		0.07								0.90						Devi et al., 1981
37																" "
38																" "
39																" "
40																" "
41																" "
42																" "
43																" "

* : Prior to 21 Years

Table 2: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Live births No. %	Live births Mean	Living children No. %	Living children Mean	Miscarriages abortion No. %	Miscarriages abortion Mean
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1		Bangalore	Hospital	Hindu	Second Cousin	130				2.64		2.34		
2			Patients											
3.		" "	" "	" "	First Cousin	243				2.36		2.07		
4.		" "	" "	" "	Uncle-Niece	366				2.46		2.27		
5.		" "	" "	Muslim	Non Consang.	478				3.06		2.77		
6.		" "	" "	" "	Second Cousin	39				2.92		2.56		
7.		" "	" "	" "	First Cousin	67				2.69		2.40		
8.		" "	" "	" "	Uncle-Niece	32				2.97		2.69		
9.		" "	" "	Christian	Non Consang.	233				2.49		2.11		
10		" "	" "	" "	Second Cousin	10				2.50		2.40		
11		" "	" "	" "	First Cousin	15				2.47		2.13		
12		" "	" "	" "	Uncle-Niece	18				2.50		2.33		
13		" "	Impatients	" "	Uncle-Niece					2.38		2.25		
14					First Cousin					2.43		2.30		
15					Second Cousin					2.39		2.24		
16					Beyond					2.49		2.38		
17					Second Cousin									
18					Non Consang.					2.32		2.21		
19			Kodavas		All Consang.	23		3.65		3.26		2.96		
20					Non Consag.	1256		3.20		3.69		3.00		
21			Amma		All Cosang.	16		4.13		3.69		3.79		
22			Kodavas											
23					Non Consang.	281		3.11		2.89		2.89		
24			Mother with		Non Consang.					2.28		2.18		
25			Liveborn											
26			Pregnancies											
27			" "		Others					2.44		2.36		
28			" "		Second Cousin					2.40		2.28		
29			" "		First Cousin					2.43		2.31		
30														
31														
32			" "		Uncle-Niece					2.34		2.22		
33	**26.**	**Andhra Pradesh**												
34		Hyderabad	Hospital		Unrelated	880								
35			Patients											
36		" "	" "		Second	2								
37					Cousin once									
38					Removed									
39		" "	" "		Second	8								
40					Cousin									
41		" "	" "		First Cousin	8								
42					Once									
43					Removed									

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1																Devi et al., 1981
2																" "
3																" "
4																" "
5																" "
6																" "
7																" "
8																" "
9																" "
10																" "
11																" "
12																Bittles et al. 1985
13																" "
14																" "
15																" "
16																
17																
18																" "
19				0.39										0.30		Saheb et al. 1981
20				0.02										0.17		" "
21				0.31										0.19		" "
22																
23				0.09										0.14		" "
24																Bittles et al.,1987
25																
26																
27																" "
28																" "
29																" "
30																
31																" "
32																
33							3.7									Murty &
34																Jamil, 1972
35																" "
36																
37																
38																
39							12.5									" "
40																
41																" "
42																
43																

* : Prior to 21 Years

Table 2: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Pregnancies No. %	Pregnancies Mean	Live births No.	Live births %	Live births Mean	Living children No.	Living children %	Living children Mean	Miscarriages abortion No.	Miscarriages abortion Mean
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*		
1		Hyderabad	Hospital		First Cousin	121										
2			Patients													
3.		" "	" "		Uncle-Niece	11										
4.		" "	" "		Others	61										
5.		Mahbubnagar	Madiga		All Consang.	6		3.6			3.3	54.8				
6.																
7.		" "	" "		Non Consang.	107		4.4			4.3	54.4				
8.		" "	Mala		All Consang.	40		4.5			4.5	62.4				
9.		" "	" "		Non Consang.	48		3.4			3.2	61.1				
10		" "	Reddy		All Consang.	86		3.9			3.7	65.5				
11		" "	" "		Non Consang.	235		4.0			3.9	78.4				
12		" "	Vysya Rural		All Consang.	12		4.5			4.0	51.9				
13		" "	" "		Non Consang.	69		4.1			4.0	75.1				
14		" "	Vysya Urban		All Consang.	57		3.7			3.4	63.2				
15		" "	" "		Non Consang.	106		3.4			3.3	86.5				
16		West Godavari	Kama	Agriculturist	All Consang.	52							3.40			
17		District														
18		" "	" "	" "	Non Consang.	189							3.30			
19		Mahbubnagar	Madiga		All Consang.	28			179		6.4					
20		District														
21		" "	" "		Non Consang.	16			101		6.3					
22		" "	Mala		All Consang.	8			32		4.0					
23		" "	" "		Non Consang.	12			67		5.6					
24		" "	Reddy		All Consang.	53			335		6.3					
25		" "	" "		Non Consang.	34			209		6.1					
26		" "	Vyasya		All Consang.	36			200		5.5					
27		" "	" "		Non Consang.	16			93		5.8					
28		Nellore	Fishermen		All Consang.	58		5.43			5.05		3.00	0.07		
29		District														
30		" "	Fishermen		Non Consang.	48		3.48			3.43		3.33			
31			Inpatients		Consang.											
32																
33			" "		Non Consang.											
34			Parents of		Consang.											
35			Inpatients													
36			" "		Non Consang.											
37			Reddy	Agriculturist	Consang.	75		4.2			3.9		3.2			
38			" "	" "	Non Consang.	104		3.2			3.1		2.8			
39			Mala	Scedhuled	Consang.	116		3.5			3.3		2.7			
40				Caste												
41			" "	" "	Non Conang.	251		3.0			3.0		2.4			
42		" "	Desuri Kapu	Agriculturist	Consang.	440		4.6			4.2		2.83			
43		" "	" "	" "	Non Consang.	487		3.1			3.11		2.83			

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1							6.6									Murty & Jamil,
2																1972
3							18.2									" "
4							9.86									" "
5			6.9		2.40				14.3							Rao * Murty,
6																1988
7			2.2		33.6				9.9							" "
8			1.7		25.4				10.5							" "
9			6.2		24.1				8.6							" "
10			4.8		20.8				8.9							" "
11			1.2		7.9				12.6							" "
12			11.1		24.1				13.0							" "
13			1.2		16.4				7.4							" "
14			8.1		26.3				2.4							" "
15			1.7		9.9				2.0							" "
16																Ray, 1979
17																
18																" "
19																" "
20									6							Rao & Murty,
21									48							" "
22									15							" "
23									36							" "
24									8							" "
25									64							" "
26									59							" "
27									28							" "
28		0.12						1.16								Reddy & Rao,
29																1978
30								0.52							22.2	Dronamraju &
31																Meera Khan,196
32															16.6	" "
33															22.7	" "
34																
35															16.90	" "
36								0.6								Reddy, 1986
37								0.4								" "
38								0.7								" "
39																
40																" "
41								0.5								" "
42																Reddy,1987
43																" "

* : Prior to 21 Years

Table 2: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Pregnancies No. %	Pregnancies Mean	Live births No.	Live births Mean	Living children No.	Living children Mean	Miscarriages abortion No.	Miscarriages abortion Mean
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1		Nellore	Devanga	Artisan Caste	Consang.	418		5.2		4.69		3.06		
2		District												
3.		" "	" "	" "	Non Consang.	448		3.7		3.50		2.92		
4.		" "	Mala	Scheduled	Consan.	397		4.8		4.40		3.14		
5.				Caste										
6.		" "	Mala	" "	Non Consang.	434		3.5		3.37		2.85		
7.		Chittoor	Pokanati		Consang.	98		3.97		3.70		3.27		0.20
8.		District	Reddy											
9.		" "	" "		Non Consang.	65		3.29		3.20		2.76		0.04
10		" "	" "		Consang.	126		3.3		3.20		2.76		0.04
11		" "	" "		Non Consang.	129		3.28		3.24		2.83		0.27
12			Kammas		Consang.			4.76		3.05		2.45		0.09
13														
14			" "		Non Consang.			3.42		3.18		2.32		0.09
15		Tirupati Town	Pattusalis		Consang.	129		4.60		4.33		2.90		0.05
16														
17		" "	" "		Consang.	127		4.60		4.36		2.90		0.06
18		" "	" "		Non Consang.	136		4.31		4.04		3.09		0.07
19		" "	" "		Non Consang.	131		4.26		4.14		3.25		0.07
20			Chenchu	Tribe	Non Consang.	356	1341	3.75	1265	3.55	939	2.63		
21														
22			" "		Beyond	15				3.73		2.53		
23			" "		Second Cousin									
24			" "		Second	24				3.33		2.63		
25					Cousin									
26			" "		First Cousin	9				3.66		2.56		
27					Once									
28					Removed									
29			" "		First Cousin	89				4.30		2.89		
30			" "		Uncle-Niece	11				3.73		2.90		
31			" "		All Consang.	148	581	3.93	587	3.97	403	2.72		
32		Vishakhapatnam	Brahmin	Upper Caste	Non Consang.					3.71		3.29	9.7	
33		District	(Urban)	Clerics										
34		" "	" "	" "	Consang.					3.91		3.45	10.3	
35		" "	" "	" "	Non Consang.					4.22		3.71	13.3	
36		" "	" "	" "	Consang.					2.84		2.58	15.7	
37		" "	(Rural)	Low Caste	Non Consang.					4.47		3.60	0.3	
38				Fishermen										
39		" "	(Rural)	" "	Consang.					4.43		3.42	0.3	
40		" "	Jalari	" "	First Cousin					4.23		3.32	0.50	
41		" "	" "	" "	Uncle-Niece					4.64		3.53	0.20	
42		Chittoor	Mala	Scheduled	Consang.	321		3.56				2.97		0.01
43		District												
44		" "	" "	" "	Non Consang.	564		3.43				2.87		0.02
45		" "	" "	" "	Uncle-Niece		59							

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1																Reddy, 1987
2																
3																" "
4																" "
5																" "
6																
7		0.07						0.28								Reddy &
8																Reddy, 1979
9		0.04						0.27								" "
10		0.10						0.56								" "
11		0.02						0.30								" "
12		0.16						0.48								" "
13																Reddy &
14																Naidu, 1978
15		0.12						0.37								" "
16		0.19						1.25								Reddy & Rao.
17																1978b
18		0.11						1.25								" "
19		0.08						0.70								" "
20		0.12						0.68								" "
21	4.30						10.70		23.90							Sirjuddin &
22																Basu, 1984
23	4.30						10.70		23.90							" "
24																
25																" "
26																
27																" "
28																
29																
30																
31	5.67						12.60		28.30							" "
32	2.8						11.5									Srikumari
33																et al., 1985
34	2.7						11.6									" "
35	2.2						12.0									" "
36	5.6						9.3									" "
37	0.7						18.8									" "
38																
39	1.3						21.7									" "
40	1.7						20.2									" "
41	0.9						23.1									" "
42		0.02						0.46								Reddy,1983b
43																
44		0.02						0.39								" "
45											6					" "

* : Prior to 21 Years

Table 2: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Pregnancies No. %	Pregnancies Mean	Live births No.	Live births Mean	Living children No.	Living children Mean	Miscarriages abortion No.	Miscarriages abortion Mean
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1		Chittoor	Mala	Scheduled	First Cousin		1039							
2		District												
3		" "	" "	" "	First Cousin		6							
4					Once									
5					Removed									
6			Patients with		Non Consang.				83		61			
7			Ventricular											
8			Septal Defect											
9			" "		Consang.				25		15			
10			Patients with		Non Consang.				77		58			
11			Pulmonary											
12			Stenosis											
13			" "		Consang.				29		23			
14			Patients with		Non Consang.				71		54			
15			Other											
16			Diseases											
17			" "		Consang.				58		37			
18			Patients with		Non Consang.				231		173			
19			CHD (pooled)											
20			" "		Consang.				112		75			
21			Total CHD		Non Consang.				195		147			
22			Patients											
23			" "		Consang.				87		56			
24			Control Group		Non Consang.				247		211			
25			" "		Consang.				60		47			
26					Non Consang.									
27														
28					Consang.									
29	**27.**	**Tanil Nadu**												
30		Vellore			Uncle-Niece	35		3.9		3.6		3.3	5.8	
31														
32		" "			First Cousin	80		4.1		3.9		3.7	4.8	
33		" "			First Cousin	21		4.1		4.0		3.6	1.2	
34					Once									
35					Removed									
36		" "			Others	20		4.3		4.0		3.5	4.7	
37		" "			All Consang.	156		4.10		3.90		3.60	4.5	
38		" "			Non Consang.	221		3.80		3.60		3.40	4.4	
39		" "			Total	337		4.00		3.70		3.50	4.4	
40		" "	Pediatric Out		Uncle-Niece				13.2					
41			Patients											
42		" "			First Cousin				17.8					
43		" "			1-1/2 Cousin				2.20					
44		" "			Second Cousin				2.00					

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1											174					Reddy, 1983b
2																
3																" "
4																" "
5																" "
6																Vishnupriya et
7																al., 1981
8																
9																" "
10																" "
11																" "
12																" "
13																" "
14																" "
15																" "
16																" "
17																" "
18																" "
19																" "
20																" "
21																" "
22																" "
23																" "
24																" "
25																" "
26									4.6							Chakravartti et
27																at ., 1971
28									15.8							" "
29																
30	1.50		7.30		3.10		3.10		3.80		10.10					Asha Bai et al.,
31																1981
32	0.30		5.10		0.60		2.50		2.90		6.00					" "
33			1.20		7.10		2.30		1.20		10.60					" "
34																
35																
36	4.70		9.40		8.90		1.30		1.30		11.50					" "
37	1.10		5.60		3.10		2.50		2.60		8.20					" "
38	2.10		6.50		2.10		1.90		0.90		4.90					" "
39	2.70		6.10		2.60		2.10		1.60		6.30					" "
40																Centerwall &
41																Centerwall, 1966
42																" "
43																" "
44																" "

* : Between 0-6 & : Prior to 21 Years

Table 2: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Pregnancies No. %	Pregnancies Mean	Live births No.	Live births Mean	Living children No.	Living children Mean	Miscarriages abortion No.	Miscarriages abortion Mean
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1		Vellore	Pediatric		Others				2.20					
2			Out-Patients		(Distant)									
3		" "	" "		All Consang.				37.40					
4		" "	" "		Non Consang.				62.60					
5		Nilgiri Hills	Kota	Tribe	Uncle-Niece	2	4							
6														
7		" "	" "	" "	Full First	25	89							
8					Cousin									
9		" "	" "	" "	Full First	6	3							
10					Cousin Once									
11					Removed									
12		" "	" "	" "	Half First	4	17							
13					Cousin									
14		" "	" "	" "	Half First	1	1							
15					Cousin Once									
16					Removed									
17		" "	" "	" "	Full Second	11	24							
18					Cousin									
19		" "	" "	" "	Full Second	2	4							
20					Cousin Once									
21					Removed									
22		" "	" "	" "	Full Third	2	8							
23					Cousin									
24		" "	" "	" "	Others	4	18							
25		" "	" "		All Consang.	57	168							
26		" "	" "	" "	Non Consang.	392	995							
27		North Arcot		Rural	Non Consang.		4449					3.3		
28		District		Population										
29		" "		" "	All Consang.		3889					3.4		
30		" "		" "	Beyond First		590					3.4		
31					Cousin									
32		" "			First Cousin		1991					3.6		
33		" "		" "	Uncle-Niece		1308					3.2		
34		" "		" "	Total		8338					3.4		
35		" "		Urban	Non consang.		4251			3.1				
36		" "		" "	All Consang.		1654					3.2		
37		" "		" "	Beyond First		294					3.1		
38					Cousin									
39		" "		" "	First Cousin		989					3.3		
40		" "		" "	Uncle-Niece		371					3.1		
41		" "		" "	Total		5905					3.2		
42		" "		" "	Non Consang.	6169	20606	3.3	20010	3.2	15646	2.5		
43		" "		" "	All Consang.	5459	19438	3.6	18708	3.4	14064	2.6		
44		" "		" "	Beyond First	732	2607	3.6	2504	3.4	1902	2.6		
45					Cousin									

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1																Centerwall &
2																Centerwall, 1966
3																" "
4																" "
5									1							Ghosh &
6																Majumdar, 1979
7			8				16		24							" "
8																
9			1						2							" "
10																
11																
12							2		6							" "
13																
14																" "
15																
16																
17			1				3		3							" "
18																
19			2													" "
20																
21																
22			2				3		3							" "
23																
24							2		5							" "
25			14				26		44							" "
26			83											21.0		Rao & Inbaraj,
27			21.10[2]		46.80[2]		93.60[2]									1977
28														17.6		" "
29			22.90[1]		54.6[2]		106.70[2]							20.8		" "
30			25.60[2]		55.30[2]		95.10[2]									" "
31																
32			21.60[1]		53.50[2]		112.60							16.5		" "
33			23.50[1]		56.10[2]		102.40[2]							18.1		" "
34			21.90[1]		53.30[2]		102.10[2]							19.4		" "
35			20.80[1]		33.70[2]		93.30[2]							21.2		" "
36			22.10[1]		46.40[2]		106.90[2]							19.4		" "
37			27.70[1]		17.90[2]		88.50[2]							20.7		" "
38																
39			22.10[1]		55.70[2]		102.40[2]							19.1		" "
40			22.40[1]		44.40		133.90[2]							19.2		" "
41			21.20[1]		39.60		105.00[2]							20.0		" "
42			34.40[3]		43.90[2]		106.80[2]									" "
43			41.50[3]		52.50[2]		126.70[2]									" "
44			43.00[3]		49.50[2]		118.60[2]									" "

* : Prior to 21 Years 1. Rate per 100 pregnancies 2 : Rate per 1000 liveborn; 3 : Rate per 1000 pregnancies

Table 2: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Live births No. %	Mean	Living children No. %	Mean	Miscarriages abortion No. %	Mean
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1		North Arcot		Rural	First Cousin	2886	10722	3.7	10348	3.6	7743	2.7		
2		District												
3		" "		" "	Uncle-Niece	1841	6109	3.3	5856	3.2	4419	2.4		
4		" "		" "	Total	11628	40044		38718					
5		" "		Urban	Non Consang.	6378	21116	3.3	19735	3.1	15352	2.4		
6		" "		" "	All Consang.	2620	9001	3.4	8421	3.2	6276	2.4		
7		" "		" "	Beyond First	458	1512	3.3	1405	3.1	1084	2.4		
8					Cousin									
9		" "		" "	First Cousin	1573	5488	3.5	5163	3.3	3828	2.4		
10		" "		" "	Uncle-Niece	589	2001	3.4	1853	3.2	1369	2.3		
11		" "		" "	Total	8998	30117		28156					
12		Vellor Town			Non Consang.	90	341	3.8					5.9	
13														
14		" "			Uncle-Niece	21	80	3.8					3.7	
15		" "			First Cousin	50	213	4.3					2.8	
16		" "			Others	52	96	4.4					6.3	
17		" "			All Consang.	93	389	4.20					3.9	
18		Madras			Non Consang.						12596			
19														
20		" "			All Consang.						9152			
21		" "			First Cousin						5046			
22		" "			Uncle-Niece						2954			
23		" "			Others						1152			
24														
25		**28. Kerala**												
26					First Cousin	83	391							
27					Second Cousin	8	34							
28					Non Consang.	185	770							
29		Palghat	Nayar		All Consang.	8						3.1		
30		Region												
31					Non Consang.	168						3.9		
32		**29. Pondicherry (U.T.)**												
33		***VI. ISLANDS***												
34		30. Lakshdweep (U.T.)												
35		31. Andaman and Nicobar Islands (U.T.)												
36		***VII. OTHERS***												
37		**NEPAL**												
38		**BHUTAN**												
39		**SRI LANKA**												
40		**PAKISTAN**												
41		Lahore City			First Cousin			4.07						
42														
43					1-1/2 Cousin			4.65						

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1				39.2[3]		53.1[2]		127.9[2]								Rao & Inbaraj
2																1979
3				45.0[3]		52.9[2]		128.2[2]								" "
4				40.6[3]		50.1[2]		121.6[2]								" "
5				70.9[3]		45.8[2]		131.5[2]								" "
6				68.7[3]		54.2[2]		150.0[2]								" "
7				78.7[3]		55.5[2]		135.2[2]								" "
8																
9				64.0[3]		54.0[2]		154.0[2]								" "
10				74.0[3]		53.4[2]		150.0[2]								" "
11				71.3[3]		52.6[2]		144.1[2]								" "
12								7.6		3.6						John & Jayabal,
13																1971
14								6.3		5.0						" "
15								12.2		3.8						" "
16								7.3		2.1						" "
17								9.8		3.6						" "
18	615					231										Kesavan et al.,
19																1978
20	499					195										" "
21	270					97										" "
22	181					77										" "
23	48					21										" "
24																
25																
26				15.1						18.6						Kumar et al.1987
27				11.8						8.8						" "
28				30.0						8.7						" "
29																Ray, 1979
30																
31																
32																" "
33																
34																
35																
36																
37																
38																
39																
40																
41																Shami et al.,
42																1990
43																" "

* : Prior to 21 Years 2 : Rate per 1000 liveborn; 3 : Rate per 1000 pregnancies

Table 2: Contd.....

S. No.	No.	Place (Region)	Population	*L1	Type of consanguinity	Pregnancies No.	Pregnancies No. %	Pregnancies Mean	Live births No.	Live births %	Live births Mean	Living children No.	Living children %	Miscarriages abortion Mean	Miscarriages abortion No. %	Miscarriages abortion Mean
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1					Second Cousin			3.47								
2																
3					Others			5.13								
4					Non Consang.			3.79								
5		Mianchannu			First Cousin			4.78								
6		City														
7					Non Consang.			2.89								
8		Muridke City			First Cousin			4.86								
9					Non consang.			5.47								
10		Sheikhupura			First Cousin			4.91								
11		City														
12					1-1/2 Cousin			6.13								
13					Non Consang.			4.33								
14		Gujarat City			First Cousin			4.95								
15					1-1/2 Cousin			4.67								
16					Second Cousin			5.00								
17					Others			4.68								
18					Non Consang.			4.40								
19		Jhelum City			First Cousin			4.91								
20					1-1/2 Cousin			4.64								
21					Second Cousin			7.00								
22					Others			5.00								
23					Non Consang,			4.57								
24		Rawalpindi			First Cousin			4.41								
25		City														
26					1-1/2 Cousin			4.69								
27					Second Cousin			3.00								
28					Others			3.00								
29					Non Consang.			4.54								
30		Quetta,	Pathan				147		91.16					2.72		
31		Balochistan														
32		" "	Baloch				71		87.32					1.41		
33		" "	Jats				129		96.13					3.87		
34		" "	Aracen				106		98.11					1.89		
35		" "	Miscellaneous				121		92.56					4.13		
36					First Cousin		144		90.97					4.17		
37					Second Cousin		34		85.29					11.76		
38					Others		470		94.86					0.68		
39					Non Consang.		72		97.22					1.39		
40	**BANGLADESH**															
41	**MALDIVES**															

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; Consang.: Consanguineous

Intra-uterine loss			*Extra-uterine loss*										*Mortality per mother*		*Sterility*	
	Still births		*Total*		*Neonatal deaths*		*Infant deaths*		*Child deaths*		**Non-accid-ental deaths*					
No.	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Mean*	*No. %*	*Authors*
16	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
1																Shami et al.,
2																1990
3																" "
4																" "
5																" "
6																" "
7																" "
8																" "
9																" "
10																" "
11																" "
12																" "
13																" "
14																" "
15																" "
16																" "
17																" "
18																" "
19																" "
20																" "
21																" "
22																" "
23																" "
24																" "
25																" "
26																" "
27																" "
28																" "
29																" "
30	6.12	8.84					0.75									Mian & Mushtaq,
31																1994
32	11.27	12.68					3.23									" "
33		3.87					2.42									" "
34		1.89					0.96									" "
35	3.30	7.43					2.68									" "
36	4.86	9.03					2.29									" "
37	2.94	14.71														" "
38	4.11	5.14					1.71									" "
39	1.39	2.78					1.43									" "
40																
41																

* : Prior to 21 Years

Table 3: Consanguinity -Effects on morbidity

S. No.	No.	Region (Place)	Population	*L_1 (No.)	Status of offstring (No.)	Diseases and disorders: Related: Uncle-niece (No.)	First cousin (No.)	First cousin once removed (No.)	Others (No.)	All related
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1		**INDIA**								
2	***I.***	***NORTH INDIA***								
3	***A.***	*WESTERN HIMALAYA (S.No. 1,2)*								
4.	**1.**	**Jammu and Kashmir**								
5.	**2.**	**Himachal Pradesh**								
6.	**3.**	**Punjab**	Hindu							
7										
8										
9										
10										
11										
12	**4.**	**Chandigarh (U.T.)**								
13	**5.**	**Haryana**								
14	**6.**	**Delhi (U.T.)**								
15	**7.**	**Uttar Pradesh**								
16					Muslim(1)			1. Disease Tay-Sachs		
17										
18	*B.*	*CENTRAL HIMALAYA (S.No. 7, Eight Districts of Uttar Pradesh)*								
19	**8.**	**Rajasthan**								
20			Dawoodi	Shia			1. Retinitis			
21			Bohras	Muslim			Pigmentosa			
22							2. Usher's			
23							Syndrome			
24							3. Myopia			
25							4. Hypertension			
26	***II.***	***WEST INDIA***								
27	**9.**	**Gujarat**								
28	**10.**	**Maharashtra**								
29			Bombay	Hospital						
30				Data						
31			" "	" "						
32										
33			" "	" "	Alive (2)			1. Hare lip/		
34								Cleft Palate		
35								2. Imperforate Anus		
36								3. Talipes		
37			" "	" "	Alive (2)			1. Anophth-		
38								almia		
39										
40			" "	" "	Live Born				1. Hare Lip/	
41					Dend (1)				Cleft Palate	
42									2. Polydactyly	
43									3. Talipes	

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; M : Male; F : Female

		Affected children												
	Not related	Uncle-niece		First cousin		First cousin once removed		Others		All consang-uineous		Non-consang-uineous		
S. No.	(No.)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	Authors
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1														
2														
3														
4														
5														
6	Infantile													Solan &
7	Amaurotic													Fredrickson,
8	Familial Idiocy													1972
9	Tay-Sachs											2*	1*	Mani et al.,
10	Disease													1963
11														
12														
13														
14														
15														
16										6*	6*			Maniar &
17														Arora, 1966
18														
19														
20														Basu, 1978
21														
22														
23														
24														
25														
26														
27														
28														
29										1.34	1.34	0.81	0.81	Stevenson et
30														al., 1966
31										1.49		1.39		Sandhvi, 1974
32														
33														Stevenson et
34														al., 1966
35														
36														" "
37														
38														
39														
40														" "
41														
42														
43														

*R_1 : Total Children; *R_2 : Living Children; *Number Given

Table 3: Contd.....

S. No.	No.	Region (Place)	Population	*L_1 (No.)	Status of offstring (No.)	Diseases and disorders: Related: Uncle-niece (No.)	First cousin (No.)	First Cousin once removed (No.)	Others (No.)	All related
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1		Bombay	Hospital Data		Live Born		1. "Agenesis			
2					Dear (1)		of Sclera"			
3			Christian (2)							
4	**11.**	**Goa, Daman and Diu**								
5	**12.**	**Dadra and Nagar Haveli (U.T.)**								
6	***III.***	***EAST INDIA***								
7	*III.*	*EASTERN HIMALAYA (S.No. 13 to 20 and Darjeling District of West Bengal)*								
8	**13.**	**Arunachal Pradesh**								
9	**14.**	**Assam**								
10	**15.**	**Nagaland**								
11	**16.**	**Manipur**								
12	**17.**	**Mizoram**								
13	**18.**	**Tripura**								
14	**19.**	**Meghalaya**								
15	**20.**	**Sikkim**								
16	**21.**	**West Bengal**								
17	**22.**	**Bihar**								
18	**23.**	**Orissa**								
19	***IV.***	***CENTRAL INDIA***								
20	**24.**	**Madhya Pradesh**								
21	***V.***	***SOUTH INDIA***								
22	**25.**	**Karnataka**								
23		Bangalore	Mentally			1. Mental				
24			Retarded			Retardation				
25			Children							
26		" "	Schizophrenics			2. Schizo-				
27						phrenia				
28		Mysore		Brahmin	Live		Phenyl-			
29				Hindu			ketonuria			
30					New born	Single				
31					Infants	Aminoacid				
						Disorders				
32										
33					New born	General				
34					Infants	Aminoacid				
35						Disorder				
36		Bangalore		Hindu (2)					Tay Sachs	
37									Disease	
38		Mysore		Muslim						Phenylke-
39										tonuria
40										" "
41		" "		Hindu						
42	**26.**	**Andhra Pradesh**								
43		Nellore	Fishermen	Hindu		1. Cleft Lip and				
44		District				Palate				
45						2. Webbed				
46						toes (2)				

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; M : Male; F : Female

		Affected children												
	Not related	Uncle-niece		First cousin		First cousin once removed		Others		All consang-uineous		Non-consang-uineous		
S. No.	(No.)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	Authors
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1														Stevenson etal 1966
2														
3	Tay-Schs											4	2	Ramakumr &
4	Disease													Sood, 1961
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24										30.30				Rao & Narayana, 19
25														
26														
27										19.00				" "
28														
29					1*	1*								Centerwall & Ittyerah, 1976
30														
31										5*			22*	Bittles et al., 1982
32														
33										8*			25*	" "
34														
35														
36														
37										3*		3*		Rao et al., 1964
38														
39										1*		1*		Centerwall & Ittyerah, 1966
40														
41										1*		1*		" "
42														
43			2*											Reddy & Rao. 1978
44														
45														
46														

*R_1 : Total Children; *R_2 : Living Children;* Number Given

Table 3: Contd.....

S. No.	No.	Region (Place)	Population	*L_1 (No..)	Status of offstring (No.)	Diseases and disorders — Related: Uncle-niece (No.)	First cousin (No.)	First cousin once removed (No.)	Others (No.)	All related
1	2	3	4	5	6	7	8	9	10	11
1			Patients							
2			(Cancer)							
3										
4			Patients							
5			(Pulmonary							
6			T.B.)							
7			Patients							
8			(Other kinds							
9			of T.B.)							
10			Patients							
11			(Diseases of							
12			C.V.S.)							
13			Patients							
14			(Diseases of							
15			C.N.S.)							
16			Patients							
17			(Respiratory							
18			Diseases)							
19			Patients							
20			(Deficiency							
21			Diseases)							
22			Patients							
23			(Injuries)							
24			Patients							
25			(Malforma-							
26			tions)							
27		Tirupati	Pattusali							Congenital
28		Town								Malformations-
29										Cleft Palate,
30										Mental Defici-
31										ency, Clubfoot
32										Shortening of
33										4th metatarsal
34		Chittoor	Mala	Scheduled						
35		District		Caste						
36				Hindu (1)						
37										
38										
39			Hospital							Hydrocephalus
40			Patients							with meningocol
41										with Cleft lip;
42										Cleft lip and
43										Palate with
44										hyoisoadias;

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; M : Male; F : Female

		Affected children												
	Not related	Uncle-niece		First cousin		First cousin once removed		Others		All consang-uineous		Non-consang-uineous		
S. No.	(No.)	$*R_1$ (No. %)	$*R_2$ (No. %)	$*R_1$ (No. %)	$*R_2$ (No. %)	$*R_1$ (No. %)	$*R_2$ (No. %)	$*R_1$ (No. %)	$*R_2$ (No. %)	$*R_1$ (No. %)	$*R_2$ (No. %)	$*R_1$ (No. %)	$*R_2$ (No. %)	Authors
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1			5*	11*				1*		25.00				Dronamraju
2														Meera Khan,
3														1961, 1963
4			6*	8*				2*		42.10				" "
5														
6														
7			1*	10*				1*		30.80				" "
8														
9														
10			1*	10*				3*		23.00				" "
11														
12														
13			3*	8*				2*		21.00				" "
14														
15														
16			6*	11*				4*		36.20				" "
17														
18														
19			2*	5*				4*		36.20				" "
20														
21														
22			1*	6*				1*		20.00				" "
23														
24			2*	7*				1*		41.70				" "
25														
26														
27										4.65		0.0		Reddy & Rao,
28														1978
29														
30														
31														
32														
33														
34					9*								23*	Reddy, 1983
35														
36	Amaurotic													Ghai &
37	Familial													Khetarpal, 1963
38	Idiocy													
39										7.61	7.61	0.91	0.91	Murty & Jamil,
40														1972
41														
42														
43														
44														

$*R_1$: Total Children; $*R_2$: Living Children; *Number Given

Table 3: Contd.....

S. No.	Region No.	(Place)	Population	*L_1 (No..)	Status of offstring (No.)	Diseases and disorders: Related: Uncle-niece (No.)	First cousin (No.)	First cousin once removed (No.)	Others (No.)	All related
1	2	3	4	5	6	7	8	9	10	11
1										Anencephaly;
2										Oesophageal
3										atresia ;
4										Exomphalos;
5										Polydactyly;
6										Deformed
7										Pinna ;
8										Gross Skelatal
9										Malformations;
10										Hydrocephaly
11			Patients with							
12			Congenital							
13			Heart							
14			Diseases							
15	Vellore				Alive	1. Pyloric	Mental	Mental		
16						Stenosis(M);	Deficiency	Deficiency		
17							with	(F);		
18							Dwarfism (M);			
19						2. Myopathy	Choanal	Cavernous		
20						(F);	Atresia (M);	Haemangioma		
21								of Thigh (M);		
22						3. Spina	Bilateral	Spastic		
23						Bifida	Cleft Lip and	Cerebral		
24						Occulta (M);	Palate (F);	Palsy (M);		
25						4. Treacher	Congenital			
26						Collions	Heart			
27						Syndrome (M);	Disease (F);			
28						5.	Cavernous			
29							Haemangioma			
30							of Thigh (M);			
31						6.	Micropha-			
32							thalmia (F);			
33						7.	Thyroglossal			
34							Sinus (M);			
35		" "			Still Born	1. Hydroce-		Extreme		
36						phalus (M);		Exomohalos		
37		" "			Neontatal	1. Myelome-				
38					Death	ningocele (M)				
39		" "								
40										
41		" "	Pediatric			Albinisim (1)	Esophaegal	Thumb	Albinism (1)	
42			Outpatients				Atresia (1)	Widened		
43						Anal Atresia	Meconium ileus		Anal Atresia	

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; M : Male; F : Female

		Affected children												
	Not related	Uncle-niece		First cousin		First cousin once removed		Others		All consang-uineous		Non-consang-uineous		
S. No.	(No.)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	Authors
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11										29.03		70.96		Vishnupriya
12														et al., 1981
13														
14														
15	Imperforate													Asha Bai et al.,
16	Anus (M);													1981
17														
18														
19	Anal Stricture													
20	(M);													
21														
22	Thalassemia													
23	major (M):													
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35	Multiple													
36	Anomalies (M)													" "
37	Multiple													
38	Anomalies (F)													" "
39	Duodenal													
40	Atresia (M)													
41	Pyloric													" "
42	Stenosis (M)													
43			4.7	3.6	2.2	2.4	4.7	3.9		2.8	2.5	0.9	0.4	" "
44														

*R_1 : Total Children; *R_2 : Living Children; *Number Given

Table 3: Contd.....

S. No.	Region No.	(Place)	Population	*L_1 (No..)	Status of offstring (No.)	Diseases and disorders — Related: Uncle-niece (No.)	First cousin (No.)	First cousin once removed (No.)	Others (No.)	All related
1	2	3	4	5	6	7	8	9	10	11
1						Earlobe Extra,	Palate, Lip		Exom-	
2						Tongue-Tie	Cleft (1)		phalos (1)	
3						(1)				
4										
5						4. Palate and	Polydactyly		Finger Nail	
6						Lip, Cleft (1)	(1)		Missing (1)	
7						5. Polydactyly	Teratoma,		Hyposphadeus	
8						(1)	Sacrococcy-	(1)		
9							geal (1)			
10						6. Skin Tag,			Metatarsus	
11						Chest Wall (1)			Varus (1)	
12						7.			Patent Ductus	
13									Arterisus (1)	
14						8.			Polydac-	
15									tyly (1)	
16						9.			Skin Freckles	
17									General (1)	
18	Vellore		Pediatric							
19			Outpatients							
20	North Arcot			Rural						
21	District									
22	"	"		Urban						
23			Pediatric							
24			Patients							
25			with major							
26			Congenital							
27			anomalies							
28			Pediatric							
29			Patients							
30			with							
31			Mental							
32			Retardation							
33	Madras		Malformed						Congenital	
34			Infants						Malformations	
35	"	"	"	"					Congenital	
36									malformations	
37	"	"	Hindu	Malformed					Congenital	
38				Infants					malformations	
39	"	"	Muslim	"	"				Congenital	
40									malformation	
41	"	"	Christian	"	"				Congenital	
42									malformations	
43										

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; M : Male; F : Female

		Affected children												
	Not related	Uncle-niece		First cousin		First cousin once removed		Others		All consang-uineous		Non-consang-uineous		
S. No.	(No.)	$^*R_1$ (No. %)	$^*R_2$ (No. %)	$^*R_1$ (No. %)	$^*R_2$ (No. %)	$^*R_1$ (No. %)	$^*R_2$ (No. %)	$^*R_1$ (No. %)	$^*R_2$ (No. %)	$^*R_1$ (No. %)	$^*R_2$ (No. %)	$^*R_1$ (No. %)	$^*R_2$ (No. %)	Authors
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	Anal Atresia													Centerwall & Centerwall, 1966
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18										4.10	4.10	1.10	1.10	Centerwall & Centerwall, 1966
19														
20		6.20[1]		7.30[1]						5.90[1]		7.70[1]		Rao & Inbaraj, 1977, 1980
21														
22		11.10[1]		10.90[1]				17.90[1]		12.20[1]		7.70[1]		" "
23										9.10	9.10	5.30	5.30	Centerwall & Centerwall, 1966
24														
25														
26														
27														
28										4.60	4.60	2.60	2.60	
29														
30														
31														
32														
33										30	30	25	25	Chandra & Harilal, 1978
34														
35		70*	70*	128*	128*			23*	23*	221*	221*	220*	220*	Kesavan et al., 1978
36														
37		67*	67*	117*	117*			22*	22*	206*	206*	199*	199*	" "
38														
39				4*	4*			1*	1*	5*	5*	5*	5*	" "
40														
41		3*	3*	7*	7*					10*	10*	15*	15*	" "
42														
43														

$^*R_1$: Total Children; $^*R_2$: Living Children; * Number Given; 1. Rate per 1000 liveborn

Table 3: Contd.....

S. No.	Region No.	(Place)	Population	*L_1 (No..)	Status of offstring (No.)	Diseases and disorders: Related: Uncle-niece (No.)	First cousin (No.)	First cousin once removed (No.)	Others (No.)	All related
1	2	3	4	5	6	7	8	9	10	11
1										
2	**28. Kerala**									
3	**29. Pondicherry (U.T.)**									
4	***VI. ISLANDS***									
5	**30. Lakshadweep (U.T.)**									
6	**31. Andaman and Nicobar Islands (U.T.)**									
7	***VII. OTHERS***									
8			Indian							
9										
10										
11	South India		Tamil	South						Niemann Pick
12			Vathima	Indian						Disease
13				Brahmin						
14	"	"	Tamil	"	"		Niemann			
15						Pick Disease				
16	"	"	Tamil	South						
17				Indian Non-						
18				Brahmin						
19	North India		Narmadia	North						
20				Indian						
21				Brahmin						
22										Hurler
23										Syndrome
24										Threoninemia
25										
26	**NEPAL**									
27	**BHUTAN**									
28	**SRI LANKA**									
29	**PAKISTAN**									
30			West Pakistan	Khatris	Live				Phenylke-	
31				Hindu					tonuria	
32			Quetta							1. Postnatal
33										asnormalities
34	**BANGLADESH**									
35	**MALDIVES**									

*L_1 : Rural/Urban/Religious/Hierarchical/Occupational Group; M : Male; F : Female

		Affected children												
	Not related	Uncle-niece		First cousin		First cousin once removed		Others		All consang-uineous		Non-consang-uineous		
S. No.	(No.)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	*R_1 (No. %)	*R_2 (No. %)	Authors
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1														
2														
3														
4														
5														
6														
7														
8	Tay-Sachs											3*	3*	Manchanda
9	Disease													et al., 1957
10														
11										2*				Jadhav et al.,
12														1978
13														
14										1*	1*			" "
15														
16	Niemann Pick											2*		" "
17	Disease													
18														
19	Niemann Pick											2*		" "
20														
21														
22										3*	3*			Chatterjee et al.,
23														1978
24														Reddi et al.,
25														1978
26														
27														
28														
29														
30									2*					Centerwall &
31														Ittiyerah, 1966
32										11*		2*		Mian &
33														Mushtaq, 1994
34														
35														

*R_1 : Total Children; *R_2 : Living Children; *Number Given