ORIGINAL ARTICLE

PREGNANCY OUTCOMES OF CONSANGUINITY AMONG ANTENATAL PATIENTS ATTENDING COMBINED MILITARY HOSPITAL QUETTA, PAKISTAN

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Background: All definitions of consanguinity encompass the basic concept of close blood relation. Highest rates of consanguineous unions are observed for North and Sub Saharan Africa, Middle East, and west, central and south Asia, where 20–50% marriages are consanguineous. In Pakistan, we can hardly find any rigorous research on the pregnancy outcomes of consanguinity except those conducted by Allan Bittles. This study was conducted with the objective to measure statistically if there existed any association of consanguinity with pregnancy outcomes in the form of stillbirths, abortion and Rh-incompatibility. **Methods:** This cross sectional analytical study was conducted at the Obstetrics department of Combined Military Hospital Quetta, Pakistan from 1st November 2017 to 28th February 2018. All pregnant women visiting Out Patient Department were included. Women unwilling to participate or needing emergency intervention were excluded. Sample size, i.e., 384 was calculated using online OpenEpi calculator and simple random sampling technique was applied. A structured interviewer administered questionnaire was used to extract retrospective information. Descriptive statistics, 95% Confidence Intervals, Chi-Square test and Contingency Coefficient were calculated using SPSS Version 20. Results were regarded significant at $p<0.05$. **Results:** Out of 384 study participants, 188 (48.9% with 95% CI:43.9–53.9%) were married to first cousins. Mean±SD age of the study participants was 27.5±4.8 years. Difference between stillbirth, and abortion among consanguineous unions and non-consanguineous unions was significant while that of Rh-incompatibility was non-significant. **Conclusion:** Large population based studies are needed before declaring consanguinity as a health problem in our setting.

Keywords: Consanguinity; Stillbirth; Abortion

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INTRODUCTION

Consanguinity can be defined as the fact of being descendants of the same ancestor.[1] Consanguineous marriages are the unions between individuals having a common ancestor or the union between a man and a woman having blood relation.[2–4] In medical literature, it is usually defined as the union of a couple being second cousins or closer.[5] In earlier studies, it is defined as the union of a couple sharing at least one ancestor not remote than a great grandfather.[6] Whatever definition is used, the basic concept of close blood relation is always upheld.

Globally, highest rates of consanguineous unions are observed for North and Sub Saharan Africa, Middle East, and west, central and south Asia, where 20–50% marriages are consanguineous.[7] Emigrants from countries where consanguinity is common e.g., Pakistan, Turkey, Lebanon, Afghanistan and other Middle Eastern countries residing in Europe, America and Australia, also practice intra-familial marriages and are subjected to criticism in many western countries.[9] Intra-familial marriages are preferred by one fifth of the world population[10] and are usually common among uneducated communities with low per capita income and are usually arranged for maintaining the family property and strengthening intra-familial relationships.[11] Along with this, low divorce rate, ease of wedding arrangements including low dowry[12] and lower domestic violence are also reported as the advantages13,14. These types of marriages may have adverse child health outcomes mainly in the form of deleterious autosomal recessive conditions.[15–22]

In the western world, after the mid-19th century, these marriages are looked at with suspicion while Orthodox Church showed resentment towards cousin marriages long before this[11] and can be traced back to 1500 years ago[8]. In America, 31 states have enacted anti-first cousin marriage laws. Peoples Republic of China and Peoples Democratic Republic of Korea have also enacted similar laws[23] while in the United Kingdom, legislators called for a ban on first cousin marriages among Pakistani community[24] but

an overall decline in first cousin marriage is observed only among Norwegian Pakistani community[25]. The decline in countries like Jordon, Lebanon and Palestine is attributed to factors like female education, improved economic status and rural to urban mobility.[9]

Consanguineous combinations are of many types[9]; first cousin marriages being the most common type[11,26]. In some populations, the proportion of first cousin marriages is 20–30% of all marriages.[8] In South Indian Hindus, uncle and niece union is allowed[27] but among Muslims all over the world, it is prohibited. Islam clearly enumerates both consanguineous and non-consanguineous relatives with whom marriage is forbidden. It is stated "Prohibited to you are:- Your mothers, daughters, sisters; aunties from father's side, aunties from your mothers' side; nieces from your brothers, nieces from your sisters, your foster-mothers, your foster-sisters; your mother-in-laws; your step-daughters under your guardianship born from your (past) relationship - no prohibition if not from you; your biological sons' lawful wives, [also forbidden] is marriage to two sisters at the same time, except for what has already happened in the past; for Allah is Oft-forgiving, Most Merciful[28]".

Sufficient Literature is available on consanguinity and associated socio-demographic factors, both nationally and internationally. Unfortunately, the association between consanguinity and health outcomes is sparingly assessed and investigated leading to contradictory conclusions. Allan Bittles is a prolific researcher in the area of consanguinity and has contributed a lot to medical literature. In Pakistan, we can hardly find any rigorous research on the pregnancy outcomes of consanguinity except those conducted by Allan Bittles mostly on secondary data or retrospective interviews. This study was conducted with the objective to find out the association between consanguinity and pregnancy outcomes in the form of stillbirths, abortions and Rh incompatibility through retrospective information.

MATERIAL AND METHODS

This Cross-sectional Analytical study was conducted from 1st November 2017 to 28th February 2018 at Combined Military Hospital (CMH) Quetta, Baluchistan province of Pakistan. Online sample size calculator[29] was used and the desired sample size obtained was 384.

All pregnant ladies visiting Out Patient Department for antenatal visits were included. Patients either not willing to participate or needing emergency intervention were excluded from the study. Simple random sampling technique using random number table was used. An interviewer-administered structured questionnaire was filled with the study participants.

Appropriate descriptive statistics, 95% Confidence Intervals (CI), Chi-sq statistics, and Contingency Coefficients were calculated using SPSS version 20. Ethical approval was granted by the Ethical Review Committee of the Institute of Health Sciences Mardan, Khyber Pakhtunkhwa, Pakistan. Permission for data collection was obtained from the commandant CMH Quetta. Informed consent was obtained from study participants prior to data collection.

Consanguinity was taken as independent variable while abortion, stillbirth and Rh-incompatibility were taken as dependent variables. To avoid confusion among study participants, both miscarriage and abortion were merged into a single term 'abortion' and defined as a pregnancy loss before completing the 5th month of gestation.[30] However, stillbirth was treated as a separate term and defined as a baby born at or after 7 months of gestation with no signs of life.[31]

Throughout this study, any relation to the husband other than the first cousin is regarded as non-consanguineous. It was noticed during the pre-testing of a questionnaire that women could not comment on the exact blood relation of their husband's due to long isolation from their relatives' due to the nature of husbands' job. In case of primigravida, their retrospective interviews regarding previous pregnancies were meaningless, still they were included in the denominator for calculating proportions.

RESULTS

Out of 384 study participants, 188 (48.9% with 95% CI: 43.9–53.9%) were married to first cousins; either maternal or paternal while 196 (51%) were non-consanguineous marriages. Among consanguineous unions, 54 (28.7%) women were illiterate, 103 (54.7%) were intermediate or below and 31 (16.5%) graduates or masters. Among non-consanguineous unions, 47 (23.9%) were illiterate, 90 (45.9%) were intermediate or below and 49 (25%) graduates or masters, while 10 (5.1%) had professional or research degrees.

Mean±SD age of the study participants was 27.5±4.8 years. Maximum duration since marriage was 25 years while the minimum was 2.4 months. Sixty-six (17%) of study participants were primi gravida. Stillbirths recorded for consanguineous participants was 25 (13.2% with 95% CI: 8.36–18.04%) while among all participants, stillbirth noted

was 32 (8.3%). Abortion observed among consanguineous participants was 71 (37.7% with 95% CI: 30.77–44.63%) and among all participants, it was 118 (30.7%). Among all participants, only 15 (3.8 %) had Rh-incompatibility, of whom 8 (53.3%) were given injections rhogam during their first delivery/termination of pregnancy.

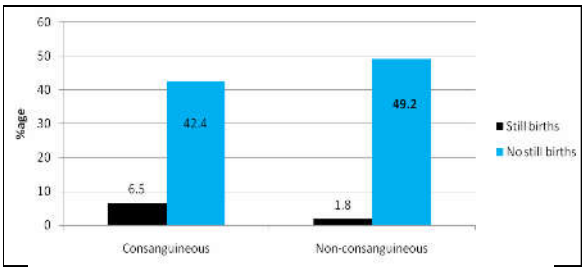

Figure-1: Consanguinity vs Stillbirths (n=384)

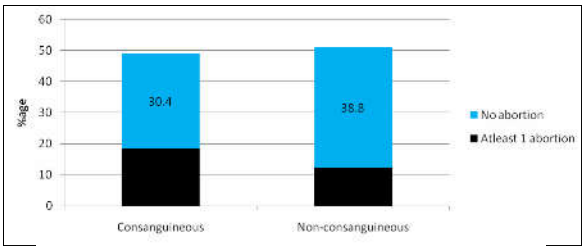

Figure-2: Consanguinity vs abortion (n=384)

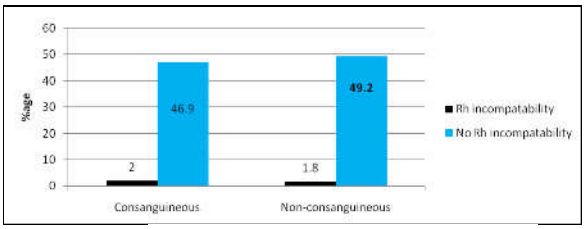

Figure-3: Consanguinity vs Rh incompatibility

Table-1: Quantification of association with consanguinity

Consanguinity	Stillbirth			Abortion			Rh-incompatibility		
	χ^2	Contingency coefficient	*p*-value	χ^2	Contingency coefficient	*p*-value	χ^2	Contingency coefficient	*p*-value
	11.8	0.17	0.000**	8.56	0.15	0.003**	0.12	0.01	0.729

DISCUSSION

In communities where consanguinity is prevalent, the commonest form is inter-first cousin marriage. In this study, 48.9% of the total unions were consanguineous which is in agreement with the findings of other studies. A study conducted in Oman reported that out of total marriages, 52% were consanguineous while 39% of all marriages were inter-first cousins.[32] In Saudi Arabia, consanguineous marriages were recorded for 54.3% of the total pregnant women while first cousin marriages were 31.4% of the study participants.[33] Obeidat *et al* conducted a study in Jordan, where consanguineous marriages were found among 49% study participants.[2] A study conducted by Bittles *et al* in Pakistan found 50.3% of the total marriages as consanguineous and 37.07 of the total were inter-first cousin.[27] Riaz *et al* conducted a study at Rahimyar Khan Pakistan, in which he found consanguineous unions among 58.46% of married Muslim females, first cousin marriages being 51.9% of the total.[34] Findings of a study conducted in Bajaur agency of Pakistan were interesting in the sense that there was no propensity for first cousin marriage in Bajaur agency. Of the total males, 22.34% were tied in the consanguineous union while only 19.9% of those were inter-first cousins.[35]

Research studies have reported adverse health effects of consanguinity as still births[36,37], abortions[38], Pre-term delivery[39], infant and child mortality[40], congenital birth defects and malformations[41]. In this study, a significant association was found between consanguinity and stillbirths. A recent study conducted at an Australian tertiary care hospital by Kapurubandara *et al* declared consanguinity as an independent risk factor for stillbirths and noticed significantly high stillbirths among women with consanguineous relationships.[42] Similarly, studies conducted by Islam[32], Khoury *et al*[36], Kulkarni *et al*[43] and Qandalji[44] showed an association between consanguinity and stillbirths. A meta-analysis of 46 populations showed an excess of 1.5% stillbirths for the first cousin in comparison with non-consanguineous unions.[23] Fewer studies couldn't found any significant association between these two variables. Those studies were conducted by Obeidat *et al*[2], Bittle & Black[23], Nath *et al*[45] and Gowri *et al*[46].

This study also established a significant association between consanguinity and abortion. This finding is in contrast with that of the study conducted by Islam[32] who couldn't establish any significant association. Available literature could hardly give any clue towards a significant difference in abortion among consanguineous and non-consanguineous unions.

Though Rh-incompatibility was slightly more among consanguineous couples than non-consanguineous (2% and 1.8% respectively), this difference was not significant.

Studies have shown that earlier studies declaring consanguinity as objectionable on health grounds may be fallacious because of not accounting

for certain independent variables like parental socioeconomic status, parity, inter birth interval, maternal age and literacy.[5,11,23] Similarly, maternal malnutrition and psychosocial stress also have adverse pregnancy outcomes in the form of many diseases and low life expectancy.[47] On the other hand, in Bahrain, high school children were educated and pre-marital counselling was encouraged, which led to a substantial decrease in the incidence of sickle cell anemia.[48]

This study has a few important limitations. As it is a hospital-based study without any specified population, therefore could not compute prevalence. As participants provided retrospective information, there are chances of recall bias. The small sample size is another issue that can affect generalization.

CONCLUSION

Consanguineous marriages can be regarded as an important social and health issue. Improvement in socioeconomic conditions and access to health care services can mask the effects of consanguinity; if any. Andrew DJ suggests that avoiding consanguineous marriages for better health outcomes in progeny is almost exaggerated and needs re-assessment49. Before we could embark on genetic testing and counselling, large population-based studies accounting for control of important socio-demographic attributes in our setting are needed.

AUTHORS' CONTRIBUTION

SA: Literature search, conceptualization of study, analysis, writeup. WS: Proofreading, Figures plotting. HK: Data collection, literation search, Data entry. NS: Data collection, Data cleaning.

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