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# Young adults' attitudes towards consanguinity in relation to various sociodemographic factors in the Arab society of Israel

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## Abstract

Consanguineous marriages (CMs) have been a longstanding tradition in various communities worldwide, despite their known negative effects on future offspring. Our study aimed to determine the young adults' attitudes towards consanguinity in the Arab society of Israel, pertaining to various sociodemographic factors. The data included in this study were obtained from a national survey.

The results showed that 35.4% of adults supported CMs, with a significant gender disparity: 41.2% of males compared to 29.4% of females. A direct correlation between the participants' age and positive attitudes towards CMs was noticeable. A significant portion of married adults (~46%) supported CMs, while majority of the single adults (~42%) held neutral attitudes towards CMs. Additionally, a large majority of adults (~63%) with CMs type had positive attitudes towards consanguinity. Regarding the geographic distribution, and the religious affiliation of adults, notable variations in attitudes were observed. No significant association was found between the adults' education or employment, and their attitudes towards CMs, while an inverse relationship was observed between their income levels and these attitudes. Logistic regression analysis revealed that the parameters which prove to be the significant predictors for the adults' attitudes towards supporting CMs were males, south region, married participants, and CMs type.

The findings underscore that majority of the adults' attitudes towards CMs were either neutral or supporting this practice, therefore, effective strategies must be developed to increase the awareness of the young adults in relation to various health implications of CMs, thus improving the well-being of future offspring.

**Keywords:** Consanguineous Marriage; Consanguinity; Attitudes; Young Adults; Sociodemographic Factors.

## 1. Introduction

Consanguinity can be defined as marriages between couples who are relatives as second cousins or closer [1, 2]. It is one of the most recent and oldest challenging issues that is practiced widely in various human societies worldwide [3]. In the Western world, the rates of consanguineous marriages (CMs) are below 0.5% [4, 2]. On the other hand, it is well known that, CMs are deeply rooted and respected tradition across many communities in North Africa, the Middle East, and West Asia, where marriages within the family account for 20% to over 50% of all unions [5, 6]. In almost all Arab countries in addition to different Islamic societies, (*viz.* Turkey, Iran, Pakistan), where CMs are considered to be a

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traditional phenomenon, their occurrences remain to be high and their prevalence reaches 50% [7, 8, 9, 10]. Numerous studies have demonstrated that consanguineous unions can have detrimental effects on the health of offspring, including reduced fertility, increased mortality rates, elevated rates of genetic disorders, especially autosomal recessive conditions and the development of various conditions such as congenital malformations [11, 12, 13, 14]. It had been documented that the factors influencing the prevalence of CMs include demographics, religious affiliation, socioeconomic status, local customs such as socially endorsed practices of endogamy in tribal communities, and educational attainment [15, 16].

It is important to note that the prevalence of CMs in a society is deeply affected by the knowledge and attitudes of its people towards this phenomenon [17, 18]. Therefore, numerous studies were conducted to explore the peoples' attitudes towards consanguinity and its associations with socio-demographic characteristics. The results of such studies concluded that positive attitudes towards consanguinity were associated with different sociodemographic factors; gender, age, educational status, income level, marital status and marriage type [19, 20, 21, 16].

Many studies have investigated the prevalence of CMs within the Arab society in Israel and their relationship with sociodemographic factors [22, 10, 23, 24]. Recent findings underscore a significant and ongoing increase in consanguinity among the Arab population in Israel, highlighting persistent challenges [25]. To the best of our knowledge, no research has explored the attitudes of adults regarding consanguinity in relation to sociodemographic factors within the Arab society of Israel. As exploring the young adults' attitudes towards CMs is of a considerable importance, for the proper implementation of future educational prevention programs, therefore, this study aims to investigate the attitudes of adults regarding CMs in relation to various sociodemographic factors in the Arab community of Israel.

## 2. Methodology

Study Population and Survey design: The Galilee Society, also known as "The Arab National Society for Health Research and Services," carries out regular thorough national surveys within the Arab society in Israel, to track changes in socio-demographic and health-related indicators. These surveys aim to gather critical data and share knowledge about this society, thus, enhancing the understanding of their requirements, obstacles, and potential prospects. This effort informs evidence-based strategies and plans. In 2021, a national survey targeted adults aged 18 to 35 within this society. This study utilized data obtained from the survey to explore how different socio-demographic factors among adults impact their attitudes toward consanguinity.

The survey employed a multistage sampling design. Enumeration areas were selected as the first stage of stratification, followed by the random selection of 24 eligible households within each chosen area. From each household, one adult aged 18-35 was randomly selected using the Kish method. The study population was stratified by gender and age group to ensure representativeness. All participants provided informed written consent after receiving an explanation of the study's purpose, conducted in accordance with the principles outlined in the Declaration of Helsinki. The total sample included 1,553 households from the Arab community in Israel.

### 2.1. Data Collection

Data were collected from all participants via in-person interviews using a specialized survey questionnaire. The field team comprised seasoned surveyors trained by project supervisors and administrators. There were two main sections in the questionnaire. The first section comprised questions related to personal information *i.e.* gender and age, and questions related to socio-demographic characteristics. Various socio-demographic factors were categorized as follows: Age groups included 18-24, 25-29, and 30-35 years, while marital status encompassed single, engaged, married, divorced, widowed, and separated cases. Educational status was classified based on educational attainment, ranging from less than 12 years of schooling to academic degrees. In Israel, "Bagrut" refers to the comprehensive high school final exams overseen by the Ministry of Education. Employment status was categorized as employed, unemployed, or outside the labor force (including homemakers and disabled individuals). Household income levels were classified as low, medium, or high based on the average total income of family members. As the Arab population live in various geographic areas, therefor, the places of residence were divided into four regions: North, Haifa, Center, and South. Religious affiliation included Muslim, Christian, and Druze categories. Information regarding the type of marriage were obtained by asking the ever-married participant if she/he had a blood relationship to her/his spouse. Relationships were grouped into CMs and non-CMs. The second section included a question regarding the adults' attitude towards CMs, in the form of: "Are you a supporter of consanguineous marriages?" with the answer of "Yes" or "No" or "Neutral" (meaning neither of the two previous options).

### 2.2. Data Analysis

Data management and statistical analyses were performed using the SPSS program. Associations between adults' attitudes toward consanguinity and various factors were assessed using Chi-squared tests, with statistical significance set at $p<0.05$. Multivariate analysis using a binary logistic model was employed to identify the factors associated with a positive attitude towards CMs. Crude odds ratios (ORs) and 95% confidence intervals (CIs) were calculated; adjusted odds ratios and 95% CIs were derived from the logistic regression model.

## 3. Results

The results obtained from the current survey, revealed that young adults aged 18-35 comprised 28.4% of the Arab society in Israel, with a male-to-female ratio of 51.1% to 48.9%. Their socio-demographic characteristics are detailed in Table 1.

**Table 1** Demographic profiles of the participants categorized by gender

| **Factor** | **Male** | | **Female** | | **Total** | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Age range: | | | | | | |
| 18-24 | 363 | 46.3 | 409 | 54.5 | 772 | 50.3 |
| 25-29 | 208 | 26.5 | 170 | 22.6 | 378 | 24.6 |
| 30-35 | 213 | 27.2 | 172 | 22.9 | 385 | 25.1 |
| Marital status: | | | | | | |
| Single | 409 | 52.2 | 342 | 45.5 | 751 | 49.0 |
| Engaged | 68 | 8.7 | 76 | 10.1 | 144 | 9.4 |
| Married | 291 | 37.2 | 303 | 40.3 | 594 | 38.7 |
| Divorced | 15 | 1.9 | 17 | 2.3 | 32 | 2.1 |
| Widowed | 0 | 0 | 8 | 1.1 | 8 | 0.5 |
| Separated | 0 | 0 | 5 | 0.7 | 5 | 0.3 |
| Region: | | | | | | |
| North | 337 | 43.0 | 337 | 44.9 | 674 | 43.9 |
| Haifa | 193 | 24.6 | 132 | 17.6 | 325 | 21.2 |
| Center | 108 | 13.8 | 108 | 14.4 | 216 | 14.1 |
| South | 146 | 18.6 | 174 | 23.2 | 320 | 20.8 |
| Religion: | | | | | | |
| Muslim | 687 | 87.6 | 652 | 87.1 | 1339 | 87.3 |
| Christian | 49 | 6.3 | 51 | 6.8 | 100 | 6.5 |
| Druze | 48 | 6.1 | 46 | 6.1 | 94 | 6.1 |
| Educational status: | | | | | | |
| <12 years | 104 | 13.5 | 67 | 9.0 | 171 | 11.3 |
| Completed 12 years | 182 | 23.6 | 169 | 22.8 | 351 | 23.2 |
| Bagrut | 286 | 37.0 | 269 | 36.3 | 555 | 36.7 |
| Non-academic diploma | 93 | 12.0 | 89 | 12.0 | 182 | 12.0 |
| Academic degree | 107 | 13.9 | 147 | 19.8 | 254 | 16.8 |
| Income level: | | | | | | |
| Low | 403 | 61.7 | 414 | 69.5 | 817 | 65.4 |
| Medium | 126 | 19.3 | 102 | 17.1 | 228 | 18.3 |
| High | 124 | 19.0 | 80 | 13.4 | 204 | 16.3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Employment status: | | | | | | |
| Employed | 551 | 70.6 | 302 | 40.3 | 853 | 55.8 |
| Unemployed | 51 | 6.5 | 80 | 10.7 | 131 | 8.6 |
| Outside the labor force | 178 | 22.8 | 368 | 49.1 | 546 | 35.7 |

It was observed that the majority of young adults fall within the age range of 18–24 years, making up to 50.3%, with a noticeable gender difference (46.3% males and 54.5% females). The older age groups of 25–29 years, as well as the next one (30–35 years) account for about 25% each, with no significant gender differences in either group. This indicates that the Arab society in Israel is predominantly young. Regarding marital status, 38.7% of young people in the Arab society of Israel are married, and 9.4% are engaged. In contrast, the majority, 49%, are single, with a notable gender difference: 52.2% of males and 45.5% of females.

Based on the regional distribution of young adults, approximately 44% live in the North region. The Haifa and South regions have nearly identical rates at around 21%, while the Center region has the lowest rate at approximately 14%. According to religion, most young adults are Muslims (87.3%), while Christians and Druze have nearly equal proportions at 6.5% and 6.1%, respectively. These distributions are consistent across both genders.

Regarding educational status, it was found that the majority of participants (~65%) had a Bagrut certificate and/or higher academic education. About 23% of young adults completed 12 years of education without a Bagrut certificate, while the remaining 11% had less than 12 years of education. Notably, the primary gender difference was in the attainment of academic degrees, with approximately 20% of females and 14% of males holding such qualifications.

Most participants (~65%) have a low-income level, while the rest are almost equally divided between medium and high-income levels, without a considerable difference between the two genders. Regarding employment status, about 56% of young adults are employed, 9% are unemployed, and a notable 36% are outside the labor force, potentially as homemakers or due to disabilities. There is a significant gender difference: 70% of males and 40% of females are employed, while 23% of males and 49% of females are outside the labor force. This indicates that a substantial portion of young females are not employed but are homemakers.

The survey results reflecting adults' attitudes towards CMs are presented in Table 2.

**Table 2** Young adults' attitudes towards CMs according to various adult-related socio-demographic factors.

| **Factor** | **Attitude towards CMs:** | | | | | | **Total (N)** | ***P*** |
|---|---|---|---|---|---|---|---|---|
| | Reject | | Neutral | | Support | | | |
| | N | % | N | % | N | % | | |
| Gender: | | | | | | | | |
| Male | 104 | 13.3 | 357 | 45.5 | 323 | 41.2 | 784 | 0.00 |
| Female | 184 | 24.5 | 346 | 46.1 | 221 | 29.4 | 751 | |
| Total | 288 | 18.8 | 703 | 45.8 | 544 | 35.4 | 1535 | |
| Age range: | | | | | | | | |
| 18-24 | 223 | 29.3 | 312 | 40.9 | 227 | 29.8 | 762 | 0.00 |
| 25-29 | 88 | 23.7 | 148 | 39.8 | 136 | 36.6 | 372 | |
| 30-35 | 80 | 20.8 | 137 | 35.6 | 168 | 43.6 | 385 | |
| Region: | | | | | | | | |
| North | 138 | 20.5 | 295 | 43.9 | 239 | 35.6 | 672 | 0.00 |
| Haifa | 133 | 42.1 | 114 | 36.1 | 69 | 21.8 | 316 | |
| Center | 80 | 37.2 | 72 | 33.5 | 63 | 29.3 | 215 | |
| South | 40 | 12.7 | 116 | 36.7 | 160 | 50.6 | 316 | |
| Religion: | | | | | | | | |
| Muslim | 329 | 24.8 | 536 | 40.5 | 460 | 34.7 | 1325 | 0.022 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Christian | 13 | 13.1 | 45 | 45.5 | 41 | 41.4 | 99 | |
| Druze | 49 | 52.7 | 14 | 15.1 | 30 | 32.3 | 93 | |
| Educational status: | | | | | | | | |
| <12 years | 41 | 24.6 | 68 | 40.7 | 58 | 34.7 | 167 | 0.183 |
| Completed 12 years | 61 | 17.5 | 137 | 39.4 | 150 | 43.1 | 348 | |
| Bagrut | 172 | 31.3 | 207 | 37.6 | 171 | 31.1 | 550 | |
| Non-academic diploma | 57 | 31.5 | 68 | 37.6 | 56 | 30.9 | 181 | |
| Academic degree | 51 | 20.2 | 112 | 44.4 | 89 | 35.3 | 252 | |
| Income level: | | | | | | | | |
| Low | 202 | 25.0 | 284 | 35.2 | 321 | 39.8 | 807 | 0.000 |
| Medium | 51 | 22.7 | 103 | 45.8 | 71 | 31.6 | 225 | |
| High | 64 | 31.5 | 81 | 39.9 | 58 | 28.6 | 203 | |
| Employment status: | | | | | | | | |
| Employed | 219 | 25.9 | 324 | 38.3 | 303 | 35.8 | 846 | 0.334 |
| Unemployed | 28 | 21.9 | 48 | 37.5 | 52 | 40.6 | 128 | |
| Outside the labor force | 142 | 26.3 | 225 | 41.7 | 173 | 32.0 | 540 | |
| Marital status: | | | | | | | | |
| Single | 226 | 30.5 | 316 | 42.6 | 199 | 26.9 | 741 | 0.000 |
| Engaged | 47 | 33.3 | 52 | 36.9 | 42 | 29.8 | 141 | |
| Married | 108 | 18.2 | 212 | 35.8 | 272 | 45.9 | 592 | |
| Divorced | 9 | 28.1 | 13 | 40.6 | 10 | 31.3 | 32 | |
| Marriage type: | | | | | | | | |
| Consanguineous | 32 | 10.9 | 76 | 25.9 | 185 | 63.1 | 293 | 0.000 |
| Non-consanguineous | 86 | 26.1 | 142 | 43.2 | 101 | 30.7 | 329 | |

A notable finding was that 35.4% of adults supported such marriages, with a significant gender disparity: 41.2% of males compared to 29.4% of females. On the other hand, approximately 19% expressed rejection, while a substantial portion (~46%) held neutral attitudes. Interestingly, a direct correlation between age and positive attitudes towards CMs was noticeable, as older adults showed a higher inclination towards supporting this type of practice.

Based on the geographic distribution of adults, notable variations in attitudes were observed: young adults who live in Haifa and Center regions showed the highest rates of rejection (~42% and ~37%, respectively) towards CMs. Conversely, those who live in the North and South regions displayed the lowest rejection rates (20.5% and ~13%, respectively), signifying the highest levels of support. These regional disparities were found to be statistically significant.

According to religious affiliation, adults exhibited varying levels of support for CMs: Christians showed the highest rate of support at 41.4%, followed by Muslims at approximately 35%. In contrast, Druze displayed the lowest support rate (~32%) and the highest rejection rate (~53%). These differences were statistically significant (p=0.022).

Overall, the study revealed that there is no significant association between educational attainment or employment status, and adults' attitudes towards CMs. However, a notable inverse relationship was observed between income levels and these attitudes: higher income levels correlated with lower support for CMs, and *vice versa*.

Based on adults' marital status, the study found that a significant portion of married adults (~46%) supported CMs, with only ~18% rejecting them. Conversely, majority of single adults (~43%) held neutral attitudes towards CMs, and approximately 30% rejected such marriages. Regarding the type of marriage (CMs or non-CMs), the results indicated that a large majority of adults with CMs type had positive attitudes towards this practice (~63%). In contrast, only about 31% of adults with non-CMs type expressed positive attitudes towards CMs. This disparity was found to be statistically significant.

The results obtained by the logistic regression analysis are displayed in table 3.

**Table 3** Logistic regression analysis of the adults' attitudes towards consanguinity.

| Factors | Reference | Adjusted Odds Ratio | 95% Confidence Interval | *p*-value |
|---|---|---|---|---|
| Gender: Male | Female | 1.49 | 1.12-2.18 | 0.002* |
| Age range: 18-24 | 25-35 | 1.0 | 0.941-1.031 | 0.56 |
| Region: South | Other regions | 2.11 | 1.27–3.49 | 0.004* |
| Religion: Muslim | Non-Muslim | 1.43 | 0.42-6.41 | 0.788 |
| Educational status: ≤ 12 years | Academic degree | 1.23 | 0.571-2.652 | 0.362 |
| Income level: Low | High | 1.38 | 0.93-2.46 | 0.210 |
| Employment status: Unemployed | Employed | 1.2 | 0.569-2.18 | 0.576 |
| Marital status: Married | Single | 2.52 | 1.560–6.597 | 0.019* |
| Marriage relative: Consanguineous | Non-consanguineous | 3.8 | 2.53-6.885 | 0.001* |

*: refers to a significant value.

It identifies the predictors of adults' positive attitudes towards CMs. It was found that four parameters have proven to be significant predictors for adults' support attitudes to CMs. These parameters are: gender (males compared with females) [OR = 1.49 (1.12-2.18); p = 0.002], region (South region compared with other regions) [OR = 2.11 (1.27–3.49); p = 0.004], marital status (married compared with single) [OR = 2.52 (1.560–6.597); p = 0.019], and CM (CMs compared with non-CMs) [OR = 3.8 (2.53-6.885); p = 0.001]. It was noteworthy that the factors: age, religion, income level, educational status, and employment status were no longer significantly associated to participants' attitudes toward CMs.

## 4. Discussion

Consanguinity is a worldwide issue and its prevalence varies among populations, religions, ethnicities, geographical locations and across time. In Arab countries and other various Islamic societies, where CMs are considered to be a traditional phenomenon, their occurrences remain to be high [26, 27, 28, 29].

Recently, we found that the total rate of CMs in the young population (18-35 years old) of the Arab society in Israel during the year 2021, is high and accounted for 47%. This rate is within the range of that found in many other Arab and Islamic societies [13, 30, 31].

The current study investigated the adults' attitudes towards CMs among the Arab society in Israel. The positive attitude towards consanguinity among the respondents was high, with more than one third of the adults having a positive attitude towards consanguinity, this high rate of positive attitudes towards CMs could be explained by the fact that this type of marriage is still socially favored among the young people of this society which is supported by the high prevalence (~47%) of this practice among adults in this community [31]. In concordance with our results, high rates of positive attitudes towards CMs were observed among other Arab communities; as approximately half of the Saudi Arabian adults had a positive attitude towards consanguinity as social and traditional culture were found to be the predominant reasons for favoring this type of marriage [19]. Additionally, about 45% of the adult Qatari population preferred CMs over non-CMs, as the most common reason stated by those participants was "habit and traditions [17].

It was previously evident that many factors play a crucial role in determining the prevalence and conception towards the phenomenon of consanguinity in various societies [17, 18, 25]. In the current study we examined the peoples' attitudes towards CMs in relation to different sociodemographic factors and found some of them to be associated with a positive attitude regarding this practice.

Our study showed a significant association between adults' support attitudes towards CMs and the participant's gender, as more males had a support attitude than females as well as more females had a rejection attitude than males towards CMs. Various studies had similar associations, in that more males had a positive attitude towards CMs more than females as well as more females had an opposing attitude than males [16, 19, 20, 21]. This could be explained by the overall higher knowledge of the females than males in relation to the negative consequences of CMs from genetic disorders point of view and their direct adverse effect on their offspring, their emotional as well as direct involvement in pregnancy and delivery processes [16, 32]. Additionally, our data showed that there is a significant association between the adults' attitudes toward CMs and their age range. It is evident that there is a direct correlation between the age and the adults' attitudes towards CMs, as the age increases, it was found that the adults tend to have higher support rate of CMs. This could be due to the fact that older people have higher acceptance to the traditional values and do not tend to oppose them, while, the younger people tend to oppose the societal norms. It is noteworthy that different studies from various societies confirmed this finding [16, 17, 20].

The results demonstrated that adults in the South region of the Arab society in Israel had the highest rate of positive attitudes towards CMs (~50%). It is noteworthy that this finding was later corroborated by the logistic regression analysis to be a significant predictor of positive attitudes towards consanguinity. As this region is mainly inhabited by Bedouins who are well-known for their favoring this practice, that has been deeply rooted in their culture since ancient times [33]. It was observed that the resident adults of the Center and Haifa regions had lower rates of positive attitudes, this is likely to be attributed to the high presence of urban areas in these regions which had lower prevalence of CMs, additionally, these two regions contain much greater number of large cities in which social ties are less prevailing [34]. Furthermore, as the North region includes urban, semi-urban and rural localities, it was found that the adults' attitudes towards CMs in this region was similar to the average rate of the sample.

Unexpectedly, our data showed that Christian's adults tend to have the highest support rate of CMs (41.4%), while the Druze adults have the lowest support rate (~32%) and the highest rejection rate (52%), surprisingly this finding seemed to be contradicting to our previously obtained results [31] as the highest incidence of CMs was among Druze (42%) and the lowest was among Christians (26.5%). It is noteworthy to mention that the Druze and Christian Arabs are characterized by relatively small communities that lead to intra-marriages, in order to maintain their identities. In addition, the populations of these two religions are isolated, which limits opportunities to marry with their counterparts from other Arab countries. These characteristics of the communities may explain this contradiction between the adults' perceptions towards CMs and their real practice.

According to the marital status parameter, it was found that majority of the married participants (~46%), chose to support CMs, furthermore, the attitudes of the adults' belonging to the CM type were found to be highly supporting CMs (63%). It is interesting to note that these findings were further corroborated by the logistic regression analysis to be identified as significant predictors of positive attitudes towards consanguinity. Thus, it could be demonstrated that adults' positive attitudes do reflect on their own decision of marrying consanguineously or it could be that their experience with their own practice of CMs seemed to have influenced their attitudes. These findings were in concordance with those obtained by other studies [16, 19, 35].

Despite the fact that various studies showed a significant correlation between young people's attitudes towards CMs and some of the prevailing socioeconomic factors [21, 36], contrarily, our study that is based on logistic regression analysis, revealed the lack of association between adults' attitude toward CMs and various socioeconomic parameters such as income level, educational status, and employment status. This lack of association could be attributed to the high consideration that CMs are traditionally deeply rooted in our society.

## 5. Conclusion

The findings underscore that majority of the adults' attitudes towards CMs were either neutral or supporting this practice, therefore, it is of utmost importance to carry out specially designed cultural and educational programs with the aim of addressing misconceptions and raising the knowledge of the young adults in relation to various health implications of CMs. Moreover, we strongly recommend emphasizing the importance of genetic counseling and its crucial impact on future generations in our society, particularly for young people both before and after marriage. Health education programs and genetic counseling should be provided by qualified native Arabic speakers who have a deep understanding of the society's religious and cultural context.

## Compliance with ethical standards

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### *Disclosure of conflict of interest*

All the authors of this study declare that they do not have any conflict of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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