

The relationship between consanguineous marriage and death in fetus and infants

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Background: Given the high prevalence of consanguineous marriages in rural and urban areas of Iran, the aim of this study was to identify its role in increasing fetal and infant deaths. **Materials and Methods:** This was a cross-sectional study in which 494 mothers with more than one exceptional child (mentally retarded and physically-dynamically disabled) or with normal children were selected based on multi-stage random sampling method. Data was gathered using the features of parents with more than one exceptional child questionnaire. The validity and reliability of this questionnaire was acceptable. Hierarchical log-linear method was used for statistical analysis. **Results:** Consanguineous marriage significantly increased the number of births of exceptional children. Moreover, there was a significant relation between the history of fetal/infant death and belonging to the group. There was a significant relation between consanguineous marriage and the history of fetal/infant death which means consanguineous marriage increased the prevalence of fetal/infant death in parents with exceptional children rather than in parents with normal children. **Conclusions:** The rate of fetal/infant death in exceptional births of consanguineous marriages was higher than that of non-consanguineous marriages.

Key words: Consanguinity, Child, Exceptional, Disabled Children, Abortion, Induced, Stillbirth.

INTRODUCTION

The birth of an exceptional child in a family that has been waiting for a normal child could cause emotional crisis. This can leave the parents heartbroken.^[1] Nowadays, one of the most important factors in etiology of disabilities is genetics. Consanguineous marriages are the basis of many physical and mental disabilities.^[2] Consanguineous marriage can increase different kinds of disabilities.^[3] Movafagh et al. revealed that the prevalence of consanguineous marriage was about 38 percent in Iran.^[4] Higher prevalence of consanguineous marriages leads to more deaths and disabilities in fetal and infants. Based on World Health Organization's report, the rate of death among children under 5 years old in 2004 in Iran was 38 in every 1000 live births in which 63% happened in infants.^[5] The latter was significant in comparison with that of other Middle East countries (about 43%). In America, the rate of stillbirths is 5 per 10000; this number is about 30-40 per 1000 births in undeveloped countries.^[6] Rein-dollar revealed that repeated abortions and miscarriages in consanguineous marriages are significantly more frequent than in non-consanguineous marriages.^[7] The aim of this study was to investigate the role of consanguineous marriage in increasing the possibility of fetal/infant's deaths.

MATERIALS AND METHODS

This was a cross-sectional study. Studied population included mothers who had more than one exceptional child (mentally retarded and physically-dynamically disabled) in Isfahan. These parents were selected after getting the permission of Welfare Organization and Health Network, districts 1 and 2 of Isfahan and according to the list that was provided to the researcher in July 2010. Samples included 494 mothers; 247 had more than one exceptional child and 247 had normal children. Sample size was justified based on the size of statistical population and statistical model. Multistage random sampling method was used for selecting mothers. Mothers of exceptional children were selected if they had at least two exceptional children (mentally retarded and physically-dynamically disabled). Samples of the two groups had no differences in the number of children and geographic distribution.

Consanguineous marriages were defined in this study as the marriage between two people who are relative and have same genes with similar physico-chemical structure. In consanguineous marriages couples must at least have one ancestor in common. Consanguineous marriage has been defined by the

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degree of sanguinity. Since sanguinity degree in Iran is more than 4 due to high prevalence of consanguineous marriages, marriages with the sanguinity degree of 3, 4, 5 and 6 were considered as consanguineous marriage in this study.^[8] In addition, fetal/infant death was defined as abortion, stillbirth, prenatal death and neonatal death. Data was gathered by interviewing each subject in person.

Data was gathered using the features of parents with more than one exceptional child questionnaire made by Dr. Afrooz; this questionnaire's reliability was assessed by Nosrati in 2005 using the rerun method and its reliability coefficient was reported to be between 0.92 and 0.95. The questionnaire was reviewed by a panel of four experts that approved its content validity.^[9] Since predictor variables in this study were from nominal class, hierarchical logarithm-linear statistical model was used for data analysis, which is the most proper model for analyzing discrete multivariate data. Using this model, main effects, bilateral bonds and three way links were examined. SPSS version 16 (SPSS Inc., Chicago, IL, USA) was used for data analysis.

RESULTS

In mothers with more than one exceptional child, 10.5% of the parents were not relative but there was a history of fetal/infant's death among them, 18.2% were relatives and also had a history of fetal/infant death, 6.3% were not relative with no history of fetal/infant death. Fifteen percent of parents were relative but did not have any history of fetal/infant death. Overall, 28.7% of parents with more than one exceptional child had a history of fetal/infant death and 21.3% did not have. In addition, 25.2% of them were relatives and 16.8% of them were not. Among parents of normal children, 23.9% were not relative but had a history of fetal/infant death, 10.9% were not relative with no history of fetal/infant death, 12.3% were relative with a history of fetal/infant death and 2.8% were relative but

did not have a history of fetal/infant death (Table 1).

According to the model, at least one of the main effects and unilateral links and one of the bilateral and three way links were statistically significant (Table 2). The analysis revealed a significant relation between fetal/infant death and being belonged to the group. Consanguineous marriage and being belonged to the group demonstrated significant relationship too. Finally, all three factors of consanguineous marriage, history of fetal/infant death and being belonged to the group showed significant relationship. Final model showed that these interactions could define the relations between variables (Table 3).

DISCUSSION

This study revealed that the prevalence of consanguineous marriage among parents of exceptional children was 33.2% which was about twice of that in parents of normal children (15.1%). In line with the significant relation between consanguineous marriage and being belonged to the group in our study, genetic researches showed that consanguineous marriages could increase the possibility of disabilities and abnormalities in children. Results of researches conducted by Martini et al.,^[10] Bhat and Babu,^[11] Murshid,^[12] Durkin et al.,^[3] Alper et al.,^[13] Hasanzadeh Nazarabadi et al.,^[14] Vaziri nejad et al.,^[15] Hooman et al.,^[16] and Hejazi et al.,^[9] which were in agreement with the results of the present study showed that consanguineous marriages could increase the occurrence of exceptional children and innate abnormalities. In addition, studies have shown that mothers with normal children have significantly experienced more fetal/infant death than mothers of exceptional children.

In line with our study, Arias et al. reported that the first cause of death among infants was innate abnormalities.^[17] World Health Organization reported that 15% of neonatal deaths in Iran are due to innate

Table 1. Frequency distribution of parents based on consanguineous marriage and history of fetal/infant death in both groups

| Type of marriage | Children | History of fetal/infant death | Percent |
|--------------------|---------------------------------|-------------------------------|---------|
| Non-consanguineous | Parents of exceptional children | Yes | 10.5 |
| | | No | 6.3 |
| | Parents of normal children | Yes | 23.9 |
| | | No | 10.9 |
| Consanguineous | Parents of exceptional children | Yes | 18.2 |
| | | No | 6.3 |
| | Parents of normal children | Yes | 12.3 |
| | | No | 2.8 |

Table 2. Models to multi-track effects and higher

| | K | Degree of freedom | Likelihood ratio | Pearson correlation |
|--------------------------------|---|-------------------|------------------|---------------------|
| | | | P value | P value |
| Multi-track effects and higher | 1 | 19 | <0.001 | <0.001 |
| | 2 | 13 | <0.001 | <0.001 |
| | 3 | 4 | 0.004 | 0.007 |
| Multi-track effects | 1 | 6 | <0.001 | <0.001 |
| | 2 | 9 | <0.001 | <0.001 |
| | 3 | 4 | 0.004 | 0.007 |

Table 3. Correlations coefficient between being belonged to the group, consanguineous marriage and history of fetal/infant death among parents

| Effects | Degrees of freedom | P value |
|---|--------------------|---------|
| Belonged to the group * history of fetal/infant death | 1 | 0.001 |
| Belonged to the group * consanguineous marriage | 1 | <0.001 |
| History of fetal/infant death * consanguineous marriage | 1 | 0.6 |
| Consanguineous marriage | 1 | 0.5 |
| Belonged to the group | 1 | 1 |
| History of fetal/infant death | 1 | <0.001 |

abnormalities. In other words, one of the main reasons of death among fetal and infants, is innate disabilities and abnormalities.^[5] If these abnormal pregnancies were not aborted or medical care helped these abnormal infants to survive, they have a higher risk of disability and physical and mental retardation. Based on the common etiology of physical and mental retardations and fetal/infant death, it could be said that relatively weak fetuses and infants, who cannot tolerate serious damages during pregnancy, birthing, and after birth, or have severe abnormalities, are likely to suffer mortality. Inversely, infants with minor damages, those who are genetically stronger, or those who can survive because of developed technology and extreme critical care, are likely to suffer disability and abnormality. That is the reason why researches of Arias et al.,^[17] WHO,^[5] Nayeri et al.,^[18] Soleimani and Sourtiji,^[19] and Tabatabaei et al.^[20] reported that one of the major causes of death in fetuses and infants was abnormalities and disabilities. This could explain the increased fetal/infant death rate among mothers with normal children in comparison with mothers of exceptional children. This has led to increased prevalence of some kinds of physical-mental disabilities. The prevalence of cerebral palsy has been increased in Ireland, England and Australia due to decreased rate of death among fetuses and infants.^[21-23] Some studies have shown a significant difference between mothers of exceptional children and mothers of normal children in terms of consanguineous marriage and fetal/infant death. In other words, consanguineous marriage among mothers

of exceptional children would lead to significantly higher fetal/infant death rate. Results of Ghorbani et al.,^[24] Sangestani and Bashirian^[25] and Tabatabaei et al.^[20] were similar to those of the present study and revealed that consanguineous marriages increased the rate of fetal/infant death among parents of exceptional children. Hejazi et al.^[9] demonstrated that probably there is a common genetic factor among some groups of relatives which increased the occurrence of some abnormalities among specific races. This could be due to existence of defected genes in exceptional children's and parents' genome. In other words, consanguineous marriages could lead to abnormalities which may cause fetal/infant death among mothers of exceptional children. In conclusion, consanguineous marriages could significantly increase the rate of fetal/infant's death among mothers of exceptional children compared to mothers of normal children.

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