

Consanguinity and Congenital Anomalies in the Bangladesh Armed Forces Personnel

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ABSTRACT

Background: The prevalence of consanguinity is very high among the Muslim countries. Different studies revealed that consanguineous parents have the higher risk of giving birth of child with congenital anomalies. Bangladesh, a largely populated Muslim country has a possibility of having higher rate of consanguinity and congenital anomalies among the general populations and as well as Armed Forces Personnel (AFP). **Materials and methods:** This study was a cross-sectional study conducted at Dhaka Cantonment during the period of March 2019 to August 2019. A total number of 400 AFP were selected systematically for the purpose of the study. A pre-tested questionnaire was used to collect data from the respondents. **Results:** Among the respondents 11% were officers, 7.8% JCO, 34.5% NCO and 46.7% ORs. The mean age of the respondents was 35.48±4.76 years. The prevalence of consanguinity was found 7.3%. Among them, 79.3% were first cousin and 20.7% were second cousin. A total 18 children were found with congenital anomalies. Congenital anomalies were significantly associated with consanguineous marriage and with first cousin marriage. The reasons for consanguineous marriage were mostly economic (48.3%). **Conclusion:** The congenital disorders are incurable disease and the family having a child with congenital disorder usually suffer throughout their life. Awareness and information about the risk of congenital anomalies in the consanguineous marriage should be made available at all levels to reduce the problem.

Key words: Consanguinity; Congenital anomalies; Armed forces personnel.

Introduction

Consanguinity or Consanguineous marriage is the marriage between blood relatives that indicate the relationships up to second cousin marriage¹. Congenital anomalies are the structural or functional anomalies, including metabolic disorders, which are present at the time of birth or can be identified prenatally or later in life. Congenital anomalies are also known as birth defects, congenital disorders or congenital malformations (WHO). Although congenital anomalies may be genetic, infectious or environmental in origin, most often it is difficult to identify the exact causes. Congenital anomalies are one of the major childhood health problems and the treatment and rehabilitation of children with congenital anomalies are costly and complete recovery is usually impossible². It results in long-term disability, which may have significant impacts on individuals, families, health-care systems and societies. An estimated one in 33 infants born with birth defects and result in approximately 3.2 million congenital disabilities every year. About 270,000 newborns die during the first 4 weeks of life every year from congenital anomalies³. Consanguinity has

been described as an important risk factor contributing to an increased occurrence of congenital disorders and subsequent morbidity and mortality among the offspring⁴. It was also found that the children with consanguineous parents have a higher risk of congenital disorders than the children of non-consanguineous parents. Close blood relatives have a higher chance of inheriting the same alleles than the less closely related individuals and therefore children of consanguineous unions are more frequently suffer from genetic disorders⁵.

It has been estimated that almost 690 million people in the world are consanguineous⁶. South Asia, Middle East and Northern Africa are the regions where the rate of consanguinity is historically and culturally high⁷. Consanguineous marriage is common in many parts of the world especially in the Middle-Eastern countries and is also common in other Muslim countries and regions⁸. The rate of consanguineous marriage is particularly high among the South Asian population⁹. Because of high consanguinity rates within the Muslim population, the incidence of congenital malformation in Islamic countries is between 10 to 45%¹⁰.

Bangladesh is largely populated Muslim country. Like other Muslim countries, there is a possibility of having higher rate of consanguinity and congenital disorders in Bangladesh. Bangladesh Armed Forces is a small part of total population. Due to its pattern of job its members should be free from all kinds of anxiety and tension. But it has been observed that the children of armed forces personnel have been suffering from various congenital anomalies. Some of them are from consanguineous parents. It was revealed that there is higher risk of congenital disorders among the children with parental consanguinity. But it was not known

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the rate of consanguinity among the armed forces personnel and information related to congenital anomalies. So, this study is an effort to find out the prevalence of consanguinity among Bangladesh armed forces personnel and congenital anomalies among their children.

Materials and methods

This study was a cross-sectional study conducted at Dhaka Cantonment. Out Patient Department of Combined Military Hospital Dhaka, Sick Bay of BNS Haji Mohsin and Medical Squadron of BAF Base Bashar were selected as a place of study conveniently for selecting Army, Navy and Air Force personnel respectively. A total number of 400 armed forces personnel were selected systematically for the purpose of the study. Data were collected during the period of March 2019 to August 2019. Among the 400 samples, 200 from Bangladesh Army, 100 from Bangladesh Navy and 100 from Bangladesh Airforce.

Inclusion criteria:

- i) Married and having child
- ii) Willing to participate in the study.

Exclusion criteria:

- i) Unmarried personnel
- ii) Married personnel but not having child
- iii) Declining to participate in the study.

After taking ethical clearance from appropriate authority and informed consent from the respondent, data was collected by a pre-tested structured questionnaire. Apart from the information related to consanguinity, information related to socio-demographic factors and information related to health disorders of the children were also obtained. The collected data were analyzed with the help of SPSS program.

Results

Table I : Service status of the respondents (n=400)

Rank	Frequency	Percentage
Officer	44	11%
JCO (Junior Commissioned Officer)	31	7.8%
NCO (Non-Commissioned Officer)	138	34.5%
ORs (Other Ranks)	187	46.7%

Table I showed that among the respondents, 11% were Officer, 7.8% were JCO, 34.5% were NCO and 46.7% were ORs. Mean age of the respondents was 35.48 years with SD ±4.755 years. Minimum age was 26 years and maximum age 47 years.

Table II : Type of marriage among the respondents (n=400)

Type of marriage	Frequency	Remarks
Consanguineous marriage	29(7.3%)	1st cousin=23(79.3) 2nd cousin=6(20.7)
Non-consanguineous marriage	371(92.7%)	-

Table II showed that the prevalence of consanguineous marriage was 29(7.3%). Among the consanguineous marriage, majority 23(79.3%) were first cousin marriage and 6(20.7%) were second cousin marriage.

Table III : Association between type of marriage and congenital anomalies among the children (n=400)

Type of marriage	Congenital anomalies among the children		Total	p value
	Yes	No		
Consanguineous	4(22.2)	25(6.5)	29(7.2)	.034
Non-consanguineous	14(77.8)	357(93.5)	371(92.8)	
Total	18(100)	382(100)	400(100)	

Figures within the parenthesis indicate percentage

Table III demonstrated that a total number of 18 children were found with congenital anomalies. Among them 22.2% were from consanguineous marriage and 77.8% were from non-consanguineous marriage. As the p<0.05, so there was statistically significant association between congenital anomalies and consanguineous marriage.

Table IV : Association of congenital anomalies and type of relation between parents (n=400)

Type of relation	Congenital malformations		Total	p value
	Yes	No		
1st cousin	3(16.7)	20(5.2)	23(5.8)	.040
2nd cousin	1(5.6)	5(1.3)	6(1.5)	.112
No relation	14(77.8)	357(93.5)	371(92.8)	.061
Total	18	382	400	

Figures within the parenthesis indicate percentage

According to Table IV, higher rate of congenital anomalies were observed in first cousin marriage (16.7%) than in the second cousin (5.6%) marriage. As in case of 1st cousin marriage the p<0.05, so there was statistically significant association between congenital anomalies and first cousin marriage.

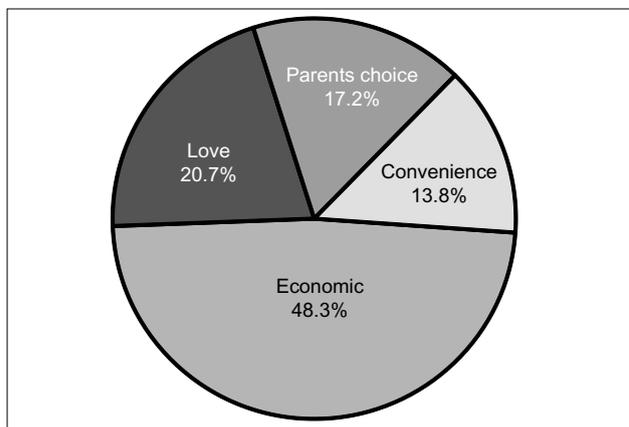


Figure 1 : Reasons for consanguineous marriage

Figure 1 showed that 'Economic' reasons (48.3%) were the major cause of consanguineous marriage. The other causes were 'Love' (20.7%) 'Parents' choice'(17.2%) and 'Convenience'(13.8%).

Table V : Association between congenital anomalies and level of maternal education

Level of maternal education	Congenital anomalies		Total	p value
	Yes	No		
Lower level	4(10.0)	36(90.0)	40(100)	.196
Middle level	11(4.1)	256(95.9)	267(100)	
Higher level	3(3.2)	86(96.8)	93(100)	
Total	18(4.5)	382(95.5)	400(100)	

Figures within the parenthesis indicate percentage

Table V showed that congenital anomalies were 10% among the children with lower level of maternal education, 4.1% among children with middle level maternal education and 3.2% among children with higher level maternal education. So, with the increase in the level of maternal education the percentage of congenital anomalies had gradually reduced. But there was no significant association between the level of maternal education and congenital anomalies ($p=0.196$).

Table VI : Attitude towards consanguinity

Attitude	Frequency	Percentage
Positive	245	61.3%
Negative	112	28.0%
Neutral	43	10.8%
Total	400	100%

Table VI showed that 61.3% of the respondents expressed their positive attitude towards consanguineous marriage, 28% expressed negative attitude and 10.8% were neutral.

Discussion

This study revealed that the prevalence of consanguinity among the Bangladesh Armed Forces personnel was 7.3%. A number of relevant studies on the prevalence of consanguinity had been carried out internationally specially the Muslim countries. In the Arab countries, the rate of consanguinity in Saudi Arabia is 58%, 49% in Jordan, 40-54% in the UAE and 29% in Egypt, 51% Qatar, 40% among the Palestinians, 44% among the Yemenis in Sanaa, 54% in Kuwait, 49% to 33% in Tunisia and Morocco, 50% in Oman. Among the South Asian population, in Pakistan, the overall rate of consanguineous marriage is 60-70%¹¹. In India, it was found about 12%, but it was much higher among Muslims (22%) than other social groups⁸. In a study carried out in Teknaf region of Bangladesh where it was found 17.6%¹². The lower rate of consanguinity among the armed forces personnel might be due to increased awareness, economic reasons and culture in the service environment.

In this study majority 79.3% consanguineous marriages were between the first cousin and 20.7% were second cousin. In the study of Amini SR and Kamali M first cousin

marriage was observed as the most consanguinity in parents among the consanguineous marriage¹³. Hamamy AH et al conducted a study in Jordan and revealed that first-cousin marriages constituted 69% among all consanguineous marriages¹⁴.

In another study conducted by Bittles AH and Black ML found 86% of consanguineous marriage were between first cousin⁶. Bhagya B et al in their study in India observed that first cousin marriage was 43.42%, second cousin marriage was 39.47% and 17.11% were distant relatives¹⁵.

It was found in this study that there was a statistically significant association between congenital malformations and consanguineous marriage. Al-Gazali et al conducted a study in Arab countries and found that consanguinity was closely related with congenital malformations, childhood morbidity and handicap¹⁶. Tayebi N et al conducted a cross-sectional study at Shahid Sadoughi hospital, Yazd of Iran and found a significant correlation between consanguineous marriages and the prevalence of anomaly². In all studies reported among Arabs, including in the UAE, Kuwait, Oman, Jordan, Egypt, Arabs in Jerusalem, and Saudi Arabia, the frequency of congenital malformations was higher among the consanguineous parents compared to the general population¹⁷. Bittles AH and Black ML also revealed that a significant positive association between consanguinity and morbidity has been demonstrated consistently, and congenital and genetic disorders with a complex aetiology likely to be more prevalent in the children of consanguineous parents and have a higher chance of recurrence⁶.

This study showed that higher rate congenital anomalies were observed in first cousin marriage than in the second cousin marriage and this difference was statistically significant ($p=0.040$). Stoll et al in his study demonstrated that the prevalence of still births and birth defects is substantially higher among the offspring of first cousin parents¹⁸. This finding was also similar to the study conducted by Hashmi MA where it was found that the prevalence of malformations had significant association with the types of relationship of parents, the inter-marriage with first cousins alone¹⁹.

This study disclosed that higher number of congenital anomalies were found among the children with lower level of maternal education, but there was no significant association between them ($p=0.196$). This finding was different with the study finding of Nabulsi MM et al where higher maternal education was the only variable that was negatively correlated with parental consanguinity²⁰. This finding was not also consistent with the finding of Bener A et al where it was observed a significant association between mothers' educational level and consanguinity²¹. This difference may be due to the fact that the mothers were from a selected community with average economic background.

Multiple reasons of consanguineous marriage were found at national and international level. Some of them are socio-cultural, strengthening the family ties, retention of property within a family, ease of finding a suitable marriage partner etc¹¹. In the present study economic reason was found the major cause of consanguineous marriage and the other causes were love, parents' choice and convenience. Shamsad, S. in his review article found that to keep property within families, social, economic benefits, easy adjustment after marriage as the reasons of consanguineous marriage²². Bittles AH. in his study found that the most common reasons for popularity of consanguineous marriage include a strong family traditional marriage, maintenance of the family structure, family ties, property, dowry, close relationship between wife and her in-laws, greater marriage stability and durability¹. Hamamy and Bittles in their study revealed that premarital negotiations regarding financial matters of marriage are more easily conducted and sometimes less costly²³. Wife's parents prefer to have their daughter living near them and to enjoy the presence of their grand children. Moreover, wealthy landlords may prefer to keep their property within the family.

This study revealed that 61.3% of the respondents expressed their positive attitude towards consanguineous marriage, 28% expressed negative attitude and 10.8% were neutral. They expressed attitudes in accordance with their experiences but not based on the proper information about consanguinity. This finding was agreed with Shelkamy FR et al who found that more than 75% of students had positive attitude towards the consanguinity and less than 25% of students had negative attitude²⁴. This finding was also similar to Alharbi OA et al who found 481% positive attitude towards consanguinity²⁵.

Conclusion

The congenital anomalies are incurable disease and the family having a child with congenital disorder usually suffer throughout their life. So, awareness is very important in this field. The information about the risk of congenital anomalies in the consanguineous marriage should be made available at all levels especially among the health care personnel and general population. This fact should also be brought to the attention of health, social and political authorities. The only measure that can prevent this disorder is premarital and prenatal screening followed by genetic counseling which are already available in many Muslim countries. Unfortunately, these types of facilities are not available in our country.

So, awareness would be the only measure to reduce consanguinity and congenital health problems in our country. Priority should also be given to address the problem by conducting scientific research and utilizing research finding in this field.

Discloser

Both the authors declared no competitive interest.

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