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Association of Maternal Age and Presence of Non-Communicable Diseases in Consanguineous Marriage with Congenital Abnormalities in Infants

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ABSTRACT

Consanguineous marriages are most common among communities where most families are of traditional and extended types. It has been seen that females who conceive at a very young age or have any non-communicable disease have higher chances to have off springs with congenital abnormalities. **Objective**: To find out the association between maternal age and non-communicable diseases with congenital abnormalities in children. **Methods**: It is a cross-sectional study performed at District Head Quarter Hospital, Okara, including 100 married participants in the age range of 19-55 years after obtaining their informed consent **Results:** It was observed that 57% of mothers were below 20 at marriage, 42% were above 20 at marriage and 1% of mothers were above 30 at marriage, were having children with congenital abnormalities. 22 out of 100 mothers had obesity, 15 had diabetes and 21 had CVD when pregnant. The infants born to these mothers suffered from brain anomalies, cleft lip and cleft palate, CVD and diabetes. The results were obtained with p less than 0.05. **Conclusion**: Congenital abnormalities were more common among children with mothers aged below 20 or 25 and suffering from any metabolic or genetic disorder.

INTRODUCTION:

Consanguineous marriage is defined as a marriage between people who belong to same families having same forefathers and ancestors [1]. They might be close blood relatives or may be a part of an extended family. Cousin marriages are done for supporting relationships, economic ties and for psychological and religious aspects [2]. According to different studies and reports, prevalence of cousin marriages worldwide is estimated to range from 20% to 60% in different regions [3]. Cousin marriages are contracted typically at a young age, when a female might not have developed sufficient nutritional reserves required to bring a healthy infant to life. If the female is already suffering from any non-communicable or communicable disease before conception or during pregnancy, this can also lead to the development of congenital anomalies in the offspring [4, 5]. Some of the most common disorders present in females are diabetes mellitus, gestational diabetes mellitus, hypertension, obesity, arthritis, kidney and liver diseases.6 Along with these micronutrient deficiencies of Vitamin A, Vitamin D and folic acid are also very common [7]. All these maternal disorders and deficiencies lead to congenital anomalies in infants such as cleft palate and cleft lip, heart problems, spina bifida and other abnormalities of brain [8-11]. Exposure to pre-gestational diabetes mellitus and gestational diabetes mellitus is associated with the occurrence of congenital anomalies of the kidney and urinary tract. Congenital anomalies of the kidney and urinary tract are a diverse group of structural and functional abnormalities of the kidney, collecting system, bladder, and urethra [12]. According to scientific research, diabetes mellitus, metabolic or genetic other disorders and nutritional deficiencies to which a developing fetus, when exposed, can be teratogenic and can induce organ malformation leading to congenital abnormalities [13, 14]. Obesity during pregnancy has a negative impact on both fetal and neonatal outcomes, including an increased chance of significant congenital abnormalities, which are a leading cause of stillbirth and infant mortality as

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well as long-term morbidity [15-17]. A wide range of congenital abnormalities, including neural tube defects, cardiovascular anomalies, cleft lip and palate, anorectal atresia, and limb reduction anomalies, are more common in the offspring of obese women [18- 20].

Apart from the above-mentioned facts, there is scarcity of data available in this aspect. The current study aims to highlight such congenital abnormalities present at the time of the birth in babies born to parents who are consanguineously married and mothers are young and suffering from any non-communicable disorder. Hence, this study will try to fill the gap in existing knowledge. The purpose of this study is to evaluate the association of maternal young age and presence of non-communicable disorders with congenital abnormalities.

METHODS:

It is a cross-sectional study performed at District Head Quarter Hospital, Okara, including 100 married participants in the age range of 19-55 years after obtaining their informed consent. The inclusion criteria were all adult individuals, with and without cousin marriage of both genders were included and the exclusion criteria were non-cooperative individuals. Individuals were assessed through pre-tested questionnaire. Questionnaire was made according to the study objective and was pretested among 10-15 individuals, and was modified accordingly. SPSS version 21.0 was used for data analysis. Frequencies were derived and Chi-square test was applied to find out the association, p value less than 0.05 was considered significant.

RESULTS

The result showed that 57% of mothers were below 20 at marriage, 42% of mothers were above 20 at marriage and 1% of mothers were above 30 at marriage, as shown in Table 1. The results showed that according to BMI scale, 9% of mothers were lying in the normal category, 29% were overweight, 33% of mothers were obese, 27% of mothers were lying in the category of obese grade 1, and 2% were in obesity grade 2 category.

Age of marriage	Frequency
Below 20	57
Above 20	42
Above 30	1
Total	100

Table 1: Frequency distribution of age of marriage

Mother BMI	Frequency
18.4-24.9	9
25.0-29.9	29
30.0-34.9	33
35.0-39.9	27
>40	2

Table 2: Frequency distribution of BMI of mothers

Children with congenital abnormality	Frequency
Cleft lip and Cleft palate	13
Heart problems	20
Abnormalities of brain	26
No	41
Total	100

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Table 3: Frequency distribution of children with congenital abnormality

The result showed that 13% of mothers had children with cleft lip and cleft palate, 20% had children with heart problems, 26% had children with abnormalities of brain and 41% of mothers had children with no congenital abnormality (Table 3). The result showed that 22% of mothers had obesity as genetic disorder, 15% of mothers had diabetes as genetic disorder, 21% of mothers had CVD as genetic disorder, 9% of mothers had arthritis as genetic disorder, 18% of mothers had hypertension as genetic disorder and 15% of mothers had no genetic disorder (Table 4).

Genetic disorder	Frequency
Obesity	22
Diabetes	15
CVD	21
Arthritis	9
Hypertension	18
No	15
Total	100

Table 4: Frequency distribution of genetic disorder in mothers

DISCUSSION:

According to the current study, 57% mothers were below age 20 when they delivered their child. Low maternal age at the time of infant birth has been associated with congenital anomalies according to different researches. One such study carried out by Shrim A, Ates S *et al* in 2011 also supported the significant association of young maternal age with different types of congenital anomalies in infants born to mothers who were below 20 years [21]. Present study indicates that mothers with children having congenital anomalies, suffered from different grades of obesity. 33% mothers were overweight while 27% were suffering from obesity grade 1. This indicated a significant relationship between maternal obesity and infant congenital abnormalities. Same relationship has been indicated by multiple research studies one of them was carried out in 2018 by Kong L, Norstedt G *et al* [22]. According to a study conducted in Canada by researchers in 2014, presence of different genetic disorders in mothers impacted the normal cognitive development and health of infants. Present study also strongly indicated that mothers having different disorders such as hypertension, diabetes, obesity and other disorders gave birth to infants' having genetic disorders such as cleft palate, cleft lip, heart diseases and anomalies of brain [23].

CONCLUSIONS:

Young maternal age has been associated with increased risk of congenital anomalies in infants. Age lower than 20 years poses a high risk for the development of congenital anomalies in infants due to multiple factors. Along with young age, presence of various genetic disorders in mothers is directly linked to the malformation of different organs, development of physical abnormalities and congenital anomalies in infants.

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