IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 11 Ver. 2 (November. 2018), PP 08-11
www.iosrjournals.org

Retrospective Study on Consanguineous Marriage Birth Deffects Among Patients Attending Pediatric Ward In Tertiary Care Hospital, South India

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Abstract: *Consanguinity is the quality of being descended from the same ancestor as another person. Consanguinity is prevalent in many middle eastern and Arab cultures and societies. Genetic disorders and congenital abnormalities occur in about 2%-5% of all live births, account for up to 30% of paediatric hospital admissions and cause about 50% of childhood deaths in industrialised countries. To determine the prevalence of consanguineous marriages, type of consanguinity and to determine the role of consanguinity on congenital malformations so as to create awareness. Retrospective hospital based study with consecutive sampling of 1552 babies in Mahatma Gandhi Memorial Hospital over a period of 12 months from January to December 2015.Out of 1552 babies 61 babies were having congenital malformations. Malformed babies were noted in 8 % of consanguineous marriages versus 1 % in non-consanguineous marriages, with P value of 0.04 which is statistically significant. In conclusion, congenital malformations are more in consanguineous marriages i.e., consanguinity may play important role in high rates of malformations in children. In order to prevent, genetic counselling before marriage must be applied for all couples because they may have family history of genetic disorders and especially consanguineous couples.*

Keywords: *Consanguineous marriages, congenital anomalies, genetic counselling.*

Date of Submission: 25-10-2018 Date of acceptance: 06-11-2018

I. Introduction

The word consanguinity comes from Latin words, *con* meaning shared and *sanguis* meaning blood. In clinical genetics, consanguineous marriage is defined as a union between two individuals who are related or second cousins or closer.

However, the most common form of consanguineous marriage worldwide is between first cousins, who on average have co-inherited 1/8 of their genes from one or more common ancestors. First cousin offspring will therefore be homozygous at 1/16 of all loci, which is consanguinity expressed as a coefficient of inbreeding [f] of 0.0625[1].

The preferred types of consanguineous marriage vary according to tradition, so that in Arab society's first cousin marriage between a man and his father's brother's daughter is most common.

Population stratification may therefore be a major influence in the measurement of consanguinity associated morbidity and mortality, with straight forward comparison between the progeny of first cousins and unrelated parents genetically invalid unless both sets of parents are known to be members of same caste, tribe [2].

Consanguinity is prevalent in many Middle Eastern and Arab cultures and societies [3], some studies have shown significant differences in genetic disorders between children born to consanguineous marriage partners and those born to non-consanguineous parents [4] while others have found no significant differences [5]. Genetic disorders and congenital abnormalities occur in about 2%-5% of all live births, account for up to 30% of paediatric hospital admissions and cause about 50% of childhood deaths in industrialised countries [6].

Mental disturbances are defined as structural defects of the body and/or organs that impair viability and require intervention. Minor morphogenetic errors are small structural developmental disturbances that do not impair viability and do not need to be treated. Preventive public health measures administered through pre- and peri-conception and prenatal health care services decrease the frequency of certain congenital anomalies including those due to consanguineous marriages.

Some studies have shown a relationship between consanguinity and some genic conditions and health problems such as Phenylketonuria (PKU), immunodeficiency disorders, children's hypertension, beta thalassemia, protein-c and protein-s deficiency, low birth weight and down syndrome [7-9].

This study is aimed to determine the prevalence of consanguineous marriages, type of consanguinity and to determine the role of consanguinity on congenital malformations so as to create awareness about the ill effects of consanguineous marriages in people there by decreasing the burden of congenital malformations related morbidity and mortality in our society to a large extent.

II. Materials and methods

Retrospective hospital based study with consecutive sampling of 1552 babies who had been delivered or admitted in Mahatma Gandhi Memorial Hospital, Warangal, Telangana during 12 months' period from January to December 2015.

Data collection was performed by collecting the information i.e., name of the baby mother, age, sex, weight, address, reason for hospitalization, address and contact number from the paediatric department.

Performed individual enquiry with the parents and collected data i.e., regarding their type of marriage. The data was entered into Microsoft Excel and then calculations were done. The information of each question and results were recorded and analysed. The rates of congenital malformations were compared using Statistical T-test. The level of significance was determined at $p<0.04$.

III. Results

Among 1552 cases screened, 597 (38.4%) were from consanguineous marriages and 955 (61.5%) were from non-consanguineous marriages. Babies are admitted for different reasons in the ward of paediatric shown in **Table I**.

Table I: Description of sample

	Total marriages	**Percentage**	**Male**	**Percentage**	**Female**	**Percentage**
Consanguineous	597	38.4%	354	59.2%	243	40.7%
Non-consanguineous	955	61.5%	483	50.5%	472	49.4%

Out of 597 babies of consanguineous marriages, 279 (46.7%) were with respiratory distress and 346 (36.2%) were from non-consanguineous marriages. Perinatal Asphyxia 96 (16.0%) in consanguineous marriages and 38 (3.9%) in non-consanguineous marriages. Prematurity 47 (7.8%) in consanguineous marriages and 38 (3.9%) in non-consanguineous marriages shown in **Table II**.

Table II: Disorders in the new born among consanguineous versus non-consanguineous

	Consanguineous				**Non- consanguineous**			
	Male	Female	**Total**	**Percentage**	Male	Female	**Total**	**Percentage**
Respiratory distress	156	123	279	46.7%	223	123	346	36.2%
Perinatal asphyxia	50	46	96	16.%	20	18	38	3.9%
Prematurity	25	22	47	7.8%	21	17	38	3.9%
Congenital malformations	25	24	49	8.2%	7	5	12	1.2%
Low birth weight	57	43	100	16.7%	60	52	112	11.7%
Death	96	88	184	30.8%	197	111	308	32.2%
Any other	30	24	54	9.04%	57	56	113	11.8%

Congenital malformations were 61 among which 49 (8.2%) in consanguineous marriages and 12 (1.2%) in non-consanguineous marriages. Low birth weight 100 (16.7%) in consanguineous marriages and 112 (11.7%) in non-consanguineous marriages explained in **Table III**.

Table III: Different types of anomalies affecting different systems are given below

System	**Number (49)**	**Percentage**
Respiratory system	23	46%
Cardiovascular system	11	22%
Gastro intestinal system	9	18%
Central nervous system	7	14%

IV. Discussion

Consanguinity has a major effect on the occurrence of congenital anomalies. Congenital anomalies, when major, may cause immediate death and if they survive infancy are affected physically, mentally or socially and can be at increased risk of morbidity due to various health disorders. Minor anomalies may not cause any major problems, but it may be an indicator of significant anomalies affecting major systems of the body and

sometimes can affect the normal life. The prevalence of consanguineous marriages is found to be very high in the region of study , probably due to associated factors like low socio economic status , illiteracy ,despite medical advancements.[10] This is at par with earlier studies that show the prevalence of consanguinity amongst populations in south India to be fairly high [11].Some of the previously done studies show the prevalence of south India to be ranging from 20%-60% which matches to the finding of this study 20-38%.A study done previously in the Mangalore to reveal the pattern and prevalence of consanguinity had concluded that consanguinity is more in Muslims than in Hindus and Christians.[12] Another study conducted in Belgaumhas also resulted in the same conclusion.[13] This study shows a high prevalence of congenital defects in consanguinity. This finding of the study can be found consistent with a study conducted in Norway that found that birth defects in children tended to increase in consanguinity [14].

A study conducted in Iran showed consanguinity to decrease an education status and socio economic status increased. [15] The present study shows prevalence of consanguinity, role of consanguinity on incidence of congenital anomalies, mostly the major congenital anomalies with the objective of taking remedial steps to create awareness among the people of this region about consanguineous of consanguinity which would be helpful in decreasing the congenital malformation problem in society [10].

The total number patients screened during the period of study was 1552, out of which 597 were consanguineous marriages and 955 were non-consanguineous marriages. The prevalence of consanguineous marriages was 38%. The total number of congenital malformations in consanguineous marriages was 49, whereas in non-consanguineous they were 12. The prevalence of congenital malformations was 8% among the total consanguineous marriages where as it is only 1%. This shows that there is increased occurrence of congenital anomalies in non-consanguineous marriages.

While the prevalence of congenital anomalies at birth in developed countries is reported to be between 3-5 %, those reported in Taiwan are said to be approximately 4.3%, 7.92 % reported for the United Arab Emirates, 2.46 % for Oman, 2.7 % for Bahrain [16-20]. The frequency of malformations in our study was higher compared with other studies probably because of environmental factors, low socio economic status of many individuals besides high prevalence of consanguinity in this region. In this study, among the babies with malformations, males were more as compared to female. These findings are consistent with these reported by Gorgan et al, where male new born were more affected than females. [21] WHO is working with many national and international agencies for improving laboratory capacity, to provide needy technical expertise and trying to establish a global policy by bringing together birth defect surveillance and research programmes from around the world in order to investigate and prevent birth defects to lessen the impact of their consequences.

V. Conclusion

Congenital malformations are more in consanguineous marriages i.e., consanguinity may play important role in high rates of malformations in children.

In order to prevent, genetic counselling before marriage must be applied for all couples because they may have family history of genetic disorders and especially consanguineous couples.

India needs to take a big leap in this direction with consanguineous marriages being more prevalent.

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