
Comparative Study on Birth Disorders in Cousin and Unrelated Marriages

Ashraful Kabir

Department of Biology, Saidpur Cantonment Public College, Nilphamari, Bangladesh

***Correspondence to:** Dr. Ashraful Kabir, Department of Biology, Saidpur Cantonment Public College, Nilphamari, Bangladesh.

Copyright

© 2019 Dr. Ashraful Kabir. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received: 26 August 2019

Published: 25 October 2019

Keywords: *Birth Abnormalities; Cousin Marriage; Recessive Disorders*

Abstract

Context

This is our common believe that that consanguineous marriages (cousin marriage) are deleterious to human with lots of congenital abnormalities. Adequate studies were not available on this marriage in our societies.

Objectives

The objective of this study is to observe different types of post-birth abnormalities in children of consanguineous and non-consanguineous couples.

Materials and Methods

Total 50 pair both consanguineous and non-consanguineous couples were observed with their children. In this study, those incidents were carried out by the interview of the parents.

Results

Frequencies of the children of consanguineous couples were stillbirth (6), mentally retarded (12), twin (3=6), squint (1), eye problems with calcium deficiency (1), infant death (2), ichthyosis (1), congenital malnutrition (3), less hemoglobin production (1), hypertrichosis (2), stammered (3), valvular heart disease (0), psychosis (0), blood disorder (0), and gigantism (0) whereas in non-consanguineous couple children stillbirth (0), mentally retarded (2), twin (0), squint (0), eye problems with calcium deficiency (0), infant death (1), ichthyosis (0), congenital malnutrition (0), less hemoglobin production (0), hypertrichosis (0), stammered (0), valvular heart disease (1), psychosis (1), blood disorder (2), and gigantism (1) respectively. Chi-square result was not significant between two types of marriage and on their children. In addition, frequencies of male and female sex-ratio were recorded 0.87 : 1 and 0.98 : 1 in consanguineous and non-sanguineous couple where females were more affected in both cases.

Conclusions

By studying lots of references it can be concluded that consanguineous marriage is harmful for their children. We should discourage always this type of marriage in our society.

Introduction

Consanguineous or cousin marriage is very common marriage system of the world. In history, this phenomenon was very common in renowned people. That time, though people knew the bad impact or chromosomal abnormalities but for some traditional or familial cultures they did it. The bad effect of first cousin is higher than second cousin marriage. Cousin carries same type of genes so that their offspring cannot cope with adverse environment. Their IQ and stability are lower than non-consanguineous couple. In tribal people, for their same community they always get marry in their same community. Consanguinity is a deeply rooted social trend among 1/5 of the world population mostly residing in the Middle East, West Asia, and North Africa as well as among emigrants from those communities in North America, Europe, and Australia [1].

Consanguinity has a significant influence on child mortality and morbidity independent of other causes of death and disease [2,3]. However it is not obvious that the risk of recurrence is higher for infants whose parents are consanguineous compared with infants whose parents are unrelated. Although consanguineous marriages are rare in Norway, the Norwegian Medical Birth Registry provides a unique opportunity to study recurrence of stillbirth and infant death among children of consanguineous and unrelated parents. The results are adjusted for maternal age, educational levels of the parents, and year of birth. Parental consanguinity increases the probability of homozygosity at any given chromosomal locus for the offspring [4]. Traditionally, it is assumed that the main cause of differences in risk between consanguineous and non-consanguineous groups is recessive diseases [5]. The absolute effect of consanguinity was constant across a wide range of population risks of pre-reproductive death. In some developed countries, they are totally prohibited to get cousin marriage. Consanguinity is prevalent globally [6]. Consanguineous marriage has cultural and economic advantages [4].

The most common congenital defects include cleft lips, cleft palates, club feet, microcephaly, blindness, deaf-mutism, mental retardations, polydactyly, and other abnormalities of the limbs. Since cousins have one or both grandparents in common and if either of the two grandparents, maternal or paternal, carries a defective recessive gene, it stands a good chance of becoming homozygous in any one child who is a product of such consanguineous marriages [7]. It is because closely related individuals have a higher chance of carrying the same alleles, deleterious or beneficial than less closely related or unrelated individuals. Customs of laws, however, discourage or prohibit close relative marriages such as between sibs, between parent and child or between niece/nephew and uncle/aunt [8]. Recessive genetic disorders in first cousin matings have a 10-fold frequency (1 in 2000) then the non-sanguineous matings (1 in 20000) [9]. Brother-sister or father-daughter matings share $\frac{1}{2}$ or 0.5 of their DNA, compared to second cousin matings who share only $\frac{1}{32}$ or 0.03 of their DNA, although still much greater than the general population [10]. DNA relationship is 100% in identical twin, in parent/child and full sibling this is 50% both, half sibling 25%, first cousin 12.5%, and in second cousin 3.13% (www.google.com, cousin marriage). A large majority of cases in post-World War II in Japan and the Indian subcontinent indicate that early mortality is increased in the progeny of consanguineous union when compared with children born to unrelated parents [11,12]. The objective of this study is to find out such abnormalities in children by knowing their family history from the parents in order to make consciousness on consanguineous marriage in our society.

Materials and Methods

Relatives

In relatives, it was very easy to observe the abnormalities of those children where their parents were first or second cousin.

Colleagues

In any work-place, colleagues play a vital role for sharing their family history. Long time professional bondage was the influential assets of this study.

Students

Educational institution is a good source for preserving knowledge on consanguineous marriage and those incidents after birth. The educational background of the students of this study was Secondary School Certificate (SSC) passed and now they are intermediate students (HSC) with average age 18 years. Sometimes, direct observation of those students helps for identifying those defects. With those minor defects they can share everything with their teachers/guardians. If those students get assurance from a researcher for such solutions they take part cordially.

Case Study

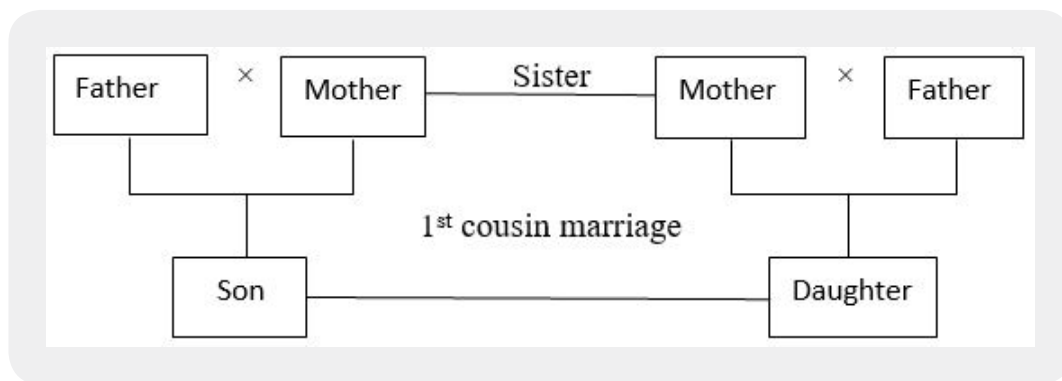
Through case study, lots of information can enrich the quality of this type of article.

Observed Couple

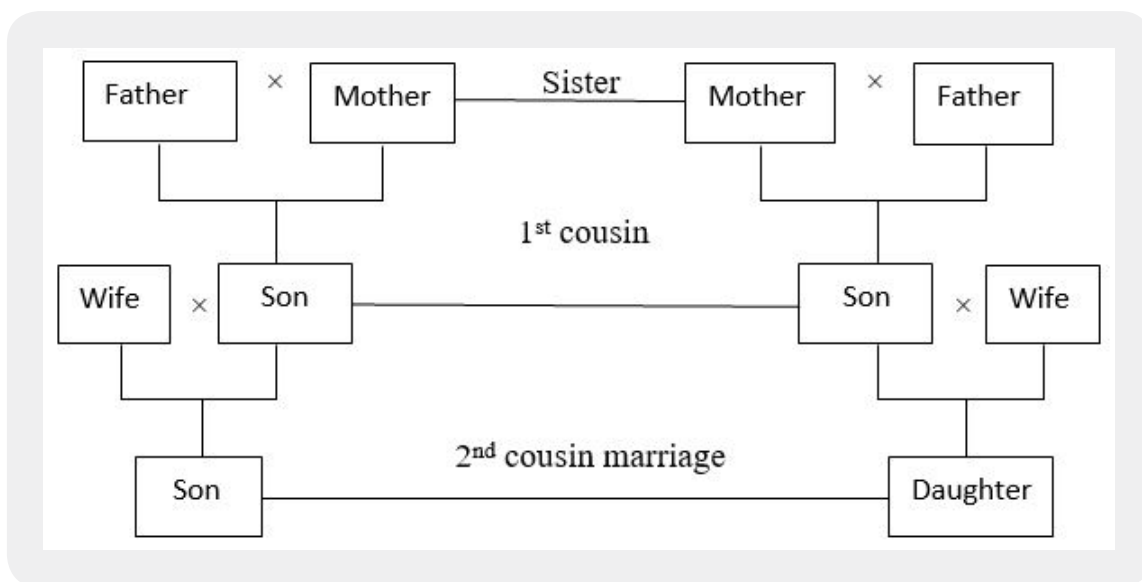
For this study, 50 pairs of both consanguineous and non-consanguineous couple were interviewed. Through the discussion with the parents the family history played a significant role for understanding the matter of those abnormalities. Maximum disorders were recessive and some were fatal. Design experiment was helpful for identifying the first and second cousin of the parents. Though the control group (non-consanguineous) was not established in this study but a common survey showed that in most cases their offspring were normal. Analyses on the target group/couple (consanguineous) gave those abnormalities of the children in most cases.

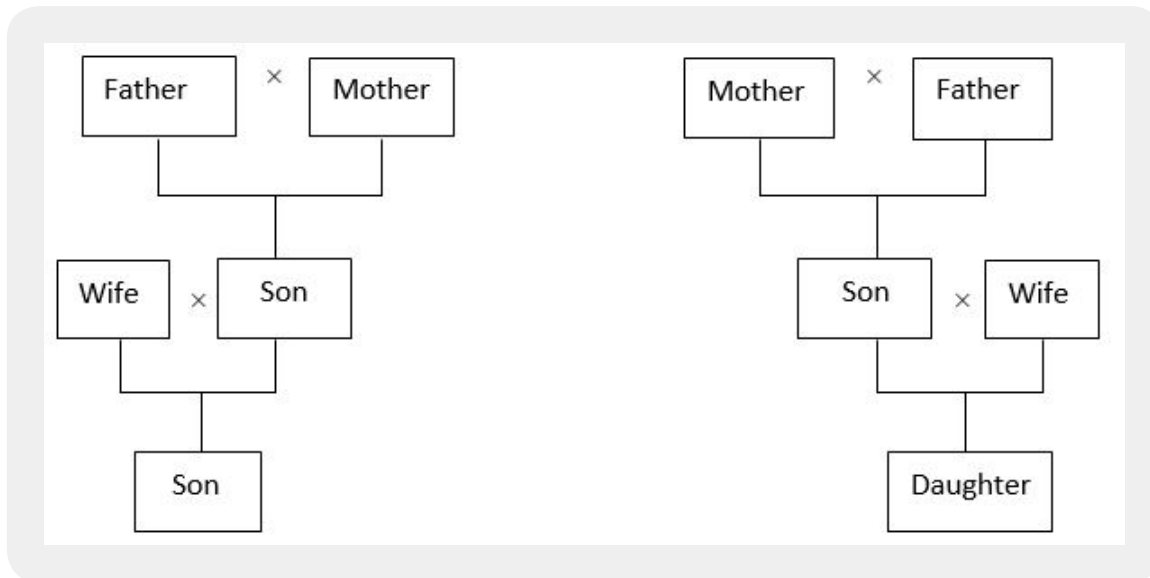
Tree Diagram on Two Types of Marriages

1st Cousin Marriage



2nd Cousin Marriage



Non-Cousin Marriage**Collection and Analyses of Data**

Data on birth abnormalities viz., stillbirth, mentally retarded, twin, squint, eye problems with calcium deficiency, infant death, ichthyosis, congenital malnutrition, less hemoglobin production, hypertrichosis, stammered, valvular heart disease, psychosis, blood disorder, and gigantism information were collected by interview of the parents then their children. Data were subjected to chi-square test as appropriate, and were analyzed by using SPSS version 23.

Results**Birth Abnormalities*****Stillbirth***

Frequency on the stillbirth of the children of consanguineous couples was (6). This is very common phenomenon in Bangladesh. Illiterate people cannot understand the real cause of death of children after birth.

Mentally Retarded

This is another very common which happens frequently in people. The highest number of mentally retard (12) were found in cousin marriage and 2 in unrelated parent. Down syndrome is available in these mental problems.

Twin

Normally people know that twin will be same. But in society different types of twin (dizygotic twin) are common than monozygotic twin. For the different face people cannot understand that they are twin. In this result three pair of twin was observed.

Squint

This was found only one offspring in cousin couple.

Other Eye Related Problems

In this modern technological world, mainly in Bangladesh, maximum children are suffering enormous eye related problems (myopia, hypermetropia) with vitamin and mineral deficiency. Though observed result were found few but it is sure that if possible to take information from a large population it will be high.

Infant Death

This is a common incident after birth in both cousin and unrelated parents.

Ichthyosis

Though this is very rare in Bangladesh but only one incident was found in cousin marriage.

Congenital Malnutrition

Though the people of Bangladesh are well known about the nutrition but the poor people are suffering with this. This is very dangerous for the children in future.

Less Hemoglobin Production/Blood Disorder

This was few in both couple but related with malnutrition. Blood related diseases are serious for our next generation. Blood initiates the total functions of the human body.

Hypertrichosis

Basically this is totally depended on the male and female sex hormone. For over production of these hormones this incident may happen. In cousin marriage this was found more than the unrelated couple. Hormonal treatment can help but it has some side effects. Physician will take the right decision on this case.

Gigantism

Excess production of growth hormone is the cause for this incident was observed in an unrelated parent.

Stammered

When a child tries to talk, their parents should help for correcting the way of delivering words. Nervousness and speedy talking are the root cause for stammering. Sometimes coarse tongue can be a cause for this. Yoga for the tongue and speech therapy can be helpful.

Valvular Heart Disease

This was rare but only found in an unrelated parent. The child was son and carrying his heart in the mid position (mid cardiac) of the chest with two pores. Only surgical correction can be helpful but proper guidelines should be maintained entire life.

Psychosis

This was found only one case in unrelated parent. This is nervous disorder.

Abnormalities of the children between cousin and unrelated marriages did not differ significantly (Table 1, 2, and 3). Common IQ was tested within both types of students (cousin and non-cousin) through questionnaires on the basis of their age. The IQ was not satisfactory in those students whose parents were cousin.

Sex Ratio

Of 236 children of cousin and unrelated couple, the sex-ratio of male and female were 0.87 : 1 and 0.98 : 1 respectively (Table 4 and 5).

In the present study, the highest frequency was mental retardation (consanguineous couple, n=12) compared with non-consanguineous couple (n=2). Infant death was common in both couple (n=2 and n=1) (Table 1).

Table 1: Problems associated with cousin and unrelated couples

Problems	Children of consanguineous couple	Children of non-consanguineous couple
Stillbirth	6	0
Mentally retarded	12	2
Twin	6	0
Squint	1	0
Eye problem and Calcium deficiency	1	0
Infant death	2	1
Ichthyosis	1	0
Congenital malnutrition	3	0
Less haemoglobin production	1	0

Hypertrichosis	2	0
Stammered	3	0
Valvular heart disease	0	1
Psychosis	0	1
Blood disorder	0	2
Gigantism	0	1

50 pair consanguineous and non-consanguineous couple showed insignificant result in their children. At the 70 and 28 degrees of freedom the expected results on following marriages were less than 5. Pearson Chi-square test was the helpful kit for these analyses (Table 2 and 3).

Table 2: *Insignificant chi-square result of consanguineous couple*

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	75.000 ^a	70	.320
Likelihood Ratio	50.743	70	.960
N of Valid Cases	15		

a. 90 cells (100.0%) have expected count less than 5. The minimum expected count is .07.

Table 3: *Insignificant chi-square result of non-consanguineous couples*

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	30.000 ^a	28	.363
Likelihood Ratio	27.829	28	.474
N of Valid Cases	15		

a. 45 cells (100.0%) have expected count less than 5. The minimum expected count is .13.

Female child was more prone with these problems than the male child. Malnutrition of the pregnant mother, less education, unhygienic environment, irregular sexual cycle can be the causes for those bad incidents (Table 4 and 5).

Table 4: *Frequencies of affected versus normal children recorded from 50 consanguineous couple*

Consanguineous couples	Affected children		Normal children		Total children		Sex-ratio
	♂	♀	♂	♀	♂	♀	
50	17	21	41	46	58	67	0.87 : 1
Frequency	38		87		125		

Table 5: *Frequencies of affected versus normal children recorded from 50 non-consanguineous couple*

Non-consanguineous couples	Affected children		Normal children		Total children		Sex-ratio
	♂	♀	♂	♀	♂	♀	
50	3	5	52	51	55	56	0.98 : 1
Frequency	8		103		111		

Discussion

Consanguinity leads to a higher risk of recurrence, and the effect of consanguinity is stronger when the previous sibling was stillborn or died. It had no independent significant effect on occurrence of stillbirth in the subsequent child, whereas the effect of a previous stillbirth was stronger than for any other combination of outcomes [4]. The risk of stillbirth and infant death for children with unrelated parents did not vary significantly among ethnic groups [3]. An early study by in American population showed that birth defects owing to consanguinity include stillbirths and neonatal deaths (0.111%) and infant and juvenile deaths (0.156%) [13]. Result of this article on stillbirth and infant death in case of cousin marriage showed 15.79% and 5.26%. Whereas in non-consanguineous couple the rate of stillbirth was nil but in infant death this was 12.5%. Reports show that consanguinity increases the probability of detrimentally affected offspring in the population. Examples include pre- and postnatal deaths in babies from first cousin marriages [13], hearing impairment and deaf-mutism [14,15], and blindness [15,16]. Children of consanguineous parents may be over represented in patients with severe mental retardation [15,17,18]. Hearing impairment and deafness were found in children from consanguineous marriages [14]. Hearing loss, blindness, congenital glaucoma, cerebral lipidosis, and mental retardation associated with decreased IQ scores and increased levels of intellectual disabilities are common in first cousin marriages compared to the non-consanguineous unions [11,12,19,20]. A study showed higher rates of mental disorders and hearing deficit in children from first-cousins in the urban and semi-urban areas of Qatar [18]. Observed result through some questionnaires according to their age their IQ (consanguineous offspring) was not satisfactory. In addition, in cousin marriages mentally retarded offspring were found 12 where non-consanguineous were only 2. According to a recent investigating, deafness and retinal dystrophies leading to blindness are prevalent in the children from first cousin marriages in North Africa, the Middle East and large parts of Asia due to the expression of detrimental recessive genes [15,18]. Association between consanguinity and various birth and congenital malformations was statistically significant compared to the non-consanguineous cases in Rajshahi, Bangladesh [21]. May be for maintaining minimum number of couples (50 pair in each group) in this research work the results are showing insignificant statistics.

Conclusions and Recommendations

From the above sources we see that consanguineous marriage either this is first or second cousin or after is not good for their children. Very few cases their children can be normal. In this modern world, we will discourage this cousin marriage in people. If this type of marriage can exist enormously, one day human community may extinct. Not only the extinction but also the inbreeding depression can create great hazards on the gene pool of human. This study clearly demonstrates the negative and harmful impacts of marriages

between close relatives on immediate progenies. Emphasize the importance of genetic counseling for the prospective couples in our society to avoid such birth disorders is must. Good familial bondage, consciousness, and proper education can overcome such bad situations in our familial life. In our education system, we should implement the basic knowledge on marriage system with the reproduction.

Research Gap

Most of the parents of the students had intermediate educational background (Higher Secondary Certificate (HSC) passed). So education was their great barrier for this consanguineous marriage. Students for this study were not conscious on their parents' marriage as well as cousin marriage. They are not habituated to deliver their personal information. Normally from the references we have known that there were lots of bad incidents in cousin marriage but this result does not find any significant result. If it would possible to complete power analysis (large sample size) it would better for a good result. For overcoming these anomalies further research is needed.

Bibliography

1. Hamamy, H. (2012). Consanguineous marriages. *J. Community Genet.*, 3(3), 185-192.
2. Stoltenberg, C., Magnus, P., Lie, R. T., Daltveit, A. K. & Irgens, L. M. (1997). Birth defects and parental consanguinity in Norway. *Am. J. Epidemiol.*, 145(5), 439-448.
3. Stoltenberg, C., Magnus, P., Lie, R. T., Daltveit, A. K. & Irgens, L. M. (1998). Influence of consanguinity and maternal education on risk of stillbirth and infant death in Norway. *Am. J. Epidemiol.*, 148(5), 452-458.
4. Stoltenberg, C., Magnus, P., Skrondal, A. & Lie, R. T. (1999). Consanguinity and recurrence risk of stillbirth and infant death. *Am. J. of Public Health*, 89(4), 517-523.
5. Oyen, N., Skjaerven, R. & Irgens, L. M. (1996). Population-based recurrence risk of sudden infant death syndrome compared with other infant and fetal deaths. *Am. J. Epidemiol.*, 144(3), 300-305.
6. Bittles, A. H. (1994). The role and significance of consanguinity as a demographic variable. *Popul. Dev. Rev.*, 20, 561-584.
7. Novitsky, E. (1977). *Human Genetics*. Mcmillan Publ. Co. Inc., New York, USA. (pp. 1-458).
8. Stern, C. (1955). *Principles of Human Genetics*. WH Freeman & Co. USA. (pp. 1-635).
9. Snyder, L. A., David, F. & Daniel, L. H. (1985). *General Genetics*. Jones & Barttett Publ. Inc. Boston, USA. (pp. 1-525).
10. Kingston, H. M. (2002). *ABC of Clinical Genetics* (3rd edn.). BMJ Books, London. (pp. 1-129).

11. Bittles, A. H. (2002). The impact of consanguinity on the Indian population. *Indian J. Human Genet.*, 8(2), 45-51.
12. Bittles, A. H. (2003). Consanguineous marriage and childhood health. *Dev. Med. Child. Neurol.*, 45(8), 571-576.
13. Morton, N. E. (1958). Empirical risks in consanguineous marriages: Birth weight, gestation time and measurement of infants. *Am. J. Hum. Genet.*, 10(3), 344-349.
14. Ben Arab, S., Bonaiti-Pellie, C. & Belkahia, A. (1990). An epidemiological and genetic study of congenital profound deafness in Tunisia (governorate of Nabeul). *J. Med. Genet.*, 27(1), 29-33.
15. Saggara, R. A. & Bittles, A. H. (2008). Consanguinity and child health. *Paed. Child Health*, 18(5), 244-249.
16. Elder, M. J. & De Cock, R. (1993). Childhood blindness in the West Bank and Gaza Strip: Prevalence, etiology and hereditary factors. *Eye*, 7(Pt 4), 580-583.
17. Al-Hakeem, S. & Hamamy, H. (1992). Genetic studies on institutionalized mentally retarded males with special reference to fragile X syndrome. Unpubl. MSc Thesis, L-Mustansiriyah Medical College, Bagdad, Iraq.
18. Bener, A., Hussain, R. & Teebi, A. S. (2007). Consanguineous marriages and their effects on common adult diseases. Studies from an endogamous population. *Med. Princ. Pract.*, 16(4), 262-267.
19. Bittles, A. H., Grant, J. C., Sullivan, S. G. & Hussain, R. (2002). Does inbreeding leads to decreased human fertility? *Ann. Hum. Biol.*, 29(2), 111-130.
20. Bittles, A. H. & Neel, J. V. (1994). The costs of human inbreeding and their implications for variations at the DNA level. *Nat. Genet.*, 8(2), 117-121.
21. Islam, M. S. & Ahmed, S. (2009). Incidences of birth abnormalities, congenital defects and their association with consanguineous marriages in Rajshahi: a case study. *J. Bio-Sci.*, 17, 107-112.