

## Consanguineous Marriage among Egyptian Youth: Secondary Analysis of Survey of Young People in Egypt, 2014

Sabra M. Ahmed

Public Health and Community Medicine Department, Assiut University, Egypt

Received: December 2016

Accepted: February 2017

### Abstract

**Background:** Although the frequency of consanguineous marriage is generally declining, most Middle Eastern Arab countries including Egypt still have a custom of preferring consanguineous marriage particularly among first cousins. The **objectives** of the study were to explore the frequency and determinants of consanguinity among youth population in Egypt using secondary analysis of data from survey of young people in Egypt, 2014 (SYPE, 2014) were used in this study. The **results** of this study show that consanguineous marriage among youth (13 – 35 years) in Egypt is 27.4%. However the frequency varies by region. It is highest in rural Upper Egypt (43.6%) and lowest in urban Lower Egypt (13.2%). Also it is higher in rural (29.3%) than urban (23.9%) areas. Consanguineous marriage is associated with younger age at marriage, low educational level, increased number of brothers and sisters, higher birth order, extended family and lower wealth quintile. This means that the socio-economic determinants are still working in maintaining this high rate of consanguinity even among youth population. It was **recommended** that public health education programs on the negative outcome of consanguineous marriages need to be established and efforts should be made to lower the associated social factors.

**Key words:** consanguineous marriage, risk factors, youth, Egypt.

**Corresponding Author:** Sabra M. Ahmed Email: sabraa16@gmail.com

### Introduction

Historically, the term consanguinity is derived from the Latin words: con “shared” and sanguis “blood”. A marriage is said to be consanguineous where the marriages are solemnized among persons descending from the same stock with close biological relations<sup>1</sup>. The terms inbreeding and consanguinity are used interchangeably to describe unions between couples. Inbreeding is the production of offspring from within a limited genetic pool, as when generations of royalty are married among members of the same families.<sup>2</sup> Globally, the most common form of consanguineous union contracted is between first cousins, in which the spouse share 1/8 of their genes inherited from a common ancestor and

so their progeny are homozygous at 1/16 of all loci.<sup>1</sup>

Homozygosity is the state of possessing two identical forms of a particular gene, one inherited from each parent. Theoretical calculations predict that 6% (1 /16) of the genome of a child of first cousins will be homozygous.<sup>2</sup> Consanguineous marriages influence the genetic structure of the population. Consanguineous marriages have a greater risk of producing offspring that are homozygous for a deleterious recessive gene. Studies have shown that polygenic or multi-factorial diseases, sterility, stillbirths, spontaneous abortions, infant mortality, as well as congenital

malformations were higher among consanguineous marriages.<sup>3,4</sup>

Different factors are detected as the predictors for consanguineous marriage such as socioeconomic status, educational level, residence, income and people's attitude.<sup>5,6</sup> Better understanding of these factors can help us in implementation of appropriate interventions to prevent this health problem. Consanguineous marriages continue to be practiced in several areas of the world, with higher frequencies in the Middle East and Asian and African populations including Egypt.<sup>5,7</sup> It is less common in Europe and the United States.<sup>8</sup> Globally 8.5% of all children have consanguineous parents.<sup>9,10</sup> In this study, we aimed to determine the prevalence of consanguinity among youth population aged 13-35 years in Egypt and the underlying risk factors.

## Methodology

The 2009 Survey of Young People in Egypt (SYPE) covers a broad set of areas crucial to the transition to adulthood, including education, employment, migration, health, family formation, social issues, and civic and political participation. The Population Council, in partnership with the Central Agency for Public Mobilization and Statistics (CAPMAS), collected the second round of data for the Survey of Young People in Egypt (SYPE) in 2013/2014, which re-interviewed the same sample of young people that were interviewed in 2009. SYPE 2009 interviewed a nationally representative sample of 15,029 young people aged 10-29 from 11,372 households. SYPE 2014 interviewed 10,916 (72.6%) of the same young people (now aged 13-35) who were interviewed in SYPE 2009. This yields a panel dataset that is nationally representative for both time periods. The SYPE sample is a

stratified, cluster and multistages random sample of the young Egyptian population.

Details of the study's design and methods have been described by Survey of Young People in Egypt, 2014. (Available on [popcouncil.org/SYPE2014](http://popcouncil.org/SYPE2014)). Secondary analysis of data of SYPE, 2014 was used in this study.

**Data processing:** Obtaining data files and Recoding of some variables (such as education of respondents, education of parents, number of brothers and sisters, birth order and family type).

### *Analysis techniques*

All of the analyzed variables are taken directly from the SYPE, 2014 and are self-explanatory. The dependent variable is type of marriage whether consanguineous or non-consanguineous, the independent variables are different socio-demographic variables, like age, education of the respondents and parents, family type, number of brothers and sisters, birth order and wealth quintile.

The data were processed by Statistical Package for Social Sciences (SPSS) program, version 20. Chi square test was used for comparisons between categorical variables and t-test was used for comparison between quantitative variables. A P-value of <0.05 was considered statistically significant. Significant variables in the bivariate analysis were included in the multivariate (binary logistic regression) analysis.

## Results

The overall prevalence of consanguineous marriage in the sample was 27.4%. The frequency of first-cousin marriages was 12.4 0% of the total sample (Table 1). Of the consanguineous marriages recorded, 45.5 % were between first cousins and 54.5% between other relatives.

The prevalence of consanguineous marriage was significantly higher in rural (29.3%) than urban (23.9%) areas ( $P < 0.001$ ). Rural Upper Egypt had the highest prevalence of consanguineous marriage (43.6%) and urban Lower Egypt had the lowest prevalence (13.2%) ( $P < 0.001$ ).

As the level of education is increased, the prevalence of consanguineous marriage is decreased; illiterate respondents had a prevalence of consanguineous marriage of 34.2% compared to 18.1% for those with post-secondary education. The same was found for education of both fathers and mothers ( $P < 0.001$  for each).

Respondents with extended families had higher prevalence of consanguineous marriage (38.1%) than those with nuclear ones (21.8%) ( $P < 0.001$ ).

The mean age of respondents was significantly lower among those with consanguineous marriage than those with non-consanguineous marriage ( $27.1 \pm 4.7$  versus  $27.4 \pm 4.4$ ,  $P = 0.017$ ).

Number of brothers and sisters and birth orders was significantly higher among those with consanguineous marriage than those with non-consanguineous marriage ( $P < 0.001$  for each).

As the wealth quintile is increased, the prevalence of consanguineous marriage is decreased, those with the lowest wealth quintile had a prevalence of consanguineous marriage of 36.9% compared to 18.8% for those with the richest wealth quintile ( $P < 0.001$ ).

Logistic regression analysis shows that residing in urban governorates and Lower Egypt (whether urban or rural), nuclear family, older age at marriage and small number of brothers and sisters are significantly associated with lower probability of consanguineous marriage.

## Discussion

**Prevalence of consanguineous marriage:** this study showed that the overall frequency of consanguinity among youth in Egypt is still high (27.4%), however this frequency varies by region. It was significantly highest in Rural Upper Egypt (43.6%) and lowest in Urban Lower Egypt (13.2%). In previous Egyptian studies it ranged from 22.9% to 39.9% depending on the region<sup>11-14</sup>. EDHS, 2014 reported that the prevalence of consanguineous marriage was 31%. Similar to the present study, it is highest in Rural Upper Egypt (47.9%) and lowest in Urban Lower Egypt (19.2%)<sup>15</sup>.

This prevalence was reported much lower in western communities like Austria (less than 1%), but higher in other countries; 35% in Syria, 49% in Jordan, 22% in Turkey, and over 50% in Saudi Arabia<sup>9,5,16,6,17</sup>.

Similar to other studies, in our study the most common form of consanguineous marriage was between first cousins<sup>18,19</sup>. These kinds of marriages need special attention because of their high coefficient of inbreeding ( $F=0.125$ ), which means that their progeny will be homozygous at 12.5% of all loci and at higher risk for autosomal recessive disorders<sup>7</sup>. The same was also reported in other Arab countries<sup>20, 21</sup>, in Tehran<sup>10</sup>, in Bengal and India<sup>22</sup> and in Spain<sup>23</sup>.

**Degree of urbanization and consanguinity:** In this study, consanguinity is more prevalent in rural than in urban populations. This was also reported by previous studies in Egypt as well as in other countries<sup>13,20,24</sup>. Such results could have been expected since the rural society is somewhat isolated and the family relations are stronger than in urban areas<sup>13</sup>. Also unquestioning obedience to parents by their children irrespective of their age is still

practiced in these areas. Rural areas are also 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<sup>25</sup>.

*Age at marriage and consanguinity:* Results of this study showed that, the mean age at marriage was significantly lower among those with consanguineous marriage than those with non-consanguineous marriage ( $20.6 \pm 3.7$  versus  $21.6 \pm 4.7$ ,  $P = 0.017$ ). The same was also previously reported in Alexandria, Egypt by Sallam et al.<sup>26</sup>. He reported that the causes of early marriage include consanguinity, illiteracy and unawareness of reproductive health. The same was also reported in other areas of Egypt<sup>27</sup> as well as in other Arab countries<sup>28</sup>. Many other studies also have reported that consanguineous marriage occurs in younger ages in comparison with non-consanguineous marriage<sup>6,15,18</sup>. Also, this study reported that consanguineous marriage is significantly associated with higher number of brothers and sisters and higher birth order. It has been demonstrated that this can result in lower maternal age at first child-birth and higher number of children<sup>6,15</sup>. EDHS, 2014 reported that 39.9% of marriages are consanguineous among those aged 15-19; compared with 31.2% among those aged 30-35 years. On the other hand Gruz et al. stated that the frequency of consanguinity did not vary in different age groups in Turkey (Antalya)<sup>29</sup>.

The result of this study found that there is a significant association between consanguinity and participant's level of education by bivariate analysis; which is not present by logistic regression analysis. A significant association between consanguinity and

lower level of education was reported in other areas of the world<sup>30,31,32</sup>.

**Recommendations:** Public education programs on the negative outcome of consanguineous marriages need to be disseminated and efforts should be made to decrease the associated social factors. Emphasis should be made on the importance of premarital genetic counseling. All blood related couples planning to marriage are obligate to perform genetic screening before marriage and avoiding of marriages between carriers.

## References

1. Hussain R, Bittler AH.(1998): The prevalence and demographic characteristics of consanguineous marriages in Pakistan. *J Biosoc Sci*; 30: 261 -75
2. Abdalla B. and Zaher A. (2013): Consanguineous Marriages in the Middle East: Nature Versus Nurture, *The Open Complementary Medicine Journal*, 5, 1-10.
3. Bittles AH. (2001): Consanguinity and its relevance to clinical genetics. *Clin Genet*; 60: 89-98.
4. Rudan I, Rudan D, Campbell H, Carothers A, Wright A, Smolej Narancic N (2003): Inbreeding and risk of late onset complex disease. *J Med Genet*; 40: 925-32.
5. Shawky RM, El-Awady MY, Elsayed SM, Hamadan GE (2001): Consanguineous matings among Egyptian population. *Egypt J Med Human Genet*;12(2):157-63.
6. Mobaraki AEH, Söderfeld B. (2010): Gender inequity in Saudi Arabia and its role in public health. *Eastern Mediterran. HealthJ*;16(1):113-8
7. Hamamy H, Antonarakis SE, Cavalli-Sforza LL, (2011): Consanguineous marriages, pearls and perils: Geneva International Consanguinity Workshop Report. *Genetics in Medicine. Genet Med*;13 (9):841-7.
8. Bittles AH and Egerbladh I. (2005): The influence of past endogamy and consanguinity on genetic disorders in

- northern Sweden. *Ann Hum Genet*; 69(Pt5): 549-58.
9. Obeidat BG, Khader YS, Amarin ZO, Kassawneh M, AlOmari M. (2010): Consanguinity and adverse pregnancy outcomes: the north of Jordan experience. *Matern Child Health J*;14(2);283-9.
10. Akrami SM, Montazeri V, Shomali SR, Heshmat R, Larijani B. (2009): Is there a significant trend in prevalence of consanguineous marriage in Tehran? A review of three generations. *J Genet Couns*; 18(1):82-6.
11. Egypt Demographic and Health Survey; 2005. Ministry of Health and Population, Cairo, Egypt, El-Zanaty and Associates Cairo, Egypt. The DHS Program ICF International Rockville, Maryland, USA.
12. Egypt Demographic and Health Survey, 2008. Ministry of Health and Population, Cairo, Egypt, El-Zanaty and Associates Cairo, Egypt. The DHS Program ICF International Rockville, Maryland, USA.
13. Seod IA, Gamal El-Din RM, Said HM, Mansi YA. (2009): Consanguineous marriage as a risk factor for reproductive losses in Egypt. *Kasr El-Aini Med J*.
14. Mansour H, Fathi W, Klei L, and Wood J. (2010): Consang & increased risk of schizophrenia in Egypt. *Schizophr. Res*; 120:108-12.
15. Egypt Demographic and Health Survey 2014. Ministry of Health and Population, Cairo, Egypt, El-Zanaty and Associates Cairo, Egypt. The DHS Program ICF International Rockville, Maryland, USA.
16. Posch A, Springer S, Langer M, Blaicher W, Streubel B, Schmid M. (2012): Prenatal genetic counseling and consanguin. *Prenatal Diagnosis*; 32(12):1133-8.
17. Koc I. (2008): Prevalence and socio-demographic correlates of consanguineous marriages in Turkey. *J Biosoc Sci*; 40(1):137-48
18. Tayebi N, Yazdani K, Naghshin N. (2010): The prevalence of congenital malformations and its correlation with consanguineous marriages. *Oman Med J*; 25(1):37-40
19. Sedehi M, Keshtkar A, Golalipour MJ. (2012): The Knowledge and the Attitude of Youth Couples On/Towards Consanguineous Marriages in the North of Iran. *J Clin Diagnostic Res*; 6(7):1233-6.
20. El-Mouzan M, Al-Salloum A, Al-Herbish A, Qurachi M, Al-Omar A. (2007): Regional variations in the prevalence of consanguinity in Saudi Arabia. *Saudi Med J*; 28(12):1881-4.
21. Barbour B, Salameh P. (2009): Consanguinity in Lebanon: prevalence, distribution and determinants. *J Biosoc Sci*: 1-13.
22. Mukherjee D, Das S, Banik S. (2007): Trends of consanguineous marriages in Sunni Muslim population of West Bengal, India. *Anthropol Anz*; 65(3): 253-62.
23. Varela TA, Ainsua RL, Farina J. (2003): Consanguinity in the Bishopric of Ourense (Galicia, Spain) from 1900 to 1979. *Ann Hum Biol*; 30(4):419-33.
24. Zaoui S, Biemont C. (2002): Frequency of consanguineous unions in the Tlemcen area. *Cahiers d'études et de recherches francophones/ Sante*; 12: 289-95.
25. Bittles AH, Hammany HA. (2009): Consanguinity and endogamy in Arab countries. In: Teebi A, editor. *Genetic disorders among Arab population*. Heidelberg: Springer.
26. Sallam SA, Mahfouz AA, Dabbous NI. (2001): Reproductive health of married adolescent women in squatter areas in Alexandria. *Eastern Mediter Health J*; 7(6):935-42.
27. Mohamed MS. (1995): An epidemiological study on consanguineous marriage among urban populations in Alexandria. *J Egypt Public Health Assoc*; 70(3-4):293-305.
28. Bittles AH. (1994): The role and significance of consanguinity as a demographic variable. *Popul Dev Rev*; 20(3):561-84.
29. Gruz K, Dedeoglu N, Luleci G. (1989): The frequency and medical effects of consanguineous marriages in Antalya Turkey. *Hereditas*; 111(1): 79-83.
30. Bennett RL, Motulsky AG, Bittles (2002): A Genetic counseling and screening of consang. couples and their offspring recommendations of the national society of genetic counselors. *J Genet Counsel*; 11(2): 97-119.

31. Bittles AH. (2005): Endogamy, consanguinity and community disease profiles. *Commun Genet*; 8: 17-20.

32. Harper P. (2004): *Practical Genetic Counseling*. London: Arnold. The Human Genetics Society of Australasia (HGSA).

**Table (1): Prevalence of consanguineous marriage among Egyptian youth aged 13 – 35, 2014.**

Marriage type	Frequency (N = 4812) (%)
• Non-consanguineous	3492 (72.6)
• Consanguineous:	1320 (27.4)
- First-cousin	600 (12.4)
- Other relative	720 (15.0)
First- cousin marriage (N = 600):	
- Son/daughter of father's brother	243 (40.5)
- Son/daughter of father's sister	138 (23.0)
- Son/daughter of mother's brother	109 (18.2)
- Son/daughter of mother's sister	110 (18.3)

**Table (2): Prevalence of consanguineous marriage by background characteristics among Egyptian youth aged 13 – 35, 2014.**

Characteristics	Consanguineous marriage		Total 4812	P-value
	Yes (1320)	No (3492)		
<b>Urban-rural residence</b>				
- Urban	401(23.9)	1274 (76.1)	1675 (34.8)	<0.001
- Rural	919 (29.3)	2218 (70.7)	3137 (65.2)	
<b>Place of residence***</b>				
- Urban governorates	154 (20.3)	606 (79.7)	760 (15.8)	<0.001
- Urban Lower Egypt	63 (13.2)	414 (86.8)	477 (9.9)	
- Rural Lower Egypt	296 (17.5)	1391 (82.5)	1687 (35.1)	
- Urban Upper Egypt	97 (41.1)	139 (58.9)	236 (4.9)	
- Rural Upper Egypt	544 (43.6)	704 (56.4)	1248 (25.9)	
- Frontier Governorates	166 (41.1)	238 (58.9)	404 (8.4)	

**Table (2): Prevalence of consanguineous marriage by background characteristics among Egyptian youth aged 13 – 35, 2014 (Continued).**

Characteristics	Consanguineous marriage		Total 4812	P-value
	Yes (1320)	No (3492)		
<b>Respondent's education</b>				
- Illiterate	299 (34.2)	576 (65.8)	875 (18.2)	<0.001
- Primary	150 (31.1)	332 (68.9)	482 (10.0)	
- Preparatory	171 (31.5)	372 (68.5)	543 (11.3)	
- General secondary	34 (24.8)	103 (75.2)	137 (2.8)	
- Vocational 2ry	520 (26.4)	1448(73.6)	1968 (40.9)	
- Post- 2ry education	146 (18.1)	661 (81.9)	807 (16.8)	
<b>Father's education:</b>				
- Illiterate	770 (29.9)	1807 (70.1)	2577 (59.3)	<0.001
- Read and write	168 (27.3)	447 (72.7)	615 (14.2)	
- Basic education	130 (24.5)	400 (75.5)	530 (12.2)	
- 2ry / higher education	132 (21.2)	490 (78.8)	622 (14.3)	
<b>Mother's education:</b>				
- Illiterate	1016 (29.4)	2443 (70.6)	3459 (82.5)	<0.001
- Read and write	40 (19.0)	170 (81.0)	210 (5.0)	
- Basic education	51 (20.4)	199 (79.6)	250 (6.0)	
- 2ry / higher education	54 (19.6)	222 (80.4)	276 (6.5)	
<b>Employment status</b>				
- Employed	441(26.6)	1220(73.4)	1661 (34.5)	0.023
- Un-employed	31(19.1)	131(80.9)	162 (3.4)	
- Out of labor force	848(28.4)	2141(71.6)	2989 (62.1)	
<b>Family type:</b>				
- Nuclear	652 (21.8)	2342 (78.2)	2994 (65.2)	<0.001
- Extended	610 (38.1)	990 (61.9)	1600 (35.8)	
<b>Gender of respondents:</b>				
- Males	368 (26.0)	1050 (74.0)	1418 (29.5)	0.137
- Females	952 (28.0)	2442 (72.0)	3394 (70.5)	
<b>Age groups:</b>				
- 13 – 17	35 (37.6)	58 (62.4)	93 (1.9)	0.018
- 18 – 24	343 (29.7)	810 (70.3)	1153 (24.0)	
- 25 – 29	467 (26.1)	1325 (73.9)	1792 (37.2)	
- 30 – 35	475 (26.8)	1299 (73.2)	1774 (36.9)	
<b>Mean ± SD</b>	27.1 ± 4.7	27.4 ± 4.4	27.3 ± 4.5	0.017*
<b>Age at marriage:</b>				
- 13 – 17	240 (34.5)	456 (65.5)	696 (15.1)	<0.001
- 18 – 24	830 (28.2)	2109 (71.8)	2939 (63.9)	
- 25 – 29	172 (20.1)	683 (79.9)	855 (18.6)	
- 30 – 35	21 (18.9)	90 (81.1)	111 (2.4)	
<b>Mean ± SD</b>	20.6 ± 3.7	21.6 ± 4.7	21.3 ± 4.5	<0.001*

**Table (2): Prevalence of consanguineous marriage by background characteristics among Egyptian youth aged 13 – 35, 2014 (Continued).**

Characteristics	Consanguineous marriage		Total 4812	P-value
	Yes (1320)	No (3492)		
<b>No. of brothers &amp; sisters</b>				
- 0 – 1	31 (16.0)	163 (84.0)	194 (4.0)	<0.001
- 2 – 3	296 (20.8)	1128 (79.2)	1424 (29.6)	
- 4 – 5	526 (28.4)	1323 (71.6)	1849 (38.4)	
- ≥ 6	467 (34.7)	878 (65.3)	1345 (28.0)	
<b>Mean ± SD</b>	5.6 ± 2.8	4.8 ± 2.6	5.1 ± 2.7	<0.001*
<b>Birth order</b>				
- First - Second	584 (24.2)	1830 (75.8)	2414 (50.2)	<0.001
- Third - Fourth	454 (29.7)	1074 (70.3)	1528 (31.8)	
- Fifth and more	282 (32.4)	588 (67.6)	870 (18.8)	
<b>Median (IQR)</b>	3 (3)	2 (3)	2 (3)	<0.001**
<b>Wealth quintile:</b>				
- Lowest	311(36.9)	532 (63.1)	843 (17.5)	<0.001
- Second	297 (32.0)	632 (68.0)	929 (19.3)	
- Middle	266 (27.5)	703 (72.5)	969 (20.1)	
- Fourth	245 (24.5)	757 (75.5)	1002 (20.8)	
- Richest	201(18.8)	868 (81.2)	1069 (22.2)	
<b>Total fertility desire:</b>				
<b>(Mean ± SD)</b>	3.3 ± 1.1	3.1 ± 1.1	3.2 ± 1.1	<0.001*
<b>Current marital status:</b>				
- Married				
- Divorced, Widowed, or Separated	1243 (27.6)	3258 (72.4)	4501(93.5)	0.317
- Signed contract/ engaged	19 (20.7)	73 (79.3)	92 (1.9)	
	58 (26.5)	161 (73.5)	219 (4.5)	

*Chi square test was used. \* t – test was used \*\* Mann-Whitney U test was used.*

*\*\*\* Urban governorates include: Cairo, Alexandria, Suez and Port Said governorates.*

*IQR=Interquartile range*

**Table (3): Logistic regression analysis for variables related to consanguineous marriage among Egyptian youth, 2014.**

Variables	B	Odds ratio (95% CI)	P - value
<b>Residence by region:</b>			
- Rural Upper Egypt		1 (baseline)	<0.001
- Urban Upper Egypt	0.065	1.163 (0.850 - 1.592)	0.346
- Frontier governorates	0.086	1.089 (0.840 - 1.412)	0.618
- Urban governorates	0.804	0.488 (0.385 - 0.617)	<0.001
- Rural Lower Egypt	1.219	0.322 (0.267 - 0.388)	<0.001
- Urban Lower Egypt	1.313	0.293 (0.215 - 0.400)	<0.001
<b>Family type (nuclear)</b>	0.641	0.527 (0.451 - 0.615)	<0.001
<b>Age at marriage (older)</b>	0.037	0.963 (0.944 - 0.983)	<0.001
<b>No. of brothers &amp; sisters (more)</b>	0.057	1.059 (1.024 - 1.095)	0.001
Constant	0.609	1.688	0.027

Nagelkerke R<sup>2</sup> = 0.143