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Association of Consanguineous Marriage with Sociodemographic Characteristics of Parents and its Impact on Mortality and Morbidity in off Springs: Analytical Study from Punjab, Pakistan

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ABSTRACT

Objective: This study aims to fill the gap in literature by demonstrating the significance of Sociodemographic determinants and its impact on mortality and morbidity in off springs of consanguineous couples in Punjab, Pakistan.
Study Design: Cross-sectional analytical study.
Place and Duration of Study: Online study on married couples in Punjab Pakistan, from Nov 2021 to Mar 2022,
Methodology: Married couples of both the consanguineous and non-consanguineous marriages who were able to participate and understand questions in survey were included. Sample size of 338 was calculated using Open epi info software. Keeping in view the response rate of 76% forms were distributed to 400 participants. Sampling technique uses was non probability purposive sampling. The questionnaire included Sociodemographic information and questions related to morbidity and mortality in off springs for qualitative variables, relevant frequencies and percentages were determined. Chi square test was applied to determine relationship between two qualitative variables, a *p*-value of 0.05 was considered statistically significant.
Results: Total n=193(64%) were non-consanguineous couples, while n=107(36%) were consanguineous. Majority were between 46-60 years of age and monthly income of Rs. 71,000-90,000 Almost one third was graduates=91(30%) and post graduates n=84(28%).The prevalence of diseases came high in children of consanguineous families n=13(4%) as compare to non-consanguineous. There was a significant association between type of marriage disease (p=0.001) and under-five mortality in children (p=0.003).
Conclusion: The children born to consanguineous couples exhibited more burden of inherited disorders than children born to non-consanguineous couples.

Keywords: Consanguineous marriage, Consanguinity, Morbidity, Sociodemographic Under-five mortality.

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INTRODUCTION

Since the beginning of humanity, consanguineous marriage has been a constant occurrence. An approximate estimate indicates that 20% of the world's population lives in communities where consanguineous marriages are preferred.[1] Nearly one fourth of the global population lives in communities where consanguineous marriage is a traditional and respected social trend of marital union.[2]

Consanguineous marriages (CMs) have historically been common in lots of cultures around the world. Despite being forbidden by law in some nations and forbidden by other religions, such as Catholicism and Hinduism, CMs are frequently used in the Middle East, Northern Africa, and South Asia. The propensity for consanguinity in South Asian and Middle Eastern communities is heavily influenced by sociocultural aspects, such as shared geography, ethnicity, culture, and religion.[3] In communities with high rates of consanguinity, CM is generally preferred because it preserves family line of descent, makes it easier for stakeholders to find a compatible spouse, elevates female status and fosters better relations with in-laws, lowers marital costs, increases the possibility of receiving better care for people in their older life, and, most importantly, fosters better marital relationship stability.[4] The importance of consanguineous marriage has increased as a result of recent advances in social sciences and public health studies. Consistently, studies have indicated that Pakistan, a multiethnic nation with a variety of caste systems, has the highest rate of consanguineous marriages.[5] CM is also observed in Europe, Australia, and North America, albeit less frequently.[6] CM is positively associated with a higher chance of autosomal recessive genetic illnesses in the offspring, notwithstanding the socioeconomic benefits.[7] Besides, Parental consanguinity could be a predisposing factor for several multifactorial complications including obesity, cardiovascular disorders, diabetes

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and few malignancies, which can influence the reproductive outcomes.[8] At the same time several studies challenge the influence of CM on intricate, multifactorial health conditions It is difficult to distinguish the evaluation of the overall negative effects of CM from the epidemiological setting because it is highly varied.[9]. Pakistan has an economy with a lower-middle income that is overpopulated (around 220 million people). Due to insufficient resources, the country struggles to maintain living standards. It should be noted that Pakistan has not yet begun offering any national genetic counselling services. This study aims to fill the gap in literature by demonstrating the significance of Socio-demographic determinants and its impact on mortality and morbidity in off springs of consanguineous couples in Punjab, Pakistan.

METHODOLOGY

This cross-sectional analytical study was conducted online on married couples in Punjab, Pakistan. The duration of study was four months from November 2021 to March 2022.

Sampling technique uses was non probability purposive sampling. Sample size was calculated by using Open epi info sample size calculator with hypothesized percentage frequency of outcome factor in population as 65%,[10] with confidence limit as 5%, a sample size of 338 was calculated. The questionnaire was created using questions that were addressed and validated in previously published studies.[11] The questionnaiere included sociodemographic information & questions related to morbidity and mortality in off springs.

Inclusion Criteria: Married couples of both the consanguineous and non-consanguineous marriages that were cognitively able to participate and understand questions in survey were included.

Exclusion Criteria: Those who didn't give consent, those without kids, single, divorced, widowed and infertile couples study were excluded from study.

Data was collected using modified version of questionnaire built by Department of Genetic Engineering and Biotechnology, School of Life Sciences, Shah Jalal University of Science and Technology, Sylhet, Bangladesh.[12]

The couples were explained about the purpose of study and were instructed to fill the questionnaire. Data were entered and analyzed with Statistical package for social sciences SPSS 21. For qualitative variables frequencies and percentages were determined. Chisquare test was applied to determine relationship between two qualitative variables, a *p*-value of 0.05 was considered statistically significant.

Study was approved by the ERC of AMC, NUMS (ERC/ID/23). In order to guarantee anonymity and secrecy, personal information like name and home address was protected by locking questionnaires into cupboards. Only the researcher had access to the password-protected statistical programme utilised for the analysis

RESULTS

Keeping in view the response rate of 76%,[11] forms were distributed to 400 participants and n=352 questionnaires were returned making a response rate of 88%. Over all n=300(85%) questionnaires were finally included in the study as n=52(14%) questionnaires were not filled properly. Out of these, n=193(64%) were non-consanguineous couples, while n=107(36%) were consanguineous. Majority of the husbands, n=253 (85%) and wives n=233(78%) were between 46-60 years of age. A greater number of participants n=115(38%) had monthly income of Rs. 71,000-90,000 More than one fourth of the husbands were graduates=91(30%) and post graduates n=84(28%). The socio demographic characteristics of the study partici-pants are shown in the (Table-I). Almost half of the consanguineous couples were Jutt 23(21%) and Rajput n=23(21%) followed by Mughals n=18(15.9%) while Non consanguineous marriages were most prevalent among Arains, n=47(23.9%). The prevalence of diseases came high in children of consanguineous families n=13(4%) as compare to non-consanguineous n=4(1%). Out of consanguineous couples, n=4(3%) had cases of Type-1 diabetes mellitus in their children, n=1(1%) case of thalassemia, n=2(2%) cases of hypertension, n=2(2%) cases of physical disability and n=2(2%) case of growth retardation, n=5(4%) cases of delayed developmental milestones and n=2(1%) case of growth retardation, while n=187(97%) of the consanguineous families had no history of disease in their children. On the other hand, out of non-consanguineous families, there were n=3(1.5%) cases of diabetes, no case of thalassemia, n= 5(2.5%) cases of hypertension, n=2(1%) cases of mental disorder, and n=1(0.5%) case of physical disability, while n=186(94.4%) non-consanguineous families had no history of disease in their children (Table-II). Almost half of consanguineous couples earned between 31,000-50,000rps while more than half n=115(38%) of non-consanguineous couples earned between 71,000 -90,000rps. There was a significant association between

Table-I: Sociodemographic Characteristics of Study Participants

Type of Marriage	n(%)
Consanguineous	107(36)
Non consanguineous	193(64)
Age of Husband(years)	
Less than 45 years	11(4)
46-60 years	253(85)
61-75	30(9)
More than 75 years	6(2)
Age of Wife	
Less than 45 years	45(15)
46-60 years	233(78)
61-75	18(6)
More than 75 years	4(1)
Monthly Income	
10,000-30,000	41(14)
31,000-50,000	81(27)
51,000-70,000	63(21)
71,000-90,000	115(38)
Caste	
Malik	9(4)
Baloch	22(7)
Shiekh	21(7)
Butt	25(8)
Pathan	28(9)
Mughal	31(11)
Jutt	49(16)
Rajput	52(17)
Arain	63(21)
Husband's Education	
Uneducated	11(4)
Under matric	10(3)
Matric	63(21)
Fsc/Finearts	41(14)
Graduation	91(30)
Postgraduate	84(28)
Total	**300**

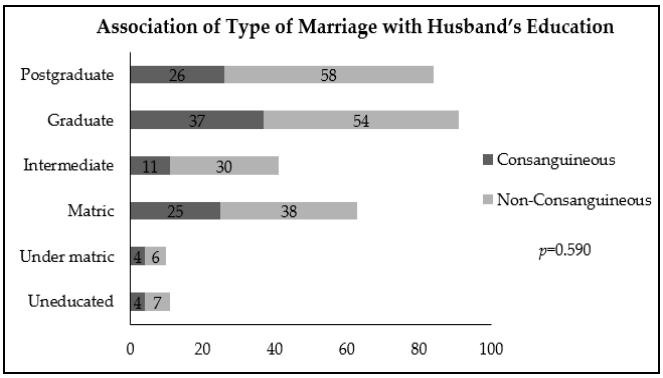
Table-II: Association of type of marriage with monthly income, disease in children and under-five mortality

Variable	Type of Marriage		*p*-value
Monthly Income	**Consang-uineous**	**Non consanguineous**	
10,000-30,000Rs	9(3)	32(11)	0.002
31,000-50,000Rs	40(13)	41(14)	
51,000-70,000Rs	27(9)	36(12)	
71,000-90,000Rs	31(10)	84(28)	
Disease in Child			
Yes	13(4)	4(1)	0.001
No	94(31)	189(64)	
Under Five Mortality			
Yes	21(7)	10(3)	0.003
No	86(29)	183(61)	

monthly income and type of marriage (p=0.002). There was also significant association between disease in children and type of parents' marriage (p=0.001) Amongst all participants n=13(4%) had disease in children while only n=4(1%) had disease in children. Chi square test of significance also revealed significant association between type of pa-rents' marriage and under-five mortality in children (p=0.003). Under 5 mortality rate was also high in children of consan-guineous families n=21(7%) as compared to those of non-consanguineous families n=10(3%). A significant asso-ciation was found between consanguineous marr-iages in relatives and disease in children of relatives who had consanguineous marriage.p=<0.05). (Table-III).

Table-III: Association of Consanguineous Marriage with Type of Disease in Children

Diseases in Children	Consanguine ous Marriage n(%)	Non Consanguineous Marriage n(%)	*p*-value
Diabetes	4(3)	2(0.5)	0.175
Hypertension	2(2)	0(0)	
Thalassemia	1(1)	0(0)	
Structural Abnormality/ Physical Disability	3(3)	1(0.5)	
Delayed Developmental Milestones	5(4)	2(0.5)	
Growth retardation	2(0.5)	2(0.5)	
None of the Above	89(84)	187 (97)	
Total	107(100)	193(100)	



Figure–1: Association of type of marriage with husband's education

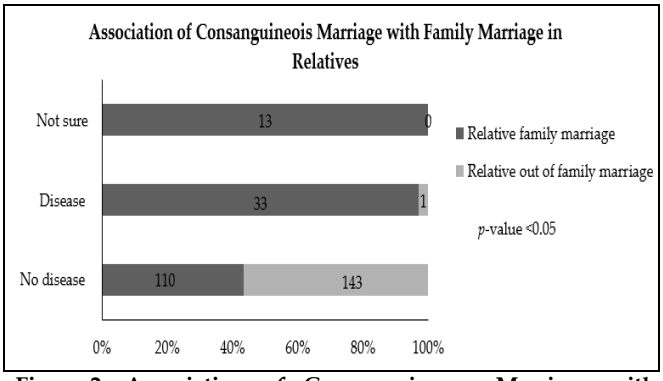


Figure-2: Association of Consanguineous Marriage with Family Marriage in Relatives

DISCUSSION

This study was done to assess prevalence of consanguineous marriages and its impact on morbidity and mortality in offspring of married couples in Punjab, Pakistan. Over all almost one third of the couples were consanguineous and there was increased trend of consanguinity found in less affluent couples. The findings of study revealed significant impact of consanguineous marriages on diseases and under –five mortality in the off springs

Epidemiological studies reveal a marked rise in the health burden of consanguinity, particularly in emerging nations where intra-familial marriages are encouraged by socioeconomic and religious factors.[13] Pakistan is one of those nations with the highest prevalence of consanguinity that is still popular.[14]

The prevalence of first-cousin marriages in the current study was 36% which is contrary to a research conducted in Bangladesh where only% prevalence of consanguineous marriage was found out though Bangladesh is a same low Middle Income Muslim country like Pakistan. A secondary data analysis of trends of consanguinity in Pakistan revealed a mixed trend Consanguineous marriages increased in Pakistan from 63.0% in 1990–1991 to 67.9% in 2006–2007, but then fell to 66.2% in 2012–2013 and 63.6% in 2018. contrary to these finding our study findings revealed lesser prevalence.[15]

Majority of the husbands, n=253(85%) and wives n=233(78%) were between 46-60 years of age.A greater number of participants n=115(38%) had average monthly income. Similar to study conducted in KSA,[16] More than one fourth of the spouse were graduates= 91(30%) and post graduates n=84(28%) which is contrary to a study conducted in Punjab, Pakistan where 57% were uneducated,[11]

There was no significant association of education with type of marriage. However a study conducted in Pakistan revealed significant association of type of marriage with education.[17] The insignificant association between education and consanguinity has also been noted in earlier studies from Japan, Turkey, Pakistan, Iran, and Yemen.[13] There was lesser prevalence of consanguineous marriages in educated spouses. Evidence from Saudi Arabia also documented similar results. Reduced consanguinity rates were seen among educated men and women, according to study con-ducted in Riyadh Saudi Arabia by Alahdal, *et al*.[16]

Almost half of consanguineous couples earned had low monthly income while more than one third of non-consanguineous couples had average income There was a significant association between monthly income and type of marriage (p=0.002). Which is in line with the evidence from Saudi Arabia.[16] Better socioeconomic situations can lower the likelihood of CM because parents are less likely to accept it as a way to save money on wedding expenses these findings are consistent with the sdystematic review done by Hemant, *et al*.[18]

The prevalence of diseases came high in children of consanguineous families n=13(4%) as compare to non-consanguineous. There was also significant association between disease in children and type of parents' marriage (p=0.001) Prevalence of disease in children of consanguineous couples was more than non-consanguineous A significant association was found between consanguineous marriages in relatives and disease in children of relatives who had consanguineous marriage p=<0.05). Findings of this study corresponds to the previous researches that consanguineous marriages are associated with adverse outcome in the offspring.

They are more prone to delayed milestones as well as various genetic disorders like thalassemia and delayed milestones this is in line with a study finding of research conducted by Chauhan *et al*.[19] These findings are consistent with a national survey done in Turkey.[20] For all cases, there was a substantial difference in the prevalence of delayed milestones, cancer, blood disorders, mental disorders, heart illnesses, hypertension, and diabetes mellitus in the offspring of consanguineous parents versus non-consanguineous parents. All identified illnesses were more prevalent in marriages between relatives.[21] This study focuses on educating families about the health risks and implications of consanguinity by raising public aware ness, disseminating information, encouraging health education, and enhancing family communication.

It is not surprising to attribute CM as one of the causes of diseases having a genetic base in places like Pakistan where non-communicable diseases, including multifactorial and genetic illnesses, are on the rise as a leading cause of death. In order to assess CM's potential as a risk factor for the development of hereditary and multifactorial disorders, Chi square test of significance also revealed significant association between type of parents' marriage and under-five mortality in children (p=0.003). Under 5 mortality rate was also high in children of consanguineous families n= 21(7%)

as compared to those of non-consanguineous families n=10(3%). Research conducted in India confirm the link between consanguineous marriage and under five mortality in children of consanguineous marriages.[22]

The prevalence of genetic disorders due to consanguineous marriage are still high in Pakistan. It essences the need for genetic counselling from premarital to post natal levels in Pakistani families since increase in genetic disease burden is associated with burden on health care system and reduced effective manpower of country in addition to the ordeal to which the family of affected individuals is subjected.

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LIMITATIONS OF STUDY

Results must be evaluated in light of the study's limitations. Since this is a cross-sectional study, the analysis may have misclassified some subjects. Results may not be generalizable to the population of all married individuals because the majority of the study sample consisted of couples of Punjab and urban areas, many of whom had quite high socioeconomic and educational standing.

CONCLUSION

This study implies that CM is associated with the occurrence of hereditary and multifactorial diseases and congenital anomalies in Punjab. We found out in our study that children born to consanguineous couples exhibited more burden of inherited disorders than children born to non-consanguineous couples. However, the pattern and breadth of the disease's consequences may not be uniform, necessitating more in-depth research. Health authorities, healthcare professionals, genetic consultants, or academicians could weigh the potential social, cultural, and economic benefits of consanguineous marriage against its potential detrimental effects on offspring's genetic risks. Our study essences the necessity of mass health education and genetic counseling programs in understanding the role of CM in reproductive consequences, hereditary, multifactorial, and congenital diseases.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

NAT: Conception, Design, Write up, Review of manuscript & approval for the final version to be published.

BASA: Analysis and interpretation, Write up, Review of manuscript & approval for the final version to be published.

AHB: Data Collection and Entry methodology & approval for the final version to be published.

AA: Data colllection, Entry analysis & approval for the final version to be published.

MZ: Data collection and Entry referencing, Analysis & approval for the final version to be published.

HA: Data collection and Entry analysis, Interpretation & approval for the final version to be published.

UM: Data collection and Entry referencing & approval for the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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