



## Double First Cousin Marriage and Genetic Disorders in South of IRAN

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**Abstract:** Marriage between persons biologically related as second cousins are known as consanguineous. Double first cousins arise when siblings of one family reproduce with siblings of another family. A consanguineous couple especially double cousin couple is at increased risk for both autosomal recessive disorders and several congenital malformations. This study is designed in order to illustrate the prevalence of first double cousin marriage and its outcomes in Hormozgan province in south of IRAN. This is a cross-sectional study. Participants are 68 couples who came to medical genetic counseling center because of first double cousin marriage between 2003 to 2013. In 10 years from 2003-2013 genetic counseling was done for 4800 couples. 2856 couples (59.5%) had consanguineous marriage. 68 couples were double first cousin (1.4%). Double first cousin marriage is high risk for offspring to have genetic disorders. Counseling and giving knowledge and information to couples could encourage them to avoid high risk marriages like double first cousin.

**Keywords:** Double First Cousin, Marriage, Genetic Disorders

### INTRODUCTION

Consanguineous marriage is one of the most important risk factors for congenital disorders in many countries of world <sup>1</sup>. Consanguineous marriage is traditional and accepted in most communities of North Africa, Middle East and West Asia <sup>2</sup>. Marriage between persons biologically related as second cousins ( $F \geq 0.0156$ ) are known as consanguineous. It is estimated that one billion of the current global population live in countries with a trend to consanguineous marriage <sup>3, 4</sup>. Double first cousins arise when siblings of one family reproduce with siblings of another family. The resulting children are related to each other through both parents' families. Double first cousins share both sets of grandparents in common and have double the degree of consanguinity than

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ordinary first cousins. Genetically, they are as related as half-sibling sharing 25% of their DNA. Their inbreeding coefficient is  $1/8$  or 0.125. A consanguineous couple especially double cousin couple is at increased risk for both autosomal recessive disorders and several congenital malformations maybe due to common mutations in an autosomal recessive gene from a shared ancestor. Unfortunately, in many countries there is little information about consanguineous marriages and their outcomes. Genetic counseling gives information to patients or relatives at risk of an inherited disorder to be aware about the nature and genetics of their disease and helps them to manage and even prevention of their disorder. Genetic counseling could reduce the genetic disorders and give information to families about prevention ways like prenatal diagnosis <sup>5</sup>. This study was designed in order to illustrate the prevalence of first double cousin marriage and its outcomes in Hormozgan province in south of IRAN.

### MATERIAL AND METHODS

**Setting:** The study conducted in Medical Genetic Counseling Center of Bandar Abbas in south of Iran with high consanguineous marriages with aim of illustration the prevalence of first double cousin marriage and its outcomes in Hormozghan province in south of IRAN. Between 2003 to 2013. **Subjects:** This is a cross-sectional study. Participants were 68 couples who came to medical genetic counseling center because of first double cousin marriage.

**Data collection:** 68 couples with first double cousin marriages participated in this study. Through genetic counseling complete family history was taken, pedigree was drawn and the coefficient of inbreeding estimated for each couple. Data on consanguineous marriages were collected using a standard questionnaire. **Data analysis:** The study data was analyzed using software SPSS16.

### RESULTS

In 10 years from 2003-2013 genetic counseling was done for 4800 couples. 2856 couples (59.5%) had consanguineous marriage. 68 couples were double first cousin (1.4%). From couples with double first cousin marriage 26 couples (38.3%) came before marriage that all of them refused marriage after aware of risk for genetic disorders for their children, 34 couples (50%) came preconception and 4 couples (11.7%) during pregnancy.

**Table1.** Time of Counseling

Time of Counseling	number	percent
Before marriage	26	38.3
Before pregnancy	34	50
During pregnancy	4	11.7

<b>Total</b>	64	100
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Persons had different ethnicities. 48 couples had Fars ethnicity, 12 couples were Balochis and 4 couples were Arab. Inbreeding coefficient in 30 couples (44.1%) were more than 1/8. 36 couples (52.9%) had history of genetic disorders in their families. 30 couples had child and in 28 of them (93.4%) at least one child was affected to a genetic disorder. 6 couples were carrier of Beta thalassemia and referred for prenatal diagnosis.

### Discussion

Double first cousin marriage is high risk for offspring to have genetic disorders. In our study 68 couples (1.4%) had this type of marriage. In *KHYBER SAIFY et al.* study that was done in AFGHANISTAN in 2014 double first cousin was reported (6.9%)<sup>6</sup>. In study by *al-Gazali et al.* 1997 in United Arab Emirates (UAE) double first cousin marriages were (3.5%)<sup>7</sup>. *El-Kheshen et al.* 2013 in Lebanon reported double first cousins (0.8%) (8). *Othman et al.* in 2009 reported prevalence of consanguineous marriages in Syria 7.8%<sup>8</sup>. Although compared to another countries prevalence of double first cousin marriage is not too high in south of Iran, but because of high risk for having a child with genetic disorders, It is important that primary health care providers, specifically in highly consanguineous regions aware couples about risks of this marriages<sup>9</sup>. In our study all of the 26 couples that came for counseling before marriage, refused marriage after given information about risk of their marriage. So counseling and giving knowledge and information to couples could encourage them to avoid high risk marriages like double first cousin. Providing evidence-based guidelines in counseling a consanguineous couple could help to minimize their risks for having affected offspring.

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