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ORIGINAL RESEARCH

Assessment of Perceptions and Predictors Towards Consanguinity: A Cross-Sectional Study from Palestine

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Background/Aim: Consanguinity represents a biological relationship between two individuals. In clinical genetics, it specifically refers to the marriage between individuals who are second cousins or closer. The aim of the study is to assess perceptions and their predictors among the Palestinian population towards consanguinity.

Methods: A survey-based cross-sectional study was conducted. The sample was collected using convenience and snowball sampling methods, yielding a sample of 1008 participants. The perceptions towards consanguinity and its predictors were assessed using Chi-square test.

Results: The prevalence of consanguinity among married participants was 18.7% (N = 81/432), while it was 28.8% among their parents. Consanguinity rate was significantly low among the young age group (ie, <47 years old) and among participants whose mothers have undergraduate educational levels ($P < 0.05$). Other factors like parental consanguinity, educational level of participants, their father's educational level, and residency place showed no significant associations ($P > 0.05$). Rejection of consanguinity was significantly noted among young age participants, absence of parental consanguinity, the presence of children or family members with genetic disorders and female gender ($P < 0.001$). Furthermore, participants who indicated that they are governmental employees, those with 2000–5000 ILS monthly income, those who are married ($P < 0.01$), and those who indicated that their mothers are holders of postgraduate degree were significantly more likely to reject the idea of consanguinity ($P < 0.05$). Also, medical and/or scientific reasons were significantly associated with rejecting the idea of consanguinity ($P < 0.001$).

Conclusion: Consanguinity prevalence has decreased among recent generations in Palestine, but it remains a significant challenge in Palestine. Therefore, educational and awareness programs about consanguinity and its health effects are effective strategies for reducing the consanguinity rate, especially for persons who are at the age of marriage.

Keywords: consanguinity, perceptions, awareness, genetics, health effects

Introduction

Consanguinity refers to the relationship between any two individuals who are biologically related. In clinical genetics, consanguinity is defined as the marriage between two individuals who are related as second cousins or closer (ie, Inbreeding coefficient ≥0.0156).[1] Consanguinity is estimated using inbreeding coefficient, which is a genetic measure of how two people are closely related to each other. The lower the inbreeding coefficient, the lower the shared genetic material, and vice versa.[2] About one-fifth of all marriages across the world are considered consanguineous marriages.[3–5]

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The prevalence of consanguinity varies greatly from one country to another, and even within the same country. This variation depends on several factors, especially religious, cultural, and geographical factors. In Arab populations and Islamic populations,[6,7] consanguinity is a deeply rooted social trend with very high rates that ranges in generally around 20–71% of all marriages.[8] First cousin marriages represent the most common type of these consanguineous marriages with a rate of about 20–30%. The preference of consanguinity in specific communities is believed to be due to several socio-cultural and economic advantages.[9–11]

These factors include, but are not limited to, the flexibility of marital arrangements, strengthening and stabilizing the family structure and relations, and preserving the financial resources, especially when it comes to inherited possessions.[12,13] At the molecular level, it is believed that the long-term practice of consanguinity might eliminate the detrimental recessive genes from the population over successive generations, through the death of affected persons.[14,15] Also, it was found that the fertility rate is higher among consanguineous marriages.[13]

Despite these aforementioned advantages of consanguinity, recently with secular changes, its prevalence has decreased in several Arab countries such as Jordan[16] and Palestine.[17] This is believed to be due to higher educational levels, decreased trend in fertility resulting in lower chances of suitable relatives to marry, the tendency of people to move from rural to urban areas, and the enhanced economic situation of families.[12]

Several studies have linked consanguineous marriages with an increased risk of various health defects.[6,18] The most important is the increased risk of having offspring affected by autosomal recessively inherited diseases due to the possible inheritance of lethal genes from common ancestors. These disorders are wide and include metabolic, hepatic, haematological, renal, cardiac, and immunodeficiency disorders.[19–22] Common congenital malformations and multi-factorial disorders include blindness, asthma, hypertension, diabetes mellitus, deafness, physical and mental retardation, autism, depression, schizophrenia, and epilepsy.[23]

Furthermore, higher rates of prenatal, neonatal, and child morbidity or mortality were reported in consanguineous marriages.[13,19,24] The population in the state of Palestine was estimated in July 2022 to be around 5,000,000. The Palestinian population is considered young as the percentage of elderly people aged 65 years and above reached only 3% of the total population (PCBS | On the Occasion of the International Population Day, 11/07/2022).[25] Palestine has a low-middle-income economy with very limited resources, so the country was struggling to meet the basic living needs. The Palestinian population is conservative and living in families with significant influence of the societal bonding, traditions, and religious regulations.[26]

The widespread and long-standing practice of consanguinity among the Palestinian population and the associated adverse health consequences has been addressed by several studies on this problem and found the prevalence to be 20–61%.[17,27–33] Several studies were performed among a sample of patients suffering from specific diseases such as familial cleating,[30] stunting,[32] and cerebral palsy[29] that might affect the prevalence of consanguinity among the Palestinian population. However, these studies might not be enough to represent the Palestinian population as many of them were performed in specific regions such as Gaza Strip[28,32] or West Bank.[30,34] Subsequently, this study is the most recent one, which aims to find the perceptions towards consanguinity, and its predictors among the Palestinian population from the current generation and their parents.

Methods

Study Design and Participants

This was a cross-sectional study, carried out in Palestine with an approximate population of 5,000,000 and an adult population (18 years old and above) of approximately 3,000,000 (http://www.pcbs.gov.ps). Convenience and snowball sampling methods were used to reach the participants. The sample size was calculated based on a single proportion formula, considering a sample proportion of 50% while using a cross-sectional study design wherein n = required sample size (n = Z (α/2) 2 pq/d2) and 95% CI with 5% margin of error. Therefore, a minimum sample size of 385 participants was required as the study's target population to represent the general population. Subsequently, complete data was collected from 1026 participants, but 18 of them were removed by the researchers due to incomplete collected data.

Subsequently, the adopted sample included 1008 individuals during the period between November 2022 and January 2023.

Participants were recruited by an online questionnaire (Supplementary Material) including a web link to the questionnaire page in a Google Form via email and public social media (eg, Facebook, WhatsApp, etc.). Exclusion criteria included people who refused to participate and participants below 18 years old. The study was approved by the Institutional Review Board (IRB) of An-Najah University in Nablus, Palestine (Ref. No. Oct 2021/6) and was performed in compliance with the Helsinki Declaration for research in human. All participants provided their informed consents to participate in this research before they were included in the study.

Data Collection and Assessment Tool

A specialized data collection notebook was created for the purpose of recording the participants' information. The questionnaire utilized in this study comprised closed-ended questions categorized into three sections: socio-demographic information, clinical details, and hereditary diseases of the participants. Additionally, it included inquiries about the participants' perceptions, attitudes, received health education, and the source of their knowledge regarding consanguineous marriage. The questionnaire also explored the level of relatedness among the parents of the participants and among the married participants themselves. Except for socio-demographic and clinical characteristics, attitudes, sources of health education, and degrees of relatedness, all other responses were collected using dichotomous questions that required a simple yes or no response. However, when addressing the participants' perceptions concerning consanguineous marriage, a question with three response options was utilized: No opinion, reject consanguinity, and accept consanguinity.

The questionnaire was administered in Arabic language, the native language of the people in Palestine. Five experts in public health, medicine, and pharmacy education in the West Bank of Palestine reviewed the study questionnaire prior to its distribution among the participants. The questions were tested in a pilot study involving 30 participants. Cronbach's alpha of the questionnaire was performed and was found to be 0.755. This value was within the acceptable level of reliability.

Data Analysis

The Statistical Package for the Social Sciences (SPSS v.25) was used to carry out statistical analysis. An initial descriptive analysis was performed, and data was expressed as frequency and percentage for categorical variables. Categorical variables were compared with the chi-square test. A P-value <0.05 was considered statistically significant.

Results

Descriptive Results

The valid response included a total of 1008 participants. The mean ± Standard Deviation (SD) of ages of participants was 29.04 ± 12.33 years. About three-quarters of participants (N = 762, 75.6%) were holding undergraduate studies (ie, Diploma or Bachelor's degree) and less than one-quarter (N = 164, 16.3%) were holding postgraduate degree (ie, Master or Ph.D. degree). Furthermore, less than half of the participants (N = 444, 44%) stated that the educational level of their fathers was undergraduate degrees (ie, Diploma or Bachelor's degree), and 405 participants (40.2%) stated that their mothers were holding undergraduate degrees (ie, Diploma or Bachelor's degree).

A high proportion of the participants were students (N = 486, 48.2%), 197 participants (19.5%) were governmental employees, and 118 participants (11.7%) were private sector employees. More than half of the participants (N = 548, 54.4%) live in villages, followed by city residency (N = 435, 43.2%), and Palestinian refugee camp residency (N = 25, 2.5%).

Majority of the participants had household monthly income ranges between 2000 and 10,000 Israeli Shekel (ILS) (ILS = 0.26 USD), about 47.7% of the participants (N = 481) was between 2000 and 5000, and 323 participants (32%) stated that their household monthly income ranges from 5000 to 10,000 ILS. In addition, less than half (N = 432, 42.8%) were married or previously married (widowed or separated). About a quarter of the participants (N = 291, 28.9%) had

consanguineous parents. In addition, the mean ± SD of Body Mass Index (BMI) was 24.9 ± 5.1. Also, most of the participants (N = 805, 79.9%) stated that they are aware and well informed about the association between genetic diseases and consanguinity. Less than half of the participants (N = 359, 35.6%) stated that the source of their education concerning consanguinity and its effects was during their studies.

To determine the prevalence of consanguinity among participants with marriage experience (married and previously married), a descriptive analysis was performed including married, widowed, and separated participants. The prevalence of consanguinity was 18.7% (N = 81/432). Table 1 shows the association of consanguinity among married and previously married participants with sociodemographic characteristics and their perceptions toward consanguinity. The young age group (ie, <47 years old) was significantly associated with the least proportion of consanguinity (P < 0.05). The highest proportion of consanguinity was shown significantly among participants who stated that they are supporting

Table 1 Predictors of Consanguinity Among Ever Married Participants

Variables	Total N (%) N = 432 (100)	Consanguineous Status of Married, Separated or Widowed Participants		P-value
		Non-Consanguineous	Consanguineous	
Age				**0.005**
Young Group (< 47)	343 (79.4)	288 (84)	55 (16)	
Middle Group (48–63)	81 (18.8)	59 (72.8)	22 (27.2)	
Elderly Group (≥ 64)	8 (1.9)	4 (50)	4 (50)	
Opinion regarding consanguinity				**0.000**
Against	317 (73.4)	275 (86.8)	42 (13.2)	
With	26 (6)	14 (53.8)	12 (46.2)	
No Opinion	89 (20.6)	62 (69.7)	27 (30.3)	
Relative parents				0.480
No	276 (63.9)	227 (82.2)	49 (17.8)	
Yes	156 (36.1)	124 (79.5)	32 (20.5)	
Income Level (ILS)*				0.457
< 2000	39 (9)	30 (76.9)	9 (23.1)	
2000–5000	221 (51.2)	183 (82.8)	38 (17.2)	
5000–10,000	127 (29.4)	99 (78)	28 (22)	
>10,000	45 (10.4)	39 (86.7)	6 (13.3)	
Educational Level (Respondent)				0.596
< School Level	1 (0.2)	1 (100)	0 (0)	
School Level	55 (12.7)	42 (76.4)	13 (23.6)	
Undergraduate Level	249 (57.6)	201 (80.7)	48 (19.3)	
Postgraduate Level	127 (29.4)	107 (84.3)	20 (15.7)	
Educational Level (Mother)				**0.026****
< School Level	90 (20.8)	64 (71.1)	26 (28.9)	
School Level	225 (52.1)	189 (84)	36 (16)	
Undergraduate Level	103 (23.8)	88 (85.4)	15 (14.6)	
Postgraduate Level	14 (3.2)	10 (71.4)	4 (28.6)	
Educational Level (Father)				0.402
< School Level	45 (10.4)	33 (73.3)	12 (26.7)	
School Level	182 (42.1)	146 (80.2)	36 (19.8)	
Undergraduate Level	179 (41.4)	150 (83.8)	29 (16.2)	
Postgraduate Level	26 (6)	22 (84.6)	4 (15.4)	
Residency Place				0.305
City	192 (44.4)	158 (82.3)	34 (17.7)	
Village	229 (53)	43 (18.8)	43 (18.8)	
Palestinian Refugee Camp	11 (2.5)	7 (63.6)	4 (36.4)	

Notes: P-values obtained from Chi-Square. **Bold p-values are statistically significant.
Abbreviation: *ILS, Israeli Shekel (ILS = 0.26 United States Dollar).

consanguinity (P < 0.001). Participants with mothers who have undergraduate educational levels significantly showed to have the lowest proportion of consanguinity (P < 0.05). Other factors like parental consanguinity, educational level of participants or their fathers, and residency place showed no significant associations.

Perceptions Towards Consanguinity According to Socio-Demographic Characteristics

Table 2 shows the sociodemographic characteristics of participants and their perceptions towards consanguinity. Young, single, and female participants were significantly associated with negative perceptions towards consanguinity (P < 0.05). Furthermore, participants who indicated that they are governmental employees, those with 2000–5000 ILS monthly income, those who are married (P < 0.01), and those indicated that their mothers are holders of postgraduate degree (P < 0.05), were significantly more likely to reject the idea of consanguinity.

Table 2 Participant Perceptions Towards Consanguinity According to Socio Demographic Characteristics

Variables	Total N (%) N = 1008 (100)	Perception Toward			P-value
		(Accept) N (%)	(No Opinion) N (%)	(Reject) N (%)	
Age					**0.009**
Young Group (< 47)	914 (90.7)	24 (2.6)	213 (23.3)	677 (74.1)	
Middle Group (48–63)	84 (8.3)	8 (9.5)	17 (20.2)	59 (70.2)	
Elderly Group (≥ 64)	10 (1.0)	0 (0)	1 (10)	9 (90)	
Gender					**0.000**
Male	324 (32.1)	22 (6.8)	85 (26.2)	217 (67)	
Female	684 (67.9)	10 (1.5)	146 (21.3)	528 (77.2)	
Marital Status					**0.001**
Married	417 (41.4%)	25 (6.0)	85 (20.4)	307 (73.6)	
Separated/Divorced	6 (0.6%)	0 (0)	2 (33.3)	4 (66.7)	
Single	576 (57.1%)	6 (1)	142 (24.7)	428 (74.3)	
Widowed	9 (0.9%)	1 (11.1)	2 (22.2)	6 (66.7)	
Having children					**0.000**
Yes	393 (39.0)	26 (6.6)	82 (20.9)	285 (72.5)	
No	39 (3.9)	0 (0)	7 (17.9)	32 (82.1)	
Non-Applicable (Un-married)	576 (57.1)	6 (1)	142 (24.7)	428 (74.3)	
Residency Place					0.899
City	435 (43.2)	12 (2.8)	105 (24.1)	318 (73.1)	
Village	548 (54.4)	19 (3.5)	120 (21.9)	409 (74.6)	
Palestinian Refugee Camp	25 (2.5)	1 (4)	6 (24.0)	18 (72)	
Income Level (ILS)*					**0.002****
< 2000	72 (7.1)	0 (0)	12 (16.7)	60 (83.3)	
2000–5000	323 (32)	18 (3.7)	102 (21.2)	361 (75.1)	
5000–10,000	481 (47.7)	11 (3.4)	68 (21.1)	244 (75.5)	
>10,000	132 (13.1)	3 (2.3)	49 (37.1)	80 (60.6)	
Occupation					**0.001****
Unemployed	63 (6.3)	0 (0)	15 (23.8)	48 (76.2)	
Student	486 (48.2)	5 (1)	123 (25.3)	358 (73.7)	
Retired	11 (1.1)	0 (0)	4 (36.4)	7 (63.6)	
Private Sector Employees	118 (11.7)	6 (5.1)	30 (25.4)	82 (69.5)	
Own Business	42 (4.2)	5 (11.9)	4 (9.5)	33 (78.6)	
NGOs*	40 (4.0)	2 (5)	8 (20)	30 (75)	
Home Duties	51 (5.1)	3 (5.9)	14 (27.5)	34 (66.7)	
Governmental Employees	197 (19.5)	11 (5.6)	33 (16.8)	153 (77.7)	

(*Continued*)

Table 2 (Continued).

Variables	Total N (%) N = 1008 (100)	Perception Toward			P-value
		(Accept) N (%)	(No Opinion) N (%)	(Reject) N (%)	
Educational Level (Participant)					0.549
< School Level	1 (0.1)	0 (0)	0 (0)	1 (100)	
School Level	81 (8)	5 (6.2)	22 (27.2)	54 (66.7)	
Undergraduate Level	762 (75.6)	21 (2.8)	169 (22.2)	572 (75.1)	
Postgraduate Level	164 (16.3)	6 (3.7)	40 (24.4)	118 (72)	
Educational Level (Mother)					**0.021****
< School Level	100 (9.9)	8 (8)	18 (18)	74 (74)	
School Level	436 (43.3)	13 (3)	93 (21.3)	330 (75.7)	
Undergraduate Level	405 (40.2)	11 (2.7)	107 (26.4)	287 (70.9)	
Postgraduate Level	67 (6.6)	0 (0)	13 (19.4)	54 (80.6)	
Educational Level (Father)					0.368
< School Level	56 (5.6)	2 (3.6)	8 (14.3)	46 (82.1)	
School Level	389 (38.6)	15 (3.9)	87 (22.4)	287 (73.8)	
Undergraduate Level	444 (44)	13 (2.9)	101 (22.7)	330 (74.3)	
Postgraduate Level	119 (11.8)	2 (1.7)	35 (29.4)	82 (68.9)	

Note: **Bold p-values are statistically significant.
Abbreviations: *ILS, Israeli Shekel (ILS = 0.26 United States Dollar); *NGOs, Non-Governmental Organization.

Perceptions Toward Consanguinity According to Attitude and Health Education

Results in Table 3 show that medical and/or scientific reasons were significantly associated with rejecting the idea of consanguinity ($P < 0.001$), on the contrary of no significant associations with education regarding consanguinity or its source.

Table 3 Health Education and Perceptions Toward Consanguinity

Variables	Total N (%) N = 1008 (100)	Perceptions Toward Consanguinity			P-value
		(Accept) N (%)	(No Opinion) N (%)	(Reject) N (%)	
Rationale opinion Toward Consanguinity					**0.000***
Economic Reasons	5 (0.5)	3 (60)	1 (20)	1 (20)	
Family Customs & Traditions	77 (7.6)	4 (5.2)	33 (42.9)	40 (51.9)	
Medical Reasons	602 (59.7)	0 (0)	77 (12.8)	525 (87.2)	
Personal Reasons	258 (25.6)	24 (9.3)	106 (41.1)	128 (49.6)	
Religious Reasons	66 (6.6)	1 (1.5)	14 (21.2)	51 (77.3)	
Received health education?					0.680
Yes	805 (79.9)	24 (3.0)	182 (22.6)	599 (74.4)	
No	203 (20.1)	8 (3.9)	49 (24.1)	146 (71.9)	
Source of Health Education					0.802
Advocacy & Media	202 (20.0)	8 (4.0)	41 (20.3)	153 (75.7)	
Cultural & Religious Source	72 (7.1)	1 (1.4)	16 (22.2)	55 (76.4)	
No Specific Sources	296 (29.4)	10 (3.4)	75 (25.3)	211 (71.3)	
Scientific, Academic, and Research	438 (43.5)	13 (3.0)	99 (22.6)	326 (74.4)	

Note: *Bold p-values are statistically significant.

Table 4 Perceptions Toward Consanguinity According to Parental and Participants Consanguinity

Variables	Total N (%) N = 1008 (100)	Perception Toward Consanguinity			P-value
		(Accept) N (%)	(No Opinion) N (%)	(Reject) N (%)	
Parental consanguinity					**0.029***
Distant Relationship	39 (3.9)	2 (5.1)	14 (35.9)	23 (59.0)	
Double First Cousin	4 (0.4)	0 (0.0)	2 (50)	2 (50.0)	
First Cousin	214 (21.2)	10 (4.7)	61 (28.5)	143 (66.8)	
First Cousin-Once Removed	12 (1.2)	0 (0.0)	5 (41.7)	7 (58.3)	
Non-Relative	718 (71.2)	20 (2.8)	143 (19.9)	555 (77.3)	
Second Cousin	21 (2.1)	0 (0.0)	6 (28.6)	15 (71.4)	
Participants consanguinity					**0.000***
Distant Relationship	10 (1.0)	1 (10.0)	5 (50)	4 (40.0)	
Double First Cousin	2 (0.2)	0 (0.0)	1 (50)	1 (50.0)	
First Cousin	61 (6.1)	8 (13.1)	21 (34.4)	32 (52.5)	
First Cousin-Once Removed	11 (1.1)	3 (27.3)	3 (27.3)	5 (45.5)	
Non-Relative	339 (33.6)	13 (3.8)	142 (24.7)	270 (79.6)	
Second Cousin	9 (0.9)	1 (11.1)	56 (16.5)	5 (55.6)	
Non-Applicable (Un married)	576 (57.1)	6 (1.0)	3 (33.3)	428 (74.3)	
Genetic disorder among family members?					**0.000***
Yes	268 (26.6)	7 (2.6)	37 (13.8)	224 (83.6)	
No	740 (73.4)	25 (3.4)	194 (26.2)	521 (70.4)	

Note: *Bold p-values are statistically significant.

Perceptions Toward Consanguinity According to Consanguineous Marriage

The perceptions towards consanguinity by degree of parental consanguinity of the participants as well as among married participants are shown in Table 4. Study participants whose parents (ie, father and mother) were non-relatives were significantly more likely to reject the idea of consanguinity (N = 555, 77.3%, P < 0.01) (Table 4). Also, married participants who do not have any degree of relativeness with their husbands/wives (N = 270, 79.6%, P < 0.001) were more likely to reject the idea of consanguinity. Moreover, the research findings revealed a significantly substantial rise in the prevalence of genetic disorder among the family members of those participants who expressed their opposition to consanguineous unions (P < 0.001).

Discussion

The percentage of parental consanguinity among participants in this study was lower than what was reported in previous studies. This could be explained by differences in socio-demographic and clinical characteristics of the populations. But, it also supports the hypothesis that the prevalence of consanguinity worldwide including Palestine is declining over time due to higher knowledge, awareness, and educational levels. It is worth noting that the majority of the study participants indicated that they are aware of the association between consanguinity and the increased incidence of genetic disorders.[28,33]

Their knowledge and awareness were derived from a variety of sources, and the most prominent during their university studies. Therefore, this highlights the importance of focusing on educational and awareness programs at various universities, including all specialties, in order to achieve the desired results in terms of decreasing consanguinity levels. Previous research backs this up.[35,36] Universities and colleges may be urged to provide supplementary instruction on genetic disorders and their social impact. It is worth noting that people with only a high school educational level or less were more likely to accept an idea of consanguinity.

This study found that younger participants had negative perceptions toward consanguinity, which is consistent with a previous study.[37] It confirms the theory that the prevalence of consanguinity is declining and will do so for the foreseeable future because young people might not favour it. The main explanation for perception of not accepting

consanguinity was medical concerns and the fear of inheriting a genetic disorder. Subsequently, increasing people's education, knowledge, and awareness about genetic disorders as well as their association with consanguinity will have a positive effect on their perception toward consanguinity. However, this is not always obvious; sometimes the social stigma and the inability to cancel an arranged marriage led to the consanguineous marriage proceeding despite prior knowledge of the increased risk of several types of genetic disorders.[38–43]

The significant link found between perception toward consanguinity and an incidence of genetic disorders is consistent with several previous studies, including those on congenital heart disease in Saudi Arabia[44,45], on autosomal disorders in Qatar, X-linked disorders in Pakistan[6,22] and recessive disorders in Iran.[46] In addition, these studies highlighted the impact of perception toward consanguinity and development of these diseases. Increased variation sharing between close relatives suggests that this is due to shared genetic mutations more than shared environments.

In addition, low-income people seem to have fewer opportunities for marriage that may be reflected on the economic status. This idea is supported by findings that families with lower incomes tend to accept the idea of consanguineous marriage and higher-income families tend to reject the idea of consanguineous marriage. Consanguinity has financial benefits due to reduced costs, simpler or easier premarital negotiation and marital arrangements, lower parental and partner expectations, and financial benefits of wedding gifts.[40,47,48]

The significant increased prevalence of rejecting the idea of consanguineous marriage among females reflects the changed culture and traditions among parents and families, as they were previously based on dropping their daughters out of school when the groom becomes available.[49] The highest rates of consanguineous marriages were strongly associated with lower parental educational levels.[50,51] Subsequently, this culture has changed dramatically towards the female completing at least her university education before marriage, which had a great impact on her perception toward the idea of consanguineous marriage.

Expectedly, the tendency to reject consanguineous marriage was observed among participants with a higher level of education. The informed choices made by educated individuals stem from their understanding of the detrimental health consequences associated with unions between their own parents. Several studies have shown a negative correlation between consanguinity and educational level.[15,52–54] The current study can demonstrate that the educational level can play a vital role in rejecting the idea of consanguineous marriage.

Despite the fact that low economic status plays a role in increasing the prevalence of consanguineous marriage,[1,49] the current study found that married participants and those with household monthly low income were more likely to reject the idea of consanguineous marriage. Persons with low household monthly income indicated that their opinion of rejecting consanguinity was based on medical and scientific reasons. These results are in contrast to what has been found in a recent study.[55] It is clear that the heterogeneity of the studied populations might affect the level of knowledge and thus perceptions towards consanguinity.

Our finding demonstrated that hereditary diseases were found among almost a quarter of the study participants and rejecting the idea of consanguinity had increased significantly among participants suffering from hereditary diseases. It is well known that the offspring of consanguineous marriages might be at increased risk for recessive disorders because of the transmission of pathogenic mutations inherited from a common ancestor causing autosomal recessive disorders. 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.[56,57]

Our study showed that less than half of the participants belong to relative parents. In addition, married participants whose husbands/wives were relatives were more likely to reject the idea of consanguineous marriage. This might be due to their fears of hereditary diseases or abortion as confirmed by many evidences. Indeed, previous studies found a double incidence of abortion cases among consanguineous marriage cases in Iraq (6), Turkey,[58] Azerbaijan,[59–61] and Egypt.[62] Overall, this is the first study on consanguinity conducted in Palestine recently. This is a leading study that included a large sample through the use of a well-structured questionnaire that included several important variables in the field. The study focused on a top neglected priority that concerns about half of Palestinians.

Conclusion

Consanguinity remains a significant challenge in Palestine that is worth taking into consideration despite the fact that consanguinity prevalence is decreasing in recent generations. Awareness and educational programs remain the most effective tool for augmenting people's knowledge and awareness about the health effects of consanguinity, particularly the risky scientific and health effects on the upcoming offspring.

What is Already Known About This Topic?

Consanguinity is prevalent in Palestine, despite its association with negative health outcomes. While previous studies have identified some of the factors contributing to the high prevalence of consanguinity, there is limited understanding of attitudes and perceptions of Palestinian adults towards this practice.

What Does This Article Add?

This cross-sectional study aims to address the gap in knowledge by investigating the associated attitudes and perceptions toward consanguinity among Palestinian adults in the West Bank of Palestine. The study's findings will provide valuable insights for policymakers and healthcare professionals working towards reducing the prevalence of consanguinity, and improving health outcomes of the Palestinian population.

Data Sharing Statement

All data generated or analysed during this study are included in the article.

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Disclosure

The authors have no conflicts to declare.

References

1. Bittles AH. Consanguinity and its relevance to clinical genetics. *Clin Genet*. 2001;60(2):89–98. doi:10.1034/J.1399-0004.2001.600201.X
2. Johnston HR, Keats BJB, Sherman SL. Population Genetics. *Emery Rimoin's Princ Pract Med Genet Genomics Found*. 2019;359–373. doi:10.1016/B978-0-12-812537-3.00012-3
3. Bittles AH, Black ML. Evolution in health and medicine Sackler colloquium: consanguinity, human evolution, and complex diseases. *Proc Natl Acad Sci U S A*. 2010;107(Suppl 1):1779–1786. doi:10.1073/PNAS.0906079106
4. Modell B, Darr A. Science and society: genetic counselling and customary consanguineous marriage. *Nat Rev Genet*. 2002;3(3):225–229. doi:10.1038/NRG754
5. Saadat M. Morbidity and mortality of COVID-19 negatively associated with the frequency of consanguineous marriages, an ecologic study. *Egypt J Med Hum Genet*. 2022;23(1). doi:10.1186/S43042-022-00218-8
6. Akhtar MS, Aslamkhan M, Zar MS, Hanif A, Haris AR. Dichromacy: color vision impairment and consanguinity in heterogenous population of Pakistan. *Int J Front Sci*. 2019;3(1):41–56. doi:10.37978/TIJFS.V3I1.47
7. Zalan A, Khatib M, Sheikh Muhammad A, et al. Effect of women's status on consanguinity in the Arab Society of Israel. *Adv Anthropol*. 2017;12:137–148. doi:10.4236/aa.2022.123011
8. Alshawish E, Yaseen F. Knowledge and attitude toward genetic counseling and testing among parents of children with genetic disorder in the West Bank/ Palestine. *Palest Med Pharm J*. 2018;3(1):4. doi:10.59049/2790-0231.1017
9. Tadmouri GO, Nair P, Obeid T, Al Ali MT, Al Khaja N, Hamamy HA. Consanguinity and reproductive health among Arabs. *Reprod Health*. 2009;6(1). doi:10.1186/1742-4755-6-17
10. Hamamy H. Consanguineous marriages: preconception consultation in primary health care settings. *J Community Genet*. 2012;3(3):185–192. doi:10.1007/S12687-011-0072-Y

11. Iqbal S, Zakar R, Fischer F, Zakar MZ. Consanguineous marriages and their association with women's reproductive health and fertility behavior in Pakistan: secondary data analysis from Demographic and Health Surveys, 1990–2018. *BMC Womens Health*. 2022;22(1):1–16. doi:10.1186/S12905-022-01704-2/TABLES/5
12. Bittles AH. A community genetics perspective on consanguineous marriage. *Community Genet*. 2008;11(6):324–330. doi:10.1159/000133304
13. Anwar S, Mourosi JT, Arafat Y, Hosen MJ. Genetic and reproductive consequences of consanguineous marriage in Bangladesh. *PLoS One*. 2020;15(11). doi:10.1371/JOURNAL.PONE.0241610
14. Psss RAO, Inbaraj SG. Trends in human reproductive wastage in relation to long-term practice of inbreeding. *Ann Hum Genet*. 1979;42(3):401–413. doi:10.1111/J.1469-1809.1979.TB00672.X
15. Temaj G, Nuhii N, Sayer JA. The impact of consanguinity on human health and disease with an emphasis on rare diseases. *J Rare Dis*. 2022;1(1):1–7. doi:10.1007/S44162-022-00004-5
16. Hamamy H, Jamhawi L, Al-Darawsheh J, Ajlouni K. Consanguineous marriages in Jordan: why is the rate changing with time? *Clin Genet*. 2005;67(6):511–516. doi:10.1111/J.1399-0004.2005.00426.X
17. Assaf S, Khawaja M. Consanguinity trends and correlates in the Palestinian territories. *J Biosoc Sci*. 2009;41(1):107–124. doi:10.1017/S0021932008002940
18. Jbara A, Ghanim M, Al-Othman N. Familial versus sporadic multiple sclerosis in Palestine: a Familial versus sporadic multiple sclerosis in Palestine: a retrospective cross-sectional pilot study retrospective cross-sectional pilot study Familial versus sporadic multiple sclerosis in Pale. *Palest Med Pharm J*. 2023;8(1):4–5. doi:10.59049/2790-0231.1138
19. Keyfi F, Nasseri M, Nayerabadi S, Alaei A, Mokhtariye A, Varasteh A. Frequency of inborn errors of metabolism in a Northeastern Iranian Sample with high consanguinity rates. *Hum Hered*. 2018;83(2):71–78. doi:10.1159/000488876
20. Shanti H, Chouchane L, Badii R, Gallouzi IE, Gasparini P. Genetic testing and genomic analysis: a debate on ethical, social and legal issues in the Arab world with a focus on Qatar. *J Transl Med*. 2015;13(1). doi:10.1186/S12967-015-0720-9
21. El-Hazmi MAF, Al-Hazmi AM, Warsy AS. Sickle cell disease in Middle East Arab countries. *Indian J Med Res*. 2011;134(5):597–610. doi:10.4103/0971-5916.90984
22. Ben-Omran T, Al Ghanim K, Yavarna T, et al. Effects of consanguinity in a cohort of subjects with certain genetic disorders in Qatar. *Mol Genet Genomic Med*. 2020;8(1). doi:10.1002/MGG3.1051
23. Bener A. Does consanguinity increase the risk of mental illnesses? A population based study. *Eur Psychiatry*. 2017;41(S1):S512–S512. doi:10.1016/J.EURPSY.2017.01.661
24. Özpulat F, Kabasakal E, Taşdelen Baş M. Adolescents' opinions and thoughts about consanguineous marriages: a Turkey sample. *J Hum Sci*. 2017;14(1):105. doi:10.14687/JHS.V14I1.4071
25. PCBS. The International Population Day; 2023. Available from: https://www.pcbs.gov.ps/post.aspx?lang=en&ItemID=4544. Accessed August 14, 2023.
26. OCHAoPt. Humanitarian needs overview in Palestine 2021; 2020:1–53.
27. Jarallah Y. The ties that bind? Marriage formation, consanguinity and war in Lebanon and Palestine. *J Popul Res*. 2022;39(1):97–132. doi:10.1007/S12546-022-09281-9/FIGURES/6
28. Sirdah MM. Consanguinity profile in the Gaza Strip of Palestine: large-scale community-based study. *Eur J Med Genet*. 2014;57(2–3):90–94. doi:10.1016/J.EJMG.2014.01.003
29. Daher S, El-Khairy L. Association of cerebral palsy with consanguineous parents and other risk factors in a Palestinian population; 2014. Available from: https://fada.birzeit.edu/handle/20.500.11889/2952. Accessed December 25, 2022.
30. Saeed OB, Moore MG, Zawahrah H, Tayem M, Kavoosi T, van Aalst JA. The Influence of Consanguinity on Familial Clefting Among Palestinians. *Cleft Palate Craniofac J*. 2019;56(8):1072–1079. doi:10.1177/1055665619838381
31. Pedersen J. The influence of consanguineous marriage on infant and child mortality among Palestinians in the West Bank and Gaza, Jordan, Lebanon and Syria. *Community Genet*. 2002;5(3):178–181. doi:10.1159/000066333
32. El Kishawi RR, Soo KL, Abed YA, Muda WAMW. Prevalence and associated factors influencing stunting in children aged 2–5 years in the Gaza Strip-Palestine: a cross-sectional study. *BMC Pediatr*. 2017;17(1). doi:10.1186/S12887-017-0957-Y
33. Sharkia R, Khatib M, Sheikh-Muhammad A, Mahajnah M, Zalan A. The prevailing trend of consanguinity in the Arab society of Israel: is it still a challenge? *J Biosoc Sci*. 2023;55(1). doi:10.1017/S0021932021000675
34. Zawahrah HJ, Moore MG, Saeed O, Tayem M, Shahin H, van Aalst JA. Demographics of consanguinity in Palestinians with orofacial clefts: a non-randomised longitudinal study. *Lancet*. 2019;393:S55. doi:10.1016/s0140-6736(19)30641-5
35. Halpern GJ, Jaber L. Chapter 6; 2014:117–135.
36. Thingujam S, Sakthignanavel A, Vengadakrishnan J, Poduval J. Effect of Health Education on Knowledge and Behaviour Towards Consanguineous Marriage and Infantile Hearing Loss. *Indian J Otolaryngol Head Neck Surg*. 2022;74(3):343–349. doi:10.1007/S12070-021-02652-3
37. Al-Qattan HM, Amlih DF, Sirajuddin FS, et al. Quantifying the Levels of Knowledge, Attitude, and Practice Associated with Sickle Cell Disease and Premarital Genetic Counseling in 350 Saudi Adults. *Adv Hematol*. 2019;2019. doi:10.1155/2019/3961201
38. Al-Farsi OA, Al-Farsi YM, Gupta I, Ouhtit A, Al-Farsi KS, Al-Adawi S. A study on knowledge, attitude, and practice towards premarital carrier screening among adults attending primary healthcare centers in a region in Oman. *BMC Public Health*. 2014;14(1):1–7. doi:10.1186/1471-2458-14-380/TABLES/4
39. Alswaidi FM, Memish ZA, O'Brien SJ, et al. At-risk marriages after compulsory premarital testing and counseling for β-thalassemia and sickle cell disease in Saudi Arabia, 2005–2006. *J Genet Couns*. 2012;21(2):243–255. doi:10.1007/S10897-011-9395-4
40. Bittles AH, Black ML. Consanguinity, human evolution, and complex diseases. *Proc Natl Acad Sci U S A*. 2010;107(SUPPL. 1):1779–1786. doi:10.1073/PNAS.0906079106/SUPPL_FILE/0906079106SI.PDF
41. Van Buren F, Van Gordon W. Emirati Women's experiences of consanguineous marriage: a qualitative exploration of attitudes, health challenges, and coping styles. *Int J Ment Health Addict*. 2020;18(4):1113–1127. doi:10.1007/S11469-019-00123-Z/TABLES/1
42. Denic S, Agarwal MM. Altruism as an Explanation for Human Consanguinity. *Public Health Genomics*. 2022;25(1–2):1–11. doi:10.1159/000518441

43. Fawaz RI. Scholar commons scholar commons exploring genetic counselors' experiences, language, and exploring genetic counselors' experiences, language, and discussion of consanguinity in clinical practice: a multinational discussion of consanguinity in clinical pra; 2022. Available from: https://scholarcommons.sc.edu/etd. Accessed April 1, 2023.
44. El Mouzan MI, Al Salloum AA, Al Herbish AS, Qurachi MM, Al Omar AA. Consanguinity and major genetic disorders in Saudi children: a community-based cross-sectional study. *Ann Saudi Med*. 2008;28(3):169. doi:10.5144/0256-4947.2008.169
45. Albesher N, Massadeh S, Hassan SM, Alaamery M. Consanguinity and congenital heart disease susceptibility: insights into rare genetic variations in Saudi Arabia. *Genes*. 2022;13(2). doi:10.3390/GENES13020354
46. Biglari S, Biglari A, Mazloomzadeh S. The frequency of consanguinity and its related factors in parents of children with genetic disorders. *J Adv Med Biomed Res*. 2022;30(143):501–506. doi:10.30699/JAMBS.30.143.501
47. Mete C, Bossavie L, Giles J, Alderman H. Is consanguinity an impediment to child development outcomes? 2019. Available from: www.iza.org. Accessed February 24, 2023.
48. Abdo AM, Abdulrhman H, Safe SH, et al. Knowledge and attitude of engaged and recently married couples toward premarital screening: a cross-sectional study. *Inq*. 2022:59. doi:10.1177/00469580221097424/ASSET/IMAGES/LARGE/10.1177_00469580221097424-FIG2.JPEG
49. Jurdi R, Saxena PC. The prevalence and correlates of consanguineous marriages in Yemen: similarities and contrasts with other Arab countries. *J Biosoc Sci*. 2003;35(1):1–13. doi:10.1017/S0021932003000014
50. Khlat' M. Consanguineous marriage and reproduction in Beirut, Lebanon. *Am J Hum Genet*. 1988;43:188–196.
51. Mahboub SM, Alsaqabi AA, Allwimi NA, Aleissa DN, Al-Mubarak BA. Prevalence and pattern of consanguineous marriage among educated married individuals in Riyadh. *J Biosoc Sci*. 2020;52(5):768–775. doi:10.1017/S0021932019000786
52. Khoury SA, Massad D. Consanguineous marriage in Jordan. *Am J Med Genet*. 1992;43(5):769–775. doi:10.1002/AJMG.1320430502
53. Mccullough JM, O'Rourke DH. Geographic distribution of consanguinity in Europe. *Ann Hum Biol*. 2009;13(4):359–367. doi:10.1080/03014468600008541
54. Aldeeb AF, Hamdy Aboraya H, Zidan OO, Elsabagh HM. Prevalence and perception of consanguineous marriage among medical students. Available from: http://creativecommons.org/licenses/by/4.0/. Accessed April 1, 2023.
55. Alotaibi A, Alkhaldi NK, AlNassir AM, et al. Exploring people's knowledge of genetics and attitude towards genetic testing: a cross-sectional study in a population with a high prevalence of consanguinity. *Healthc*. 2022;10(11). doi:10.3390/HEALTHCARE10112227
56. Bennett RL, Motulsky AG, Bittles A, et al. Genetic counseling and screening of consanguineous couples and their offspring: recommendations of the National Society of Genetic Counselors. *J Genet Couns*. 2002;11(2):97–119. doi:10.1023/A:1014593404915
57. Aliyeva Z, Jacob T. The role of consanguineous marriages in the development of intellectual disabilities. *Res Square*. 2022. doi:10.21203/rs.3.rs-1573754/v1
58. Basaran N, Hassa H, Basaran A, Artan S, Stevenson JD, Sayli BS. The effect of consanguinity on the reproductive wastage in the Turkish population. *Clin Genet*. 1989;36(3):168–173. doi:10.1111/J.1399-0004.1989.TB03183.X
59. Najafi K, Mehrjoo Z, Ardalani F, et al. Identifying the causes of recurrent pregnancy loss in consanguineous couples using whole exome sequencing on the products of miscarriage with no chromosomal abnormalities. *Sci Rep*. 2021;11(1). doi:10.1038/S41598-021-86309-9
60. Sahin E, Inciser Paşalak Ş, Seven M. Consanguineous marriage and its effect on reproductive behavior and uptake of prenatal screening. *J Genet Couns*. 2020;29(5):849–856. doi:10.1002/JGC4.1214
61. Bellad MB, Goudar SS, Edlavitch SA, et al. Consanguinity, prematurity, birth weight and pregnancy loss: a prospective cohort study at four primary health center areas of Karnataka, India. *J Perinatol*. 2011;32(6):431–437. doi:10.1038/jp.2011.115
62. Hussein WM, El-Gaafary MM, Wassif GO, et al. Correlates and reproductive consequences of consanguinity in six Egyptian governorates. *Afr J Reprod Health*. 2022;26(12):48–56. doi:10.29063/ajrh2022/v26i12s.6

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