

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}

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 Jordan¹⁶ 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 multifactorial 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 clefting,³⁰ stunting,³² and cerebral palsy²⁹ 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 $n = \frac{Z^2 \cdot p \cdot q}{d^2}$ 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 \pm 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 \pm 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 (\geq 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 (5.0) | 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.

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