

# Association of Consanguinity with Low Birth Weight - A Tertiary Care Hospital Study

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## ABSTRACT

**BACKGROUND :** Consanguineous marriage is matrimony between individuals who are closely related. There is strong relationship between first-degree consanguinity and the risk of small size birth and neonatal death. Many congenital anomalies and genetic diseases run in families due to cousin marriages.

**OBJECTIVE :** .Our study aim was to determine is there any association between consin marriage and incidence of low birth weight in children under 5 years of age .

**PATIENTS AND METHODS :** This case control study was carried out in Department Of Pediatrics Holy family hospital Rawalpindi from November 2017 to January 2018 . Our sample size was 260 . Two groups were made one with normal birth weight and other with low birth weight (<2500g /2.5 kg) . The sampling technique was non probability consecutive sampling technique .All those children who were premature , syndromic and whose parents didn't gave consent were excluded . After informed consent from parents data was collected through structured questionnaire .Data was analyzed in SPSS version 17 .

**RESULTS :** Out of 260 cases of low birth weight 173(66.3%) were product of consin marriage while 87 (33.3%) were not. In 260 controls(normal birth weight ) 124 (47.6%) were product of cousin marriage while 136 (52.4%) were not . Odd ratio came out to be 2.18. P value 0.01 .Sensitivity was 66 % while specificity was 52 % . Positive predictive value 58% and negative predictive value 60%. In cases 73.6 % were males while 26 % were females .In controls 58.4% males while 41.6% were females . Mean age of children of cases was 11 months  $\pm 3$  while of controls 15 months  $\pm 2$  .6.

**CONCLUSION :** Consanguinity is one of the determinant of low birth weight .

**KEYWORDS :** Cousin marriage ,low birth weight .

## INTRODUCTION

Consanguinity ("blood relation", from the Latin consanguinitas) is the legal union of male and female of a common ancestor or between a man and woman related by blood<sup>1</sup>. In clinical genetics, a consanguineous marriage means union between couples who are related as second cousins or closer<sup>2</sup>. Various studies conducted in Pakistan have shown that around two-third (66%) of marriages are consanguineous and this trend is more prevalent in rural areas. Consanguinity has been shown to increase the risk of congenital anomalies .infant mortality, intrauterine growth retardation and low birth weight<sup>3, 4,5,6</sup>. Low birth weight is defined by WHO (1992) as weight at birth less than 2500 grams irrespective of gestational age and recommended an additional demarcation of 1500 grams as very low birth weight<sup>7,8,9,10</sup>. Consanguineous marriages plays a vital role in the causation of low birth weight babies along with many other factors related to geo-demographics, maternal health and pregnancy history<sup>11,12</sup>.

There are many studies done to establish the association of consanguinity and low birth weight babies on international and national level. Studies conducted in India, Iran, Peshawar, Karachi all highlighted that Consanguineous marriages adversely affect pregnancy outcomes including low birth weight<sup>13,14,15</sup>. All the studies done concluded that consanguinity is the source of not only congenital anomalies rather worst pregnancy outcomes.

We are doing our research to determine how much influence is of cousin marriages on birth weight of babies as this practice is quite common in developing countries like Pakistan. The rationale behind our study is to give recommendations to public health care providers to try to make community aware of cousin marriages detrimental effects on reproductive health. **PATIENTS AND METHODS :**

This case control study was carried out in Department Of Pediatrics Holy family hospital Rawalpindi from November 2017 to January 2018. Our sample size was 260 each for cases and controls. Two groups were made one with normal birth weight and other with low birth weight (<2500g /2.5 kg). The sampling technique was non probability consecutive sampling technique. All those children who were premature, syndromic and whose parents didn't gave consent were excluded. After informed consent from parents data was collected through structured questionnaire. Data was analyzed in SPSS version 17. Birth weight, age of children, gender, maternal smoking and disease history and cousin marriages were taken as variables. Odd ratio of cousin marriage and birth weight was computed.

## RESULTS

In the group of cases (birth weight less than 2.5 kg) 192(73.6 %) were males while 68 (26.1%) were females. Mean age of children was 11 months  $\pm$  3.173 (66.3%) were product of consin marriage while 87 (33.3%) were not. P value was 0.01 which is less than 0.05 which shows significant difference exist between cousin marriage and birth weight. 201 mothers (77.3%) had disease during pregnancy (anemia, diabetes, hypertension, preeclampsia, eclampsia) while 59(22.69 %) had no disease. 3 children (1.1%) had smoking history at home, 257 (98.5) had no smoking history. 155 (59.4%) mothers had history of miscarriage while 105 (40.2%) had no such history (Table 1).

In the group of controls (normal birth weight children >2.5 kg) 152 (58.4%) were males while 108(41.6%) were females. Mean age of children was 15 months  $\pm$  2.5.124 (47.6%) were product of cousin marriage while 136 (52.4%) were not. Odd ratio came out to be 2.18. Sensitivity was 66 % while specificity was 52 %. Positive predictive value 58% and negative predictive value 60% (Table 2). 100 mothers (38%) had disease during pregnancy while 160 (62%) were normal. 95 mothers had history of miscarriage (36%).

Among cases 134 had between 10000\_20000, 116 had between 30000 to 40000 while 10 had between 40000 to 50000. In controls 140 had family income between 30000 to 40000, 90 had between 40000 to 50000 while 30 had above 50000 (Table 3). P value for cases 0.04 and controls 1.1.

Among cases 180 (60 %) mothers were house wife, 37 (14.2%) were teacher, 39 (14.9%) were doctor/engineer. Among controls 100 mothers (39%) were house wife, 110 (42%) were teachers, 50 (19%) were doctors/engineers. P value for case 0.72 while controls 1.87.

Frequency of children ages in cases and controls in table 4,5

**TABLE 1 : FREQUENCY OF MATERNAL HISTORY IN CASES AND CONTROLS**

	CASES	CONTROLS
DISEASE DURING PREGNANCY	201 YES 59 NO	100 YES 160 NO
SMOKING	3 YES 257 NO	1 YES 259 NO
MISCARRIAGE	155 YES 105 NO	95 YES 165 NO

**TABLE 2 : ASSOCIATION OF COUSIN MARRIAGE WITH BIRTH WEIGHT**

	Low birth weight	Normal birth weight
Cousin marriage	173 (a)	124(b)
Non cousin marriage	87(c)	136(d)

ODD RATIO = AD/BC

$$173 \cdot 136 / 124 \cdot 87 = 23528 / 10788 = 2.18$$

SENSITIVITY = A/A+C \*100

$$173 / 173 + 87 = 173 / 260 * 100 = 66 \%$$

SPECIFICITY = D/D+B \*100

$$136 / 136 + 124 = 136 / 260 * 100 = 52 \%$$

POSITIVE PREDICTIVE VALUE = A/A+B \*100

$$173 / 173 + 124 = 173 / 297 * 100 = 58 \%$$

NEGATIVE PREDICTIVE VALUE = D/D+C\*100

$$136 / 136 + 87 = 136 / 223 * 100 = 60 \%$$

**P Value = 0.01**

**TABLE 3 : FAMILY INCOME IN CASES AND CONTROLS**

FAMILY INCOME	CASES P value 0.001	CONTROLS P value 1.1
10000 TO 20000	134	0
20000 TO 30000	0	0
30000 TO 40000	116	140
40000 TO 50000	10	90
ABOVE 50000	0	30

**TABLE 4 : FREQUENCY OF CHILDREN AGES IN CASES**

Child Age	Frequency
<6 months	80(30.7%)
6_12 months	91(34.9%)
13_24 months	55(21.1%)
25_36	21(8%)
37_48	13(5%) =100 %

**TABLE 5: FREQUENCY OF CHILDREN AGES IN CONTROLS**

Child age	Frequency
<6 months	71(27.3%)
6_12 months	100 (38.4%)
13_24 months	60 (23%)
25_36 months	14 (5.3%)
>36 months	15(5.7%)

## DISCUSSION

According to Professor Robin Fox of Rutgers University, in history 80% of all marriages were consanguineous<sup>16,17</sup>. One of the BBC report discussed that majority of Pakistanis in foreign countries do cousin marriages. The association between birth weight and cousin marriages has been highlighted in many studies. Our study also explored this association. Low birth weight is associated with short and long term consequences representing more than 20 million births per year<sup>18</sup>. There is apparent exposure-response relationship between consanguinity and LBW<sup>14</sup>.

A study conducted in Jhangara Town rural Sindh included 800 total cases. Consanguinity and lack of breast feeding turned out to be determinants of underweight children. 56.3% were males while 43.6% were females. 53.8% were cousin marriages while 33.6% were not which is consistent with our study<sup>19</sup>. Our study also highlighted the role of breast feeding

.Children who had low birth weight and were breast fed their current health status improved as odd ratio is 1.5. Odd ratio for cousin marriage and birth weight turned out to be 2.18, p-value 0.01 which shows association between birth weight and cousin marriages is significant.

Another study done in department of Pediatrics Narayana medical college India to compare the demographic profile of mothers who delivered low birth weight babies with those who delivered normal birth weight babies and to study association between demographic mother variables with delivery of low birth babies<sup>20</sup>. It was concluded that consanguinity and low family income have significant association with low birth weight babies. P value for family income was 0.002 while in our study it was 0.001. No significant association was found between mother occupational status (p value 0.15 while in our study p value 0.72) and educational status of

mothers (p value 0.062 ,our study p value 0.16) with low birth weight babies .The results are consistent with our results.

On the study published in Journal of Pakistan medical sciences to study maternal health risk factors in Afghan refugees compared to Pakistani mothers in Peshawar NWFP which also showed consanguinity as one of the factor with odd ratio of 1.11 <sup>21</sup>. A article in Developmental medicine and child neurology highlighted that consanguinity is associated with deleterious health problems in children <sup>22</sup> . Association between birth weight , sociodemographic variables and maternal anthropometry was studied in an urban sample from Dhaka Bangladesh which showed LBW was common in younger mothers less than 20 years and older ( more than 30 years ) , low family income and uneducated families <sup>23</sup> . Our study also showed low family income contributes to LBW while it didn't concluded any significant association between educational status of mothers with LBW.

A study published in European journal of obstetrics ,gynecology and reproductive biology showed that medical risk factors before and during pregnancy affect birth weight .Any disease which produces uterine malnutrition leads to LBW <sup>24</sup>.Our study also showed that maternal smoking ,disease history affect birth weight .

## CONCLUSION

A lot of studies done at national ,international and local level highlighted that incidence of consanguinity is quite higher in Asian setups same as depicted by our study .Although our study was conducted on a small level but it realistically showed the raising trend of cousin marriages in Rawalpindi .Various socioeconomic and cultural factors are involved for this raising trend and it has got association with birth weight of children . Maternal history (anemia, hypertension, preeclampsia,

eclampsia , smoking ,miscarriage ) play significant role in causation of low birth weight.

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