

## Relationship of Interpregnancy Interval with Ultrasonographic Measurement of Lower Uterine Segment Caesarean Scar Thickness

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### Abstract

**Background:** There is a rise in the caesarean section rates throughout the world due to which obstetricians see more women with caesarean section scar. As a result of this operation, late scar dehiscence may occur leading to uterine rupture in a subsequent pregnancy. Abundant works have been done regarding complication and outcome of caesarean section. However, very limited work is noticed regarding the relationship of interpregnancy interval with caesarean scar thickness.

**Objective:** To find out the relationship of interpregnancy interval (IPI) with ultrasonographic measurement of lower uterine segment caesarean scar thickness at 3rd trimester.

**Methods:** This cross-sectional analytical study was conducted at the Department of Gynaecology and Obstetrics in Sir Salimullah Medical College and Mitford Hospital (SSMC & MH) for a period of six months. Pregnant women of 36 to 40 weeks with history of 1 previous caesarean section were approached for inclusion in the study. Eighteen (18) months interpregnancy interval were used to categorize the study population into two groups. Group I is  $\geq 18$  months IPI & group II is  $< 18$  months IPI. Written informed consent was taken from each subject and ethical issues were ensured properly. Data collection was done with an aid of a preformed questionnaire. Collected data was analyzed by the SPSS 23.

**Results:** Among 50 study participants, mean age was  $23.53 \pm 3.65$  (SD) years in group I and  $23.54 \pm 3.95$  (SD) in group II. Majority of study population were well-nourished (62.20% in group I and 56.43% in group II). About 64% of patients 'IPI was  $\geq 18$  months (group I) and 36% patients 'IPI was  $< 18$  months (group II). In group II, majority patients (88.90%) scar thickness was  $< 2.5$  mm and in group I only 6.20% patients 'scar thickness was  $< 2.5$  mm. Scar tenderness was also associated with IPI where most of the patients of group II were observed to be present with scar tenderness.

**Conclusion:** Short interpregnancy interval is proportionately associated with scar thickness in our settings. However, further study with larger sample size is recommended.

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**Keywords:** Interpregnancy interval (IPI), Caesarean scar thickness, Caesarean scar tenderness.

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## Introduction

As caesarean section rates are getting higher throughout world, obstetricians deal with more pregnant women with a caesarean section scar. This causes late scar dehiscence as well as uterine rupture in a subsequent pregnancy.<sup>1</sup> With the advancement of technology, a non-invasive method – USG is used to evaluate the caesarean section scar integrity. The ultrasound is performed trans-abdominally with a full bladder. The lower uterine segment is identified as a two-layered structure consists of an echogenic layer which includes a bladder wall and a less echogenic layer myometrium. Abdominal sonographic assessment of lower uterine segment scar is done in the 3rd trimester of pregnancy. Inter pregnancy interval is an essential thing in obstetrics. It has a major role in the maternal and fetal outcomes. When reviewing an international recommendation for birth spacing, the WHO identified four intervals, among them "Interpregnancy interval" indicates the time a woman is not pregnant between 1 live birth or pregnancy loss and the next pregnancy.<sup>2</sup> Women should be advised to avoid interpregnancy intervals shorter than six months and be counselled about the risks and benefits of repeat pregnancy sooner than 18 months. Most of the data from observational studies in the United States would suggest a modest increase in the risk of adverse outcomes associated with intervals of less than 18 months and a more significant risk of negative outcome with intervals of less than six months between birth and the start of the next pregnancy.<sup>1-8</sup> For this study purpose, 18 months interpregnancy interval will be used as a midline to categorize the study population into two groups. The objective of the study was to find out the relationship of interpregnancy interval with ultrasonographic measurement of lower uterine segment caesarean scar thickness at 36 to 40 weeks pregnancy with history of previous caesarean section.

## Objective

To find out the relationship of interpregnancy interval with ultrasonographic measurement of lower uterine segment caesarean scar thickness at 3rd trimester.

## Methods

This cross-sectional analytical study was carried out in the Department of Obstetrics and Gynaecology of Sir Salimullah Medical College and Mitford Hospital (SSMC&MH), Dhaka, Bangladesh without interrupting standard care practiced in the department from 1<sup>st</sup> July 2019 to 31<sup>st</sup> December 2019. A total of 50 pregnant women of 36 to 40 weeks with a history of 1 previous cesarean section who attended the indoor patient department of Obs. & Gynae. of SSMC&MH were included in this study. 18 months interpregnancy interval was used as a midline to categorize the study population into two groups. Group I included the pregnant women with normal interpregnancy interval or  $\geq 18$  months and Group II included the pregnant women with short interpregnancy interval or  $< 18$  months. Proper history, physical examinations and initial investigation reports were recorded in a standard data sheet. Each of them was subjected to an ultrasonogram of lower uterine segment to see the scar integrity. Presence of any obstetric complications, presence of multiple pregnancy and patients unwilling to participate in the study were excluded.

Data were collected through a structured questionnaire. Collected data were processed and analyzed using Statistical Package for Social Sciences (SPSS) software version 23.

## Study Procedure

The participants were selected on the basis of selection criteria from the admitted indoor patients in the Department of Obs. & Gynae., SSMC&MH, Dhaka, Bangladesh. All of them

were interviewed face to face and with due consent examined for certain signs and were recorded in the checklist. Each of them was subjected to an ultrasonogram of lower uterine segment to see the scar integrity. Data were collected through a structured questionnaire.

#### *Statistical Analysis*

All the data were compiled and sorted properly and analyzed. Categorical variables

were reported as frequency and percentage. Continuous variables were expressed as mean and standard deviation. To determine the association, chi-square test and unpaired student t-test were used according to applicability. In all cases, p value  $<0.05$  was considered significant. Statistical analysis of the results was done by using computer based statistical software, statistical package for social sciences (SPSS), application of standard statistical tool.

#### **Results**

A total of 50 pregnant women of 36 to 40 gestational weeks were included in this study who had previous history of caesarian section.

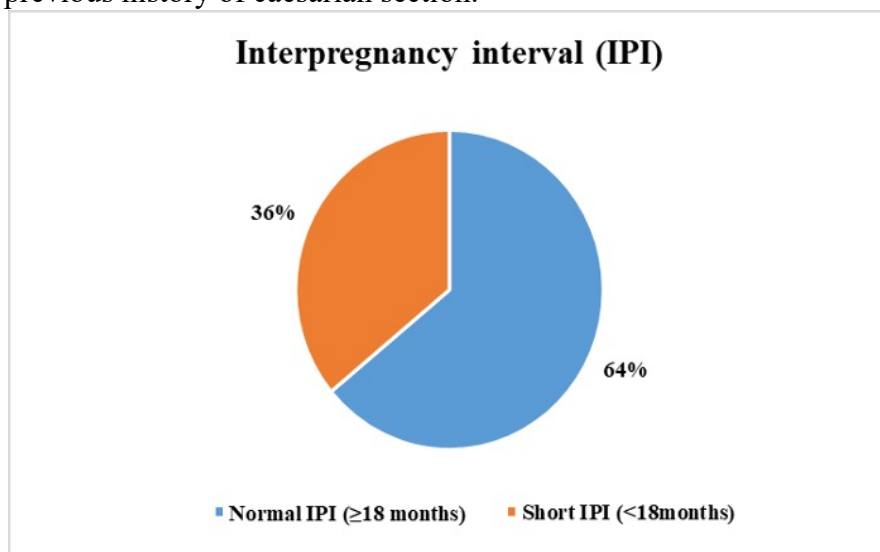


Figure 1. Distribution of the respondents by interpregnancy interval (n=50)

About 64% of patients' IPI was  $\geq 18$  months who were categorized as group I and 36% patients' IPI was  $< 18$  months who were categorized as group II.

Group I: Patients with normal inter pregnancy interval ( $\geq 18$  months)

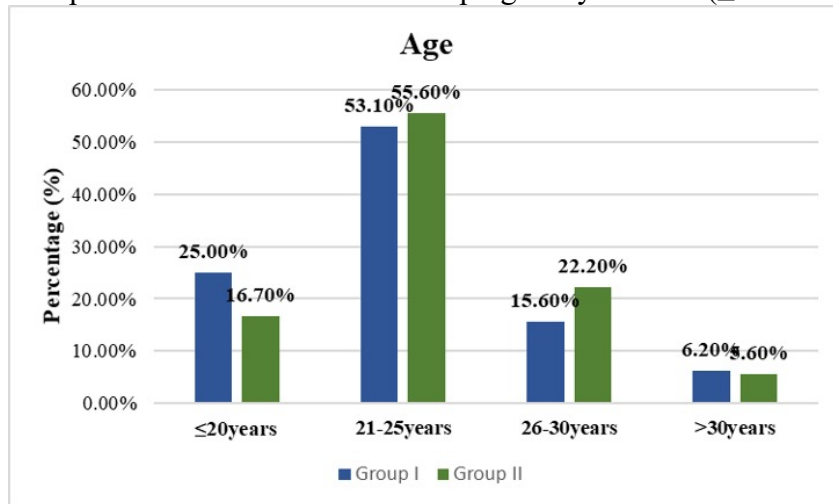


Figure 2. Distribution of respondents by age (n=50)

Group II: Patients with short inter pregnancy interval ( $< 18$  months)  
p value was determined by chi square test\* and unpaired student t test\*\*

Among the study population, majority of the patients were in age group 21-25 years old (53.10% and 55.60% accordingly in group I and II). Mean age of the patients was  $23.53 \pm 3.65$  (SD) years in group I and  $23.94 \pm 3.95$  (SD) in group II. No statistical difference ( $p > .05$ ) was observed in age distribution and mean age between groups.

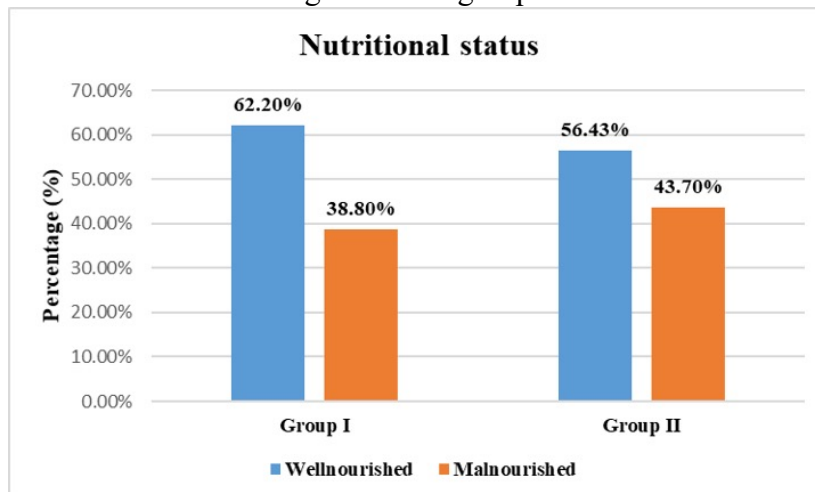


Figure 3. Distribution of respondents by nutritional status (n=50)

Group I: Patients with normal inter pregnancy interval ( $\geq 18$  months)

Group II: Patients with short inter pregnancy interval ( $< 18$  months)

p value was determined by chi square test\*

Majority of the study population were well-nourished (62.20% in group I and 56.43% in group II).

Group I: Patients with normal inter pregnancy interval ( $\geq 18$  months)

Group II: Patients with short inter pregnancy interval ( $< 18$  months)

p value was determined by chi square test\*

Majority of pregnant women had no history of infection in previous caesarean section (68.80% in group I and 61.10% in group II).

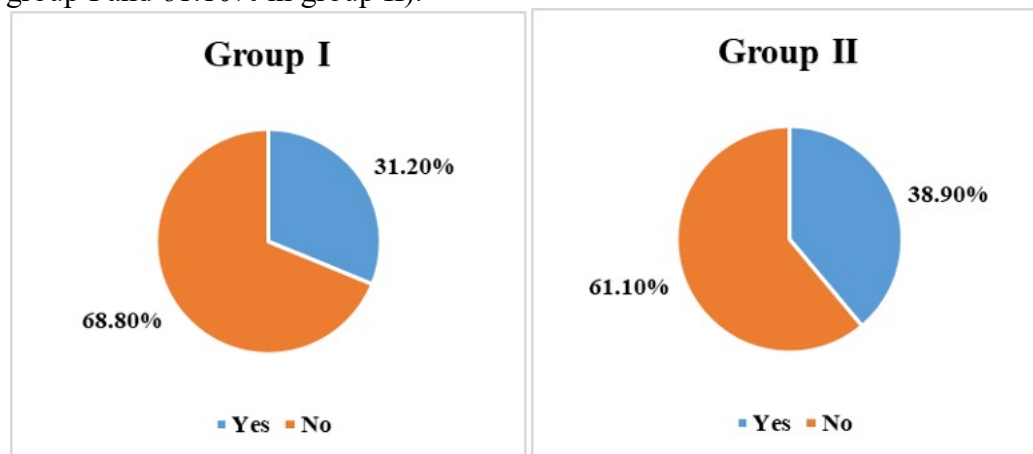


Figure 4. Distribution of respondents by H/O infection in previous caesarean section (n=50)

Table I: History of maternal complications in previous caesarean section (n=50)

	Group I n (%)	Group II n (%)	p value*
No complication	24 (75%)	9 (50%)	0.073
Complication PPH	6 (18.8%)	3 (16.7%)	0.085
Sepsis	2 (6.2%)	6 (33.3%)	0.085

Group I: Patients with normal interpregnancy interval ( $\geq 18$  months).

Group II: Patients with short interpregnancy interval ( $< 18$  months).

p value was determined by chi square test\*

In Group I, 75% and in group II, 50% respondents didn't have any history of complication during previous caesarean section. PPH (18.8% in group I and 16.7% in Group II) and sepsis (6.2% in group I and 33.3% in group II) was observed as complications. Statistical similarity was observed ( $p > .05$ ).

Table II: Relations between interpregnancy interval and scar thickness (n=50)

Scar thickness	Group I	Group II	p value*
$< 2.5$ mm	2 (6.20)	16 (88.90)	
$\geq 2.5$ mm	30 (93.80)	2 (11.10)	0.001

Group I: Patients with normal interpregnancy interval ( $\geq 18$  months).

Group II: Patients with short interpregnancy interval ( $< 18$  months).

p value was determined by chi square test\*

Scar thickness was significantly associated with interpregnancy interval. In group II, majority patients' (88.90%) scar thickness was < 2.5mm and in group I, only 6.20% patients' scar thickness was < 2.5mm.

Table III: Relation between inter pregnancy interval with scar tenderness (n=50)

Scar tenderness	Group I n (%)	Group II n (%)	p value*
Présent	4 (12.5)	14 (77.77)	<.001
Absent	28 (87.5)	4 (22.23)	

Group I: Patients with normal interpregnancy interval ( $\geq 18$  months).

Group II: Patients with short interpregnancy interval (<18 months).

p value was determined by chi square test\*

Scar tenderness was also significantly associated with inter pregnancy interval where most of the patients of group II were observed to present with scar tenderness (77.77%).

### Discussion

Caesarean section is considered the most common obstetrical operation worldwide. The ultrasonography-aided assessment of the lower uterine segment scar is crucial in determining wound dehiscence and ruptures which are the severe complications of poor healing caesarean section scar. A short interpregnancy interval (IPI) is considered as a risk for uterine rupture. The rate of vaginal birth after caesarean section was significantly reduced from year to year, and the rate of repeated caesarean section is increased during the past ten years worldwide. Evaluation of scar thickness is done by ultrasound, but it is still debatable about the size of thick scar that would guide "cut-off value" for the completion of the delivery method.

This is a cross-sectional study was carried out on the pregnant women of 36 to 40 weeks with a history of 1 previous caesarean section in the indoor patient dept. of Obstetrics & Gynaecology in SSMC. All of them were categorized into two groups- group I included patients with normal IPI ( $\geq 18$  months) and group II included short IPI (<18 months).

About 64% (n=32) were in group I and 36% (n=18) were in group II. The mean age of studied pregnant women was  $23.53 \pm 3.65$  (SD) years in group I and  $23.94 \pm 3.95$  (SD) in

group II with a majority in age group 21-25 years old. Age was statistically similar in both groups. Islam and Sultana (2019) did a similar type study among pregnant women of Bangladesh and found that they were in age group 18-31 years with a mean age of 24.5 years which corresponded with the result of present study.<sup>9</sup>

In this study, most of the pregnant women were housewives which corresponds with the study of Islam A. *et al* (2016) as they reported on the socio-economic status of pregnant women in Bangladesh.<sup>10</sup> Most of the pregnant women in our study was studied upto primary and secondary level. The unbiased measurement of socio-economic status is crucial for such benefit-incidence analysis in health, population, and nutrition. According to the study of Saif-Ur-Rahman KM. *et al* (2018) which focused on the socio economic profile of the south asian women, most women were less educated and from primary level and few completed graduation.<sup>11</sup> In this study, education, occupation and socio-economic status were statistically similar in patients of both groups. According to the study of Parvin J. *et al* (2018) which was held in Bangladesh they also found that socioeconomic status was important to ensure a safe maternal care and safe delivery and



most of the people were from low socioeconomic status therefore they were in high risk to develop to rise maternal complication.<sup>12</sup>

According to our study, a higher frequency of well-nourished pregnant women was observed in both groups. About 40.60% in group I and 55.60% in group II were on irregular ANC visits. According to the study by Huda *et al*(2020) most of the pregnant women in Bangladesh attended ANC visits irregularly because of some factors like education, socio-economic condition, home delivery preference.<sup>13</sup>

In this study, 68.80% in group I and 61.10% in group II patients had no history of infection in previous caesarean section. No maternal complications were reported in 75% in group II and 50% in group I patients. As complications, PPH and sepsis was reported in both groups. Tang X. *et al* (2019) stated that the chance of infection after caesarean section is less. But the history of infection in previous caesarean section has the risk for developing the caesarean scar defect.<sup>14</sup>

Uterine scar was statistically associated with interpregnancy interval in this study, where scar was thinner in patients with small interval. In group II, 88.90% patients uterine scar was thinner which was statistically higher ( $p < .05$ ) than the patients with thinner scar (6.20%) in group I.

Scar thickness was significantly associated with interpregnancy interval. In group II, majority patients (88.90%), scar thickness was  $< 2.5$  mm and in group I, only 6.20% patients' scar thickness was  $< 2.5$  mm. As suggested by Singh N. *et al* (2015) the lower uterine segment scar thickness found thinner ( $< 3.5$ mm) in women who had previous caesarean section that also corresponded with our result.<sup>15</sup>

Scar tenderness was present more in pregnant women when interpregnancy interval was short ( $< 18$  months) than patients with normal interpregnancy interval ( $\geq 18$  months) In our study, most of the patients of group II were observed to present with scar tenderness (77.77%).

The study also concluded that transvaginal sonography can be used to measure scar thickness in pregnant patients with previous cesarean section due to better delineation of structures such as bladder wall and decidual membranes. Scar thickness measurement at both late second trimester and third trimester can be utilized but scar thickness measurement in third trimester is more reliable.

### Conclusion

In this study, mean diameter of scar measured by ultrasonogram was lower in women who had interpregnancy interval  $< 18$  months in comparison to who had more than that. Moreover, scar tenderness was also associated with short interpregnancy interval. However, before use this finding as a general rule it must be re-examined in further larger study with appropriate design.

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