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Prevalence of consanguinity and inbreeding coefficient in Kashmore District, Sindh, Pakistan

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Abstract

Consanguinity is associated with the early existence of modern man. The kinship or cousin marriage is high in the Middle East, Asia, and Africa. The current CT scan was conducted in Kashmore, Sindh, Pakistan, where most of the population lives in rural areas. A random sample of 1000 married females belonging to three rehabilitations from the Kashmore district was obtained and differences in kinship and kinship parameters (F) were studied. The kinship rate was calculated at 68.80% and the marriage coefficient was 0.0411. The highest representation was for trade unions (47.10 percent of all marriages) and the proportion of marriages reaching Baridari/Pradari was 19.20 percent of all marriages. Kinship ratio ranges from 69.90 percent in Kandh Kot to 82.70 percent in Tangwani. The percentage of kinship in Seraiki language was 84.4%, F = 0.0321, Sindhi was 75.9%, F = 0.0366, Baloch respondents (59.0%, F = 0.0488) and other languages (95.7% F = 0.0233), and the percentage of kinship for marriage was higher (69.5%, F = 0.0397), but the kinship ratios did not appear to be related to rural or urban areas or to literacy level. Data showed wide variation in kinship ratio Social and demographic strata in the population of the Kashmore region, and the comparison between Kashmore and other Pakistanis showed regional heterogeneity of cousin marriages which attracts for further studies.

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Introduction

Marriage is a common practice, in which a bond is formed between two individuals that is social, emotional, cultural, physical and religious people. This marriage alliance has laid the foundation for the most basic social system, known as "the family" designed to appease the next generation. There are number of factors that are considered for making this bond. Consanguinity or cousin marriages or interfamilial marriage between close relatives is derived from Latin vocabulary, Con -"shared" and sanguis - "blood." In such marriages, each partner shares a common ancestral gene, such as grandparents (Hamamy, 2011). Consanguinity is prevalent in South Asia and the Middle East, with all marriages exceeding 40% (Abdalla & Zaher, 2014).

In Pakistan, there are several studies of cousin marriages in major metropolitan cities likewise Punjab and Rawalpindi, Lahore, Quetta and Karachi. These studies show that kinship or cousin marriages accounts for 31-62% of total marriages (Shami & Minhas, 1984; Bittles *et al.*, 1993; Shami *et al.*, 1994). In addition, cousins marriages have proven to be the most popular type. These data led to the prevalence of Pakistani society's preference for intimate marriage, and kinship is common among all sub-populations (Shami *et al.* 1994; Hussain & Bittles 1998). The people who practice this marriage include not only those who are separated by geographical or sociocultural factors but also the culture of choice (Bittles, AH, 2010).

Despite the widespread acceptance of kinship or cousin marriages, there are obvious regional and local heterogeneities in the system of endogamy and its internal factors. However, paternity in rural Pakistani communities is poorly studied in epidemiology and bioinformatics, especially in Kashmir in Pakistan due to war conditions, remote topography and traffic inconvenience, and unique socio-cultural norms factors prevail in the area. Therefore, in order to observe changes in the microscopic scale, it makes sense to study consanguinity in different sub-populations. In this research paper, various aspects of consanguinity including physical and biological parameters of neonates, prevalence and pattern of congenital malformations and geographic and demographic trends in the Kashmore district of the upper Sindh region of Pakistan, which is primarily a rural population were studied.

Materials and methods

Study population

The Kashmore region is located in the northern part of Sindh (28.2712° N, 69.3831° E) bordering Ghotki, Jacobabad, Shikarpur and Sukkur in Sindh province. It is also on the side adjacent to Baluchistan, with the Punjab province to the north-east of Punjab, Pakistan. In the 2017, Pakistan Census, the region's population is estimated at 1,206,772, an annual increase of 2.53%. In 2004, the Kashmir district was distinguished from Jacob Abad. Kashmor region has three areas: Kashmore, Kandh Kot, Tangwani (Fig. 1). Salahki and Balochistan are the main languages in the area. The main castes are Bijarani, Dahani, Banglani, Noonari, Khoso, Dashti, Soomro and others. The female literacy rate was 41.10% (GM Arif, 1998). Kashmor area covers an area of 2592 square kilometers. An estimated 95.3% of the population live in rural areas and have a density of 420/km2 (1100/sq.mi) (Census Organization, 2017).

Sample selection and data collection

The current cross-sectional study was conducted in 2015-16. Interviewees were interviewed by the hospital and door-to-door visits, WAPDA Hospital Guddu, Kashmore Civil Hospital and Kandh Kot Civil Hospital. Structured questionnaires were filled in through face-to-face interviews. Only married women who belong to the Kashmore region were included. Clear consent was obtained from the families for the interview and information was recorded. Ethical approval of the Bioethics Committee of the Shah Abdul Latif University, Khairpur, Sindh, Pakistan was also obtained.

Definition of variables

Data on the type of marriages and social demographic characteristics of respondents were obtained. The "occupation" and the "economic situation" have been recorded.

Three types of families/families were identified as "essential", "more than a couple" and their extension. In the nuclear family, couple and their entire childhood. In "more than couple" families, there are two brothers, their wives and their children living in the same house.

The "extended" family has three generations of families. Data are also recorded in marital arrangements, i.e. love marriages where arrangements, reciprocal arrangements, and arrangements/self-arrangements are made. "Arrange marriages" are the marriages made by the parents in relation to the marital partner; "Mutual marriage" or "Vata sata" is arranged for the exchange of two marriages between two families, whereas "self-arranged or arranged marriage" is the subject that defines the marriage of one another, And the marriage continues (Shaw, 2001; Afzal, 1984).
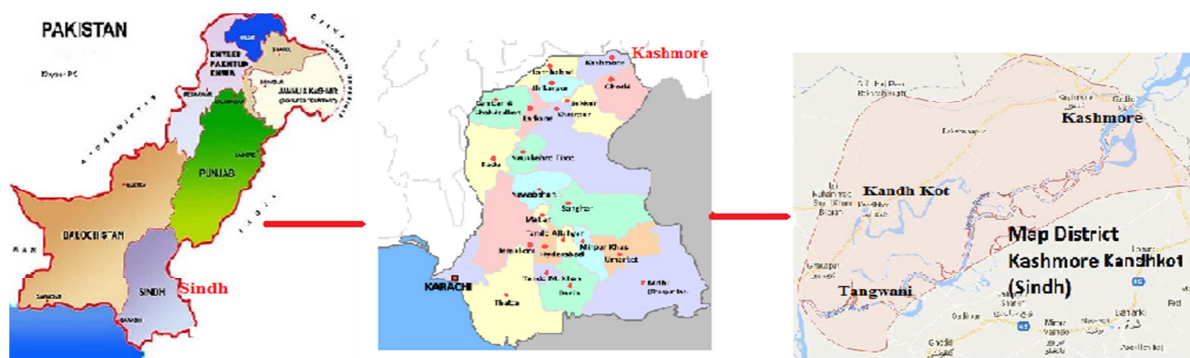

Fig. 1. Map of Kashmore district superimposed in map of Sindh and Pakistan.

Seven conjugal alliances have been recognized in kinship and non-blood allies (Bittles, 2010; Shami Zahida, 1982; Shami 1983; Shami and Iqbal, 1983; Shami and Hussain, 1984; Shami and Siddiqui, 1984; Ahmad *et al.*, 1998; Bittles *et al.*, 1993; Yaqoob *et al.*, 1993; Mian Mushtaq, 1994; Wahab and Ahmad, 1996).

Arrangement for marriage are those marriages the subject's parents make in relation to a marital partner; "Mutual marriage" or "Vata sata" is arranged to exchange two marriages of marriage between two families, whereas "self-arranged or arranged love Marriage "is the theme that defines each other's marriage and the marriage continues (Shaw and Kinship, 2001; Afzal, 1984; Nazish and Sajid, 2014).

Statistical analysis
The coefficient of the marriage of relatives (F) is calculated from the weighted average of near-proximity models and is based on different demographic specialties (Shami *et al.*, 1989) as shown in Table 1.

*Table 1. Comparative study of ratio of consanguinity and inbreeding co-efficient in Pakistan.

City	Sample size	Year	Consanguinity (%)	Inbreeding Coefficient (F)	Reference
Lahore	966	1979/80	38.8	0.0269	(Shami and Zahida, 1982)
Minachannu	135	1980	37.8	0.0236	(Shami, 1983)
Muridke	251	1980	41.2	0.024	(Shami, 1983)
Sheikhupura	1,007	1982/83	48.9	0.0271	(Shami and Iqbal, 1983)
Gujrat	1,002	1982/83	48.5	0.0277	(Shami and Hussain, 1984)
Jhelum	1,027	1983/84	44.2	0.0262	(Shami and Minhas, 1984)
Rawalpindi	1,000	1983/84	48.1	0.0286	(Shami and Siddiqui, 1984)
Pakistan	6,611	1990/91	61.2	0.0332	(Ahmed *et al.*, 1992)
Faisalabad	1,033	1985/86	52.1	0.0293	(Bittles, 1993)
Gujranwala	1,059	1985/86	58.9	0.0323	(Bittles, 1993)
Sahiwal	1,003	1985/86	56.1	0.0295	(Bittles, 1993)
Sialkot	1,037	1985/86	51.8	0.0261	(Bittles, 1993)
All-Punjab	9,520	1979/86	50.3	0.028	(Bittles, 1993)

City	Sample size	Year	Consanguinity (%)	Inbreeding Coefficient (F)	Reference
Lahore	940	1987/90	46.2	0.0242	(Yaqoob et. al.,1993)
Quetta	171	-	31.6	0.0217	(Mian and Mushtaq, 1994)
Swat(urban)	1,019	1986	31.1	0.0163	(Wahab and Ahmad, 1996)
Swat(rural)	1,018	1986	37.1	0.0166	(Wahab and Ahmad, 1996)
Kashmore district	1000	2016	68.7	0.0411	Current study

*Above table shows the comparative data of F Test in various populations of different cities of Pakistan and our current study at Kashmore District Pakistan.

Results

A total of 1,000 married women were recruited, aged between 14 and 80. The calculated blood relationship was 68.80% (n = 688) and non-blood relationship was 31.20% (n = 312). The overall inbreeding coefficient F is estimated at 0.0411. Among individual marriages, cousins represent the highest rate of representation (47.10%), followed by "distant relatives" (19. 20%). The prevalence rates at three tehsils ranged from 65.30% in Kashmore to 82.70% in Tangwani as depicted in Table 2. Distribution differences in the three tehsils ancestry and non-blood-union were statistically significant (p = 0.0001). In native languages, the kinship ratio was 84.40%. A total of 77 respondents were interviewed in the spoken language of Saraiki, 75.90% in Sindhi and 311 in total. Baloch language was used to interview 544 people, kinship ratio was 59.0%. Similarly, in the family structure/family category, "extended family" households (69.6%; F = 0.0444) followed by "core families" (68.90%; F = 0.0379) (significant difference; p = 0.8227). Regarding marital arrangements, the highest proportion of kinship was in non-reciprocal marriages (71.00%; F = 0.0419) (p = 0.0156).

Table 2. Distribution of marital unions in three marriage types in district Kashmore, Pakistan.

Parameters	Consanguineous (68.8%)			Non-consanguineous (31.2%)				Total
	DFC	FC	FCOR	SC	SCOR	D.R	N.R	
Tehsil								
Kandh Kot	3.7	51.5	13.2	7.4	4.4	8.8	11.0	135
Kashmore	4.8	46.2	11.2	3.6	1.8	22.6	9.7	703
Tangwani	12.3	46.9	12.3	3.7	5.6	13.0	6.2	162
Total	5.9	47.1	11.7	4.1	2.8	19.2	9.3	1000

The sample was distributed through the caste system, with significant ethnic differences in the population of Kashmor. For example, Bijarani, Dashti, Khoso, Noonari, Qureshi, Soomro and many more. Other castes Genigny, Dahani, Barkhani, Solanj and Bhutto are all prominent. Significant (n> 45) caste blood relationship between 66.82% ~ 80.60% as described in Table 3. The respondents' literacy rate was 70.6%.

There was no difference in the prevalence of kinship in illiterate and illiterate samples. Interestingly, in the literate sample, the blood relationship has been declining, and the respondents' literacy rate has also risen as mentioned in Table 4.In terms of professional status, 67.40% of women are housewives. Housewives usually have a higher blood relationship (67.40%, F = 0.0406) (p <0.0001).

Table 3. Distribution of consanguineous and total marital union rates and inbreeding coefficients (F) by socio-demographic variables, Kashmore district, Pakistan.

Parameters	Consanguineous unions		Total unions		F
Tehsil					
Kandh Kot	95	69.9	135	13.5	0.0421
Kashmore	459	65.3	703	70.3	0.039
Tangwani	134	82.7	162	16.2	0.0492
Total	688	68.8	1000	100	0.0411
Mother Tongue					
Sindhi	236	75.9	311	31.1	0.0366
Balochi	321	59	544	54.4	0.0488

Parameters	Consanguineous unions		Total unions		F
Tehsil					
Saraiki	65	84.4	77	7.7	0.0321
Others	66	95.7	69	6.9	0.0233
Subjects' age (years)					
>14-25	97	59.9	162	16.2	0.0397
>25-30	147	68.7	213	21.3	0.0453
>30-35	117	65.4	179	17.9	0.0396
>35-40	98	67.6	145	14.5	0.0417
>40-45	75	72.1	104	10.4	0.0376
>45-50	61	74.4	82	8.2	0.0347
>50	93	80.9	115	11.5	0.0442
Family type					
Extended	133	69.6	191	19.1	0.0444
Nuclear	453	68.9	657	65.7	0.0379
More than one couples	102	66.7	152	15.2	0.0507

Table 4. Distribution of consanguineous and total marital union rates and inbreeding coefficients (F) by educational and caste-system of subjects.

Variables	Consanguineous unions		Total unions		F
Subject's literacy level	n	%	N	%	
Illiterate	397	67.4	589	58.9	0.0451
Literate	291	70.6	411	41.1	0.0313
Primary 1-8(age years)	83	57.24	145	14.5	0.0364
Secondary 9-13	81	65.32	124	12.4	0.0309
Graduate/post-graduate 13+	127	89.44	142	14.2	0.02 95
Caste-system					
Bijarani	163	59.9	272	27.2	0.0451
Dashti	121	73.3	165	16.5	0.0423
Khoso	51	58	88	8.8	0.0618
Noonari	141	69.1	204	20.4	0.0406
Qureshi	40	81.6	49	4.9	0.0325
Soomro	60	71.4	84	8.4	0.0329
Others	112	80.6	139	13.9	0.0272
Subjects' occupation					
House wife	648	67.4	960	96	0.0406
Others	40	100	40	4	0.0523
Total	688		1000	100	0.0411

Discussion

This study is the first record of consanguinity and marriage of relatives of rural villagers in Kashmir, Sindh, Pakistan. In samples observed at a rate of 68.80%. Population estimates for Guillaume, Gujarat, Rawalpindi, Sialkot, Sahiwal, Faisalabad, Lahore and Quetta (Yaqoob *et al.*, 1993; Mian, 1994) are higher than previously estimated. However, the blood levels observed in the Kashmore population are also higher than the reported estimates in the Gyanwala, Bumbar and Malakand regions, as well as the general estimates of the Pakistani population (Shami *et al.*, 1989; Shami *et al.*, 1994; Arif, 1998; Shaw, 2001; Afzal, 1984; Nazish and Sajid, 2014).

However, the study confirms that the marriage of cousins is still the most common type of marriage, representing 87% of marriages and 49% of total marriages, respectively (Hussain and Bittles, 1998; Bittles, 2010; Shami and Zahida; Biologia, 1982; Shami, 1983; Shami and Iqbal, 1983; Shami and Hussain, 1984; Shami and Minhas, 1984; Shami and Siddiqui, 1984; Ahmad *et al.*, 1998; Bittles *et al.*, 1993; Yaqoob *et al.*, 1993; Wahab and Ahmad, 1996; Shami *et al.*, 1989. Interestingly, there was no difference in the prevalence of bloodlines among rural samples in the Kashmore area. In addition, rural socio-economic and family structures are changing (Fareed and Afzal, 2014; Bittles, 2015; Arif, 2009. This concept can be supported by the fact that at present, the most common type of family in the sample is a "nuclear family," and in a typical rural areas people consider the "large family" to be a high percentage.

These analyses show that the (subject) Writing ability has nothing to do with kinship and contrasts sharply with previous studies (Bittles, AH, 2010) but current data show a slight decline as education improves, generally suggesting that women's ability to read and write is improved (Measured by school years) increased the chances of participating in the labor market, which not only delayed the decline in age as a cause of kinship in marriage (Hussain and Bittles, 2004).

In the present data, it was also observed that female housewives generally have a higher blood relationship than women in certain occupations. However, it is not clear whether the professional status of the subject increases the likelihood of relatives or whether the relatives of their relatives tend to engage in a profession more than women who do not trade unions close to the family.

In this study, it is estimated that 85.2 percent of marriages are "arranged marriages" and those marriage decisions are made primarily by parents/guardians. "Mutual marriage" or "Vata Sata" exchange of marriage, accounting for 30% of the total number of marriages. Mutual marriages are usually carried out in landowners' families, mainly to protect the land and adjust the economy. In addition, 14.9% of respondents were "personally arranging or arranging a love marriage", convened by parents/guardians, usually between close relatives; in these marriages, the bride/groom has an impact on the parents' decisions or is almost entirely self-designed this situation. Studies show that such marriages are relatively small but increase over time. Yaqoob *et al.*, 1993). Hemophilia and cousins were observed significantly higher than those with reciprocal coalitions (F = 0.0391).

Conclusion

In short, this article describes the blood-related disparities among rural populations represented in Sindh, characterized by low literacy rates and low socioeconomic status. Baluchistan and Sindh provinces of Pakistan have prevalence of the proportion of high-risk families due to cousins marriage and the rate of intermarriage arranged wide ethnic diversity.

This study provides useful data on populations with less blood and their relatives who were not previously explored. The data shows that there is wide variation in kinship and kinship transactions within the demographic demographics of the Kashmore region. In addition, Kashmore, Sindh and other Punjab residents in Sindh showed significant regional variations in kinship distribution. Further research in neighboring areas would help to understand the kinship in the region.

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