**ORIGINAL ARTICLE**

**Prevalence of gallstones and biliary sludge formation during pregnancy detected by ultrasonography**

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**Abstract**

The risk of gallstones is thought to increase with number of pregnancies. Cholesterol gallstones are more prevalent in women than men and primarily related to sex steroids, particularly progesterone. During pregnancy there are changes in bile composition and gallbladder motility that promote gallstone formation. This study was conducted to determine incidence and outcome of pregnancy related biliary sludge and gallstone formation. Two hundred and nine consecutive expectant women were evaluated by ultrasonography at 1st trimester, 3rd trimester and at 4-6 weeks after delivery. Socio-demographic, medical and obstetrical history were taken and recorded. Incidence of gallstone and sludge formation were found 5.7% and 2.9%, respectively. The results suggest that pregnancy may be a risk factor for gallstone and biliary sludge formation.

**Key words:** Prevalence, gallstones, biliary sludge formation, pregnancy, ultrasonography.

**Introduction**

Gallbladder disease is highly prevalent in western countries. The prevalence of gallstones is upto 50.0% among adult women in some population of Latin American countries.¹ The United States of America have demonstrated gallstones in 5.0-12.0% of pregnant women.²,³ The risk of gallstones is also thought to increase with number of pregnancies.⁴,⁵ Cholesterol gallstones, more prevalent in women than men and are primarily related to sex steroids, particularly progesterone.⁶,⁷ During pregnancy there are changes in bile composition and gallbladder motility that promote gallstone formation.⁸ Pregnancy may be a risk factor for gallbladder stone and sludge formation.

In the literature, prevalence of biliary sludge was reported up to 36.0% and gallstones up to 11.0%.⁹ A prospective study also reported the development of new biliary sludge in 31.0% and new gallstones in 2.0% of the studied women during one year postpartum.¹⁰ The risk remained high during five years after pregnancy.¹¹ Most women with biliary sludge remain asymptomatic. However, those with stones may experience pain or serious complications such as cholecystitis, choledocolithiasis or pancreatitis which may have a high morbidity or mortality for both mothers and fetuses.²,¹²

There is no study showing incidence of biliary sludge or gallstone development...
during pregnancy in Bangladesh. Therefore, this prospective study was designed to determine the incidence and natural outcome of pregnancy related biliary sludge and gallstone and to define potential risk factors in developing such diseases.

Materials and Method
This study was carried out in a private clinic in Khulna from June 2014 to December 2016 enrolling 233 consecutive pregnant women in 1st trimester. The exclusion criteria was the presence of gallstone at entry. Written informed consents were taken from every participants. Particulars of participants with baseline epidemiological and biometric data were recorded in data sheet. Blood glucose and lipid profile were examined.

All the participants underwent ultrasound scanning- 1) at 1st trimester (9-12 weeks), 2) early 3rd trimester (26-32 weeks) and 3) 6-8 weeks after child birth. If biliary sludge was found at 1st scan, the participant were followed up for probable progression to gallstone. Others were followed up for probable development of new biliary sludge or gallstone. A total of 209 mothers completed all 3 scans and were considered as final study population of this study. Data were collected, compiled and entered in spreadsheet and analyzed using appropriate statistical tools. Results were reported as percentage (%).

Results
Age of the participants of this study varied from 16 to 36 years (mean ± SD, 25.3 ± 4.6 years). Among the women, 175 (83.7%) were from middle class family while 28 (13.4%) from poor family and rich family background, respectively. Of them, 112 (53.6%) were from ≤25 years of age, 97 (46.4%) from above 25 years of age (Table 1). Out of 209 women, 22 (10.5%) had history of using of injectable contraceptives and 4 (1.9%) oral contraceptives in the past. Only six (2.9%) of the women had diabetes and hypertension (Table 1).

Among the women, 90 (43.1%) were primi gravida, 63 (30.1%) 2nd, 42 (20.1%) 3rd and 14 (6.7%) 4th and more gravida. During 1st scanning none of the pregnant women had gallstones but 1 had sludge (Table 2). During 2nd scanning at early 3rd trimester, 12 (5.7%) of the women including 1 who had sludge in 1st scan had gallstones and were found to have gallstones persisted during 3rd scanning at about 6-8 weeks after delivery (Table 2). Six women (2.9%) were found to have newly developed biliary sludge during 2nd scanning at 3rd trimester and of them 5 (2.4%) persisted during 3rd scanning at 6-8 weeks after delivery, 1 (0.5%) sludge regressed (Table 2).

Table 3 shows the age, parity and gallstone and sludge formation among the women. Gallstone formation was similar among age groups ≤25 and >25 years. Sludge formation tended to be more among the age group ≤25 years. Gallstone formation was similar in relation to gravida/ parity while sludge formation tended to be more with higher gravida/ parity.

Discussion
During pregnancy changes in bile composition and gallbladder can lead to nucleation of bile acids, sludge formation and the development of gallstones. In the 3rd trimester, the changes in bile composition are mainly due to effects of estrogen. After delivery, bile composition and gallbladder movements return to normal and therefore, sludge or gallstones may resolve. In this study, incidence of gallstone and sludge formation during pregnancy was 5.7% and 2.9%, respectively. The observation seems to be consistent with that in a study where
incidence of gallstone in pregnant women was 6.3%. Other series showed lower incidence of gallstone formation during pregnancy of developed countries. On other hand in this series sludge formation was low, but higher than report by an author which was 0.68%. Most of the studies show regression of stone and sludge after delivery as gallbladder function and biliary compositions returns to normal after delivery. In this study, 1 (0.5%) sludge regressed. Gallstone formation was similar among age groups ≤25 and >25 years. Sludge formation tended to be more among the age group ≤25 years.

In this study, gallstone formation was similar in relation to gravida/parity while sludge formation tended to be more with higher gravida/parity. Gallstone formation was higher among primi gravida which was contradictory to that reported by others. Long period of breast feeding and less awareness of mothers regarding body weight may influence the higher incidence.

**Conclusion**

Pregnancy predisposes gallbladder disease including gallstone and sludge formation. Frequency of sludge formation may rise with parity. There were some limitations in the present study- high dropout rate, small sample size, and body mass index and cholesterol level of mothers were not evaluated. The study period was short and a single centered study may not proclaim the whole scenario of the country. A multi-centered study in tertiary hospitals of the country including multi disciplinary approach may reveal the real picture.

**References**

5. Scott LD. Gallstone disease and pancre-

Suggestion for citation of the above: