PERSPECTIVE

CONSANGUINITY IN MEDICINE: A SILENT HEALTH BURDEN

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Consanguinity means relationship of two (2) individuals by descent from a common ancestor. A consanguinity mating (marriage) literally means mating (marriage) between blood relation. i.e first cousins, second cousins, uncle-niece, aunt-nephew, parent child. The genetic risk for less closely related couples differs only imaginably from that in non consanguinity unions.

In breeding is an important phenomenon genetically as it brings an increase in homozygous genotype and a decrease in the corresponding heterozygous form. Consanguinity is common in several populations of the world though the consanguinity rate vary from one population to another. Furthermore, there is no variability between different tribes, communities, and ethnic groups within the same country.

In 1994, excluding the population of China and Indonesia, the combined population of countries where 10% of marriages are consanguineous was 732 million.

Furthermore: 1468 million live in Latin America, Central Africa, Northern India, Japan, Spain. European population; < 0.5% North Africa, Southern and Western Asia: 22-55%.

Religious law may differ however, and marriage between uncle/niece and aunt/nephew specifically forbidden in the Koran. The holy sermon of the prophet Mohammad Hadith state that "close marriages will often produce weak children".

On the other hand, marriages outside the social unit result in the propagation of influence in a bigger population.

The Jewish groups are heavily inbred. Judaism allows uncle-niece and first- cousin marriage. This inbreeding result both from the relatively small initial size of the Jewish gene pool coupled with strong tendencies towards endogeny as well as the fact that the Jewish culture traditionally allows and favors highly consanguineous marriages. In some Christian communities, consanguinity is also common. An analysis of 920,000 Roman Catholic marriages which took place between 1843 to 1981 in arch diocese of milwaukee showed a downward trend since the turn of the century. In Lebanon inbreeding is highly prevalent among the rural Christian communities than the urban dwellers. First cousin marriages are legal in the countries, such as the UK and Australia, but they are criminal offences in eight (8) of the states of the U.S.A and illegal in a further 31 states. Yet exceptions can be in cooperated into state laws as in permit of uncle/niece marriage within the Jewish community of Rhode Island.

Why the Practice is Maintained

Besides religion, cultural and historical factors are also important in maintaining this practice. The Arabs and by extension the Fulani probably practiced consanguinity since ancient times before the introduction of Islam in the 7th century and the Jihad. The custom of consanguineous marriage results from cultural and historical, and in some cases religious reasons. The respective cultures and history as well as the geographical

concentration of many population groups in small and isolated areas promoted the tradition of consanguineous marriages. Many families favor and encourage consanguineous marriage as a way of maintain the unity of family asset. Furthermore premarital negotiations are conducted with ease and the advanced relationship between the female and partner and her in-laws ensure greater stability of consanguineous union.

However studies have shown that several factors can influence consanguinity rules. These factors include

1. Urban-rural residence ratios of families.
2. Education levels
3. Time trend

For example, a higher tendencies of union have been observed among rural than urban inhabitants in Jordan, Egypt, Lebanon, Oman and Tunisia.

Whereas lower consanguinity rate is evident in female partners with higher level of education, highly educated men are more likely to be married to cousins. It has been argued that this is so because a son with higher education becomes a more valuable asset, he is pressured to remain within the family. While a declining trend of consanguineous marriages less been documented in Europe, America and the Roman Catholics, Bahrain, Lebanon, Kuwait and Syria. A stable trend has been reported in Jordan and Oman, however, consanguineous marriages in Algeria and Yemen are increasing in the present generations compared to previous generation. The reasons for this have been attributed to the increase in the availability of cousins due to high fertility. Anthropologists have long agreed that the main achievement of inbreeding is the inheritance of family structure and property.

Consanguinity and Reproductive Health

While the concept of inheritance is not clear in the minds of lay people, consanguinity is linked to higher incidence of Increased frequency of autosomal recessive disorder

e.g., hereditary hearing disorder and x-linked as seen in

- i. Sickle cell disease
- ii. Heameglobinopathies
- iii. Enzymopathies (G6PD) in females
- a. Hearing disorders in school children
- b. Psychiatric morbidity e.g. mental retardation.
- c. Central nervous system anomalies e.g. spinal bifida, microcephaly
- d. Reproductive wastage
 - i. Abortions
 - ii. Still birth
 - iii. Early childhood death
- e. Neonatal audit
- f. Cancer
 - i. breast cancer
 - j. Colon cancer

The reason is that the more closely two people are related, the more genes they share. A marriage of first cousin increases the risk of having a child with severe congenital or genetic disorder by 2.5 times since parents share one-eighth of their genes.

An average of 30% first cousin marriage in a population will increase the birth prevalence of many conditions by 5-15 times and their collective frequency by 5.5 times.

In breeding increases the incidence of autosomal recessive disorders by 5-10 times at the population level.

When first cousin marriage is considered, recessively inherited disorders is multiplied by 15 to 30 times. Hence total frequency of congenital and genetic disorders is doubled.

For the Lay Man

To those of you not in the medical and allied profession, it is pertinent to digress a little and discuss genetic disorders.

A genetic disorder is a disease caused in whole or in a part by a "variation" (an unusual form) or "mutation" (alteration) of a gene. Genetic disorders can be passed on to family

members who inherit the genetic abnormality. There are 3 groups of genetic disorders.

1. Single gene disorders caused by a mistake in a single gene. The mutation may be present on one or both chromosomes of a pair.
 - Sickle cell disorder
 - Tay-sachs diseases , are example of single gene disorders
2. Chromosome disorders are caused by excess of deficiency of the genes. E.g down syndrome is caused by an extra copy of a chromosome, but no individual gene on the chromosome is abnormal.
3. Multi factorial inheritance disorders caused by a combination small variations in genes, often in consent with environmental factors (virus, toxins), heart disease, most cancers and Alzheimer's disease are example of these disorders.

Genetic Testing

Genetic tests look for abnormalities in a person's gene, or the presence /absence of key proteins whose production is directed by specific genes. Abnormalities in either could indicate an inherited disposition to a disorder. Genetic testing includes:

- Genetic tests (DNA testing)
- Biochemical tests (protein testing)

Relevance of Genetic Testing

1. Predictive: discovering whether an individual has an inherited disposition to a certain disease; before symptoms appear, e.g. colon and breast cancer.
2. Confirm a diagnosis if symptoms are present.
3. Determine whether a person is a carrier for the disease e.g. cystic fibrosis, Tay – Saches disease.
4. Pre natal testing: for people at risk for having children with a chromosomal

abnormality or an inherited genetic condition. There are two procedures;

- Amniocentesis
 - Chorionic villus sampling (CVS). These are used to look for disorders:
 - Down syndrome
 - Spina bifida
 - Cystice fibrosis
 - Tay-sachs disease
5. New born disease

Test infacts blood samples for abnormal or missing gene products. E.g: Phenyl keto nuria (PKN).

Individual in families at risk for disease if – Negative test in provides an enormous sense of relief.

Positive test - enable the person to take steps to reduce risk:

- Regular screening for the disease.
- Life style changes
 - a. Diet
 - b. Regular exercise
- Relieve uncertainty make informed decision about their future

Conclusion

Consanguinity rates vary according to race, tribe economic class, isolation of society and secular exposure, improvement in education, general economic condition and health situation of the population may actually increase the consanguinity of that population in one generation. The high infant and maternal morbidity and mortality rate in the country may not be unconnected with the neglect of this vital area in medicine.

A Gwandu consanguinity research team recently won a TET FUND grant mediated by the Usman Danfodiyo University Sokoto to investigate the extent of this problem in Nigeria. This team is multi disciplinary:

Consanguinity in Medicine: A Silent Health Burden

Psychiatry, Neurology, Community Health and Anatomy.

Human fertility increases the further away your mate's home town. Marry a foreigner, a stranger. The new mysterious traveler. This assumes you meet someone you don't know from far away who is not a PSYCHOPATH. Or put another way; try to avoid having children with people who are in your family if you want to improve fertility.

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