

# Inbred and Non-Inbred First Cousin Marriages

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## Abstract

Three types of first cousin marriages, i.e, first cousin (wife) marriages (ICW) first cousin (husband) marriages (ICH), and first cousin (new) marriages (ICN) were identified in the present study. The two inbred first cousin marriages (ICW, ICH) indicate higher percentage of prenatal and postnatal deaths compared to ICN-marriages. ICW-marriages show significantly higher stillbirths and abortions compared to ICN-marriages, but ICH-marriages show non-significant differences.

An attempt has been made to explain that why ICW-marriages have more harmful effects on the progeny compared to other two types of marriages (JPMA 33:3, 198:).

## Introduction

The effects of consanguinity investigated by various authors (Schull, 1958; Sanghavi, 1966; Reid, 1976; Shami and Zahida, 1982) in different populations revealed higher mortality among children from consanguineous marriages than in non-consanguineous marriages. The problem of parental consanguinity and its effects on mortality and sterility were discussed by Schull et al. (1970) and Yarnaguchi et al. (1975) in the Japanese population. A similar problem arose while investigating the present population (Shami and Zahida, 1982), which particularly involves first cousin marriages where husband and wife were either the product of consanguineous marriages or that of non-consanguineous ones.

The present paper is concerned with the mortality of children among inbred and non-inbred first cousin marriages.

## Material and Methods

The present findings are based on three samples collected from Lahore, Mianchannu and Muridke. The methods of collection and analyses are similar to those of Shami, 1981; Shami and Zahida, 1981, 1982. Stillbirths, abortion., postnatal deaths and livebirths were considered for analysis in this study.

## Results

The data on first cousin marriages were classified depending upon their familial consanguinity. Three types were identified in the Present sample.-

(i) Either parent of the female subject was the product of first cousin marriages, classified as First Cousin (Wife) Marriages (ICW, Fig. I).

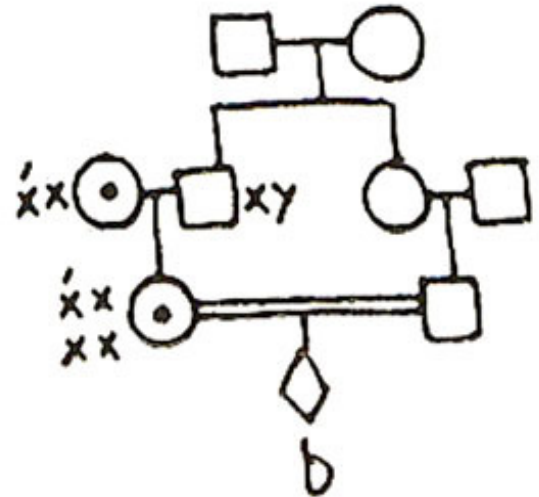
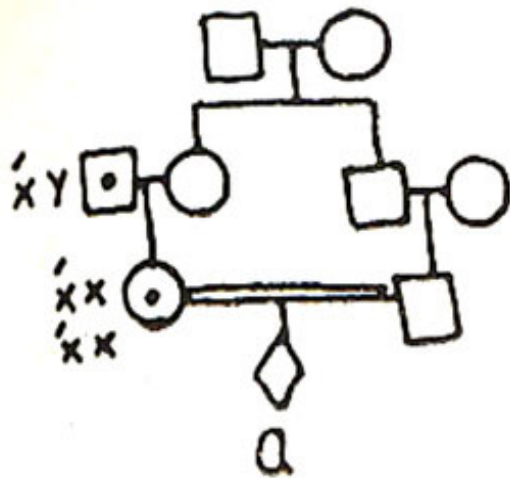


Fig. 1. Father ( , a ) or Mother ( , b ) of the female subject is the product of the first cousin marriage (X-indicates the inbred chromosome).

Here the female subject is the product of consanguineous marriages.

(ii) Either parent of the male subject was product of first cousin marriages, classified as First Cousin (Husband) Marriages (ICH, Fig. 2).

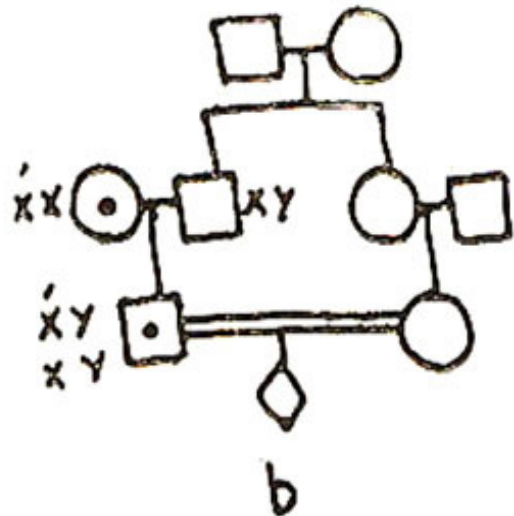
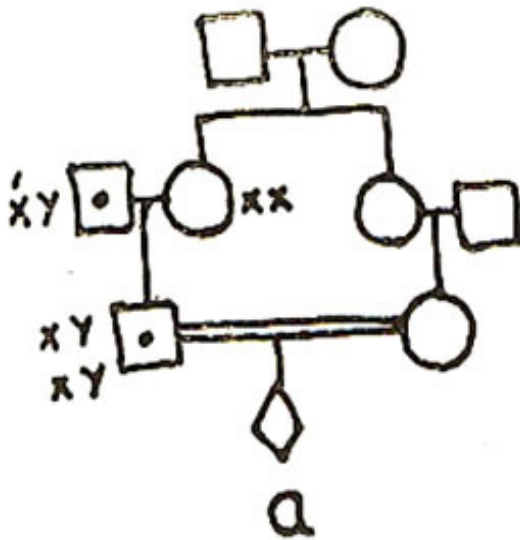
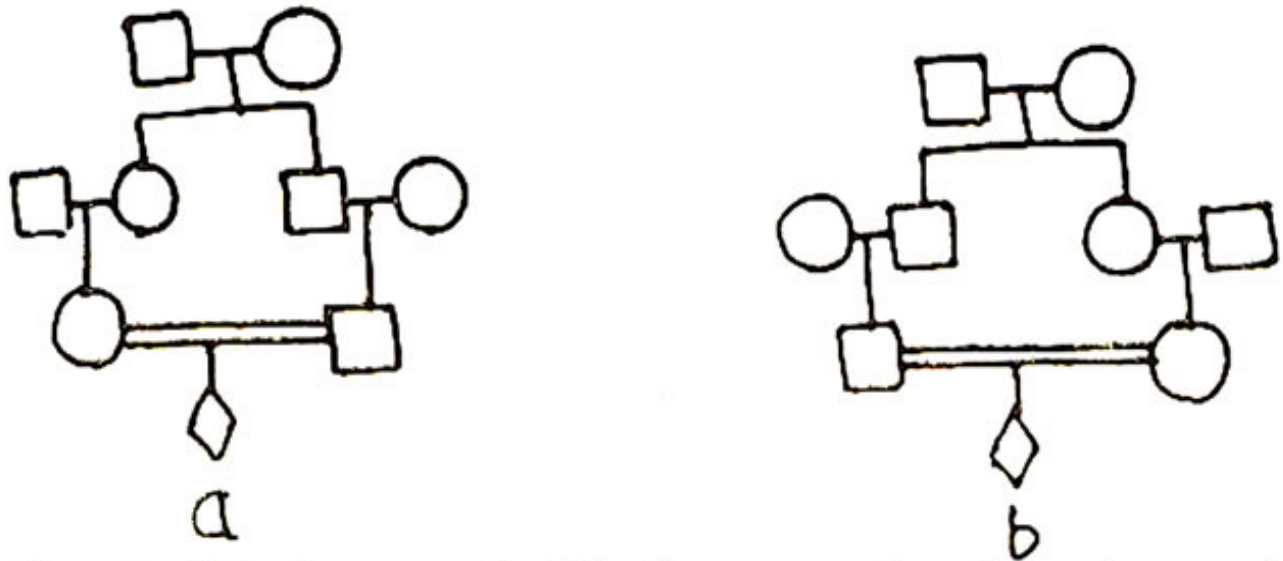


Fig. 2. Father ( , a ) or Mother ( , a ) of the male subject is the product of the first cousin marriage.

Here the male subject is the product of consanguineous marriages.

(iii) Either parent of female or male subject was neither related nor product of consanguineous marriages. These marriages were named as First Cousin (New) Marriages (IGN, Fig. 3).



**Fig. 3. Father and Mother of the female and male subjects are not related.**

The percentage distribution of first cousin (husband) marriages, first cousin (wife) marriages and first cousin (new) marriages in Lahore, Mianchannu and Muridke samples is 14.86, 23.67, 61.37, 17.65, 5.88, 76.47 and 16.00, 11.00, 65.00 respectively. In the three samples the two inbred first cousin marriages (ICW + ICH) constitute 38.94 (Lahore), 23.33% (Mianchan.nu) and 27.00% (Muridke) of the total first cousin marriages.

Mean maternal age and paternal age in the three types of first cousin marriages in the three city samples does not show any appreciable difference (Table I).

**Table I**  
**Mean Maternal and Paternal Age in First Cousin Marriages.**

Relationship	C i t y			
	Lahore	Mianchanru	Muridke	
ICW	MA (Years)	18.65 ± 0.38	19.33 ± 0.66	19.25 ± 0.63
	PA (Years)	23.89 ± 0.68	23.00 ± 1.00	23.31 ± 0.65
ICH	MA	18.98 ± 0.60	20.33 ± 2.08	19.56 ± 0.77
	PA	23.80 ± 0.84	21.77 ± 1.43	22.87 ± 0.90
ICN	MA	18.46 ± 0.25	19.95 ± 0.62	19.13 ± 0.26
	PA	22.78 ± 0.48	22.13 ± 0.54	22.15 ± 0.48

MA = Maternal age

PA = Paternal age

The effects of the three types was seen on stillbirths, abortions, prenatal deaths, livebirths, pregnancies etc. The results are shown in Table II.

**Table II**  
Percentage Distribution of the Effects of First Cousin Marriages.

City	Relationship		SB	Ab	Pd	Pt.d	LB	TS	TP
Lahore	ICW	%	11.64	8.56	20.21	13.98	79.79	66.09	22.32
		n	34	25	59	40	233	193	292
	ICH	%	8.85	8.85	17.71	10.94	82.29	71.35	14.68
		n	17	17	34	21	158	137	192
	ICN	%	6.91	9.71	16.63	11.89	83.37	71.48	62.99
		n	57	80	137	98	687	589	824
Mianchannu	ICW	%	—	50.00	50.00	35.71	50.00	14.28	6.17
		n	—	7	7	5	7	2	14
	ICH	%	—	—	—	27.27	100.00	72.73	14.54
		n	—	—	—	9	33	24	33
	ICN	%	2.78	1.67	57.14	26.67	95.56	68.89	79.29
		n	5	3	8	48	172	124	180
Muridke	ICW	%	2.70	1.35	4.05	21.62	95.94	74.32	16.52
		n	2	1	3	16	71	55	74
	ICH	%	3.09	1.08	4.12	19.56	95.87	77.32	21.65
		n	3	1	4	18	93	75	97
	ICN	%	1.44	—	1.44	13.72	98.96	84.84	61.83
		n	4	—	4	38	273	235	277

SB=Still birth      Ab=Abortion      Pd=Prenatal death      Pt.d=Post natal death      LB=Live birth  
TS=Total surviving      TP=Total pregnancies.

A better picture can be seen in Lahore data containing a larger number of families compared to other two cities. In Lahore sample the highest percentage of stillbirths (11.64%) is in ICW. Similarly, comparatively higher percentage of prenatal deaths (20.21%), postnatal deaths (13.98%) and the highest total deaths (33.90; prenatal + postnatal deaths) were also observed in ICW. On the other hand total livebirths (79.79%) and total surviving offspring (66.09%) are less than in ICW and ICH marriages. The lowest percentage stillbirths and the highest pregnancies were observed in ICN marriages. The picture with Mianchannu and Muridke samples follows the same pattern as is observed in Lahore data.

Comparisons for stillbirths and abortions in ICW vs ICN show significant differences ( $X^2=4.25$ ;  $P < 0.05$ ), but non-significant differences with ICH vs ICN ( $X^2=0.78$ ;  $P > 0.30$ ). Other comparisons for total Livebirths and total surviving children in ICW vs ICN and ICI-1 vs IGI-1 in Lahore ( $X=0.0073$ ;  $P > 0.90$ ;  $X^2=0.094$ ,  $P > 0.70$ ), Mianchannu ( $X=0.015$ ,  $P=0.90$ ;  $X^2=1.39$ ,  $P > 0.20$ ) and Muridke sample ( $X^2=0.017$ ,  $P=0.90$ ;  $X^2=0.27$ ,  $P > 0.50$ ) show non significant differences.

## Discussion

The present analysis indicates that the offsprings coming from ICW marriages are affected more than those from ICH-and ICN-marriages. Comparatively, more harmful effects were observed in ICW-marriages than in other two types could be explained on the basis of level of inbreeding, i.e, inbred genes carried by the products of consanguineous marriages- subject's father or mother (Fig. 1, 2, 3).

This may be explained on the basis of X-linkage.

In Fig. 1a, female subject's father is the product of consanguineous marriage while in Fig. 1b this is her mother. In the former case the daughters would be inbred and the sons outbred ( $XX \times XY \rightarrow XX, XX$ ),

XY, XY). In the latter case one daughter and one son would be inbred ( $kX \times XY$ )--XX, XX, XY, XY). In Fig. 2a, male subject's father and in Fig. 2b his mother is the product of consanguineous marriage. In the former case daughters would be inbred and the Sons outbred ( $kX \times \dots XX, kX, XY, XY$ ). In the latter case one son and one daughter shall be inbred ( $kX \times XY$ --XX, XX, XY, XY).

The analysis indicates that inbred female subjects would contribute more inbred genes through ICW-marriages (Fig- ia,b) compared to ICH-marriages where 50% inbred Sons are expected (Fig. 2b).

In Japanese population Yamaguchi et al. (1975) showed significant effect of maternal inbreeding on mortality of children, which was prominent, in the first year, than in the first six years of life. Paternal inbreeding showed no such effects. They indicated that the maternal inbreeding effects may be due to a delayed effect of inbreeding expressed through some 'inferiority' in physical condition of the mother due to increased homozygosity. Tanaka et al. (1967) from a study of Japanese rural area, suggested that increased homozygosity in the maternal genotype tends to decrease fetal viability. Schull et al. (1970) examined that parental consanguinity and inbreeding effects on the frequency of stillbirths and prereproductive mortality among liveborn infants failed to disclose a significant effect of parental inbreeding or consanguinity upon stillbirths. However, they found some increase in stillbirths occurring with both maternal inbreeding and paternal consanguinity, but did not have significant influence on the probability of death subsequent to parturition. Present study shows inbred mothers involved in first cousin marriages (ICW) have a significant effect on the frequency of stillbirths and abortions, but this is not seen in case of inbred fathers.

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