

# Consanguineous marriages and their effects on pregnancy outcomes in Babylon government , Iraq

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## Abstract

**Purpose:-** to know

- 1-prevalence of Consanguinity in our population.
- 2-relationship of consanguinity and education level.
- 3- relationship of consanguinity and maternal age.
- 4- relationship of consanguinity and maternal occupation.
- 5-relationship between anomaly and Consanguinity
- 6- relationship between fetal death and Consanguinity
- 6-incidence of anomaly in 1<sup>st</sup> and 2<sup>nd</sup> degree consanguinity
- 7- relationship of children congenital anomalies and residences

**Introduction :-** Arab populations have a long tradition of consanguinity due to socio-cultural factors. Many Arab countries display some of the highest rates of consanguineous marriages in the world, and specifically first cousin marriages which may reach 25-30% of all marriages. There are many risk factors increment to the prevalence of congenital malformations; however, the consanguineous marriage remains the risk factor contributing to congenital anomalies . The offspring of consanguineous unions may be at increased risk to genetic disorders because of the expression of autosomal recessive gene mutations inherited from a common ancestor. The closer the biological relationship between parents, the greater is the probability that their offspring will inherit identical copies of one or more detrimental recessive genes. Consanguineous marriages favored for the woman status have been associated with low socioeconomic status , illiteracy or low education and rural residence . Consanguinity is also associated with increased gross fertility , due to at least in part to younger maternal age at first live birth. On the other hand , consanguineous marriages could increase the risk of inheriting any one of the 4968 (autosomal recessive) genetic diseases that could effect any part of the body from the head to the foot . Due to inheritance, parents and children and brothers and sisters , commonly share 50 per cent of their genetic make-up .

**Material and methods :-** We used data gathered from Babylonian families by asking questionnaire formats on the internet and by manual questionnaire also in primary health care units(AL-Emam, AL-Qatheia, AL-Aqusa), AL-Sadeq hospital and some private clinics ). A random sample consist of 335 families were approached for study in Babylon ,Iraq from the period of 20 March to 15 may 2022.

**Conclusion :-** All pregnancy outcome (such as abortion , intrauterine fetal death and presence of congenital malformations) increase with consanguinity marriage and this increase with 1<sup>st</sup> degree blood relation more than 2<sup>nd</sup> and 3<sup>rd</sup>

relation , also we note that consanguinity marriage increase in rural area , young maternal age, low education level and unemployed mother.

## **Introduction**

Consanguineous marriages have been practiced since the early existence of modern humans. Until now consanguinity is widely practiced in several global communities with variable rates depending on religion, culture, and geography. Arab populations have a long tradition of consanguinity due to socio-cultural factors. Many Arab countries display some of the highest rates of consanguineous marriages in the world, and specifically first cousin marriages which may reach 25-30% of all marriages consanguineous marriage as a 'legal union of male and female of a common ancestor or between a man and woman related by blood. The most common prevailing form of consanguineous marriage is between first cousins. However, consanguineous marriage range from cross cousin to more distant relations and their prevalence varies by cultural traditions followed by a community. One-fifth of the human population around the world lives in communities with a preference for consanguineous marriage and at least 8.5% of children have consanguineous parents. The prevalence of preference for consanguineous unions is particularly high in South Asian population. consanguinity is a term that is derived from two Latin words "con" meaning common, or of the same and "sanguineus" meaning blood, hence, referring to a relationship between two people who share a common ancestor or blood(1). In other words, consanguineous marriage refers to unions contracted between biologically-related individuals. In clinical genetics, a consanguineous marriage means union between couples who are related as second cousins or closer. Among Arabs, this would

include double first cousins, first cousins, first cousins once removed, and second cousins(2). In population genetics, consanguinity may also refer to unions of individuals with at least one common ancestor such as those occurring within population isolates, small towns, and tribes; intra-community or endogamous marriages.(3) The custom of endogamy among individuals belonging to the same tribe (hamula or kabeela) is and has been strongly favored among Arabs, with the consequence of unequal distribution of founder mutations among the population.(4) Consanguineous marriage is referred to a marital union among close biological kin. In clinical genetics, it is called the relationship by marriage between first and second cousins (5). Consanguineous marriage is most common in the Middle East and among Islamic populations. The rate of consanguineous marriage in different countries is dependent on different factors like education level, religion, local tradition, and socioeconomic status (6). Studies over several decades have shown that there is a high correlation between consanguineous marriage and inherited congenital malformation (7). There are many risk factors increment to the prevalence of congenital malformations; however, the consanguineous marriage remains the risk factor contributing to congenital anomalies (8) The offspring of consanguineous unions may be at increased risk to genetic disorders because of the expression of autosomal recessive gene mutations inherited from a common ancestor. The closer the biological relationship between parents, the greater is the probability that their offspring will inherit identical copies of one or more detrimental recessive genes. For example, first cousins are predicted to share 12.5% (1/8) of their genes. Thus, on an average, their progeny will be homozygous (or more precisely, autozygous) at 6.25% (1/16) of gene loci (i.e., they will receive identical gene copies from each parent at these sites in their genome) (9).

Consanguinity is prevalent in many Middle Eastern and Arab cultures and societies (10). Some studies have shown significant differences in genetic disorders between children born to consanguineous marriage partners and those born to non-consanguineous parents (11), while others have found no significant differences (12). Marriage between close biological relatives is generally regarded with suspicion and distaste. In many populations there is a strong preference for consanguineous unions, most frequently contracted between first cousins, and marriage outside the family is perceived as a risky and disruptive option. The increasing importance of the genetic contribution to the overall disease profile in both developed and developing countries has highlighted potential problems associated with detrimental recessive gene expression in consanguineous progeny (13). In fact, single gene disorders are common in Eastern Mediterranean families due to the practice of consanguinity that tends to retain rare mutations within affected families, who may contain a high frequency of mutation carriers. Genetic disorders and congenital abnormalities occur in about 2% - 5% of all live births, account for up to 30% of pediatric hospital admissions and cause about 50% of childhood deaths in industrialized countries (14). Consanguinity without known genetic disease in the family appears to cause an increase in mortality and malformation rate. First cousin marriages, the most common counseling problem, seem to have an added risk of about 3 percent, so that a total risk of 5 percent for abnormality or death in early childhood, about double the general population risk, is a reasonable though approximate guide (15).

Consanguineous marriages favored for the woman status have been associated with low socioeconomic status, illiteracy or low education and rural residence (16). Consanguinity is also

associated with increased gross fertility , due to at least in part to younger maternal age at first live birth(17). On the other hand , consanguineous marriages could increase the risk of inheriting any one of the 4968 (autosomal recessive) genetic diseases that could affect any part of the body from the head to the foot . Due to inheritance, parents and children and brothers and sisters , commonly share 50 per cent of their genetic make-up (18).

The higher risk comes as consequences of autosomal recessive conditions stemming from homozygosity by descent. In other words it is the risk of recessive mutations present in an ancestor being passed down branches of the family and coming together in the consanguineous marriages (19). It is assumed that all of us carry at least one mutated allele that would lead to an autosomal recessive condition if present in two copies (homozygosity) . Hence , they will have a one in four chance of having an effected offspring (20).Consanguineous marriages are major responsible risk factors for bipolar disorders . This marriage system has been reported as an important factor in the appearance of autosomal recessive and polygenic or multifactorial diseases and congenital anomalies including hydrocephalus ,postaxial hand polydactyl and bilateral cleft lip cleft palate(21) , depression , epilepsy , mentally retardation (22) , reproductive disorders :sterility , spontaneous abortion , still birth , infant mortality , child morbidity , mortality (23 ).

## **Material and methods**

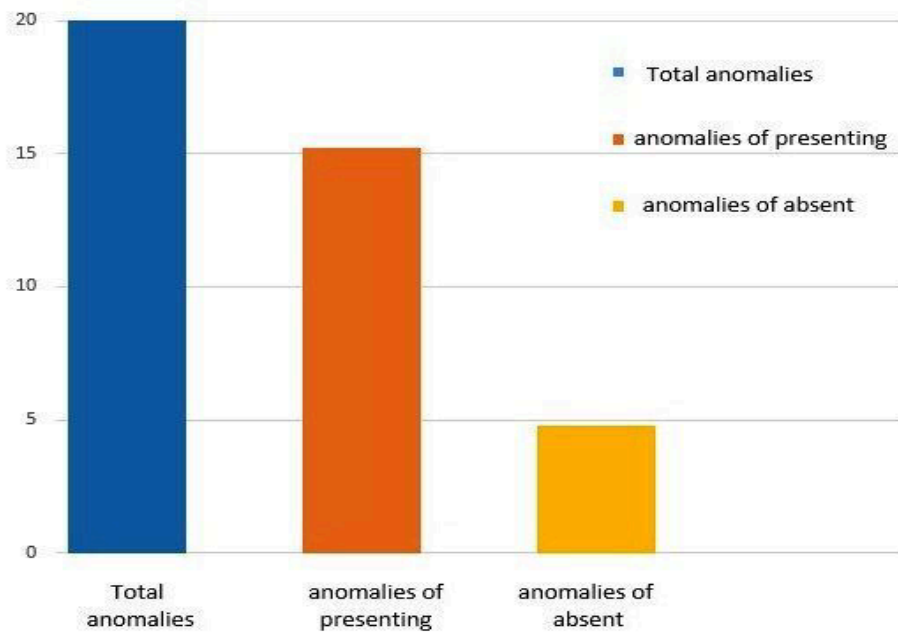
We used data gathered from Babylonian families by asking questionnaire formats on the internet and by manual questionnaire also in primary health care units(AL-Emam, AL-Qatheia, AL-Aqusa), AL-Sadeq hospital and some private clinics ). A random sample consist of 335 families were approached for study in Babylon ,Iraq from the period of 20

March to 15 may 2022. The information regarding the extent of relationship was sought from each family as to whether the couple was first cousin ,second cousin or distantly (no consanguinity). Also, information regarding education level of the women and pregnancy outcome ( a detailed history about their past obstetrical record which included history of abortion , intrauterine fetal death and presence of congenital malformations in any of kids ) was also obtained, also, information about her age , residence and occupation were taken . Then we analyzed the data to sum up the results as listed below

## Results

**Table 1)** relationship between Consanguinity and pregnancy outcome, show increase prevalence of all pregnancy complications in couples with consanguinity more than couples without consanguinity

Consanguinity					
	Total	Present (177) 52.835%		Absent (158)47.164%	
Abortion	104(31.04%)	65	19.4%	39	11.64%
Fetal death	90(26.86%)	49	14.63%	41	12.24%
Anomalies	67(20%)	51	15.22%	16	4.77%

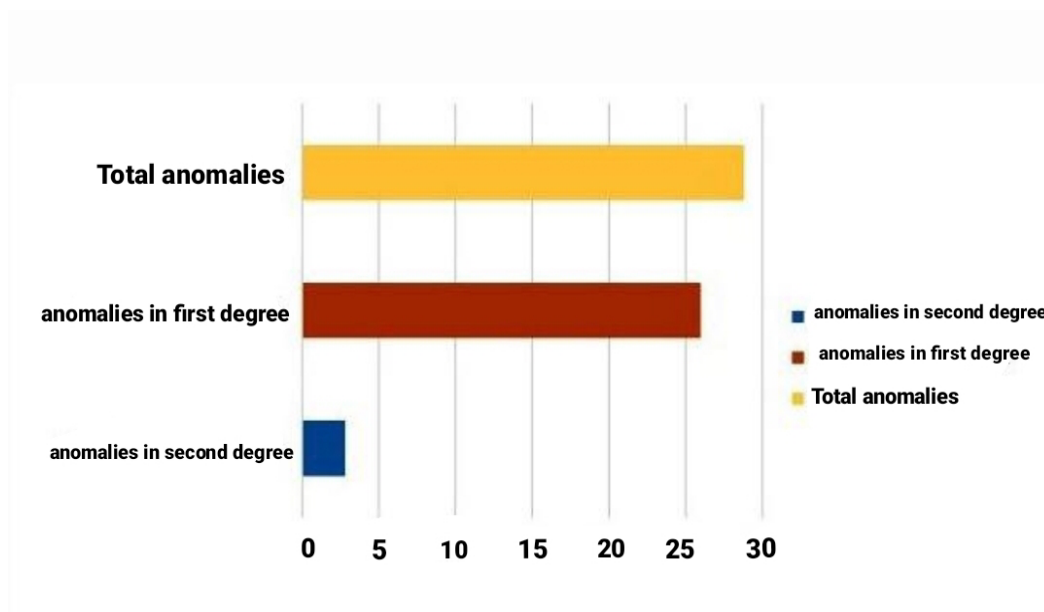


**Figure 1)** :- show total congenital anomalies in our sample ( 20%) ,which divided in to anomalies in consanguinity marriage (15.22%) and anomalies in non-consanguinity marriage (4.77%).



**Table 2)** relationship between degree of consanguinity and pregnancy outcome, that revealed increase prevalence of all pregnancy complications in couples with first degree consanguinity more than couples second degree consanguinity.

Consanguinity (177)					
	Total	1 <sup>st</sup> degree ( 152 )		2 <sup>nd</sup> degree ( 25 )	
Abortion	65(36.72%)	60	33.89%	5	2.82%
Fetal death	49(27.68%)	32	18.08%	17	9.6%
Anomalies	51(28.81%)	46	25.98%	5	2.82%



**Figure 2)** :- show anomalies in consanguinity families(28.81%) which divided in to 1<sup>st</sup> degree (25.98%) and 2<sup>nd</sup> degree (2.82%).

**Table 3)** relationship between degree of consanguinity and Residence, Age, Occupation and Education level of the mother, show increase prevalence of consanguinity in rural area , in unemployed mothers ,with low education mothers, also there is converse relationship with maternal age (prevalence of consanguinity increase with decrease maternal age ).

Consanguinity ( 335 )					
		Present( 177 )		Absent ( 158 )	
Residence	Rural area	122	36.41%	58	17.31%
	Urban area	55	16.41%	100	29.85%
Age	<20 years	10	2.98%	2	0.59%
	< 30 years	130	38.80%	75	22.38%
	<40 years	37	11.04%	81	24.17%
Occupation	Employed	70	20.89%	98	29.25%
	Unemployed	107	31.94%	60	17.91%
Education level	High	49	14.62%	73	21.79%
	Low	128	38.20%	85	25.37%

**Table 4)** relationship between congenital anomalies and residence of the mothers, show increase incidence of offspring congenital anomalies in rural area more than urban area.

Congenital anomalies ( 67 )					
Present (consanguinity )			Absent (consanguinity)		
Rural area	40	59.70%	6	8.95%	
Urban area	15	22.38%	6	8.95%	

**Discussion :-**

Our studies takes 335 Babylonian families, and report the prevalence of consanguinity in this sample which revealed 52.83% of the sample , that mean our society tend to marriage from the same families ,then studied the prevalence of abortion, intrauterine fetal death and congenital anomalies in both groups ( with and without consanguinity ), that revealed prevalence of all previous pregnancy complications higher in marriage with consanguinity (19.4% , 14.63%,15.22% ) than that without ( 11.64%, 12.24% , 4.77% ) , this result simila to study done in College of Science ,University of Baghdad (23) Then we study other parameter that related to marriage such as maternal age , residence , occupation and education level of the mothers , we find highly association between these factors and types of marriage , we found consanguinity marriage increase in rural area more than urban area (36.41% versus16.41% ) , also it increase with decrease maternal age then we study the effect of maternal education level that revealed it decrease with increased level of education ( 38.20%in low education while 14.62%in high education )and lastly we show the effect of occupation which revealed consanguinity marriage decrease in employer group than unemployed one ( 20.89%versus 31.94% ) .These result are paralleled with literatures. For example, in Jordan , it was evident that the higher the level of education of the female partner , the lower the consanguinity rate ( 24) Our result supports the considerable evidence suggesting that age at marriage has been found to has direct effect in an increasing the prevalence of the consanguineous marriages (26), also it is go with the evidence of Yemeni study which found adverse effect of maternal age on prevalence of consanguineous marriages .This may, in turn , provide further support to the hypothesis that higher the social status of individuals , the lower the likelihood for kin marriage in a population. Therefore ,legislative measures undertaken to

influence female age at marriage may have impact in lowering the prevalence of consanguinity among the population .(27)

## **Conclusion :-**

All pregnancy outcome (such as abortion , intrauterine fetal death and presence of congenital malformations) increase with consanguinity marriage and this increase with 1<sup>st</sup> degree blood relation more than 2<sup>nd</sup> and 3<sup>rd</sup> relation , also we note that consanguinity marriage increase in rural area , young maternal age ,low education level and unemployed mother ,this study give us rough estimation about incidence of consanguinity marriage in our population ,and prevalence of congenital anomaly in consanguinity marriage.

## **Recommendations**

- 1-Need a lot of number of studies , with larger population sample to know the appropriate estimation about consanguinity marriage and incidence of congenital anomalies in them.
- 2-Educate and counseling our population about risk of consanguinity marriage and if they insisted we must do for them genetic study about familial disease before marriage.

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