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MATERNAL VITAMIN B₁₂ AND D STATUS, DEPRESSION, DIETARY INTAKE, AND NEONATAL OUTCOMES FOLLOWING
BARIATRIC SURGERY

by

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Abstract

Introduction: Bariatric surgery (BS) is a more effective approach than dieting in morbidly obese women, which reduces comorbidities such as hypertension and gestational diabetes and improves fertility. Vitamin B₁₂ and vitamin D play important roles in ensuring a healthy pregnancy and healthy neonate. However, pregnancies that follow BS may be complicated by micronutrient deficiencies, particularly of vitamins B₁₂ and D. *Objectives:* To investigate vitamin B₁₂ and D status and neonatal outcomes in pregnant women with previous sleeve gastrectomy (SG) and Roux en Y Gastric Bypass (RYGB) in comparison to women without history of BS. Also, dietary intake, and mental health of women with history of BS were assessed. *Methods:* This prospective study comprised of 217 pregnant women (106 with a history of BS and 111 without a history of BS), who attended Danat Al Emarat Hospital in Abu Dhabi between July 2021 to November 2022. The primary outcomes were maternal vitamin B₁₂ and vitamin D status and neonatal birth weight. The Secondary outcomes included gestational weight gain, dietary intake, and maternal mental health status. A sub-sample of the participants with a history of BS completed a 135-items quantitative food frequency questionnaire designed for United Arab Emirates population and Edinburgh Depression Scale (n= 41 and n=38, respectively) to assess dietary intake and mental health status. *Results:* Vitamin B₁₂ level was higher in pregnant women with previous BS than in women without history of BS (309 vs 236 pg/ml, $p < 0.001$). Women with a history of BS showed a lower level of vitamin D compared to women without history of BS (27.90 vs 22.66 ng/ml, $p < 0.001$). The total gestational weight gain was lower in women with history of BS compared to women without BS history (7.99 ± 5.61 vs 11.28 ± 5.73 , $p < 0.001$). A linear regression analysis indicated that vitamin B₁₂ and vitamin D decrease in women with a history of BS. Pearson analysis showed a significant association between neonates with low birth weight and BS status ($r = 0.24$, $p = < 0.001$). A binary logistic regression analysis revealed that neonates born to women with a history of BS were three times at a higher risk of having a lower birth weight compared to neonates born to women without prior BS (OR 2.850; 95% CI 1.127-7.207). Neonates from women with Roux-en-Y bypass history were significantly at risk six times to be small for gestational age (OR=6.048 CI;1.155-31.673, $p = 0.033$). The prevalence of depression among women with history of BS was 46.3%. Moreover, linear regression analysis showed that the total depression score increased significantly by 3.8 times higher in women who underwent sleeve gastrectomy than in women who underwent Roux-en-Y bypass surgery. Intake of dietary fiber was below the recommended levels (26 g/day vs 28 g/d, respectively) while percent energy from total fat was above the recommendations (36 % vs. 20-35%). *Conclusion:* Bariatric surgery was associated with vitamin B₁₂ and vitamin D deficiencies and having low birth weight neonates. Low birth weight neonates are more frequently seen in women with a history of RYGB surgery than in women with a history of SG surgery. Presence of depression had a higher association with sleeve gastrectomy than with RYGB surgery.

Keywords: Bariatric surgery, maternal vitamin B₁₂ status, vitamin D status, maternal mental health, dietary intake, neonatal outcomes