

## Caste Based Endogamy and Health Risks: A Perspective from Punjab, Pakistan

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### Abstract

*Caste endogamy is one of the main and oldest characteristics of Punjab's traditional caste system. Rule of endogamy in Punjab specifies that the spouses must be from the similar caste group. Sociologists have long been studying different aspects of caste and caste based discrimination but endogamy, the central feature of caste has mostly been taken as granted without further concern about its causes and health implications. The present mix method research was intended to explore socio-economic determinants of endogamy and its socio-economic as well as health implications in Punjab. The sample of the present study was comprised of 494 respondents however; responses of 488 respondents were analyzed while 6 responses were excluded for not being complete. Multistage sampling technique was used for the selection of the respondents. The descriptive analysis revealed that genetic diseases were on a high among endogamously married people and their offspring.*

**Key Words:** Endogamy, Caste, Consanguinity, Inbreeding, genetic diseases, *Biradari*, Upper Caste, Lower Caste

### Introduction

Caste endogamy is the practice of seeking a mate or marriage partner from within a close system of group and family. Caste endogamy promotes the consanguinity. On average, first cousin offspring experience an additional 3.7% mortality from approximately 28 weeks gestation to 10–12 years of age. In terms of birth defects, they have an additional median risk of 3.3% (Bittles, 2012).

Endogamy goes further from caste; clan or *biradari* in Pakistan and people customarily express an inclination for weddings in their extended families. The perfect match is usually thought to be between cousins, especially the first cousins (Ballard, 1990; Shaw, 2000; Werbner, 1990). These kinds of marriages are thought to approve and make already prevailing ties stronger and concepts of kinship within the clan or family. Another significant argument supportive to this type of marriage is that the cousins can be expected to be familiar with each other before becoming life partners. Nevertheless, close relationships between cousins can similarly cause difficulties, for instance, if they have well-known each other since premature childhood and communicate to one another as classificatory siblings instead of as probable spouses (Charsley, 2007). Marriage between cousins is similarly imagined to provide easiness to the bride's conversion from being her parents' daughter to be her spouse's partner and the daughter-in-law in the family of his parents. In a cousin marriage, the mother-in-law of bride is already her aunty, which is supposed to indicate that being mother-in-law, she will not be as critical or challenging as she might be with a bride from an unfamiliar family (Charsley, 2005). Tendency of consanguineous marriages in the world is 20 percent and 10.4 percent marriages take place between first and second cousins respectively. In European community this percentage is less than 0.5 percent. However, in Pakistan, about 60 percent couples are married within the same blood, out of which 80 percent are first cousins (Khan et. 2015). Although cousin marriages are very common in Pakistan as well as among Indian Muslims but the holy book *Quran* comprises no particular guidelines that could be construed as encouraging cousin marriages.

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But on the other side the Prophet Muhammad (S.A) wedded his own daughter Fatima to Ali who was his paternal first cousin. Therefore, for Muslims, the cousin marriages can be inferred as following the *Sunnat*, i.e. the conducts of the Prophet Muhammad (S.A) (Hussain, 1999). Several kinds of genetic diseases have been found to be very common amongst consanguineous offspring, for instance genetic disorders (Asha Bai *et al.*, 1981; Agarwal *et al.*, 1991; Centerwall & Centerwall, 1966), as well as neural tube deficiencies (Kulkarni *et al.*, 1989 & Jain *et al.*, 1993) and genetic heart diseases (Afzal, 1994; Gnanalingham *et al.*, 1999; Jain *et al.*, 1993). Apart from above mentioned diseases, autosomal recessive hearing damage diseases (Chen *et al.*, 1997) and visual weaknesses for example early retinal dystrophies (Rahi *et al.*, 1995), primary inherited glaucoma (Panicker *et al.*, 2002) and anophthalmos (Hornby *et al.*, 2001) are also existent at augmented prevalence. Nevertheless, there are no state levels or national statistics for genetic disorders in Pakistan, which actually makes it impossible to derive reliable prevalence rates of diseases. A very little statement can practically be given about disease rates owing to the inclusive lack of statistics but, for instance, an initial estimation that breast cancer seemed to be common in women born to parents who were cousins in Pakistan (Shami *et al.*, 1991) has previously been reinforced by research studies on cases of early-onset, i.e. patients below the age of 40 years (Liede *et al.*, 2002). Khan (2015) conducted a research in Khyber Pakhtun Khan Province of Pakistan and concluded that infant diseases and death rates, autosomal recessive disorder and other genetic diseases are primarily connected to endogamous and cousin marriages. The ever increasing endogamy is causing genetic diseases such as mental disorders including autosomal recessive intellectual disability (ARID) by a mean of 1.1 cases per 100 of severe intellectual disability and 6.2 cases per 100 live births of mild intellectual disability (Ghani, 2016). Children born as a result of incestuous unions have significantly greater risk of disability and death due to genetic disorders and diseases caused by inbreeding and vulnerability to disease pathogens (Awoyemi, 2014).

The tendency of marriages between castes, clans and cousins should not be encouraged as the amount of offspring suffering from a cluster of inherited diseases, named Lysosomal Storage Disorder in medical vocabulary, is going up year by year. Children suffering from this genetic disease do not stay alive for more than 5 years if their disease is not diagnosed and cured as soon as possible. Treatment of Lysosomal Storage Disorder changes consequence from a miserable loss of life to a normal life but the treatment is very costly (Khan *et al.*, 2015).

A substantial attention is usually paid to the important role of cousin marriages as a contributing element in the prevalence of inherited disorders or diseases. Simultaneously, the probable effect of endogamous marriages on all levels of homozygosity and profiles of disease are still generally under-explored. With the continuing worldwide epidemiological evolution from infectious to non-communicable diseases, the effect of inherited disorders will grow into increasingly significant and a comprehensive understanding of the determining factor of human population genomic/genetic structure will all be more compulsory. Particularly, the genetic or inherited parts of adult onset disorders/diseases will turn out to be clearer and take on greater importance (Bittles, 2005). Practice of endogamous marriages may bring about a particular group's extinction instead of its long term existence, as genetic disorders and diseases may develop and badly affect the health of a large number of people in a population. An obvious example of dangers of endogamous marriages is the near extinction of an ethno-religious group named Samaritans as a consequence of their non-acceptance of people from other groups to their group and inbreeding (Awoyemi, 2014). Numerous elements mediate the effect of endogamous marriages on gene pools of a community, for example the number of community or caste founders, community size, community age, the rigidity or flexibility of community's marriage limitations, and amalgamations of population

through time, as well as religious conversions. Even though each of mentioned variables can impact the structure of endogamous populations, but these variables are basically specific to community in their effect on gene pool structure. Nevertheless, the net effect will be an enlarged percentage of homozygotes in a population overall (Bittles, 2005; Overall & Nichols, 2001). The additional danger that an autosomal recessive disorder (ARD) will be communicated in the offspring of couples in consanguineous unions is contrariwise proportionate to the rate of the disorder or disease allele(s) in the pool of gene. Therefore, in the course of the previous years, numerous uncommon genes of diseases have been found, and these disease's chromosomal localities recorded, by reviewing genetically sequestered people and exceedingly inbred families with numerous affected affiliates. These diseases and disorders are frequently explicit to individual castes, clans or tribes (Teebi & Farag, 1997). Apart of cousin marriages, it will be probable that founder impact and casual drift also function and affect the prevalence of genetic disorders and diseases because of their often small effective population sizes (Bittles, 2005). Apart from social stratification, caste discrimination and low economic mobility, endogamy encourages cousin marriages and because of consanguinity the offspring's health is affected. Children born in a result of inbreeding and endogamy often inherit genetic diseases from their parents. The present study has investigated causes of peoples' preference to marry within their caste as well as negative consequences of endogamous marriages.

### **Methodology**

The research design is the overall strategy that guides the researcher to collect and analyze the data. It is a scientific approach of measurement of the variables in a logical and coherent way with the ultimate objective to reach the empirical evidence (Bernard & Bernard, 2012). The cross sectional study was conducted in Punjab province. The population for the present research was men and women of Punjab province who were married within their castes (Endogamously). The sample of the present study was comprised of 494 respondents however; responses of 488 respondents were analyzed while 6 responses were excluded for not being complete. Multistage sampling technique was used for the selection of the respondents. At first stage, three districts (Faisalabad, Multan and Rawalpindi) were selected randomly from each of the three administrative zones of the Punjab province. At second stage, two tehsils from each selected district were selected randomly. Jaranwala and Chak Jhumra Tehsils were selected from district Faisalabad, Gujar Khan and Kalar Syedan Tehsils were selected from district Rawalpindi whereas Multan Sadar and Shujabad Tehsils were randomly selected from district Multan. At third stage, one urban and one rural union council/ward was randomly selected from each Tehsil. So, in total 12 union councils/wards were selected. At fourth stage, one village/*mohallah* was selected randomly from each rural and urban union council or ward. At fifth and last stage respondents from each village/*mohallah* were selected randomly for face to face interviews. Furthermore, the chosen sample was divided proportionately among all villages/*mohallahs* on the basis of the number of endogamously married people in every village or *mohallah*. It is to clarify that the proportion of the respondents was drawn after the researcher prepared lists of endogamously married people in each village/*mohallah* with the help of local union council secretary or *numberdar*. A structured interview schedule was prepared for data collection. The collected data were analyzed through Statistical Package for Social Science (SPSS).

## Results and Discussion

### Socioeconomic and Demographic Characteristics of the Respondents

Characteristics of the Respondents	Frequency	Percentage
<b>Age at Marriage (Years)</b>		
16-20	118	24.2
21-25	209	42.8
26 and above	161	33
<b>Sex of the Respondent</b>		
Male	267	54.7
Female	221	45.3
<b>Total Household Monthly Income (Rupees.)</b>		
20000	180	34.8
20001-35000	205	42
35001-Above	113	23.2

Above table shows that one fourth 24.2 percent respondents were from age category of 16-20 years and 42.8 percent respondents were from age group of 21-25 years at the time of marriage. One third respondents 33 percent got married after 26 years of age. Above table also shows that a majority (54.7%) of the respondents was males while 45.3 percent of the respondents were females. The results from current year's countrywide census indicate that males have outnumbered females in Pakistan. According to census 2017, males comprise 50.8 percent of country's total population while females' ratio is 49.2 percent. Majority of the respondents in present study were males, not only because they are more in numbers than females but also because Punjabi society is a male-dominated society where females mostly are not allow to interact with unknown persons outside of the family.

Findings show that a little more than one third 34.8 percent respondents had total household monthly incomes up to 20000 Pakistani rupees whereas 42 percent respondents had total monthly incomes of between 20001-35000 Pakistani rupees. A little less than one fourth 23.2 percent respondents had more than 35000 Pakistani rupees monthly incomes. But it is pertinent to mention here that most of the people in Pakistan don't usually report their informal income related to agriculture and livestock.

#### Type of Family

Extended	36	7.4
Joint	278	57.0
Nuclear	174	35.7

#### Educational Level of the Respondents

Illiterate	50	10.2
Up to Primary	74	15.1
Matric	184	37.7
Intermediate and above	190	38.9
Total	488	100.0

Over half of the respondents (57%) were living in joint families. More than one third (35.7%) of the respondents were living in nuclear families while only 7.4 percent of the respondents were living in extended families. Most of the people in urban localities of Punjab live in nuclear families while a very few live in joint families. While in rural localities, most of the people live in either extended or joint families but with the changing cultural values and increasing urbanization, family structures are rapidly changing in the Punjab province. The number of extended families is decreasing while number of nuclear families is increasing year by year. Ahmed & Ali (1992) stated that extended and joints family arrangements are

common norm in Punjab, Pakistan. Over 60 percent of the households in the province have three or more adults while only one-third has two or less adults.

Table depicts that 10.2 percent of the respondents were illiterate while 15.1 percent had up to primary level education. Data points out that more than one third 37.7 percent of the respondents had passed up to 10<sup>th</sup> grade of education. 38.9 percent of the respondents had completed 14 years of their education and 7.8 percent had post-graduation degrees. Only a few (1.6%) of the respondents were having M. Phil, PhD or postdoctoral degrees. A person's educational level does have an impact on his outlook in a particular caste or family. Educated persons usually have more say in their families than uneducated ones. According to the latest census, Pakistan's overall literacy rate is 57 percent while female literacy rate is just over 40 percent. Literacy rate in rural areas is lower than the urban localities.

Table : Socioeconomic and Demographic Characteristics of the Respondents

Characteristics of the Respondents	Frequency	Percentage
<b>Pre-marital Relation with Spouse</b>		
First cousin	143	29.3
Second cousin	88	18.0
Relative	142	29.1
No family relation	115	23.6
<b>Present Living Area</b>		
Urban	204	41.8
Rural	284	58.2
<b>Status of Respondent's Medical Screening Before Marriage</b>		
Yes	8	1.6
No	480	98.4
<b>Status of Respondent's Spouse's Medical Screening Before Marriage</b>		
Yes	26	5.3
No	462	94.7
Total	488	100.0

During survey, respondents were asked about their familial relationships before their marriage. Results obtained from this study show that a little less than one third (29.3%) of the respondents were first cousins while 18.0% were second cousins before their marriage. 29.1% husbands and wives were married in their extended families and were relatives before their marriage. Data indicates that only a little less than one-fourth (23.6%) of the respondents had no familial/blood relationship before marriage but still they belonged to the same caste. Khan (2015) of University of Health Sciences Lahore (UHSL) reported in his study that in Pakistan, approximately 82.5 percent of parents are blood kin of 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> generations and so on. He further argued that in Pakistan only around 4.4 percent of the couples are wedded outside of their extended families, castes or brethren.

The above table shows that a majority (58.2%) of the respondents was living in rural areas while 41.8 percent of the respondents were urban residents. According to Pakistan's population census of 2017, about 60 percent of country's population lives in rural areas while remaining 40 percent resides in urban localities.

It was thought-provoking that a huge majority (98.4%) of the respondents did not undergo medical screening before their marriage. Data highlights that a vast majority of 94.7 percent of the respondents reported that their spouses did not undergo medical screening before marriage.

Al Sulaiman, et al (2008) narrated that blood screening before marriage is among most vital techniques to prevent genetic disorders, congenital anomalies as well as other medical and psycho-social problems associated with marriage. But more than 90 percent people in Pakistan don't tend to undergo premarital blood screening that's why genetic disorders and diseases are very common in Pakistan. The findings of the current research indicate that there is a dire need of awareness among masses about health implications of cousin marriages as well as importance of premarital blood screening in an endogamous society like Pakistan.

### Responses of Respondents about Health Implications of Caste Endogamy

Items	Frequency	Percentage
<b>Do you know that endogamy can give birth to genetic diseases</b>		
Yes	211	43.2
No	277	56.8
<b>Do you know that endogamy is a cause of chronicle diseases</b>		
Yes	199	40.8
No	289	59.2
<b>Respondent or their family members suffering from Thalassemia</b>		
Yes	33	6.8
No	455	93.2
<b>If Yes, known causes</b>		
Not known	12	75.0
Cousin marriages	4	25.0
<b>Respondent or their family members suffering from Cardio Vascular disease</b>		
Yes	227	46.5
No	257	52.7
<b>If Yes, known causes</b>		
Not known	107	47.1
Being overweight	36	15.9
Genetically transferred	48	21.1
Smoking	21	9.3
Unhealthy diet	15	6.6
<b>Respondent or their family members suffering from high blood pressure</b>		
Yes	231	47.3
No	257	52.7
<b>If Yes, known causes</b>		
Not known	113	48.9
Being overweight	41	17.7
Genetically transferred	52	22.6
Smoking	25	10.8
<b>Respondent or their family members suffering from diabetes</b>		
Yes	167	34.2
No	321	65.8
<b>If Yes, known causes</b>		
Not known	65	38.9
Obesity	29	17.4
Genetically transferred	73	43.7

As indicated in the table above, findings depict that less than half (43.2%) of the respondents said that they had heard about relationship of endogamy with genetic diseases. A majority (56.8%) of the respondents didn't know that endogamy could cause genetic diseases. Data noted that just above one-third (40.8%) of the respondents were aware that endogamy could give birth to chronic diseases while majority (59.2%) of the respondents knew nothing about it. Bittles 2012 and Hamamy et al. 2011 argued that although belongingness of spouses to the same caste may not essentially have been the reason of genetic and chronic diseases in that particular family but endogamous marriages have been informed to have an effect on genomic risk within a particular community. Ajaz, Ali, & Randhawa (2015) found in their research conducted in Pakistan that most of their research participants did not know about health risks associated with caste endogamy. They reported that only a small number of research participants had knowledge about endogamy's potential risks.

Results show that 6.8 percent of the research respondents or their family members were suffering from thalassemia while an enormous majority (93.2%) of the respondents said that they or their family members were not suffering from thalassemia. A majority (75%) of the respondents among those who said that they or their family member were suffering from thalassemia didn't know this disease's causes. One-fourth (25%) of the respondents said that it was because of cousin marriages. According to the official statistics of Thalassemia Foundation of Pakistan, it is among most common genetic disorders in Pakistan, with an occurrence ratio of 6 percent in the country's population. However due to illiteracy and ignorance, most of the people are not aware of its presence and causes. Bagheri, Farvardin & Saadat (2015) reported that children born in a result of endogamous marriages are at greater risk of diseases like hypertension, vision loss, gastro-intestinal syndromes, heart defect, hearing deficit congenital defects, diabetes and thalassemia. Hamamy (2012) found that closer the genetic relation between spouses; more are the chances that their children will receive identical detrimental recessive genes.

Table 11 further shows that a good percentage (46.5) of the respondents said that they or their family members were suffering from cardiovascular disease. While more than half (52.7%) of the respondents said that they or their family members were not suffering from this disease. About half (47.1%) of the respondents among those who said 'yes' to the previous question didn't know the causes of cardiovascular disease. Only 15.9 percent of the respondents said that they or their family members were suffering from this disease because of obesity. Less than one-fourth (21.1%) of the respondents said that the disease genetically transferred while only 9.3 percent and 6.6 percent of the respondents said that smoking and unhealthy diet respectively caused cardiovascular disease. According to Shifa International Hospital's official statistics (2017), Pakistan's population is among those populations in the world that have highest risk of cardiac diseases. About 30 to 40% of people die because of cardiovascular diseases in the country. The risk of heart diseases is higher among offspring of endogamously married couples.

About half (47.3%) of the respondents said that they or their family members were suffering from high blood pressure while more than half (52.7%) of the respondents answered no. When asked about known causes, nearly half (48.9%) of the respondents didn't have any knowledge about the causes of high blood pressure. Less than one-fourth (17.7%) of the respondents said that obesity or being overweight caused high blood pressure while 22.6 percent of the respondent said that the disease genetically transferred. Only 10.8 percent of the respondents said that smoking was the main cause behind high blood pressure. National health survey conducted by Pakistan Medical Council revealed that blood pressure/hypertension was prevalent at the ratio of 18 percent among citizens of over 15 years of age in Pakistan. Survey also revealed that prevalence rate of hypertension was 16.2 percent in rural residents and considerably higher (21.6%) in urban residents. Results of present study

suggest that prevalence of high blood pressure was significantly higher as compared to overall population among those people who were practicing caste endogamy.

Findings show that about one-third (34.2%) of the respondents or their family members were suffering from diabetes. A majority 65 percent of the respondents or their family members were not suffering from this disease. When asked about known causes of diabetes, more than one-third (38.9%) of the respondents had no knowledge about it. An alarming 43.7 percent of the respondents said that the disease was genetically transferred while only 17.4 percent said that they or their family members were suffering from diabetes because of obesity. According to a report published in Dawn (2017), over 7 million people in Pakistan are suffering from diabetes while another 7 million are at the risk of becoming victim of this disease if no precautionary actions are taken. According to an estimate by researchers of Agha Khan University, number of people with diabetes can reach up to 14.4 million by 2040.

#### **Awareness of Respondents About Endogamy Being A Cause of Genetic Diseases**

	Chi-square value	d.f	P-value
Type of family	3.84	3	0.47
Education of respondents	7.42	5	0.02
Area of residence	6.69	5	0.03
Monthly income	9.57	6	0.00
Sex of respondents	5.34	4	0.04

Table shows the association with socio-demographic variables and awareness of respondents about endogamy being a cause of genetic disease. Chi-square analysis shows that type of family and had not any significant relation with awareness about genetic disease ( $p < 0.05$ ). While education of the respondents, area of residence, monthly income, and sex of respondents had significant association with awareness about endogamy being a cause of genetic diseases ( $p > 0.05$ ).

#### **Association Between Consanguinity And Prevalence of Diseases**

	Chi-square value	d.f	P-value
Thalassemia	10.21	8	0.00
Blood Pressure	9.52	8	0.00
Diabetes	6.33	3	0.03
Cardiovascular diseases	7.62	4	0.01

Table shows the pretty good association between consanguinity and prevalence of diseases. Data shows that thalassemia, blood pressure, diabetes and cardiovascular disease had significant association with consanguinity marriage ( $p < 0.05$ ).

#### **Conclusion**

The current research revealed that only a small number of respondents had any kind of knowledge about caste endogamy's potential health risks and its relation with genetic diseases. Researchers suggest that population of Pakistan is sub-divided into hundreds of endogamous castes and sub-caste that with the passage of time have evolved into idiosyncratic breeding pools. These pools have different genetic diseases that are transmitted



generation to generation by practicing endogamy. The results of the present study depicted that genetic diseases like Thalassemia, Cardio Vascular Disease, high blood pressure and Diabetes were on a high in endogamously married people and their offspring.

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