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Prevalence of Consanguineous Marriages and Reported Child Health-Related Problems in a Village at Al-Minufiyah Governorate, Egypt

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ABSTRACT :

Introduction: *Consanguineous unions are generally common in the developing world and especially in the Islamic countries. High rate of consanguinity are associated with many health problems in offsprings.*

Aim: *To determine the prevalance of consanguineous marriage in Abu Raqabah village, Al Minufiyah Governorate and to identify the frequencies of various birth outcomes and child health problems due to consanguineous marriage in children.*

Materials and methods: *A cross sectional study was done for detection of the total number of the families with consanguineous marriages to calculate the prevalence of consanguineous marriages. The actual population records in the Family Health Unit of Abu-Raqabah were 1190 records while the active files with complete data were only 920 file. A total of 270 records were excluded from the study due to incomplete data as they were of no medical concern.*

Results: *prevalence of consanguineous marriages in the studied population was 19.02 % (175 families out of 920). Most of consanguineous group was first cousin marriage 116 families with 89% of all consanguineous families. The present study showed significant relation between consanguineous marriage and presence of child health problems. The child health problems were higher in consanguineous group (61.4%) than in the non-consanguineous group (38.6%).*

Conclusion: *The study concluded that the prevalence of consanguineous marriage is relatively high about 19.44% in Abu Raqabah village Al Minufiyah governrate and this was related to higher incidence of some child health problems as abortion, congenital heart diseases, mental retardation, blood diseases, hearing problems, neurological diseases and child mortality under five years old.*

Keywords: *consanguineous marriage, Child health problems, Family health unit.*

INTRODUCTION

A consanguineous marriage is defined as a union between two individuals who are related as second cousins or closer, with the inbreeding coefficient equal or higher than 0.0156 *(Riaz et al., 2016).*

The study of consanguinity is a subject of interest for both social scientists and human biologists. Understanding the pattern of consanguinity is not only helpful in getting an insight into the socio-biological structure of populations, but is also pertinent to the health and disease variables of the populations. *(Shawky et al., 2011).*

The rate of consanguineous marriage varies in different countries and is usually associated with some demographic features, as religion, educational level, socio-economic status, location and size of the area, isolation of population, consanguinity in parents' marriages, responders' attitude towards consanguineous marriage, and living in rural or urban area *(Sueyoshi and Ohtsuka, 2003).*

Consanguineous marriage is associated with lower age at marriage, lower age at first birth, higher preference for larger family size and lower level of husband–wife communication about use of family planning methods and lower rate of contraceptive use *(Mazharul, 2013).*

Consanguinity is less common in North African Arab countries where it was reported to be 29% in Egypt. However in another study on the Nubian population in southern Egypt the figures ranged between 41.5-45.5%.The highest rates of such marriages have been reported in rural areas, among individuals with low educational levels, and among the poorest *(Sueyoshi and Ohtsuka, 2003).*

There are many adverse health effects of consanguineous marriage, it has a greater risk not only of producing offspring which are homozygous for a deleterious recessive gene, but also individuals with increased susceptibility for polygenic or multifactorial disease, sterility, still births, spontaneous abortions, child death, infant mortality. There is no association of consanguinity with autosomal dominant, X-linked, or chromosomal disorders (such as Down syndrome). Consanguinity increases the risk of expression of autosomal recessive conditions in the offspring *(Bittles, 2001).*

The current study was conducted to identify the magnitude of consanguineous marriage and to determine some child health effects associated with consanguineous marriage.

Aim of the work: To determine the prevalence of consanguine marriage in Abu Raqabah village, Al Minufiyah Governorates and to identify the frequencies of various birth outcomes and child health-related problems associated with consanguineous marriage in children e.g. abortion, stillbirths, congenital malformations, genetic disorders, diseases with autosomal recessive inheritance, developmental disorders, congenital heart diseases, hearing problems.

Materials and Methods:

A cross sectional study with internal comparison was conducted in the family health unit of Abu-Raqabah village in Al Minufiyah, Egypt. All families that have

health records in Abu Raqabah Family Health Unit were included in the study to calculate the frequency of consanguineous marriages.

Ethical consideration: Administrative approval for conducting this research was obtained from the authorities of the family health unit. Subjects were informed about the study objectives and verbal anonymous consents were obtained from all participants. Assuring confidentiality of information and the data collected was used only for the stated research purpose.

Methods of data collection:

1- ***Family health records:*** All family health records were included; data regarding sociodemographic characters and consanguineous marriage were obtained to calculate the prevalence of consanguineous marriage in Abu Raqaba village. Data obtained from the family health records included: Sociodemographic characters, state of consanguine marriage with degree of consanguinity if present, reproductive history, recorded child health-related problems e.g. genetic diseases, congenital heart diseases, renal diseases, hearing problem and other diseases.

According to the governmental reports of population census done by the central agency for the public mobilization and statistics (CAPMAS), the total number of families that were living in Abu Raqabah village was 1370 family during the study period. The actual population records in in the Family Health Unit of Abu-Raqabah were 1190 record while the active files with complete data were only 920 file. There were about 270 family health files excluded from the study due to incomplete data.

2- An interview questionnaire:

All families recorded as having consanguineous marriage and the similar number of families having no consanguineous marriage was met by an interview questionnaire in the family health center to obtain data about all health problems due to consanguineous marriage and to compare frequency of each health related problem between both groups. The questionnaire was constructed of questions about many items as the sociodemographic data, positive medical history for some chronic diseases of parents. Parents have been asked for more details about child health related problems like congenital heart diseases, mental retardation, blood diseases, neurological diseases, hearing diseases, visual diseases, endocrinal diseases, renal and psychiatric diseases. It was important to report the frequency of abortion, stillbirth, infant death and child death aged less than 5 years old in both consanguineous and non-consanguineous groups.

Statistical tools used in data collection: Quantitative data were summarized using means and standard deviations or medians and ranges. Categorical data were summarized as percentages. For numerical variables multivariate analysis was done using logistic regression to detect if consanguinity is an independent variable for having child health problems. For categorical variables, differences were analyzed with $\chi 2$ (chi square) tests and Fisher's exact test when appropriate.

Results and Discussion: The prevalence of consanguineous marriages in the studied population was 19.02% (175 families out of 920) according to family records reported in the Family Medicine Unit. (Figure 1)

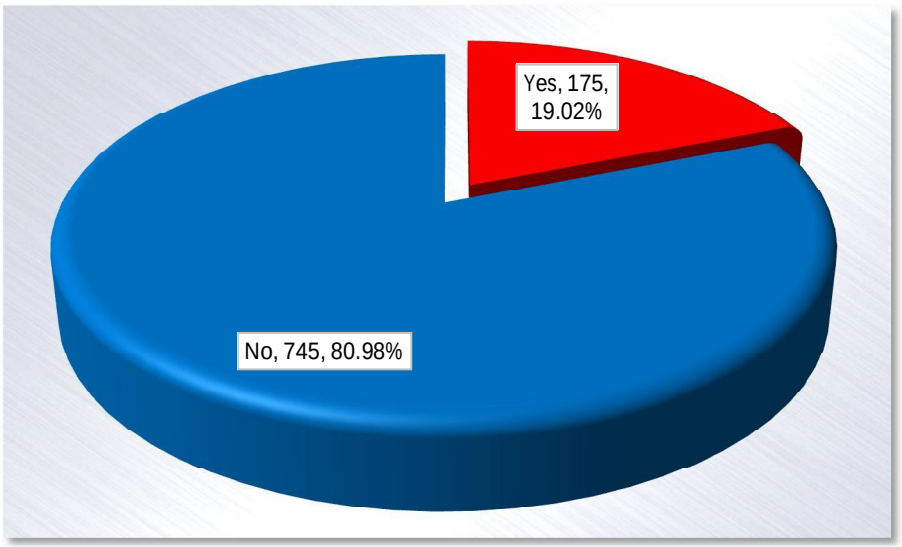

Figure (1): Prevalence of consanguineous marriages in the studied population

This result was less than the prevalence calculated in previous Egyptian study (from 22.9% to 39.9%) by ***Mansour et al. (2010)*** and that difference may be due to increase the human awareness about the health hazards of consanguineous marriage.

Similar study was carried out by ***Shawky et al., (2011).*** Using a cross-sectional approach of 10,000 unselected couples taken from three governorates Sohag, Assuit and Cairo in Egypt to reflect properly the prevalence of consanguinity. That study showed that the overall frequency of consanguinity in Egypt was (35.3%), however this frequency varies by region. It was significantly higher in Sohag (42.2%) and great Cairo (36.1%) than in Assuit (21.7%).That higher frequency of consanguinity was due to less cultural awareness of population about the risk of child health problems, in Sohag and Assuit both populations were familiar with consanguineous marriage while the present study was conducted in a village in Al Minufiyah governrate (Lower Egypt with a population nature different than that of Upper Egypt.

The present study revealed that the first cousin marriages occurred more often than other types of consanguinity (89%). Similar results were also reported in other Arab countries like Saudi Arabia ***(El-Mouzan et al., 2007).*** It was also detected that first cousin unions were the most prevalent type among the consanguineous marriages as well as in the total marriages in a recent study conducted in Pakistan ***(Riaz et al., 2016).***

On the other hand, a high frequency of unions among second cousins was reported in the Parrish of Dota and Costa Rica populations. Among Arabs it constitutes 20-52% of all marriages and first cousin marriages constitute almost one third of all marriages ***(Bener et al., 2004 and Bittles, 2008).***It has been a long-standing social habit among Egyptians. The etiology of this high degree of consanguinity is nearly the same in all Arab countries. It includes maintenance of family structure, stability, durability as well as keeping property. It has financial advantages relating to dowry or bride wealth payment and ease of marital arrangements. It also strengthens family ties and build closer relationship between the wife and her in-laws. This means that it has significant social and economic advantages. It is also noticed that consanguinity between the parents increases the chance of consanguineous marriage among their children ***(Jorde, 2001).***

Comparison between consanguineous and non-consanguineous families as regards their socio-demographic data**.**The mean fathers' age was 36 years old in both consanguineous and non-consanguineous group. The mean mother's age was 31 years old in both groups. The majority of the parents had middle education level in both groups. The majority of the fathers were skilled workers and less professional workers of both groups while mothers are almost not working in both groups. There was no statistical significant difference between both groups regarding parents' age, education level and occupation. There was significant association between number of children and consanguinity of the parents (P value <0.05) that means higher number of offspring in consanguineous families than in non-consanguineous families (Table1)

In the current study, a significant association between number of children and consanguinity of the parents was recorded (P value<0.05). This may be attributed to the association between increasing number of births and consanguineous marriages with rural, religious and low socio-economic populations according to ***Bittles, (2008)***

The present study results are coinciding with ***Bittles and Hammany (2009)*** who reported that rural areas are typified by low levels of maternal education, early age of marriage, short birth intervals and longer reproductive spans. Each of these factors is independently associated with larger family sizes and higher rates of infant and early childhood mortality, with reproduction compensation for early losses, a further complicating issue in assessing the overall health outcomes of consanguinity.

Table (1): Comparison between consanguineous and non-consanguineous families as regards their socio-demographic data

		Consanguinity				P value*
		Consanguineous		Non Consanguineous		
		Mean	SD	Mean	SD	
Father's age		36.6	9.65	35.68	8.9	0.4
Mother's age		31.4	9.60	30.75	8.6	0.5
Number of offsprings		3.338	1.361	2.885	1.445	0.010
		N	%	N	%	P value*
Father's education level	Not educated	24	18.6	16	12.3	0.13
	Middle education	78	60.5	73	56.2	
	High education	28	21.5	41	31.5	
Mother's education level	Not educated	40	30.8	28	21.5	0.15
	Middle education	70	53.8	73	56.2	
	High education	20	15.4	29	22.3	
Father's Occupation	Not working	5	3.9	4	3.1	0.06
	Unskilled worker	20	15.6	11	8.5	
	Skilled worker	50	39.1	38	29.2	
	Less professional work	50	39.1	71	54.6	
	Professional work	5	3.9	6	4.6	
Mother's Occupation	Not working	107	84.9	100	76.9	0.48
	Unskilled worker	3	2.3	2	1.5	
	Skilled worker	0	0	0	0	
	Less professional work	20	15.4	27	20.8	
	Professional work	0	0	1	0.8	
	Total	130	100	130	100	

As regards the abnormal pregnancy outcomes, there was significant association between abortion and consanguinity. Higher incidence of abortion and stillbirth in the total number of pregnancies among consanguineous group than the incidence among non-consanguineous group. This

study showed significant association between consanguineous marriage and presence of child health problems. The child health related problems were higher in consanguineous group (61.4%) than in the non-consanguineous group(38.6%). It was noticed that most of consanguineous group with positive child health problems were first cousin marriage that coincidies with ***Hamamy et al.*** who revealed that there was association of consanguineous marriages with autosomal recessive disorders and late onset of complex diseases such as diabetes, cardiovascular disorders and schizophrenia ***(Hamamy et al. 2011).***

The current study revealed significant association between number of abortions and consanguinity of the parents (p <0.05) with higher incidence of abortion among the consanguineous group. Therefore our findings agree with ***Reindollar*** who revealed that repeated abortions and miscarriages in consanguineous marriages were significantly more frequent than in non-consanguineous marriages (***Reindollar, 2000).***

There was statistically significant association between consanguineous marriage and its degree and presence of child health problems (P value <0.05). The child health related problems were higher in consanguineous group (61.4%) than in the non-consanguineous group (38.6%). It was revealed that most of consanguineous group was first cousin marriage. (Table 2)

Table (2): Relation between consanguineous marriage and its degree and presence of child health problems

		Health problems				Chi Square test	P value
		Yes (N=88)		No (N=172)			
		N	%	N	%		
Consanguinity	yes	54	61.4	76	44.2	6.20	0.01
	no	34	38.6	96	55.8		
Degree of consanguinity	First cousin	49	90.7	67	88.16	0.33	0.85
	Third cousin	5	9.3	9	11.84		

The consanguineous group of parents showed higher frequency of children with congenital heart diseases, mental retardation, blood diseases, hearing problems, visual problems and psychiatric problems than the frequency of those child health problems in non-consanguineous parents. The difference was not statistically significant due to the nature of population studied and small sample size. (Table 3)

Table (3): Relation between different parameters related to children and consanguinity of the parents.

		Consanguinity						Chi-Square	
		Consanguineous		Non-Consanguineous		Total			
		N	%	N	%	N	%	X^2	P-value
Congenital heart disease		5	3.85	4	3.08	9	3.46	0.115	0.734
Mental retardation		5	3.85	1	0.77	6	2.31	2.730	0.099
Blood problems		7	5.38	3	2.31	10	3.85	0.936	0.333
Hearing problems		6	4.62	3	2.31	9	3.46	1.036	0.309
Effect on speech	Yes	3	50.00	3	100.00	6	66.67	2.250	0.134
	No	3	50.00	0	0.00	3	33.33		
Visual problems		7	5.38	5	3.85	12	4.62	0.349	0.554
Endocrinal problems:		0	0.00	1	0.77	1	0.38	1.004	0.316
Skin problems		1	0.77	2	1.54	3	1.15	0.337	0.561
Neurological problems		6	4.62	3	2.31	9	3.46	1.036	0.309
Urogenital problems		2	1.54	2	1.54	4	1.54	0.000	1.000
Psychiatric problems		1	0.77	0	0.00	1	0.38	1.004	0.316
Other hereditary diseases		1	0.77	0	0.00	1	0.38	1.004	0.316

For a better evaluation of the risk associated to consanguineous unions on child health related problems, we carried out a logistic regression model defining the increased risk for each factor compared to the outcome health problems Odds ratio and 95% confidence Intervals for the associations between parents' characteristics and consanguinity.

There was significant positive association between mother's medical history, father's occupation and consanguinity. The risk of having child health problem was doubled if the parents were consanguineous (odds ratio 2.006). There was no significant association between Under 5 child mortality and consanguinity (P value > 0.05) (Table 4)

Table (4): Logistic regression analysis of the different factors including consanguinity and child health related problems.

	Odds ratio	95%CI for Odd ratio		P-value
Father's education level	1.251	0.324	1.282	0.211
Mother's education level	0.649	0.367	1.150	0.139
Father's occupation	0.243	0.059	0.995	0.049*
Mother's occupation	1.371	0.736	2.556	0.320
Father's medical history	1.874	0.889	3.958	0.100
Mother's medical history	3.108	1.474	6.553	0.003*
Gestational diabetes	1.667	0.494	5.621	0.410
HTN during pregnancy	1.725	0.807	3.687	0.160
Mode of delivery	0.639	0.374	1.092	0.101
Consanguinity	2.006	1.188	3.388	0.009*

Consanguineous marriage has long been a controversial topic. It is still prevalent in Egypt especially in rural areas where marriage of non-educated and unemployed persons is practiced. High population growth in Egypt (1.3 million people /year) was the cause of the whole array of economic and social problems ***(CAPMAS, 2007).*** In Egypt, we are in urgent need to improve the socio-economic and educational status. There is also need to increase public awareness of reproductive health and anticipated deleterious effects of inbreeding.

Individual studies can give different risk figures dictated by various factors, inherent to the studied populations. For example, in Norway, the risk of stillbirth and infant deaths among first cousin couples was 1.7 times that for unrelated parents. If family history points to the presence of a genetic disorder, then primary health care providers could refer the couple to a specialized genetic counseling clinic. This helps in estimating the precise risks to the offspring and in diagnosing their carrier status for autosomal recessive disorders known to be present in the family whenever such tests are feasible and applicable ***(Zakzouk, 2002).***

CONCLUSION

The study concluded that the prevalence of consanguineous marriage is relatively high about 19.44% in Abu raqaba village Ashmone Al Minufiyah governrate and this wasrelated to higher incidence of some child health related problems as abortion, congenital heart diseases, mental retardation, blood diseases, hearing problems, neurological diseases and child mortality under five years old.

Premarital counseling should be done for every couple in proper way including full history taking, medical advice, and investigations required according to the case and referral to another health care provider when needed.

Further studies with larger sample size should be conducted to follow up the consequences of consanguineous marriage

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