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PREVALENCE OF CONSANGUINEOUS MARRIAGES AMONG SHI'A POPULATIONS OF LEBANON

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Summary. In genetics, a consanguineous marriage means union between couples who are related as second cousins or closer. The present cross-sectional study was carried out in order to illustrate the prevalence and types of consanguineous marriages in the Shi'a population living in widespread territories in Lebanon including the Bekaa Valley, the south of Lebanon and the southern suburb of Beirut. Data on types of marriages were collected using a simple questionnaire. The total number of couples in the study was 1203. Consanguineous marriage was classified by the degree of relationship between couples. The overall frequency of consanguinity was found to be 28.4%, with first cousin marriages (21.3%) being the most common type followed by first cousins once removed (5.5%), then double first cousins (0.8%). The frequencies of second cousin and beyond second cousin marriages were the same at 0.4% of all the marriages. The mean inbreeding coefficient (α) was estimated at about 0.0161 for the population. There were no significant differences between the three studied territories for frequencies of different types of marriages ($p > 0.1$), nor were there significant differences between the rural and urban areas ($p > 0.1$).

Introduction

The modern state of Lebanon is a unique amalgam of eighteen officially recognized religious sects. Although no census has been taken in Lebanon since 1932, it is commonly believed that the Shi'as have become one of the largest religious communities in Lebanon (Hazran, 2009). Most Shi'a adherents live in the northern and western areas of the Bekaa Valley, southern Lebanon and Beirut's southern suburbs. The great majority of Shi'a Muslims in Lebanon are Twelvers, with a large community of Ismailis, and Alawites in north Lebanon. The Shi'as considered in this study are Twelvers.

Consanguineous marriage refers to unions contracted between biologically related individuals. In genetics, a consanguineous marriage means union between couples who are related as second cousins or closer (Tadmouri *et al.*, 2009). Consanguinity rates vary from one population to another depending on religion, culture and geography. Noticeably, many Arab countries display some of the highest rates of consanguineous marriages in the world ranging from around 20 to 50% of all marriages, and specifically

favouring first cousin marriages with average rates of about 20–30% (Tadmouri *et al*., 2009). Studies from many Islamic countries have shown a similar high rate of consanguinity (Saadat *et al*., 2004; Saify & Saadat, 2012).

In Lebanon three studies have previously reported the prevalence of consanguinity; two were carried out in the capital Beirut (Klat & Khudr, 1984; Khlat *et al*., 1988a) and one covered Beirut and other Lebanese regions (Barbour & Salameh, 2009). In addition, several other studies have investigated the influence of consanguineous marriages on reproductive health (Kanaan *et al*., 2008; Inhorn *et al*., 2009; Mumtaz *et al*., 2010) and some other diseases (Barbari *et al*., 2003). All of these studies found that the rate of consanguinity in Lebanon is high, especially in Muslims. The present study was specifically directed to assess the prevalence of consanguineous marriages in the Shi'a population living in widespread territories in Lebanon.

Methods

Although the Shi'ite population in Lebanon is distributed all over the country from the north to the south, the vast majority are centred in the Bekaa Valley, the south of Lebanon and in the southern suburb of Beirut (Fig. 1). Other sectarian groups such as Sunnis, Christians and Druze live in these territories as minorities. In this study, the Bekaa territories include Baalbek and Hermel provinces; south Lebanon includes Shi'a living in West Bekaa, Al-Janoub and Nabateye provinces.

The selected territories were stratified into urban and rural areas according to the environment, occupation, size of community and density of the population. This cross-sectional study included a total number of 1203 couples (urban 353, rural 850) and was carried out in the year 2011. Data on consanguineous marriages were collected using a simple questionnaire including simple questions such as the name of the village and the province and the degree of consanguinity, if present, between spouses. The questionnaires were completed by trained interviewers. Samples were collected from villages and cities that are absolutely Shi'a.

The coefficient of inbreeding (F) is the probability that an individual has received both alleles of a pair from an identical ancestral source, or the proportion of loci at which he is homozygous. Consanguineous marriages were classified by the degree of relationship between couples: double first cousins ($F = 1/8$); first cousins ($F = 1/16$); first cousins once removed ($F = 1/32$); second cousins ($F = 1/64$); and beyond second cousins ($F < 1/64$). The mean inbreeding coefficient (α) was calculated for the population.

Chi-squared (χ^2) tests were used to compare mating pattern frequencies between populations. A probability of less than 0.05 was considered as statistically significant.

Results

Table 1 shows the frequency of the various types of consanguineous marriages in urban and rural areas of the various studied territories. The data show that the overall prevalence of consanguinity is 28.4%, with first cousin marriages (21.3%) being the most common type of consanguineous marriage, followed by first cousins once removed (5.5%), then double first cousins (0.8%). The frequencies of second cousins and beyond second cousins were the same at 0.4% of all the marriages.

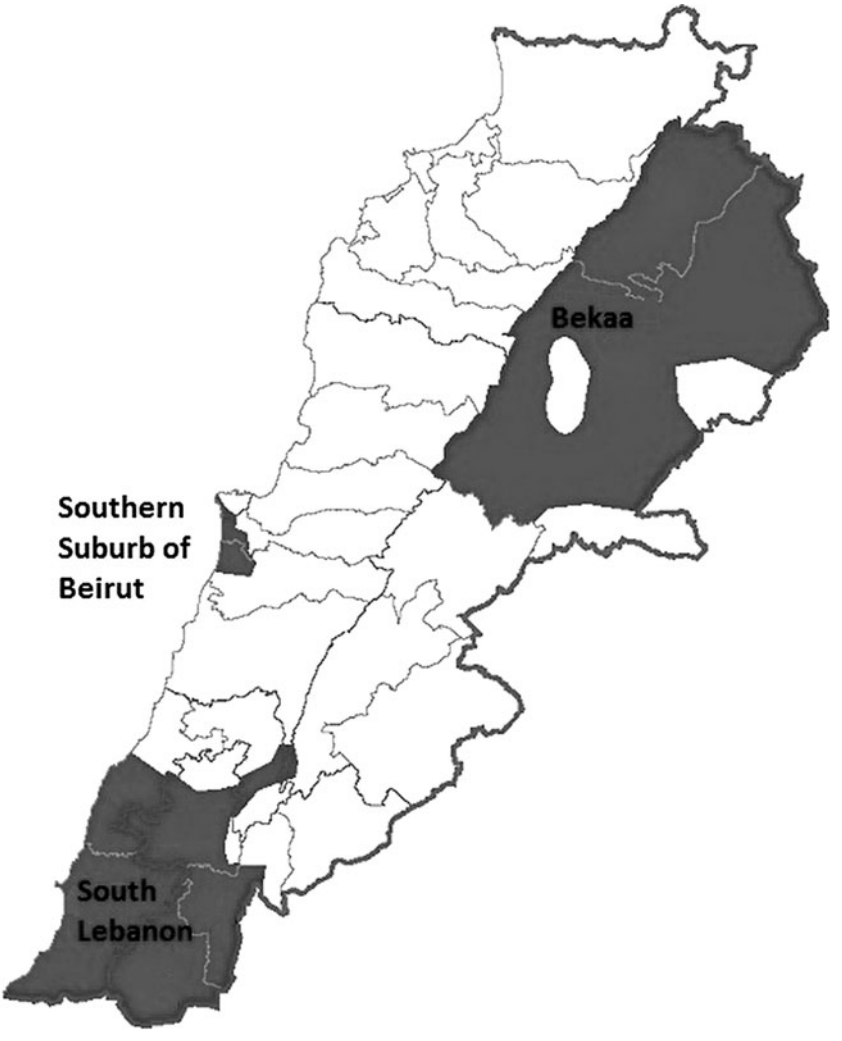

Fig. 1. Geographical distribution of study locations in Lebanon.

There was no significant difference between the studied territories for frequencies of different types of marriages ($\chi^2 = 11.29$, df $= 8$, $p = 0.186$). Also, there was no significant difference between rural and urban areas for the types of marriages ($\chi^2 = 4.68$ df $= 4$, $p = 0.321$). The data show that the overall frequency of consanguinity was 29.7% in urban and 27.9% in rural areas. The equivalent mean inbreeding coefficient (α) was 0.0161 in urban and rural areas of the studied populations.

Discussion

The results of this study show that the prevalence of consanguinity among the Shi'a population of Lebanon is high. These results are compatible with those of other studies

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Table 1. Prevalence of various types of consanguineous marriages in Lebanon

Location	Double first cousins ($F = 1/8$)	First cousins ($F = 1/16$)	First cousins once removed ($F = 1/32$)	Second cousins ($F = 1/64$)	Beyond second cousins ($F < 1/64$)	Unrelated marriages ($F = 0$)	Total	Mean of inbreeding coefficient (α)
Bekaa Valley								
Urban	1	34	14	0	3	98	150	0.0181
Rural	6	133	33	2	2	397	573	0.0177
Total	7	167	47	2	5	495	723	0.0177
South Lebanon								
Urban	1	8	1	1	0	15	26	0.0258
Rural	1	51	8	1	0	216	277	0.0129
Total	2	59	9	2	0	231	303	0.0140
Southern suburb of Beirut								
Urban	1	30	10	1	0	135	177	0.0131
All studied areas								
Urban	3	72	25	2	3	248	353	0.0161
Rural	7	184	41	3	2	613	850	0.0161
Total	10	256	66	5	5	861	1203	0.0161

carried out in Lebanon (Khlat *et al.*, 1988a, b; Barbari *et al.*, 2003; Barbour & Salameh, 2009; Inhorn *et al.*, 2009; Mumtaz *et al.*, 2010) and other Arab (Tadmouri *et al.*, 2009; Othman & Saadat, 2009) and Islamic populations (Saadat *et al.*, 2004; Saify & Saadat, 2012), which have all shown high levels of consanguinity.

The effect of religion on consanguinity is limited, especially in the Islamic religion where it has been reported that there is no encouragement of consanguineous marriages in the Islamic context (Akrami & Osati, 2007; Saadat, 2008). The consensus is that the actual reasons for high levels of consanguinity are predominantly social and economic (Bittles, 2001; Saadat *et al.*, 2004; Tadmouri *et al.*, 2009).

The present data show that statistically there is no significant difference between rural and urban areas or between the different studied territories (the Bekaa Valley, the south and the southern suburb of Beirut) for prevalence of consanguineous marriages. This may be attributable to the fact that the suburb of Beirut, which is considered an urban area, is in fact inhabited by newly arrived individuals from the Shi'a community (1975 and onwards), immigrating from southern Lebanon and the Bekaa Plain, which are considered as more rural areas; it is said to be very crowded and of low socio-economic status (Barbour & Salameh, 2009).

The study's finding that there is no difference between rural and urban areas for prevalence of consanguinity is not in agreement with other reports from several countries (Khoury & Massad, 1992; Alper *et al.*, 2004; COSIT, 2005; Othman & Saadat, 2009; Saify & Saadat, 2012), which indicated that the prevalence of consanguinity is higher in rural than in urban areas. The difference between the present findings and the above-mentioned studies can, at least in part, be explained by the homogeneity of the Shi'a populations in Lebanon. Taken together, it may be concluded that there are many similarities between the study populations in terms of demographic, cultural and socioeconomic factors.

Studies of consanguinity rates in Lebanon looking at different regions over different time periods from 1988 until 2010 show that consanguinity levels are particularly high in Muslims (Table 2). This is compatible with the results of our study, which show high consanguinity levels in the Shi'a population, which make up a large section of the Muslim population in Lebanon. It is worth making a brief comparison of the results of our study with those obtained from another study conducted in the Lebanese region (Barbour & Salameh, 2009), including the three territories studied in the present study (the Bekaa Valley, south Lebanon and the suburb of Beirut). Although the authors did not mention that the participants in their study were purely Shi'a, it can be assumed that most of them were since most inhabitants of these territories are Shi'as. The inbreeding coefficients in our study for the Bekaa Valley, south Lebanon and the suburb of Beirut were 0.0177, 0.0140 and 0.0131, respectively, while those in the Barbour & Salameh (2009) study were 0.018, 0.015 and 0.045, respectively. These differences could be due to the size of the sample and also because some of the included subjects may be non-Shi'as.

The present data show the prevalence of consanguineous marriages in the Shi'a population of Lebanon to be high. However, more studies are necessary to reveal the exact trend of consanguineous marriages in the Shi'a population in Lebanon.

Table 2. Consanguinity rates in Lebanon based on previous studies

Location	Religion	Study period	Study population	Sample size	Consanguinity (%)	Coefficient of inbreeding (α)	References
Beirut	—	1981/82	Obstetric inpatients	750	26.0	0.0116	Klat & Khudr (1986)
Beirut	Christian	1983/84	Household survey	1001	16.5	0.0049	Khlat (1988b)
Beirut	Muslim	1983/84	Household survey	1853	29.6	0.0109	Khlat (1988b)
All Lebanon	—	1998/2001	—	21,723	12.8	0.0051	Tamim *et al.* (2003)
Bekaa Valley	Muslim (Suuni Bedouin)	2000	Household survey	1100	47.2	0.0324	Joseph (2007)
Beirut	—	2003	—	100	24.7	—	Inborn *et al.* (2009)
All Lebanon	Muslim	2003/7	—	28,955	16.2	0.0081	Mumtaz *et al.* (2010)
All Lebanon	Christian	2003/7	—	7921	2.1	0.0010	Mumtaz *et al.* (2010)
Beirut	—	? 2005/9	Household survey	161	28.6	0.017	Barbour & Salameh (2009)
Mount Lebanon	—	? 2005/9	Household survey	468	30.6	0.016	Barbour & Salameh (2009)
Bekaa Valley	—	? 2005/9	Household survey	196	38.3	0.018	Barbour & Salameh (2009)
South Lebanon	—	? 2005/9	Household survey	260	26.9	0.015	Barbour & Salameh (2009)
North Lebanon	—	? 2005/9	Household survey	320	34.4	0.021	Barbour & Salameh (2009)
Suburb of Beirut	—	? 2005/9	Household survey	150	72.0	0.045	Barbour & Salameh (2009)

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