

Prevalence and perception of consanguineous marriage among medical students

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Abstract:

Background: Consanguineous marriages occur in most of populations, with different percentages among all marriages. The consanguinity rates in the Middle East, North Africa, Southwest Asia, and South India range between 20-50% or more of all marriages.⁽³⁾

Objective: To assess the prevalence of consanguineous marriage among family members of medical students', knowledge, and attitude of students towards consanguineous marriages.

Methods: A descriptive cross-sectional study was conducted in Faculty of Medicine, Tanta University, Egypt with a sample size 750 students. **Results:** The prevalence of consanguineous parents was 12%. The prevalence of consanguineous marriage among the married sisters or brothers of the participants was 25%. Most of the participants were unmarried females and Muslims (99.2% and 98.10%, respectively). A significantly higher knowledge score was present among urban females. Married participants have significantly positive attitude compared to non-married ones. Most of the participants (82%) prefer offering information to couples about consanguineous before marriage and they preferred to have the information from: clinical geneticist, followed by mass media, then gynecologist, or general practitioner. **Conclusions:** The prevalence of consanguineous marriage is high. The level of knowledge is satisfactory but the attitude for those accepting consanguineous marriage still approximate to half of the participants. Premarital health education programs are needed to improve the youth knowledge level on consanguineous marriages, better by physicians in the medical health centers or through mass media.

Keywords: awareness, consanguineous marriage, medical student, perception, prevalence.

Introduction:

Consanguinity is the blood relationship that exists among individuals that descend from a common ancestor.⁽²⁾ Consanguineous marriages occur in most of populations, with different percentages among all marriages. In Egypt, consanguineous marriage percentage is still high (35.3%), especially among first cousins.

It was found to be higher in rural areas (59.9%) than in semi-urban and urban areas

(23.5% and 17.7%, respectively). The consanguinity rates in the Middle East, North Africa, Southwest Asia, and South India range between 20-50% or more of all marriages.

However, in South America, China, and Japan, the consanguinity rates range between 1-10% of all marriages.⁽³⁾ In the United States, consanguineous marriages are not allowed by law in most of the states.⁽⁴⁾ In Europe, the rate of this marriage is less than 0.5 %.⁽⁵⁾

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Several studies in the Gulf region have reported a consanguineous marriage prevalence of more than 50% in Qatar, Kuwait, and the United Arab Emirates.⁽⁶⁻⁸⁾

In Saudi Arabia, the prevalence of first-degree cousins was 33.6%, while the prevalence of other types of consanguineous marriages was 22.4%. It was also found that rural areas had a higher prevalence of consanguinity than urban areas.⁽⁹⁾

The sociocultural reason was the predominant factor in favoring consanguinity in Pakistan. Other reasons reported included lower expenses of marriage, consolidation of family bonds, and cultural traditions.⁽¹⁰⁾

Regarding awareness, a study in India (2015) concluded that the overall awareness regarding the problems associated with consanguinity among most of the participants was very low.

Friends were the commonest source of information of consanguinity problems. Premarital counseling for couples with a family history of anomalies was needed to avoid consanguinity.

Preconception genetic counseling for consanguineous marriage couples was also needed to avoid genetic disorders will facilitate informed family planning. Enquiring of the history of consanguinity

should be a routine practice for all antenatal mothers presenting for obstetric examinations.⁽¹¹⁾

Many studies have shown the association between consanguineous marriages and inherited disorders in offspring.^(12,13) A study in Saudi Arabia showed a strong association between the prevalent consanguinity and congenital heart.⁽¹⁴⁾

In Geneva international consanguinity workshop report, offspring of consanguineous marriages have a high probability of acquiring homozygous deleterious inherited factors, and thus have a higher possibility of developing autosomal recessive disorders. The first-cousin marriages tend to increase the risk of having a child with a recessive disorder.⁽¹⁵⁾

Alharbi (2015) identified that approximately one in every two Saudi adults favors consanguineous marriage.⁽¹⁶⁾ While among Iranian youth (2012), the knowledge and attitude of youth couples regarding consanguineous marriages is poor.⁽¹⁷⁾

Since few studies have been done before in this field, especially in delta region, this study was done to assess the knowledge and attitude of students towards consanguineous marriages and determine its prevalence of among medical students' parents.

Subjects & methods:

Research Design: This is a descriptive cross-sectional study.

Study Setting, timing, and sampling: It was conducted in Faculty of Medicine, Tanta University, Egypt from 1st of November 2017 to 1st of January 2018. A convenient sample was drawn from the students in Tanta Faculty of Medicine from the first four academic years.

The least sample size was calculated using Epi-Info version 7.1.5.2. program of statistics, 5% confidence limits at 99% confidence level and found to be 431 students. For better accuracy, validity, and coverage of any drops due to incomplete questionnaires, 800 Egyptian students were selected to participate in the study. Participants who continued with complete questionnaire were 750.

Inclusion criteria: Medical students in the first four academic years, Tanta University, Egypt. **Exclusion criteria:** Students of other faculties, medical students in other academic years, and those who refused to participate in the study.

Study tool, procedures, and data analysis:

1. The questionnaire: A predesigned pretested self-administered semi-structured questionnaire was used. The

questionnaire was validated (for face and content validity) by 3 public health experts and reliability by test-retest technique (Cronbach's α coefficient = 0.82).

The questionnaire was pre-tested by a pilot study conducted among 35 students to ensure clearness, reliability, and the time needed to answer all items. Accordingly, some modifications of the questions and results of the pilot study were not included in the final analysis.

The questionnaire contained: sociodemographic data as age, sex, residence, marital status, religion, grade, parent education, consanguinity between parents, and consanguineous related congenital anomalies among participants' brothers/sisters.

Regarding knowledge: the questionnaire included 28 questions about participants' knowledge regarding consanguineous marriage (definition, causes and consequences "complications" on mothers, children, and communities).

Regarding attitude: the questionnaire included 20 questions about the attitude of students toward consanguineous marriage. Moreover, the questionnaire included 4 questions about the prevalence of consanguineous marriage among the students' parents and their brother and

sisters in addition to more questions for preferred timing and persons to give health education .

2. The Scoring system for knowledge and attitude towards consanguineous marriage: Knowledge score: There were 28 questions regarding knowledge of consanguineous marriage, answered either correct, wrong, or don't know and scored as 2, 1, and 0, respectively.

The total score of knowledge ranged from 0 to 56 and was classified into: Good "adequate knowledge": those who achieved more than 75% from the total score, Moderate "Moderately adequate knowledge": those who achieved 50-75% from the total score, and Low "inadequate knowledge": those who achieved less than 50% from the total score

Attitude score: there were 20 questions regarding attitude towards consanguineous marriage, each question had 5 answers (strongly agree, agree, neutral, do not agree, and strongly not agree) scored as 5, 4, 3, 2, 1, and 0, respectively.

The total score ranged from 0 to 100. It was classified into positive attitude "refuse consanguinity" which represents the participants who achieved $\geq 75\%$ from the total score, while negative attitude "encourage consanguinity" represents those who achieved less than 75% from the total score.

3. Data analysis: Analysis was performed using SPSS for Microsoft Windows, version 16. Qualitative data were tabulated and summarized in proportions and percentage, using chi-square test and fisher's exact tests to test hypotheses whenever appropriate.

Ethical considerations: The purpose of the study was explained to all participants and consents were obtained from all of them. The approval of scientific research ethical committee in Tanta Faculty of Medicine was obtained before starting the study. Informed consents were obtained from all participants.

Confidentiality of data and privacy of the participants was guaranteed during the whole period of the study.

Results:

Table (1) demonstrates the socio-demographic characteristics. More than two-thirds of participants (67.70%) were females. Participants aged <20 years represent 58.50% of the sample and the majority were single and Muslims (99.20% and 98.10%, respectively).

Regarding the educational level, more than two thirds of the participants' parents were of high educational level and 10.4% had consanguineous marriage. Approximately two-thirds of participants have moderate knowledge score and 27.70% of them have high score.

Higher knowledge scores were present among females compared to males (31.5% and 19.8%, respectively) and among urban students compared to rural ones (31.30% and 22.8%, respectively) with a statistically significant difference.

Also, a statistically significant good knowledge score was present among students of mothers with higher educational level (table 2). Less than half of the participants (45.90%) have negative attitude towards consanguineous marriage. Married participants have significant positive attitude compared to non-married ones.

Participants of fathers with high or intermediate educational level has significantly positive attitude towards this marriage (table 3). The prevalence of consanguineous parents among participants was 10.4%. Also, 2.8% of the participants' brothers or sisters had consanguineous marriage related congenital anomalies (table 4). Among the consanguineous parents, 23.07% of their offspring had congenital anomalies.

Out of participants' married brothers/sisters (4%), 25% were consanguineous marriage couples. Regarding the preferred timing of offering consanguineous risk information to couples, most of the participants (82%) prefer to be aware of these information before marriage,

while 7% prefer to know these information before first pregnancy, and 3% during pregnancy (figure 1).

The clinical geneticist was the preferred source of information (30%), followed by mass media (27%), gynecologist (19%), and lastly general practitioner (18%).

Discussion

Consanguineous marriages occur in most of populations, with different percentages among all marriages. Approximately two-thirds of participants in this study have moderate knowledge score regarding consanguineous marriages.

A significantly higher knowledge score was found among urban females. Less than half of participants have negative attitude towards consanguineous marriage. Participants of fathers with high or intermediate educational level has significantly positive attitude.

The prevalence of consanguineous parents was 10.4%; 23.07% of those parents had offspring with congenital anomalies, while the congenital anomalies among brothers and sisters of the participants were 2.8%.

The prevalence of marriage to the cousin of participants' sisters or brothers was 4.8%. Most of the participants prefer education about consanguineous before marriage. Also, they had preferences in

terms of source of information which are ordered as follows: clinical geneticist in the medical health centers, mass media, gynecologist, or general practitioner.

In the present study, 10.40% of participants' are consanguineous marriage couples and 23.07% of the brothers or sisters of participants having consanguineous parents were suffering from congenital anomalies. Among participants with married brothers and sisters, one quarter were married to a cousin.

Ahmed *et al* (2017) showed that consanguineous marriage among youth (13 – 35 years) in Egypt was 27.4%. It has the highest prevalence in rural Upper Egypt and the lowest one in urban Lower Egypt. Consanguineous marriage prevalence is generally higher in rural areas than urban ones.⁽¹⁸⁾

Yahyaa *et al* (2019) in a study in Iraq reported that two thirds of marriages were consanguineous, approximately one third of them were between first cousins, and 14.7% had a child with genetic disease or disability.⁽¹⁹⁾ Another study by Kaplan *et al.* (2016) in Turkey mentioned that the frequency of consanguineous marriage was 18.5%; 57.8% of them were first cousin marriages.⁽²⁰⁾

The discrepancy between these studies and our study because our sample was

among medical students within specific age group; most of them were of urban residence, with high parents' education, less extended families, and different cultures.

There are many motives for continuing consanguineous marriage in these communities including cultural traditions, family pressure, strengthening family bonds, and living near to their families, in addition to financial reasons.⁽¹⁰⁾

In Brazil, the frequency of consanguineous marriage was found to be increased over the generations, being 15.9% in the parents of the elderly participants, 17.1% in the elderly participants themselves, and 20.5% in their descendants. Most of the participants did not believe that consanguinity increased the risk of having children with disabilities.⁽²¹⁾

Approximately two-thirds of participants in our study have moderate knowledge score and one quarter have high score, with a significantly higher knowledge score present among urban females. More than half of participants had positive attitude towards consanguineous marriage and its hazard on mothers, children, and communities.

Shelkamy *et al* in his study among students living in Assuit University dorms showed that 71.9% of the students had poor knowledge about consanguinity. This

difference from our study may be related to the study sample selection as she selected medical and non-medical students.⁽²²⁾

Ahmed *et al* (2016) found that the knowledge regarding the consequences of consanguineous marriages among Saudi Arabia adults was below average. This is inconsistent with our study where the females had significantly more knowledge on the consequences of consanguineous marriages compared to males and respondents without a university education who had limited knowledge.⁽²³⁾

Another study in Saudi Arabia by Mahboub *et al* (2019) reported that most of participants had poor knowledge and negative (low score) attitude towards consanguineous marriage. The participants who had significantly higher attitude score towards consanguineous marriage were people of older age group, males, those who are married to their relatives, people who have frequent family history of consanguineous marriage, and participants with parental consanguinity.⁽²⁴⁾

A study in Pakistan (2016) in a rural community mentioned that 97.3% reported consanguineous marriages in their extended families and 74.0% had a positive attitude towards cousin marriages.⁽²⁵⁾ Most of the participants in the present study prefer offering information to couples about

consanguineous marriage before marriage. Several studies reported similar findings.^(19,25,26) Participants in the present study prefer clinical geneticist in the medical health centers or mass media to be their source of information about consanguineous marriage.

This is in consistency with the study of Ahmed *et al* (2016) in KSA.⁽²³⁾ A study in Egypt (2015) revealed that medical and non-medical students prefer physicians followed by social workers to be their source of information about consanguineous marriage.⁽²⁷⁾

While Teeuw *et al* (2014) reported that the general practitioner was the preferred professional by their participants to be their source of information about consanguineous marriage.⁽²⁶⁾

The difference between this study and our study may be because our participants from medical school who believe that clinical geneticists are more efficient and they are confident that they will give them the health education message.

Study limitations: The data was self-reported and therefore exposed to recall bias. The sample was a non-probability sample and among medical students only. So, this may interfere with generalizability of results. Thus, additional studies are necessary to incorporate sample

representative to students from medical and non-medical faculties.

Conclusion: The prevalence of consanguineous marriage is still high (10.4%). The level of knowledge is satisfactory but still not elevated, especially in our sample among medical students. Half of the participants still accept consanguineous marriage.

Recommendations: Health education programs are needed to improve the knowledge level of the youth couples on consanguineous marriages. It can be within student curricula. Also, it is better to provide this information to people before marriage by physicians in the medical health centers or through mass media. Implementing comparative studies between medical and non-medical students would also be needed. Planning of a community-based study to assess the problem's magnitude and its consequences

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Table (1): Sociodemographic characteristics

Characteristics	Frequency and Percentage NO. (%)
Gender:	
▪ Male	242 (32.3)
▪ Female	508 (67.7)
Age (years):	
▪ <20	439 (58.5)
▪ ≥ 20	311 (41.5)
Marital status:	
▪ Single	744 (99.2)
▪ Married	6 (0.8)
Residence:	
▪ Urban	316 (42.1)
▪ Rural	434 (57.9)
Religion:	
▪ Muslim	736 (98.1)
▪ Christian	14 (1.9)
Consanguineous relationship between parents	
▪ Yes	78 (10.4)
▪ No	672 (89.6)
Father's education:	
▪ Low	26 (3.5)
▪ Intermediate	164 (21.9)
▪ High	560 (74.7)
Mother's education:	
▪ Low	46 (6.1)
▪ Intermediate	200 (26.7)
▪ High	504 (67.2)

Table (2): Knowledge level about consanguineous marriage and sociodemographic characteristics

Variables	Knowledge score**			
	Low No. (%)	Moderate No. (%)	Good No. (%)	p-value
Sex				
▪ Male	30 (12.4)	164 (67.8)	48 (19.8)	0.002*
▪ Female	66 (13.0)	282 (55.5)	160 (31.5)	
Age				
▪ Less than 20	66 (15.0)	256 (58.3)	117 (26.7)	0.09
▪ ≥ 20	30 (9.6)	190 (61.1)	91 (29.3)	
Marital status:				
▪ Single	96 (12.9)	442 (59.4)	206 (27.7)	0.639
▪ Married	0 (0.0)	4 (66.7)	2 (33.3)	
Residence:				
▪ Urban	48 (11.1)	250 (57.6)	136 (31.3)	0.020*
▪ Rural	48 (15.2)	196 (62.0)	72 (22.8)	
Religion:				
▪ Muslim	84 (12.8)	436 (59.2)	206 (28.0)	0.520
▪ Christian	2 (14.3)	10 (71.4)	2 (14.3)	
Consanguineous relationship between students' parents				
▪ Yes	8 (10.3)	54 (69.2)	16 (20.5)	0.176
▪ No	88 (13.1)	392 (58.3)	192 (28.6)	
Father's education:				
▪ Low	2 (7.7)	20 (76.9)	4 (15.4)	0.122
▪ Intermediate	28 (17.1)	96 (58.5)	40 (24.4)	
▪ High	66 (11.8)	330 (58.9)	164 (29.3)	
Mother's education:				
▪ Low	4 (8.7)	32 (69.6)	10 (21.7)	0.006*
▪ Intermediate	36 (18.0)	124 (62)	40 (20.2)	
▪ High	56 (11.1)	290 (57.5)	158 (31.3)	
Total	96 (12.80)	446 (59.50)	208 (27.70)	100%

*Significant

Knowledge score:** **Good** (more than 75% of the total knowledge score). **Moderate** (50-75% of the total knowledge score). **Low** (less than 50% of the total knowledge score).

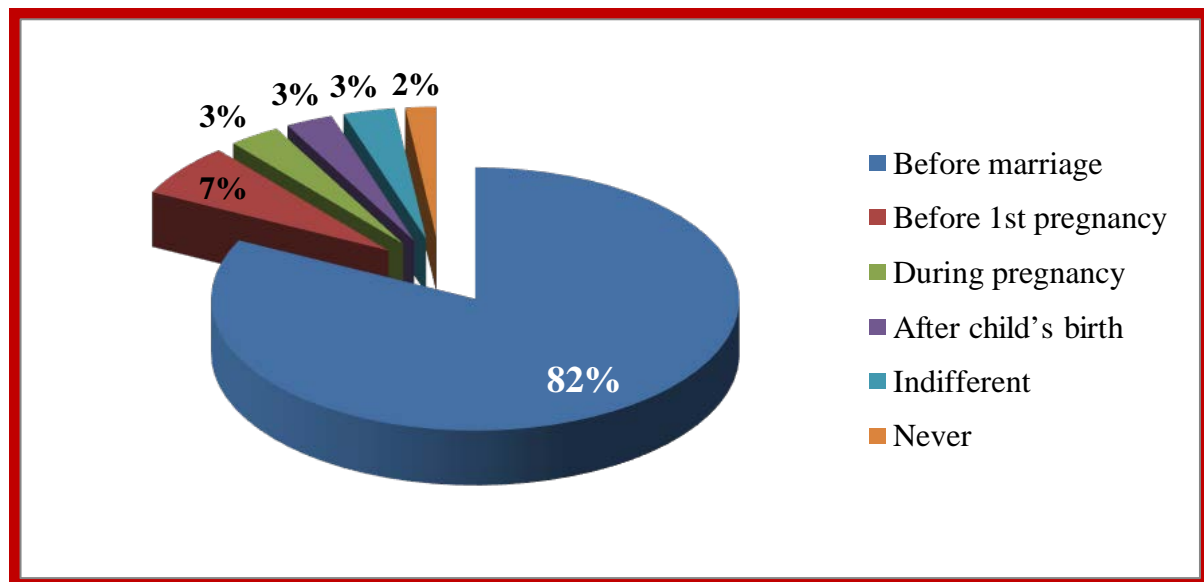
Table (3): Attitude towards consanguineous marriage

Variables	Attitude score**		
	Positive No (%)	Negative No (%)	p- value
Sex			
▪ Male	112 (46.3)	130 (53.7)	0.875
▪ Female	232 (45.7)	276 (54.3)	
Age			
▪ Less than 20	203 (46.2)	236 (53.8)	0.807
▪ ≥ 20	141 (45.3)	170 (54.7)	
Marital status:			
▪ Single	344 (46.2)	400 (53.8)	Fisher exact P= 0.034*
▪ Married	0 (0.0)	6 (100.0)	
Residence			
▪ Urban	192 (44.2)	242 (55.8)	0.295
▪ Rural	152 (48.1)	164 (51.9)	
Religion			
▪ Muslim	338 (45.9)	398 (54.1)	0.820
▪ Christian	6 (42.9)	8 (57.1)	
Consanguineous relationship between parents			
▪ Yes	38 (48.7)	40 (51.3)	0.593
▪ No	306 (45.5)	366 (54.5)	
Father's education:			
▪ Low	14 (53.8)	12 (46.2)	0.054*
▪ Intermediate	62 (37.8)	102 (62.2)	
▪ High	268 (47.9)	292 (52.1)	
Mother's education:			
▪ Low	18 (39.1)	28 (60.9)	0.068
▪ Intermediate	80 (40.0)	120 (60.0)	
▪ High	246 (48.8)	258 (54.1)	
Total	344 (45.90)	406 (54.10)	100%

Attitude score:****Negative attitude** "refuse consanguinity" achieved score $\geq 75\%$.**Positive attitude** "encourage consanguinity" achieved score less than 75%.

Table (4): Prevalence of consanguineous marriage information

Determinant	Frequency and Percentage No (%)
▪ Consanguineous relationship between parents of participants	78 (10.4)
▪ Participants with married siblings	127 (16.9)
▪ Participants with siblings married to a cousin	32 (4.30)
▪ Participants' siblings suffering from congenital anomalies	18 (2.80)

**Figure (1): Preferred timing of offering information to couples about consanguineous risks**

الملخص العربي

معدل انتشار زواج الأقارب وتصور طلاب الطب لذلك

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المقدمة: يحدث زواج الأقارب بين معظم السكان بنسب مختلفة حيث تتراوح معدلاته في الشرق الأوسط وشمال إفريقيا وجنوب غرب آسيا وجنوب الهند بين ٢٠-٥٠٪ أو أكثر من جميع الزيجات. **هدف الدراسة:** تهدف الدراسة إلى تقييم مدى انتشار زواج الأقارب بين أقارب طلاب كلية الطب، ومعرفة موقف الطلاب واتجاهاتهم نحو زواج الأقارب. **منهجية الدراسة:** دراسة مقطعية وصفية أجريت على عينة حجمها ٧٥٠ طالب بكلية الطب جامعة طنطا بمصر. **النتائج:** كان انتشار زواج الوالدين الأقارب ١٢٪، بينما كان ٢,٨٪ من المشاركين لديهم أخ أو أخت مصابون بتشوهات خلقية مرتبطة بزواج الأقارب. وبلغت نسبة انتشار زواج الأقارب بين الأخوات أو الإخوة المتزوجون ٢٥٪. كانت غالبية المشاركين من الإناث غير المتزوجات ومعظمهن مسلمات (٩٩,٢٠، ٩٨,١٠ على التوالي). كانت درجة المعرفة أعلى بكثير بين الطلاب الإناث في المناطق الحضرية مقارنة بالذكور. لدى المشتركين المتزوجين مواقف إيجابية ملحوظة مقارنة بغير المتزوجين. يفضل معظم المشتركين (٨٢٪) تقديم معلومات للأزواج عن زواج الأقارب قبل الزواج، ويفضل من يقوم بتقديمها بالترتيب التالي: من قبل أخصائي علم الوراثة الإكلينيكي، أو وسائل الإعلام، أو طبيب أمراض النساء، أو الممارس العام. **الاستنتاجات:** نسبة انتشار زواج الأقارب كانت مرتفعة بالرغم من أن مستوى المعرفة مرضي، لكن الاتجاهات أو المواقف بالنسبة لأولئك الذين يقبلون زواج الأقارب ما زالوا يقارب نصف المشاركين. يوصى بعمل برامج التنقيف الصحي قبل الزواج لتحسين مستوى معرفة الشباب بخطورة وأضرار زواج الأقارب، وهذا ممكن تنفيذه بشكل أفضل من قبل الأطباء في المراكز الصحية الطبية أو من خلال وسائل الإعلام. **التوصيات:** برامج التنقيف الصحي لتحسين مستوى المعرفة للأزواج الشباب حول زواج الأقارب، يمكن أن يكون ضمن مناهج الطلاب. يفضل هذا البرنامج قبل الزواج من قبل الأطباء في المراكز الصحية الطبية أو من خلال وسائل الإعلام. تنفيذ دراسة مقارنة بين طلاب الطب وغير الطب. التخطيط لعمل دراسة مجتمعية لتقدير حجم المشكلة وعواقبها. **الكلمات المفتاحية:** الوعي، زواج الأقارب، الإدراك، طلاب الطب، الانتشار.