**DOI:** https://doi.org/10.54393/pbmj.v6i11.960

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
Volume 6, Issue 11 (November 2023)

**Original Article**

# Impact of Short Birth Spacing on Maternal Anemia at District Head Quarters Hospital Nankana Sahib

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## ARTICLE INFO

***Key Words:***
Pregnancy, birth spacing, anemia, maternal complications

***How to Cite:***
Bhatti, T. N., Naeem, . M., Akhtar, . N. U., & Hanif, A. (2023). Impact of Short Birth Spacing on Maternal Anemia at District Head Quarters Hospital Nankana Sahib : Impact of Short Birth Spacing . Pakistan BioMedical Journal, 6(11). https://doi.org/10.54393/pbmj.v6i11.960

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Received Date: 22nd October, 2023
Acceptance Date: 11th November, 2023
Published Date: 30th November, 2023

## ABSTRACT

Short birth intervals are independently associated with increased risk of adverse maternal, perinatal, infant and child outcomes. Maternal anemia is one of the commonest complications of short birth spacing that further can enhance the risk of poor fetal and maternal outcome. **Objective:** To determine the effect of short birth spacing on maternal anemia at District Headquarters Hospital Nankana Sahib. **Methods:** This analytical cross-sectional study was done at Gynecology and obstetrics Department of District Headquarters Hospital Nankana sahib. A total of 135 pregnant women of 18 to 40 years' age, 18 to 59 months of inter-pregnancy intervals were included. All the demographic and clinical data was collected according to predesigned questionnaire. **Results:** In this study all females were anemic, whereas there were 57(42.22%) females had mild anemia, 61(45.19%) females had moderate and 17(12.59%) females had severe anemia. There was association between severity of Hb levels with higher age group, lower socioeconomic status, previous history of vaginal + C-section and females with third trimester. Moreover, there was significantly negative correlation between Hb levels and higher gravida, p-value ≤ 0.05. **Conclusions:** Itis concluded from the results of our study that all mothers had different degrees of anemia. There was a statistically significant association between severity of Hb levels with higher age group, lower socioeconomic status, previous history of vaginal + C-section and females with third trimester ($p < 0.05$). While, no significant association and a negative correlation was found between Hb levels and multigravida ($r = -0.181$ & $p = 0.035$).

## INTRODUCTION

Birth spacing, also known as the inter-pregnancy interval (IPI), refers to the amount of time that passes between the end of one pregnancy and the beginning of the next pregnancy [1]. The optimal amount of time between births protects both the health of the mother and the baby [2]. On the other hand, sub-optimal birth spacing or IPI are strongly connected with maternal morbidities and mortalities [3]. If a pregnancy occurs within 24 months after delivery, it's called short interpregnancy interval [4-7]. According to research, the average amount of time between pregnancies is between 18 and 36 months. This means that the period between previous births of a baby and the conception of the current pregnancy is considered regular birth spacing. Birth rates are the most important factor in controlling the rates of population expansion and the accompanying increase in the socioeconomic load on communities. Additionally, it has a significant potential to safeguard the health of the mother and enhance the result of any following pregnancies [8, 9]. According to the findings of certain studies, having not an appropriate birth gap are at an increased risk of having a baby born prematurely, requiring a caesarean section for delivery, developing chorioamnionitis, and having a short gestational age [3, 10-14]. In pregnant women, having a birth too close together is believed to be the primary risk factor for anaemia, along with the related morbidities and mortalities [15]. Women with short IPI had a greater rate of maternal anaemia than control women (RR: 2.091) [16]. The current study is designed to determine the effect of short birth spacing on maternal anemia at District Headquarter Hospital Nankana Sahib. If maternal anemia is higher in females with short interpregnancy interval, they will be

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considered high risk females and must be considered for possible early intervention in early antenatal period.

## METHODS

This analytical cross-sectional study was done at Gynecology and obstetrics Department of District Headquarters Hospital Nankana sahib. The study was done in 09 months, from 21 July 2022 to 21 April 2023. The sample size 135 is estimated using prevalence of anemia in females of short birth spacing as 9.7 percent. We used 5 percent margin of error and 95 percent confidence level. Data was collected using non-probability convenience sampling technique. Pregnant women of 18 to 40 years' age with short interpregnancy interval were included while pregnant women who are already diagnosed anemic before pregnancy, anemic patients who have been diagnosed as having blood disorders and on medication to improve Hb level. All participants included according to the inclusion and exclusion criteria was informed according to information sheet and a written signed consent form (Urdu and English Annexure) was taken. After the approval of Ethical Committee of the Faculty of Allied Health Sciences, University of Lahore (REC UOL-/2019-08/2022), patients were contacted. After obtaining informed consent all patients were included in the study. All the demographic and clinical data was collected according to predesigned questionnaire. Venous blood was taken into an EDTA tube from all enrolled patients. Tourniquet was used where necessary. Sampling was done from patients of pregnant women as per criteria. Serum was separated after centrifugation at 3000 RPM for five minutes. Hemoglobin level was determined by using Sysmex xs500 instrument. The anemic group was defined as having hemoglobin concentrations <11 g/dL. The severity of anemia was labelled as, Mild anemia = 10.6-10.9g/dl, Moderate anemia = 7-9g/dl, Severe anemia = Less than 7 g/dl. Birth intervals under 33 months are considered to be low. Demographic Data was collected by face to face interview, after collection of the data all questionnaire was checked for its completeness and correctness for internal consistency missing and in appropriate data was excluded, only accurate and corrected data was analyzed by using SPSS (Statistical package for social science).Data was analyzed by using SPSS version 22. Mean ± S.D was applied for numerical value and f (%) was applied for categorical data. Chi-square test was applied to see association or compare severity of anemia with different socio demographic variables, BMI and trimester. Spearman correlation was applied to see relationship between Hb levels and gravidity. P-value ≤ 0.05 was considered as significant.

## RESULTS

There were 4(3%) females in the age group of 18-19 years, 22(16.3%) subjects were in the age group of 20-24 years, 42(31.1%) subjects were 30-34 years old and 17(12.6%) subjects were 35-39 years old. According to mother's education, there were 36(26.7%) females who were un-educated, 40(29.6%) subjects had primary education and 59(43.7%) subjects had graduation or above. According to mother's area of residence, there were 21(15.6%) subjects from urban and 114(84.4%) subjects were rural areas. As per their occupation, there were 18(13.3%) subjects who were employed and 117(86.7%) subjects were unemployed. According to socioeconomic status of the patient, there were 105(77.8%) subjects who had lower socioeconomic status, 22(16.3%) subjects had middle and 8(5.9%) females were from upper class. According to BMI of pregnant females, there were 33(24.4%) subjects who had BMI as <19.8, 81(60%) subjects were within 19.8-26 of BMI and 21(15.6%) subjects had BMI as 26.1-29 Table 1.

**Table 1:** Sociodemographic profile and BMI of females

| Variables | | Frequency(%) |
|---|---|---|
| Maternal age of the patient | 18-19 years | 4(3)22 |
| | 20-24 years | (16.3) |
| | 25-29 years | 42(31.1) |
| | 30-34 years | 50(37) |
| Mother's education | 35-39 years | 17(12.6) |
| | Un education | 36(26.7) |
| | Primary | 40(29.6) |
| | Graduation or above | 59(43.7) |
| Mother's area of residence | Urban | 21(15.6) |
| | Rural | 114(84.4) |
| Occupation | Employed | 18(13.3) |
| | Unemployed | 117(86.7) |
| Socioeconomic status of the females | Lower | 105(77.8) |
| | Middle | 22(16.3) |
| | Upper | 8(5.9) |
| Current BMI of pregnant women | <19.8 | 33(24.4) |
| | 19.8-26.0 | 81(60) |
| | 26.1-29 | 21(15.6) |

There were 6(4.4%) subjects who presented in 1st trimester, 35(25.9%) subjects were in 2nd trimester and 94(69.6%) subjects presented in 3rdtrimester Figure 1.

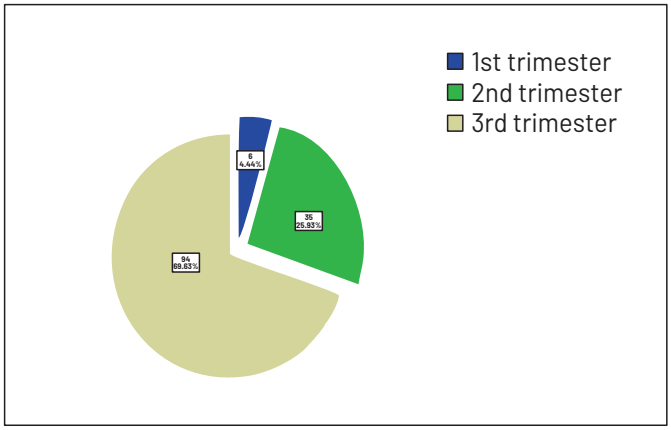


**Figure 1:** Time of presentation

The mean HB level of pregnant women was 9.368±1.284 with the minimum and maximum HB level as 6.7 and 10.9 Table 2.

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**Table 2:** Descriptive statistics of HB level of pregnant women

| HB level of pregnant women | |
|---|---|
| Mean | 9.368 |
| Median | 9.100 |
| Mode | 10.6 |
| S.D. | 1.284 |
| Range | 4.2 |
| Minimum | 6.7 |
| Maximum | 10.9 |

In this study all females had anemia, whereas there were 57(42.22%) females had mild anemia, 61(45.19%) females had moderate and 17(12.59%) females had severe anemia. There was association between severity of Hb levels and higher age group i.e., 35-39 years of age, p-value < 0.05. There was no association between severity of Hb levels and mother's education, p-value > 0.05. There was no association between severity of Hb levels and area of residence, p-value >0.05. There was no association between severity of Hb levels and occupation, p-value > 0.05. There was association between severity of Hb levels and socioeconomic status, i.e., moderate to severe Hb level was higher in lower socioeconomic class, p-value < 0.05. There was no association between severity of Hb levels and BMI classes, p-value > 0.05. There was association between severity of Hb levels and mode of delivery, i.e., moderate to severe Hb level was higher in females who had history of vaginal + C-section, p-value < 0.05. There was association between severity of Hb levels and time of presentation, i.e., moderate to severe Hb level was higher in females with third trimester, p-value < 0.05 Table 3.

**Table 3:** Comparison of severity of amenia with different sociodemographic variables, BMI and time of presentation and previous mode of delivery

| Variables | | Level of severity of Anemia | | | $X^2$ | p-value |
|---|---|---|---|---|---|---|
| | | Mild | Moderate | Severe | | |
| Age (years) | 18-19 | 0(0%) | 4(100%) | 0(0%) | 33.97 | ≤0.001** |
| | 20-24 | 6(27.3%) | 16(72.7%) | 0(0%) | | |
| | 25-29 | 19(45.2%) | 18(42.9%) | 5(11.9%) | | |
| | 30-34 | 30(60%) | 15(30%) | 5(10%) | | |
| | 35-39 | 2(11.8%) | 8(47.1%) | 7(41.1%) | | |
| Mother's education | Un Education | 16(44.4%) | 14(38.9%) | 6(16.7%) | 3.37 | 0.498 |
| | Primary | 20(50%) | 17(42.5%) | 3(7.5%) | | |
| | Graduation or above | 21(35.6%) | 30(50.8%) | 8(13.6%) | | |
| Residence | Urban | 7(33.3%) | 12(57.1%) | 2(9.5%) | 1.43 | 0.487 |
| | Rural | 50(43.9%) | 49(43%) | 15(13.2%) | | |
| Occupation | Employed | 9(50%) | 8(44.4%) | 1(5.6%) | 1.11 | 0.572 |
| | Un-employed | 48(41%) | 53(45.3%) | 16(13.7%) | | |
| Socio-economic status | Lower | 36(34.3%) | 55(52.4%) | 14(13.3%) | 20.33 | ≤0.001** |
| | Middle | 16(72.7%) | 6(27.3%) | 0(0%) | | |
| | Upper | 5(62.5%) | 0(0%) | 3(37.5%) | | |
| BMI | <19.8 | 9(27.3%) | 18(54.5%) | 6(18.2%) | 8.88 | 0.064 |
| | 19.8-26.0 | 38(46.9%) | 37(45.7%) | 6(7.4%) | | |
| | 26.1-29 | 10(47.6%) | 6(28.6%) | 5(23.8%) | | |
| Time of presentation | 1st trimester | 3(50%) | 3(50%) | 0(0%) | 9.98 | 0.041* |
| | 2nd trimester | 22(62.9%) | 9(25.7%) | 4(11.4%) | | |
| | 3rd trimester | 32(34%) | 49(52.1%) | 13(13.8%) | | |
| Mode of previous delivery | Vaginal | 22(91.7%) | 2(8.3%) | 0(0%) | 63.95 | ≤0.001 |
| | C-Section | 34(32.7%) | 59(56.7%) | 11(10.6%) | | |
| | Vaginal + C-section | 1(14.3%) | 0(0%) | 6(85.7%) | | |

There was significantly negative correlation between Hb levels and gravida, (mean Hb level was less in females who had higher gravida), i.e., r = -0.181, p-value = 0.035 Table 4.

**Table 4:** Correlation gravida's HB level of pregnant women

| Correlation gravida's HB level of pregnant women versus Gravida of mother | |
|---|---|
| r | -0.181* |
| p-value | 0.035* |
| No. of subjects | 135 |

## DISCUSSION

Women in Sub-Saharan Africa (SSA) bear the worst burden of anaemia; in this region, 39% of women of reproductive age, 38% of non-pregnant women, and 46% of pregnant women were afflicted by anaemia. Women in South Asia and Southeast Asia also have high rates of anemia [18]. In the present research, all of the females were found to have some level of anaemia, with 57 (42.22%) having mild anaemia, 61 (45.19%) having moderate anaemia, and 17 (12.59%) having severe anaemia. According to the findings of a local research, 75.7% of women who had births close together suffered from anemia [19]. In the present research, we discovered that there was a link between the severity of Hb levels and higher age groups, poorer socioeconomic statuses, past histories of vaginal births followed by C-sections, and third trimester pregnancies in females. In addition, there was a statistically significant inverse association between Hb levels and increased gravida, and the p-value for this correlation was less than 0.05. Another research was conducted in the year 2020 with the purpose of determining the impact that brief IPI has on the outcomes of pregnancies in Nigeria. This was a prospective cohort study including 271 pregnant women in Nigeria who were getting prenatal treatment in a tertiary hospital. The findings indicated that the incidence of maternal anaemia was significantly greater in women who had a short IPI compared to the control group (risk ratio = 2.091; 95% confidence interval = 1.4433.031; p 0.001). Other maternal and perinatal outcome measures, such as premature rupture of membranes, preterm labor/delivery, pregnancy-induced hypertension, third trimester bleeding, postpartum hemorrhage, and inadequate gestational weight gain, did not show any significant association with short IPI (p > 0.05). Other maternal and perinatal outcome

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measures include inadequate gestational weight gain. Therefore, Short IPI is linked to anaemia in pregnant women in Nigeria. In low-income countries, the prevalence of short IPI and anemia may be reduced with the support of public health initiatives that encourage more people to use family planning services and to breastfeed their young children [20]. In current study the age range was 18-40. Another research was conducted in a similar manner with the purpose of determining the incidence of anemia, fetal low birth weight infants, and miscarriage in women who had a short gap between pregnancies. Their research included participants ranging in age from 20 to 35 years old, with a mean age of 30.0282.24 years old. As a result, having a short inter-pregnancy gap of less than six months is connected with an increased risk of unfavorable outcomes for both the mother and the baby [19].

## CONCLUSIONS

It is concluded from the results of our study that all mothers had different degrees of anemia. Overwhelming majority i.e., 87.41% females had mild to moderate anemia. There was a statistically significant association between severity of Hb levels with higher age group, lower socioeconomic status, previous history of vaginal + C-section and females with third trimester ($p < 0.05$). While, no significant association and a negative correlation was found between Hb levels and multigravida ($r = -0.181$ & $p = 0.035$).

## Authors Contribution

Conceptualization: TNB, MN, AH
Methodology: TNB
Formal analysis: TNB, NUA
Writing, review and editing: TNB, MN, AH
All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

## Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

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