



**Original Article:**

**Prevalence and Pattern of Consanguineous Marriages Among Different Communities in Mangalore**

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**Abstract: Introduction:** Consanguineous marriages are a common practice in the Middle East, Asian and African populations. Many studies have stated an association between first cousin marriages and the incidence of autosomal recessive diseases and congenital malformations. High frequency of consanguinity is reported by researchers among South India. The objectives of this study were to determine the prevalence and type of consanguineous marriages among the different communities of Mangalore. **Methods:** This study was conducted on 1164 married women in Mangalore to investigate the prevalence and type of consanguineous marriages. All the women were interviewed personally using a structured questionnaire. Family pedigree was constructed to study the type of consanguineous marriages. Data analysis was done by SPSS Win 13.0. **Results:** A low percentage of consanguinity (6.53%) was observed with a mean inbreeding coefficient of 0.0339. Frequency of consanguinity between religions was highly significant. Of these the most frequent were first cousin marriages (43.42%). Within Hindu religion the highest rate of consanguinity was among the Billavas (47.62%) of which the most frequent were distant relative marriages (75%) followed by second cousin marriages (57.14%). There was no significant difference in the frequency distribution of the types of consanguinity between the religions and also between the different groups among Hindus. **Conclusion:** The frequency of consanguinity was found to be low in Mangalore. The findings contradict with the earlier reports of high prevalence of consanguineous marriages in South India. Increased female education, increased socio-economic status and decrease in parental decisions in marriages may be the reasons.

**Key Words:** Consanguineous marriages; Coefficient of inbreeding; Prevalence; Religion

**Introduction:**

Consanguineous marriage is a traditional practice in many communities around the world. It is defined as a marriage between two people who are second cousins or more closely related.[1] Literature reports a historically high prevalence among the Middle East countries, North Africa and South Asia accounting for 20-50+% of all marriages. First cousin (F = 0.0625) unions are more frequent comprising 20-30% of all marriages.[2,3] Blood related marriages have higher prevalence in Southern states of India.[4] This social custom is practiced mainly for religious and economic reasons.[5] In some religions marriages between first cousins and uncle-niece is permitted, but not between brothers and sisters. Among the Hindu population of South India, about 30% of marriages are consanguineous, with 20+% between uncle-niece unions (F = 0.125).[6] Consanguineous unions are preferred in some communities as it is believed to strengthen family relations. The fear of marrying with stranger, maintenance of family property, requirement of less economic transaction (dowry) and cultural practices favor intra-familial marriages.[5] Marriages within the relatives are also believed to be more stable, have better relationships with in-laws, favors the practice and continuity of cultural practices. Parents believe that in close kin relationships physical traits of the bride will be less important and in-laws will be more caring and supportive.[5] Among the major population studies reported consanguinity is found to be

associated with socio-economic levels, education and rural communities.[5]

Biological disadvantages of children with same blood-line (inbred) unions have been studied and reported globally. Consanguineous unions increase the risk of defective recessive alleles in the offspring.[2] Brothers and sisters share commonly 50% of their genetic make-up. Uncle and niece share 25% and first cousins 12.5% of their inherited genetic material.[7] Hence, blood related marriages increase the risk of defective gene being transmitted to the children from the parents. The average level of inbreeding in a homozygous offspring of consanguineous parents is calculated by the coefficient of inbreeding (F). Literature provides data on the increased risk in pregnancy outcome, mortality and morbidity among the offspring's of consanguineous couples.[8] Closer the biological relationship higher is the risk. Consanguinity is also reported to be associated with miscarriages.[8] A significant frequency has been reported between consanguinity and genetic disorders, congenital heart disease, multiple congenital anomalies, neurological malformations, chromosomal disorders and mental retardation.[9] Recent research has also shown genetic contribution to complex diseases.[10] Common adult disease like cancer, mental disorders, heart diseases, gastrointestinal disorders, hypertension, hearing deficit and diabetes mellitus were more frequent among consanguineous marriages.[10] To the best of our knowledge data on prevalence and pattern of consanguineous marriages among different communities in Mangalore Taluk are not available. In this context this study was designed to provide the extent and nature of consanguineous marriages in the Mangalore population.

#### Materials and Methods:

A cross sectional analytical design was followed to carry out the study. A convenience sample of 1164 married women was personally interviewed using a structured questionnaire in Mangalore taluk to determine the prevalence of consanguineous marriages. A family pedigree was drawn for each marriage to record the type of consanguineous relationship involved. The inclusion criteria included married

couples with at least third generation native to Mangalore. Those couples where either was not native to Mangalore and where both belong to different religion were excluded from the study. Consanguineous marriage was classified by the degree of relationship between the couples: first cousins, second cousins and distant relative. The coefficient of inbreeding (F) was calculated for each couple and the mean coefficient of inbreeding ( $\alpha$ ) estimated for the population.

**Statistical analysis:** The data were analysed by SPSS Win 13.0 program. Standard procedures of chi-square test and fisher's exact test were employed to analyze the data. Coefficient of inbreeding for the population(s) was calculated by the formula  $\alpha = \sum P_i F_i$ , where  $P_i$  is the proportion of a certain type of consanguineous marriage and  $F_i$  is the coefficient of inbreeding of that type of consanguineous marriage.

#### Results:

A total of 1164 women were interviewed 35.82% were Hindu, 32.30% were Muslim and 31.87% were Christian. 6.53% were consanguineously married [Table 1]. Consanguinity was seen among 5.04% of Hindu, 13.56% of Muslim and 1.08% of Christians [Table 1]. Among Hindus 9.52% of Brahmin, 47.62% of Billava, 14.29% of Bunt and 28.57% of Goud Saraswat Brahmin (GSB) marriages were consanguineous [Table 3]. Chi-square test between the religions was highly significant ( $\chi^2 = 50.075$ ,  $p < 0.0001$ ), whereas there was no significance between the castes among the Hindus ( $\chi^2 = 6.948$ ,  $p < 0.074$ ). Of the consanguineously married couples 43.42% were first cousins, 39.47% were second cousins and 17.11% were distant relatives [Table 2]. Fishers exact test showed no significance between the religions ( $p = 0.171$ ). Among the Hindus first cousin marriages were more frequent (47.62%) and Fishers exact test showed no significance ( $p = 0.800$ ) [Table 3]. The mean coefficient of inbreeding in the population was 0.0339. It was found to be highest in Christians (0.0625) and lower in Hindus (0.0357) and Muslims (0.0310) [Table 2]. Among the Hindus, the Brahmins had the highest coefficient of inbreeding (0.0625), followed by Bunts (0.0468), GSB (0.0371) and Billavas (0.0261) [Table 3].

Table 1: Religion and consanguinity						
Religion	Consanguineous marriage	Non Consanguineous marriage	Total			
Hindu	21 (5.04)	396 (94.96)	417 (35.82)			
Muslim	51 (13.56)	325 (86.44)	376 (32.3)			
Christian	4 (1.08)	367 (98.92)	371 (31.87)			
Total	76 (6.53)	1088 (93.47)	1164 (100)			
Percent in parenthesis; $\chi^2 = 50.075$ , $p < 0.0001$						
Table 2: Coefficient of inbreeding by religion						
Religion	First cousin	Second cousin	Distant relative	Total	F	
Hindu	10 (47.62)	7 (33.33)	4 (19.05)	21 (100)	0.0357	
Muslim	19 (37.25)	23 (45.10)	9 (17.65)	51 (100)	0.0310	
Christian	4 (100)	0	0	4 (100)	0.0625	
Total	33 (43.42)	30 (39.47)	13 (17.11)	76 (100)	0.0339	
Percent in parenthesis; Fishers exact test $p = 0.171$ ; F: Coefficient of inbreeding						
Table 3: Coefficient of inbreeding by caste						
Religion	First cousin	Second cousin	Distant relative	Consanguineous marriage	Non Consanguineous marriage	F
Brahmin	2	0	0	2 (9.52)	98	0.0625
Billava	3	4	3	10 (47.62)	105	0.0261
Bunt	2	1	0	3 (14.29)	97	0.0468
GSB	3	2	1	6 (28.57)	96	0.0371
Total	10 (47.62)	7 (33.33)	4 (19.05)	21 (100)	396	0.0357
Fishers exact test $p = 0.800$				$\chi^2 = 6.948$ , $p < 0.074$		
Percent in parenthesis; F: Coefficient of inbreeding						

### Discussion:

In the present study a low percentage of consanguinity (6.53%) is observed in Mangalore population. This finding is in contrast with the earlier studies, wherein high prevalence of consanguineous marriages is reported in South India.[4] The studies reviewing the rate of consanguinity among the populations of South India show that the rate ranges from 20% to 60% with  $F = 0.0267$  to  $0.0493$ . [11-17] The decrease recorded in our study could be attributed to increased female education, migration to urban areas, reduction in number of eligible relatives, increased socio-economic status and decrease in parental decisions in marriages. A study in Japan reported a decrease in the frequency of consanguineous marriages from 13% to 2.9% in urban and 21% to 4.3% in rural areas.[18] Muslims showed a higher frequency of consanguinity (67.11) followed by Hindus (27.63) and Christians (5.26) which supports the results of the study conducted in Belgaum.[19] Whereas a study in Pondicherry reported higher frequency of consanguinity among Hindu population.[8] The regulations governing the Hindu marriages prevent inbreeding. One such regulation is the gotra system (male lineage), where, a boy and girl of the same gotra are considered siblings and hence are not permitted to marry.[20] Among some communities where the fathers of the boy and girl share a common surname marriages are prohibited. In Christians marriages are permitted between a boy and girl if they had no common ancestor for 7 generations.[20] Though consanguineous marriages are common among Muslims, the *Quran* provides no regulations to interpret as encouraging consanguinity.[21] First cousin marriages (43.42%) were the most frequent type of consanguinity which is comparable with other studies.[3] Uncle-niece marriage and first-cousin unions have a long tradition in South India.[22] In the Hindu Marriage Act of 1955, cross-cousin marriage was recognized and the legality of Uncle-niece marriages was confirmed in the Hindu Code Bill of 1984.[23] No Uncle-niece marriages were observed in our study. The coefficient of inbreeding ( $F$ ) is the probability that the both the alleles in a homozygous individual is received from a common ancestor. Comparable to the literature the mean coefficient of inbreeding in our study is 0.0339. [12-18]

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