

Effects of Socio-Economic and Demographic Factors on the Prevalence of Consanguineous Marriages in Pakistan

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Abstract

Children born to parents having blood relation are prone to higher risk of health disorders relating to genetic inheritance. Cousin marriage is a deep rooted social tradition in Pakistan. Ratio of consanguineous marriage to non-consanguineous marriages is almost 2 to 1 (67% for PDHS, 2006-07 and 65.4% for PDHS, 2012-13). Purpose of this study is to examine the trend and correlates of cousin marriage in Pakistan. Analysis is carried on data from Pakistan Demographic and Health Surveys (PDHS) conducted during 2006-07 and 2012-13, using Binary Logistic Regression. Results indicate that education of women, place of residence, education of husband; region, ethnicity and age at first marriage have a significant effect on prevalence of cousin marriage. More or less similar results, regarding significance of factors and nature of their influence, are obtained from both surveys. Cousin marriage is more prevalent among families residing in Punjab and Sindh as compared to those living in Baluchistan. Finally, it is concluded that modernization factors such as increase in women's educational attainment, urbanization, and increase in age at marriage can cause a decline in the trend of cousin marriage in Pakistan.

Keywords

Consanguineous marriages, Binary logistic regression, Socio-economic factors, Demographic factors

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1. Introduction

Consanguineous marriage is defined as the marriage between biological kin, or more precisely, marriage between two individuals sharing a common grand parent or some other or any other relatively recent common ancestor. Cousin marriage increases genetic threats among children born to closely related parents. Other consequences of such marriage include higher fertility rate, increased infant mortality rate, higher frequency of birth defects, and increased risk for recessive disorders. Children born to parents sharing common ancestors, have greater chance of inheriting identical copies of detrimental recessive genes (Hamamy, 2012). Bittles (2001) and Tfamily (2005) reported low inbreeding among such couples. Darr and Modell (1988) reported child mortality and birth defects among British Pakistanis who were married to cousins. It is desirable to discourage cousin marriage as Hamamy et al. (2011) stated that exposure to risk due to cousin marriage out-weighs its societal or financial benefits. Determination of factors responsible for prevalence of cousin marriages in Pakistani society is necessary for creating awareness in society to reduce the rate of its prevalence which may lead to reduction in health hazards among Pakistani children due to consanguineous marriages.

Cousin marriages are present in both developed and developing world; however, rate of prevalence is higher for the developing countries. This marriage is more popular in Islamic countries and its rate is affected by religion, culture, and social norms. In addition, socio-economic factors such as education, age of women at marriage, place of residence, wealth status are also believed to influence the preference of these marriages.

In Pakistan, the system of arranged marriage is widespread (Perveen, 2012). Consanguineous marriages are preferred over non-relative marriages in this system (Bittles, 2001; Hussain, 1999; Perveen and Rehman, 2012 and Qidwai et al., 2001). Here choice of spouse is generally dependent on certain parameters which include family background, caste, region, social and economic status, and sectarian belonging. Islamic law of inheritance is another factor contributing to the preference of consanguineous marriage as it assures holding of inheritance within the family. Hussain (1999) observed that impact of social and cultural factors was stronger on the prevalence of consanguineous marriages in Pakistan, when compared with elements related to economic gains, whereas in the Middle East and South Asian countries higher frequency of consanguineous marriages is attributed to the consideration of property. Obstacles faced while searching for an

appropriate mate for children also motivate parents to go for an easier option. Caste system prevailing in the sub-continent is another strong social reason. It was anticipated that with passage of time, increase in urbanization, education and modernization would cause a decline in the trend of consanguineous marriage (Goode's, 1963). However, this trend has not changed over time (Abbasi-Shavazi, 2008). Higher frequency of cousin marriages was observed in the regions of Punjab and Baluchistan (65.3% and 67.9%, respectively) as compared to Sindh (61%) and Khyber Pakhtun Khawa (52.2%) (Afzal, Ali and Siyal, 1994).

In spite of increase in urbanization, modernization and literacy in Pakistan, rate of consanguineous marriages has remained more or less stagnant during past decades. Hence it is desirable to investigate factors responsible for the prevalence of cousin marriage here. A slight increase in the percentage of cousin marriage is observed in Sultan and Baqai (PDHS, 2006-07) as compared to past survey (PDHS, 1990-91). Social, economic and cultural factors are believed to influence the choice made for a marriage. In this study, it is attempted to investigate the determinants of marriage preference using data from PDHS (2006-07) and PDHS (2012-13).

1.1 Expected determinants of consanguineous marriage: Certain social, economic and demographic factors believed to influence the desire for consanguineous marriage are listed below:

- **Education of women:** Education of women is linked with social and economic autonomy. It is believed to create awareness and courage among women and thus enabling them to exercise the right of selection of husband. In Yemen, women with less education are more likely to marry their cousin (Jurdi and Saxena, 2003). However, in spite of increase in education of women, some highly educated families still prefer marriages within relatives.
- **Place of residence:** Rural residents prefer consanguineous marriages more than their urban counterparts (Bittles 2001). This trend is attributed to lack of education, smaller pool of viable candidates, and arranged and early marriages. In rural areas of Pakistan such marriages are also preferred to avoid distribution of land ownership outside the family.
- **Education of the husband:** Impact of husband's education on choice of consanguineous marriages varies in nature across different populations. Jurdi and Saxena (2003) reported an increasing trend in the percentages of consanguineous marriages among males with higher education level.

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- **Women's age at marriage:** Age of women at marriage plays important role in decisions and choices regarding marriage. Consanguineous marriage is higher among women married at younger ages (Bittles, 2001). Similar results were observed for Yemeni population (Jurdi and Saxena 2003). Consanguineous marriages were preferred by women of age of 25-34 years (Qidwai et al., 2003).
 - **Occupation of the husband:** Occupation of husband also plays role in the choice of cousin marriage. It is assumed that cousin marriage is more common for men engaged in lower category or blue collar jobs. Jurdi and Saxena (2003) observed no significant difference for choice of first cousin marriage among various occupational categories. Occurrence of consanguineous marriage was observed to be more frequent among women whose husbands were employed in either white collar or blue collar occupations as compared to those women whose husbands were engaged in agriculture sector (Jurdi and Saxena, 2003).
 - **Occupation of the wife:** Due to the financial independence, working women are assumed to have the opportunity of taking independent decision regarding their marriage and have more opportunities to make choice of husband for themselves. It is generally perceived that they are less likely to prefer marriage within relatives. Tfamily (2005) found that working women have little interest in first cousin marriages. Women engaged in white collar jobs are less likely to marry with cousins. But Jurdi and Saxena (2003) observed a different result and concluded that women engaged in occupations of lower category and those categorized as self-employed in agriculture sector were less likely to be in consanguineous marriages when compared with housewives. While women engaged in higher occupational categories had more chances of cousin marriage.
 - **Socio-economic status:** Socio-economic status of men and women has a strong influence on the choice of consanguineous marriages. Consanguineous marriages are higher among the people of lower socio-economic status (Bittles, 2001). It was found that the rate of such marriages decreases with increase in socio-economic levels. However, the fact that rich people prefer to marry their children in a family to avoid distribution of inherited property also exists.

1.2 Objective of the study: To identify the significant factors affecting the prevalence of consanguineous marriages in Pakistan.

2. Literature review

Demographers have identified three major reasons for existence of consanguineous marriages in any population i.e. property consolidation, political associations and strengthening of family ties (Tfaily, 2005). More chances of compatibility among spouses are expected for marriages within relatives. However, another school of thought among demographers believes that social and economic benefits can also be attained from non-consanguineous marriages as well (Khuri, 1970). It is believed that consanguineous marriages strengthen families' ties (Abdalla and Zaher 2013). Less demand for dowry may also influence the marital choices. According to Jurdi and Saxena, (2003) social and cultural factors affect the selection for consanguineous marriages. There are many studies conducted mostly in Arab countries to investigate the determinants of consanguineous marriages. Findings of some correlates vary among different countries. In some studies, researchers observed positive association between women's education and rate of consanguineous marriage (Givens and Hirschman, 1994; Hussain and Bittles, 1998, 1999, 2000 and Jurdi and Saxena, 2003 as cited in Tfaily, 2005). However, this rate is negatively associated with men's education (Givens and Hirschman, 1994; Hussain and Bittles, 2000 and Jurdi and Saxena, 2003 as cited in Tfaily, 2005). Negative relationship between husband's education and prevalence of cousin marriage was also observed in Kuwait, Lebanon and Saudi Arabia (AL-Thakeb, 1985, Khlal, 1988 and Saedi-wong et al., 1989 as cited in Jurdi and Saxena, 2003). Effect of urbanization also varies in various populations. Some found that consanguineous marriages were more prevalent in urban areas (Hussain and Bittles, 2000 and Jurdi and Saxena, 2003 as cited in Tfaily, 2005) while others (Fortunato and Cleve, 2008; Givens and Hirschman, 1994; Hussain and Bittles, 1998 and Khoury and Massad, 1992 as cited in Tfaily, 2005) observed a reverse pattern. Tfaily (2005) observed that educated women, urban residents, working women were less likely to opt for consanguineous marriages.

3. Methodology

3.1. Data: The relevant data is obtained from the Pakistan Demographic and Health Surveys (PDHS) of 2006-07 and 2012-13. Demographic and Health Surveys (DHS) is a world-wide program providing good quality data in over 40 countries lacking in vital registration system. In Pakistan so far three demographic and health surveys have been conducted, in 1990-91, in 2006-07 followed by the third in 2012-13. Pakistan Demographic and Health Surveys (PDHS) are so far

the largest household based surveys in the country. These surveys were conducted by the National Institute of Population Studies (NIPS), under the Ministry of Population Welfare, and were funded by USAID. Technical assistance was provided by Macro International Inc., the organization responsible for conducting and compiling these surveys in all countries. Respondents for current study are women of age 15-49. Categories for two variables (Region and Ethnicity) are different for PDHS (2012-13) and PDHS (2006-07), (Table 1, 2, and 3). All other factors have similar categories for both data sets.

3.2 Bivariate Analysis: The Pearson Chi-square statistics detects the significance of differences between observed and expected frequencies, where the expected frequencies are computed under the null hypothesis of no association. The Chi-square statistic is computed as:

$$\chi^2 = \sum_i \sum_j \frac{(n_{ij} - e_{ij})^2}{e_{ij}}$$

In SPSS, Likelihood-ratio test is also available to detect association for complex survey data. The Likelihood-ratio Chi-square statistic involves the ratios between the observed and expected frequencies. The statistic is computed as:

$$G^2 = 2 \sum_i \sum_j n_{ij} \ln \left(\frac{n_{ij}}{e_{ij}} \right)$$

When the row and column variables are independent, G^2 follows an asymptotic Chi-square Distribution with $(r-1)(c-1)$ degrees of freedom.

3.3 Multivariate Analysis (Binary Logistic Regression model): The Binary Logistic Regression model is used to analyze response variable having only two categories. Consider the p independent variables denoted by the vector

$$\underline{X}_j = (x_1, x_2, \dots, x_p).$$

Let, the conditional probability that the outcome is present is denoted by

$$P(y = 1/x) = \pi(x)$$

Then,

the Logit of the Multiple Logistic Regression model is given by the equation,

$$g(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p$$

In this case, the Logistic Regression model is,

$$\pi(x) = \frac{e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}}{1 + e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}}$$

where

β_0 = the constant of the equation

β_i = coefficient of i^{th} independent variable for $i = 1, 2, \dots, p$

An alternative form of the logistic regression equation is,

$$\text{Logit}[\pi(x)] = \log \left[\frac{\pi(x)}{1+\pi(x)} \right] = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p$$

4. Statistical analyses of factors affecting the consanguineous marriages in Pakistan

4.1. Descriptive Analysis: It is observed that majority of respondents (67% and 65.4%) are married within families. Figures 1 and 2 reveal that the rate of cousin marriage is visibly higher (Ratio; 1:2) than non-relative marriage in Pakistan. A slight decline with time is observed in the percentage of cousin marriage.

First cousin marriage is more common as compared to second cousin marriage. Figures (3, 4) show that the paternal first cousin marriage is higher than any other category of consanguineous marriage. This may be due to the generally prevailing male dominance in decisions relating to marriage. In Pakistani society, choice of spouse for daughters as well as sons is generally made by parents and usually fathers have the final say in this matter, so this trend is quite natural as they prefer their own nephews or nieces for marrying their children. Percentage of women married according to other categories of relationship has slightly increased for PDHS (2012-13) as compared to PDHS (2006-07).

For further statistical analysis, dependent variable is defined as:

Yes	Married within family
No	Married out of family

It is observed from Table 1, that cousin marriage is more prevalent among the illiterate women. Rapid decline in percentage is observed with increase in level of education, the higher the level of education for women, the lesser the difference between percentages of two categories. Percentage of non-consanguineous marriage is slightly higher for women with high level education. Percentages of two categories shows almost similar trend when categorized according to husband's education, however, magnitude of disparity is lesser. When compared according to the place of residence, percentage of cousin marriage is remarkably higher for rural residents than for those residing in urban areas. Women whose age was less than 35 year at the time of survey show higher percentage of cousin marriage as compared to those older than 35 year. This shows that cousin marriage is more prevalent among women in younger cohort (less than 35 year) as

compared to older cohort (35 year and above). When compared according to husband's profession, percentage of women married to their cousins is highest for those whose husband had Blue collar job and comparison according to work status of women reveals that highest percentage of cousin marriage for housewives. Consanguineous marriage is more common in Punjab, Sindh, Khyber Pukhtoonkhwa, and Baluchistan, however, its percentage is slightly lower than non-consanguineous marriage in Gilgit Baltistan. When categorized according to wealth index, cousin marriage is most prevalent among respondents falling in the poorest category. Comparison of respondents belonging to different ethnic groups shows higher or equal percentage of cousin marriage in both surveys in all groups except for the categories of Urdu speaking and Marwari.

4.2. Bivariate Analysis: Bivariate analysis is used to detect the relationship between two variables. It also indicates the strength of association between two variables.

Bivariate analysis shows (Table 2) that, all independent variables are significantly related to dependent variable i.e. cousin marriage for PDHS (2007-08) and for PDHS (2012-13) except for age of women which is insignificant for PDHS (2012-13).

4.3. Multivariate Analysis: Binary Logistic Regression model is used to study the effect of independent variables on cousin marriage, simultaneously. Ten independent variables: education of the women, place of residence, education of the husband, age of women, occupation of the husband, occupation of the women, region, wealth index, ethnicity, age at first marriage and current age of women are included in the analysis. Dependent variable is categorical having two categories, so binary logistic model is used.

4.3.1 Fitting of Binary Logistic Regression model (final model): Binary Logistic Regression model (Table 3) is fitted using Backward Elimination method. Table 3 indicates that education of women, place of residence, education of husband (No education), region, ethnicity and age at first marriage are significant factors affecting the cousin marriage in Pakistan (PDHS, 2006-07). Results are slightly changed for PDHS (2012-13). Region becomes insignificant and occupation of women (agriculture) becomes significant.

The goodness of fit is also assessed for both models (Table 4). The F statistic is insignificant at the 5% level, indicating that the appropriateness of models for

these data. Interpretations of factors having significant effect on the choice of cousin marriage are interpreted below:

- **Education of women:** Education of women is categorized into four groups and the highest level of education is used as reference. Education of women is found to be a significant factor towards the choice of cousin marriage in Pakistan for both survey data sets. With odds ratio equal to 1.856, women with no education, are 0.865 times more likely than women with higher educational level to marry within family. This trend among uneducated women may have resulted from greater risk of consanguineous marriages due to fewer choices for spouse available to them (*Tfaily, 2005*). Odds ratios for categories of primary and secondary education are also greater than 1 in both data surveys indicating higher probability of cousin marriage for them as compared to those with higher education. Similar results were observed by Jurdi and Saxena (2003) and Afzal et al. (1994).
- **Place of residence:** Place of residence is dichotomized in two categories as urban and rural areas. In both surveys, coefficients for urban category are negative indicating less likelihood of marrying within their families for urban women, when all other variables are kept constant. The odds ratio for urban residents is 0.645 for PDHS 2006-07 and 0.697 for PDHS 2012-13. Lower education level and low socio-economic status are regarded as the main reasons for the preference of consanguineous marriage among rural residents (Jurdi and Saxena, 2003). Afzal et al. (1994) also observed similar findings in his study. WattaSatta system, strong caste system and early marriages are also rendered responsible for this trend in rural areas.
- **Education of husband:** Four categories (no education, primary, secondary, and higher) are used for education of husband and higher level is considered as reference. Coefficients for all of other three categories of husband's education are negative, thus showing that cousin marriage is less prevalent among men with lower educational level. However, this effect is significant for categories of no education and primary level for PDHS 2006-07 (OR = 0.708 and 0.793 respectively); and for PDHS 2012-13 effect of husband's education is significant only for the category of no education (OR = 0.669).
- **Occupation of women:** Work status of women has been categorized as agriculture, blue collar, white collar, and not working. Category of house wives who don't work is used as reference. This variable has significant effect only for the sample in PDHS 2012-13. Here too Odds of cousin marriage are

- significantly higher only for women working in agriculture sector (OR = 1.661).
- **Region:** Four provinces, Punjab, Sindh, Khyber Pakhtoon Khwa (KPK), and Baluchistan are used as categories of the variable region. Baluchistan province is used as the reference category. This variable shows significant effect only for PDHS (2006-07). Coefficients for Punjab and Sindh are positive signifying that keeping all other factors constant, when compared with Baluchistan, cousin marriage is more prevalent in provinces of Punjab and Sindh (OR = 1.590 and 1.528 respectively). The Odds Ratio for KPK is 0.639, indicating that women of KPK have 0.361 ($1-0.639=0.361$) times less likely to marry within family as compared to the Balochi women. Afzal et al. (1994) had also concluded that among all four provinces, Punjab had the highest rate of cousin marriage.
 - **Ethnicity:** Comparison among various ethnic categories shows significantly high prevalence of cousin marriage among women belonging to Punjabi, Sindhi, Pashto, Balochi, Barauhi and Siraiki ethnicities as compared to ethnic group comprising others (PDHS, 2006-07). For PDHS (2012-13), it was found to be more prevalent among Punjabi, Sindhi, Balochi, Barauhi, Siraiki, Hindko, Shina, Potowari, Marwari women. Cousin marriage is significantly less prevalent among Chitrali and Balti women as compared to others.
 - **Age at first marriage:** Two categories (less than 35 years and more than 35 years) are used for the age of women at first marriage. Using “less than 35 years” for reference, the coefficient of age of women at first marriage is negative for data sets of both surveys which means women marrying in later age are less likely to prefer cousin marriage (OR = 0.977). If other variables are held constant odds for cousin marriage reduce by 0.023 ($1-0.977=0.023$) times for per year increase in her age. Studies by Afzal et al. (1994) and Jurdi and Saxena (2003) also show similar results. Awareness and authority accompanied with older age may be regarded as the major reason for this trend (Afzal et al., 1994).

5. Conclusion

Children of consanguineous marriage are more prone to genetic disorders. Cousin marriage is a deep rooted tradition in our society. Ratio of consanguineous marriages to non-consanguineous marriages stands at almost 2 to 1 in Pakistan and against expectations; it has remained stable during past few decades. Among consanguineous marriages, first cousin marriages hold the majority share, with marriage between paternal first cousins being more common. Education level of

both, women and men, place of residence, ethnicity and age at first marriage are found to have significant effect on prevalence of cousin marriage in both surveys. Region has significant effect only for PDHS 2006-07, while occupation of women (agriculture) has significant effect for PDHS 2012-13 only. People residing in rural areas are more likely to prefer cousin marriage as compared to those in urban dwellings. Non-negative effect of husband's education on consanguineous marriage is an unusual result. Cousin marriage is more prevalent among residents of Punjab and Sindh as compared to those living in Baluchistan. Rate of cousin marriage is more prevalent among women marrying at younger age as compared to those who married late. No substantial change is observed in the pattern of cousin marriage with respect to time.

Finally, it is concluded that modernization factors such as increase in women's educational attainment, urbanization, increase in age at marriage, can lower the prevalence of cousin marriage in Pakistan.

5.1. Limitations: Effects of only those factors are investigated in the study which was available in PDHS (2006-07) and PDHS (2012-13). Relationship between cousin marriages, fertility, mortality and morbidity is not included in the study due to time constraint.

5.2. Recommendations: It is expected that consanguineous marriages have a stronger effect on the rates of mortality, morbidity and fertility as compared to non-consanguineous marriages. In spite of its social benefits, it is necessary to create awareness among people about harmful outcomes which may result from cousin marriages. Analysis can be extended to provincial level. Effects of cousin marriage on mortality, morbidity and fertility can be statistically analyzed for Pakistan.

Table 1: Percentage distribution of marriages (cousin marriage * factors) in Pakistan

Factors	PDHS (2006-07)			PDHS (2012-13)		
	Yes	No	Total	Yes	No	Total
Education of Women						
No Education	46.0%	19.0%	65.0%	40.4%	16.6%	57.1%
Primary	9.3%	4.9%	14.2%	10.6%	5.3%	15.9%
Secondary	8.6%	5.8%	14.4%	10.0%	7.8%	17.7%
Higher	3.1%	3.3%	6.5%	4.4%	4.9%	9.3%
Total	67.0%	33.0%	100%	65.3	34.7%	100%
Place of Residence						
Urban	19.2%	14.2%	33.4%	18.0%	15.5%	33.5%

Rural	47.7%	18.8%	66.6%	47.4%	19.1%	66.5%
Total	66.9%	33.0%	100%	65.4%	34.6%	100%
Education of Husband						
No	24.0%	11.2%	35.2%	22.1%	10.9%	33.0%
Primary	11.3%	4.8%	16.2%	11.3%	5.0%	16.3%
Secondary	22.4%	11.4%	33.8%	21.9%	11.9%	33.8%
Higher	9.3%	5.5%	14.8%	10.0%	6.9%	16.9%
Total	67.0%	32.9%	100%	65.4%	34.6%	100%
Age of Women						
Less than 35 years	39.9%	18.6%	58.5%	38.9%	19.9%	58.7%
35 year and above	27.1%	14.4%	41.5%	26.5%	14.8%	41.3%
Total	67.0%	33.0%	100%	65.3%	34.7%	100%
Occupation of the Husband						
Agriculture	15.5%	5.9%	21.4%	12.3%	4.0%	16.3%
Blue collar	31.7%	17.0%	48.6%	37.4%	19.7%	57.1%
White collar	17.1%	9.0%	26.1%	14.6%	10.0%	24.0%
Don't work	2.7%	1.2%	3.9%	1.7%	0.9%	2.6%
Total	67.0%	33.1%	100%	65.4%	34.6%	100%
Occupation of the Women						
Agriculture	9.7%	2.9%	12.6%	8.8%	1.9%	10.7%
Blue collar	9.8%	4.4%	14.3%	10.7%	4.7%	15.4%
White collar	1.8%	1.3%	3.1%	1.6%	1.3%	3.0%
Don't work	45.6%	24.4%	70.0%	44.2%	26.8%	71.0%
Total	66.9%	33.0%	100.0%	65.3%	34.7%	100%
Region						
Punjab	39.2%	18.7%	57.9%	37.8%	19.7%	57.5%
Sindh	16.8%	7.2%	24.0%	15.7%	7.4%	23.1%
KPK	7.6%	5.8%	13.5%	8.4%	5.7%	14.1%
Balochistan	3.3%	1.3%	4.6%	2.9%	1.3%	4.2%
Gilgit Baltistan	-	-		0.3%	0.4%	0.7%
Islamabad (ICT)	-	-		0.3%	0.2%	0.5%
Total	66.9%	33.0%	100%	65.4%	34.6%	100%
Wealth Index						
Poorest	15.1%	4.3%	19.4%	22.0%	10.9%	32.9%
Poorer	14.1%	5.8%	20.0%	11.3%	4.9%	16.2%
Middle	13.0%	6.4%	19.4%	21.9%	11.9%	33.8%
Richer	12.8%	7.7%	20.5%	10.0%	6.9%	16.9%
Richest	12.0%	8.7%	20.7%	0.2%	0.1%	0.2%
Total	67.0%	32.9%	100%	65.4%	34.6%	100%

Ethnicity						
Urdu	3.7%	4.4%	8.0%	4.6%	5.0%	9.6%
Punjabi	26.5%	14.8%	41.3%	23.7%	14.8%	38.5%
Sindhi	8.7%	1.8%	10.5%	7.3%	1.6%	8.9%
Pashto	7.8%	5.8%	13.6%	7.8%	5.4%	13.3%
Balochi	2.9%	0.6%	3.5%	3.7%	0.3%	4.0%
English	-	-	-	0.0%	0.0%	0.0%
Barauhi	0.7%	0.1%	0.8%	1.4%	0.4%	1.8%
Siraiki	13.0%	2.6%	15.6%	12.7%	2.6%	15.3%
Hindko	2.1%	0.8%	2.8%	2.0%	1.2%	3.2%
Kashmiri	0.1%	0.0%	0.1%	0.1%	0.1%	0.2%
Shina	-	-	-	0.2%	0.1%	0.4%
Brushaski	-	-	-	0.0%	0.1%	0.1%
Wakhi	-	-	-	0.0%	0.0%	0.0%
Chitrali/Khwar	-	-	-	0.1%	0.3%	0.4%
Balti	-	-	-	0.1%	0.1%	0.2%
Pahari	0.1%	0.1%	0.2%	0.0%	0.1%	0.1%
Potowari	0.1%	0.0%	0.1%	0.2%	0.0%	0.2%
Marwari	0.1%	0.6%	0.7%	0.1%	0.6%	0.8%
Farsi	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
Others	1.2%	1.3%	2.5%	1.4%	1.7%	3.1%
Total	67.1%	33.0%	100%	65.3%	34.7%	100%
Age at First Marriage						
Younger than 14	4.3%	2.5%	6.8%	1.8%	1.2%	3.0%
14-16	20.7%	8.1%	28.7%	18.2%	7.5%	25.7%
17-19	21.4%	9.1%	31.0%	23.4%	10.4%	33.8%
Older than 19	20.6%	12.8%	33.4%	22.0%	15.6%	37.6%
Total	67.0%	32.9%	100.0%	65.3%	34.7%	100.0%

Table 2: Bivariate Analysis of prevalence of consanguineous marriage versus factors

Factors		Chi-Square	Sig.	Chi-Square	Sig.
		2006-07		2012-13	
Education of Women	Pearson	177.950	0.000	378.498	0.000
	Likelihood Ratio	171.451	0.000	368.501	0.000
Place of Residence	Pearson	200.523	0.000	412.252	0.000
	Likelihood Ratio	197.099	0.000	405.369	0.000
Education of Husband	Pearson	21.312	0.003	59.283	0.000
	Likelihood Ratio	21.208	0.003	58.801	0.000
Age of Women	Pearson	9.242	0.007	5.823	0.106
	Likelihood Ratio	9.221	0.007	5.815	0.106
Occupation of the Husband	Pearson	37.890	0.000	165.089	0.000
	Likelihood Ratio	38.667	0.000	168.690	0.000
Occupation of the Women	Pearson	86.156	0.000	263.552	0.000
	Likelihood Ratio	89.801	0.000	285.873	0.000

Region	Pearson	78.735	0.000	53.900	0.009
	Likelihood Ratio	76.396	0.000	52.781	0.010
Wealth Index	Pearson	209.780	0.000	456.711	0.000
	Likelihood Ratio	213.663	0.000	464.376	0.000
Ethnicity	Pearson	729.421	0.000	1136.774	0.000
	Likelihood Ratio	752.782	0.000	1212.625	0.000
Age at first marriage	Pearson	83.828	0.000	185.753	0.000
	Likelihood Ratio	83.670	0.000	184.731	0.000

Table 3: Odds Ratios of Binary Logistic Regression Model for cousin marriage in Pakistan

Factors		Final Model PDHS(2006-07)		Final Model PDHS(2012-13)	
		B	Exp(B)	B	Exp(B)
		Intercept		-0.063	0.939
Education of Women	No Education	0.623*	1.865	.598*	1.819
	Primary	0.430*	1.537	.527*	1.694
	Secondary	0.375*	1.455	.263*	1.301
	Higher	.000 ^a	1.000	.000 ^a	1.000
Place of Residence	Urban	-0.438*	0.645	-.360*	.697
	Rural	.000 ^a	1.000	.000 ^a	1.000
Education of Husband	No Education	-0.346*	0.708	-.402*	.669
	Primary	-0.232*	0.793	-.149	.862
	Secondary	-0.123	0.884	-.093	.911
	Higher	.000 ^a	1.000	.000 ^a	1.000
Age of Women	Less than 35 year	-	-		
	35 year and above	-	-		
Occupation of the Husband	Agriculture	-	-		
	Blue collar	-	-		
	White collar	-	-		
	Don't work	-	-		
Occupation of the Women	Agriculture	-	-	.507*	1.661
	Blue collar	-	-	.072	1.075
	White collar	-	-	-.023	.977
	Don't work	-	-	.000 ^a	1.000
Region	Punjab	0.464*	1.590		
	Sindh	0.424*	1.528		
	KPK	-0.448*	0.639		

	Balochistan	.000 ^a	1.000		
	Gilgit Baltistan	-	-		
	Islamabad (ICT)	-	-		
Wealth index	Poorest	-	-		
	Poorer	-	-		
	Middle	-	-		
	Richer	-	-		
	Richest	-	-		
Ethnicity	Urdu	0.078	1.081	.472	1.603
	Punjabi	0.493*	1.638	.711*	2.037
	Sindhi	1.460*	4.307	1.591*	4.909
	Pashto	.826*	2.283	.494	1.639
	Blochi	1.578*	4.846	2.332*	10.300
	Barauhi	1.634*	5.126	1.204*	3.334
	Siraiki	1.423*	4.151	1.627*	5.087
	Hindko	1.461	4.312	.723*	2.061
	Kashmiri	0.926	2.524	-.189	.828
	Shina			.643*	1.903
	Brushaski			-.305	.737
	Chitrali/Khwar			-.708*	.493
	Balti			-.824*	.439
	Pahari	0.765	2.148	-1.060	.347
	Potowari	1.953	7.046	1.865*	6.457
	Marwari	-2.303*	0.100	-1.911*	.148
	Farsi	1.301	3.673		
	Other	.000 ^a	1.000	.000 ^a	1.000
Age at first Marriage		-0.024*	0.977	-.034*	.967

Table 4: Goodness of Fit of Final Model

PDHS (2006-07)	PDHS(2012-13)
F(9,479)=1.60	F(9,479)=1.03
Prob>F=0.1110	Prob>F=0.4182

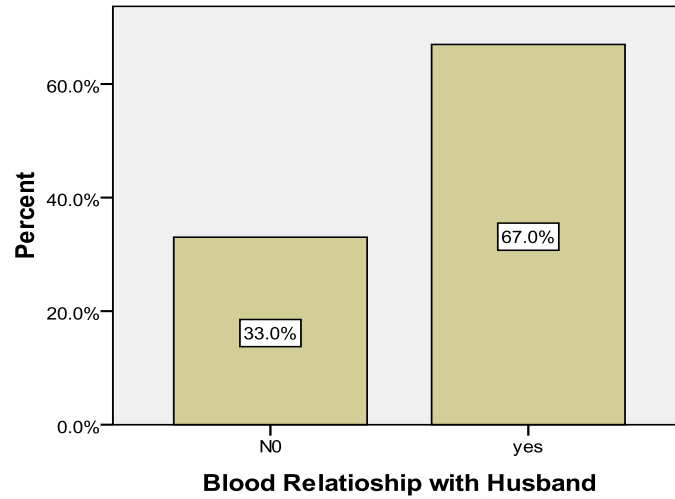


Figure 1: Bar Chart Showing Prevalence of Consanguineous Marriages in Pakistan (PDHS 2006-07)



Figure 2: Bar Chart Showing Prevalence of Consanguineous Marriages in Pakistan (PDHS 2012-13)

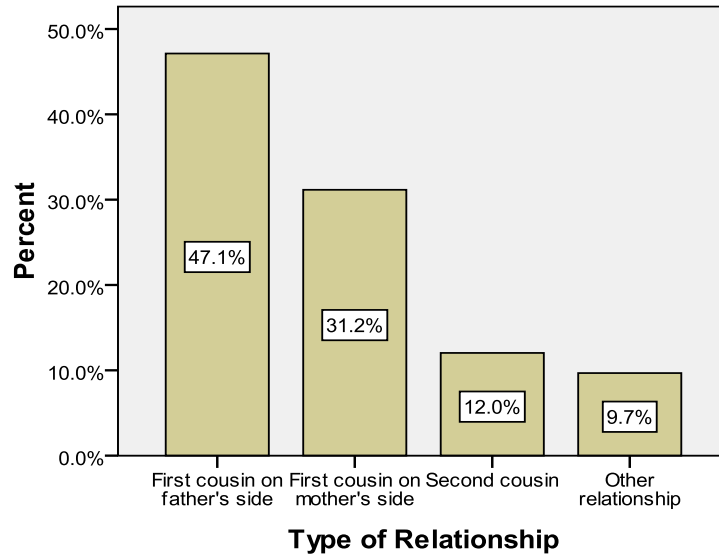


Figure3: Bar Chart Showing Type of Consanguineous Marriages in Pakistan (PDHS 2006-07)

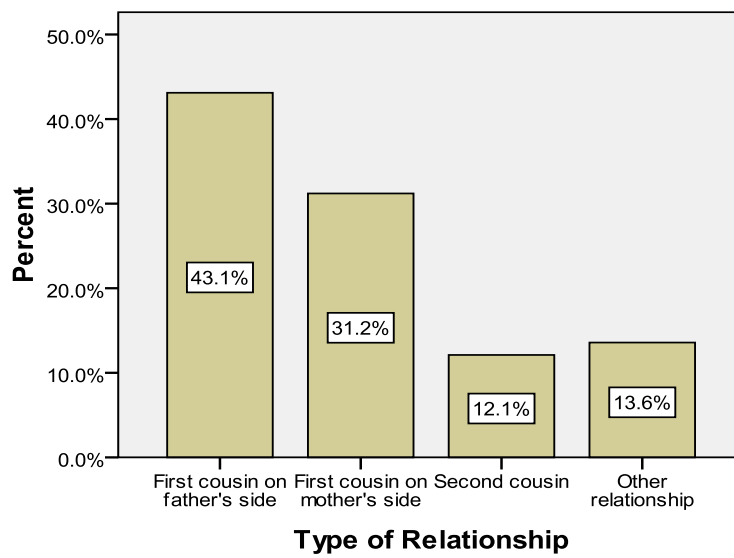


Figure 4: Bar Chart Showing Type of Consanguineous Marriages in Pakistan (PDHS 2012-13)

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