The Outcome of Pregnancy Following Bariatric Surgery in Women Attending a Secondary Care Hospital

Abstract:

Background: Bariatric surgery (BS) is widely regarded as the most effective intervention for obesity. It is associated with long-term beneficial effects on weight loss and notable improvement of metabolic comorbidities. Although BS leads to reduction of many obesity-related pregnancy complications, such as gestational diabetes mellitus (GDM), pregnancy induced hypertension and fetal macrosomia; the procedures undertaken during BS impose additional novel risks which might lead to adverse outcomes for mothers and their babies such as nutritional deficiencies, anemia, altered maternal glucose metabolism, small for gestational age babies and surgical complications related to different types of bariatric surgery.

Aims: To evaluate pregnancy outcomes in women post-bariatric surgery attending Hatta Hospital (HH), a secondary care facility under the Dubai Health jurisdictionto enhance preconception counseling for women planning pregnancy after BS and enableinformed decision-making.

Methods: A retrospective evaluation of the medical records of pregnant women who attended Hatta Hospital over the period from January 2019 to June 2024 was undertaken. Inclusion criteria comprised 71 women aged$\geq$ 18 years, who underwent any type of bariatric surgery before pregnancy. Data collected included participants' sociodemographic characteristics, past medical history and habits, medication during pregnancy, routine blood analysis, gestational weight gain or loss, type of delivery, newborn anthropometry, as well as fetal and maternal complications. An initial manual data analysis was followed by multivariate analysis conducted by SPSS Statistics. The association of the time interval between BS and to first pregnancy after BS with nutritional deficiencies and newborn weights was specifically assessed.

Results: The cohort had a mean age of 33 years and a median parity of 3. Roux-en-Y gastric bypass (RYGB) was the most common surgery type (38%). The mean interval from BS to pregnancy was 4 years, and the mean body mass index (BMI) at pregnancy was 31 kg/m^2. Iron deficiency was the most prevalent nutritional deficiency (87.9%), followed by vitamin D deficiency (71.4%). Low ferritin was observed in 77.2% of cases, with 55% requiring IV iron therapy. The prevalence of gestational diabetes mellitus was 9%, hypertensive disorders in pregnancy 19%, and hyperemesis gravidarum 66%. Dumping syndrome occurred in 1 case, and no surgical complications requiring intervention were reported during pregnancy. The mean gestational age at delivery was 34 weeks, and the average birth weight was 2.46 kg. In total, 47.5% of infants were below the 50th percentile for growth. No fetal abnormalities related to bariatric surgery were identified. Statistical analysis did not reveal significant relation between surgery to pregnancy interval (STP) and iron deficiency state as well as neonatal birth weights.

Conclusions: This cohort demonstrates thatpregnancy following bariatric surgery is associated with favorable metabolic disease reductions, notably, low GDM rates, but carries significant nutritional deficiency risks, particularly iron and vitamin D. These deficiencies may contribute to fetal growth restriction tendencies. With rigorous monitoring, supplementation, and multidisciplinary care, outcomes can be optimized for both mother and baby.

Keywords: Bariatric surgery, Obesity, Nutritional deficiency, Neonatal outcomes, Maternal complications.

Main Text

Introduction:

The significant increase in the prevalence of obesity has led to an increasing number of obese women entering pregnancy. This is particularly pronounced in the Arab Gulf region. Obesity in pregnancy is

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associated with adverse maternal and fetal outcomes such as hypertension, gestational diabetes mellitus (GDM), thromboembolism, miscarriages, and fetal macrosomia. Conventional interventions such as diet, exercise, and medication are not effective for weight reduction in morbid obesity (BMI of 40 kg/m^2 or more). Consequently, bariatric surgery (BS) has emerged as the most effective treatment for obesity, leading to significant weight loss and improvement in metabolic disorders. However, it poses unique challenges for women of childbearing age, including risks of micronutrient deficiencies, anemia, altered maternal glucose metabolism, hepatobiliary complications, dumping syndrome, internal hernias, and small-for-gestational-age (SGA) babies [1,2].

The major impact on pregnant women is the development of nutritional deficiencies, particularly Iron, vitamin D, and vitamin B12, and small for gestational age babies due to persistent weight loss, but this can be minimized by adjusting the interval between BS and subsequent pregnancy to allow for optimization of maternal nutritional status [3].

A pregnancy in a woman after bariatric surgery should be considered a high-risk pregnancy and taken care of by a multidisciplinary team [4]. Good prenatal care, micronutrient supplements preconception, in antenatal and postpartum periods, and close supervision from experts managing this pregnancy are essential components to ensure a good outcome for the mothers and their newborns.

According to 2023 statistics from the Ministry of Health and Prevention of the UAE, 40% of women of reproductive age are obese, and 59% underwent bariatric surgery, 82% of whom were local Emiratis. In spite of the high prevalence of BS in UAE women, there is a scarcity of data regarding the perinatal outcomes in this population from this region.

We are undertaking this study to evaluate the outcomes in pregnant women after BS who attended Hatta Hospital, a remotely located multispecialty secondary care hospital under the Dubai Health Authority of the United Arab Emirates(UAE).95% of pregnant women attending our hospital for antenatal care and delivery are local Arabs with a similar cultural and nutritional background.

Material and Methods:

Study design and setting*:*

This study was conducted in the department of Obstetrics and Gynecology at Hatta Hospital, Hatta, Dubai, UAE. It includes retrospective evaluation of pregnant women with prior BS who attended our hospital over the period from January 2019 to June 2024 and delivered there. The BS was performed elsewhere, but during the antenatal period, they were cared for by a multidisciplinary team, including an obstetrician, dietician, endocrinologist, and general surgeon. All were nonsmokers and received 5mg folic acid periconception and supplements of iron, multivitamins, vitamin D, and calcium during the antenatal and postnatal period. Intravenous iron infusion was administered in cases where ferritin level was <15ng/ml. Screening for GDM was conducted by a laboratory glucose profile.

Ethical Clearance was obtained from the Dubai Scientific Research Ethics Committee (DSREC-02/2025_29, approved on 25/02/2025)

Consentfor inclusion in scientific research studies was already obtained from the women at the time of registration for antenatal care, and separate written informed consent was not required. Confidentiality of information was ensured throughout the study.

Study population:

Participants included women ≥ 18 years old, who underwent any type of bariatric surgery before pregnancy.

Inclusion criteria**:** Pregnant women who had a bariatric procedure before the index pregnancy and attended antenatal care and delivery at the Dubai health facility.

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Exclusion Criteria: Multiple pregnancies, Pregnancies with no history of bariatric surgery, Women with bariatric surgery with preexisting medical illness like SLE, Chronic hypertension, or Autoimmune diseases, and Women delivered outside of our facility with incomplete records.

***Sample size and technique*:** All cases attending Hatta hospital in the study period (101 case records were retrieved)

***Sources of Data*:** case records of the pregnant women meeting the inclusion criteria.

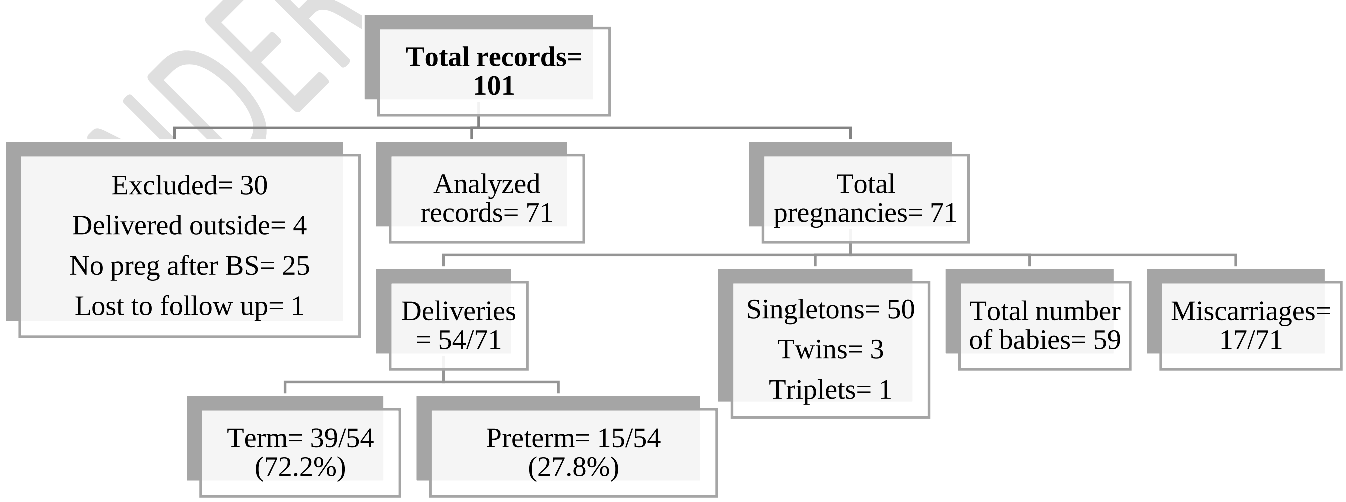
Collection of data: was done in an Excel sheet/structured data collection tool manually from the Salama system/EPIC. Information was collected regarding participants sociodemographic characteristics, BMI at booking, type of bariatric procedure, Time interval between BS and first pregnancy, past medical history, medication during pregnancy, Booking laboratory results of serum iron, ferritin, vitamin B12, vitamin D and calcium, need for Iron infusion, gestational weight gain or loss, Mode of delivery, gestational age at delivery, newborn weight and growth percentiles, fetal abnormalities and maternal complications (medical -hyperemesis, gestational diabetes mellitus, pregnancy associated Hypertensive disorders and surgical complications related to BS).

Outcome measures: primary objective was to assess (1) the prevalence of medical morbidities and nutritional deficiencies in pregnancies after BS and (2) the Effect of BS on neonatal birthweight. The secondary objective was to correlate the time interval from BS to pregnancy with iron deficiency and newborn weight.

***Statistical analysis*:** All data were coded and entered into Microsoft Excel and analyzed using SPSS software version 29.0 (IBM Corp., Armonk, NY, USA; released 2023). Descriptive statistics were used to summarize the data. Continuous variables were expressed as mean ± standard deviation (SD) or median (interquartile range, IQR), depending on distribution. Categorical variables were presented as frequencies and percentages. The Kolmogorov-Smirnov test was used to assess the normality of data distribution. The parameters that were not normally distributed were examined using the Mann–Whitney U-test. Correlation analyses were conducted to assess whether time to conception was associated with neonatal birthweight using Pearson's correlation coefficient and Spearman's rank correlation. $P < 0.05$ was considered statistically significant.

Results:

Fig.1 Flow chart of Study subjects:



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Records of 71 women who became pregnant after a bariatric surgery were analyzed. 17 (24%) ended in miscarriage and 54 (76%) progressed till delivery.Amongst the 54 delivered, 50 were singleton pregnancies, 3 twins and 1 triplet.

Table 1 shows the Maternal Demographic features of the study Population.

Maternal Age:

The mean maternal age in the cohort was approximately 33 years, with a range spanning from 21 to 46 years. This distribution suggests a higher representation of older women undergoing bariatric surgery prior to pregnancy.

Parity:

Parity among participants varied widely, ranging from 0 to 10, with a mean parity of three. Only 11% of the women were primigravidas, while the majority were multiparous. This pattern indicates that bariatric surgery was predominantly performed for cosmetic or metabolic indications rather than for fertility enhancement.

Body Mass Index (BMI) at Booking:

The mean BMI at the time of booking was 31 kg/m^2, indicating that most women entered pregnancy overweight or obese. The BMI values ranged considerably, from 20 to 44 kg/m^2, reflecting substantial heterogeneity in maternal nutritional status.

Weight Changes During Pregnancy:

On average, women gained 8.5 kg during pregnancy; however, a mean weight loss of 3.7 kg was also observed in some cases. The wide range of weight change, with a maximum weight loss of 7 kg and a maximum gain of 18 kg, underscores significant variability among participants. This variability may be attributable to the metabolic and absorptive effects of bariatric surgery as well as underlying nutritional deficiencies.

Gestational Age at Delivery:

Gestational ages at delivery ranged from 24 to 42 weeks. Preterm deliveries, defined as births occurring before 37 weeks of gestation, accounted for 27.8% of cases, while term deliveries comprised 72.2%. The elevated rate of preterm birth in this cohort appears to be associated with multiple high-risk obstetric factors rather than a direct consequence of bariatric surgery.

Mode of Delivery:

Cesarean deliveries predominated, comprising 68.5% of births, whereas vaginal deliveries accounted for 31.5%. The cesarean rate in this cohort exceeds global averages and primarily reflects obstetric indications such as a history of two or more previous cesarean sections, fetal malpresentation, maternal request, failure to progress in labor, and fetal distress. Importantly, these factors rather than bariatric surgery itself appear to drive the high cesarean delivery rate.

Table:1 Maternal Features

Maternal demographic feature	Number of women=n(%)	Range	Mean ±S.D
Age in yrs			
21-30	23 (32.4)	21-46	33±5.7
31-40	39 (54.9)		
41-45	8 (11.3)		
>45	1 (1.4)		
total	71		
Parity			
P0-P3	51 (71.8)	P0-P10	3±2.3
P4-P7	15 (21.1)		
P8-P10	5 (7.1)		
total	71		
Booking BMI (kg/m^2)			
20-25	15 (21.1)	20-44	31±5.5
26-30	22 (31.0)		
31-35	20 (28.2)		
36-40	11 (15.5)		
41-45	3 (4.2)		
total	71		
Gestational weight gain in kg			
1-5	15/54 (27.8)	1-18	8.56
6-10	18 (33.3)		
11-15	4 (7.4)		
16-20	9 (16.7)		
Gestational weight loss in kg			
1-5	7 (13)	1-7	3.75
6-10	1 (1.8)		
Gestational Age at			
Delivery in weeks			
24-28	1 (1.8)	24-42	34±8.2
29-36	14 (26)		
37-42	39 (72.2)		
Mode of Delivery			
Vaginal	17/54 (31.5)		
Cesarean section	37/54 (68.5)		

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<u>Table 2</u> demonstrates the Bariatric Surgery Profile in the study group. The commonest surgery was Roux-en-Y Gastric bypass (38% cases), followed by Sleeve gastrectomy (15.5%) and Gastric banding

(1.4%).10% cases had 2 types of procedure (SG and RYGB). In 35% cases the exact type of surgery could not be obtained from the records. 2 cases underwent Abdominoplasty after their bariatric surgery. It is an adjunctive procedure used by women after weight loss from BS to remove excess lax skin [5].

Table 2: Type of Bariatric surgery

Type of bariatric surgery	n/71	%
RYGB	27	38
Sleeve gastrectomy (SG)	11	15.5
Gastric band	1	1.4
2 types of surgeries	7	9.9
unclassified	25	35.2

Table 3 shows the Interval Between Bariatric Surgery and ConceptionThe average interval was 4.4 years, 19% women conceived within one year of BS ,27% conceived in the recommended 2-year period while others conceived beyond it.

Table 3: Bariatric surgery to pregnancy interval

Bariatric surgery to pregnancy interval in yrs	n/64	%	Range	Mean±S.D
0.3-1	12	18.8	0.3-12	4.4 ±3.07
1.1-3	17	26.6		
3.1-6	20	31.2		
6.1 -9	11	17.2		
9.1-12	4	6.2		
Not recorded	7			

Table 4 shows the micronutrient deficiencies. Iron deficiency was the commonest (88%), followed by Vitamin D (73%), Vitamin B12 (27%) and calcium (19%). Ferritin was low(<15ng/ml) in 77% cases requiring intravenous iron infusion in 55% cases. These findings reveal important nutritional risks post-bariatric surgery and during pregnancy.

Table 4: Maternal Nutritional deficiencies

Nutrient deficiency	n	%
Iron		
yes	58/66	87.9
no	8/66	12.1
Not Recorded	5	
Ferritin levels		
low	44/57	77.2
normal	13/57	22.8
Not Recorded	14	
Iv iron Therapy		
yes	38/69	55
no	31/69	45
Not Recorded	2	
Calcium		

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yes	12/64	18.8
no	52/64	81.2
Not Recorded	7	
Vitamin D		
Yes	47/64	73.4
no	17/64	26.6
Not Recorded	7	
Vitamin B12		
Yes	17/64	26.6
no	47/64	73.4
Not Recorded	7	

Table 5 shows the medical morbidities in pregnancies after BS. Significant numbers (66%)developed hyperemesis gravidarum. Pregnancy associated Hypertensive disorders (PIH, Preclampsia, eclampsia) were seen in 19% and GDM developed in 9%,relatively low compared to general populations, reflecting weight loss benefits after bariatric surgery.

Table 5: Maternal medical complication during pregnancy

Medical condition	Yes	%	no	%	NR
Hyperemesis	43	66.1	22	33.8	6
Gestational diabetes	6	9	61	91	4
Pregnancy related Hypertensive disorders	13	19.1	55	80.9	3

Table 6 and 7 shows neonatal weight profiles. Birth weight ranged from 0.5 to 3.6 Kg with a mean of 2.45 kg .32% of newborns were Small for gestational age, while 14% were large for gestational age. 47%of neonates fell at or below the 50th percentile. This indicates a tendency toward small-for-gestational-age newborns, aligning with lower mean birthweights and high micronutrient deficiencies.

Table 6: Birth weight of neonates

Birth weight(kg)	n/59 (%)	Range	Mean± S.D
0.5-1	**1(1.7)**	**0.5-3.6**	**2.456±0.71**
1.1-2	**13(22)**		
2.1-3	**31(52.6)**		
3.1-4	**14(23.7)**		

Table 7:Birth weight percentiles

Percentile	n/59	%
<=10th	19	32.2
11-49th	9	15.3
50-89th	23	39
>=90	8	13.5

Fig 2: Fetal growth profile

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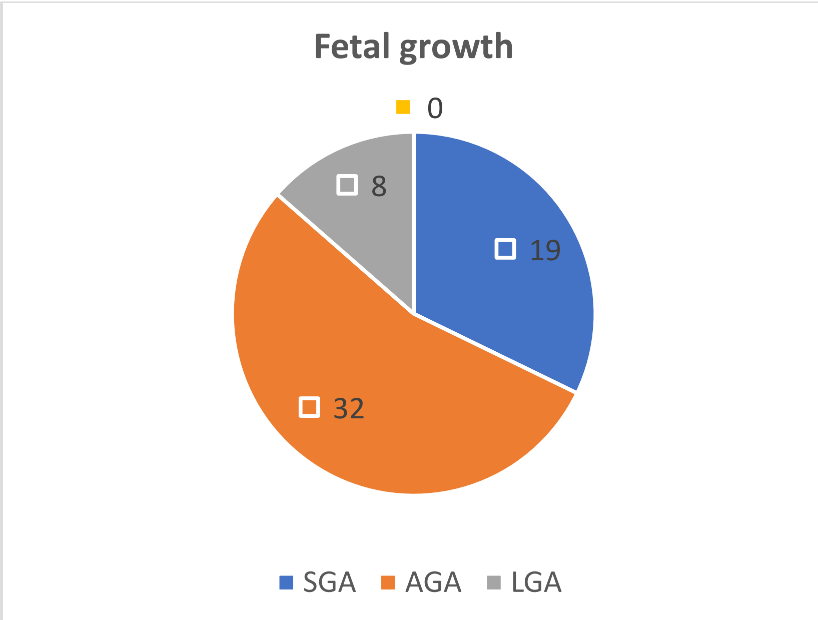

FetalAbnormalities:

Fetal genetic disorders were detected in 4 cases/71(Trisomy 21+PDA=1, Triple X=1, Trisomy 21=1`,47XXY=1) which are not related to BS. There were no fetal congenital malformations in this cohort.

Bariatric surgery related complicationswere rare and Dumping syndrome was noted in 1/71cases.

Relationship Testing and Correlations:

Fig 3: Box plot comparing Iron Deficiency vs. Time to Pregnancy

The boxplot comparing the interval from bariatric surgery to conception between iron-deficient and non-deficient women shows broadly similar distributions across groups. Median time to pregnancy appears slightly higher among iron-deficient women, but the interquartile ranges overlap noticeably, indicating similarity in central tendency. Overall, the visual overlap between boxes supports the Mann–Whitney U test result,($p = .844$), which detected no statistically significant difference between groups, indicating that time to conception following bariatric surgery does not influence iron deficiency.

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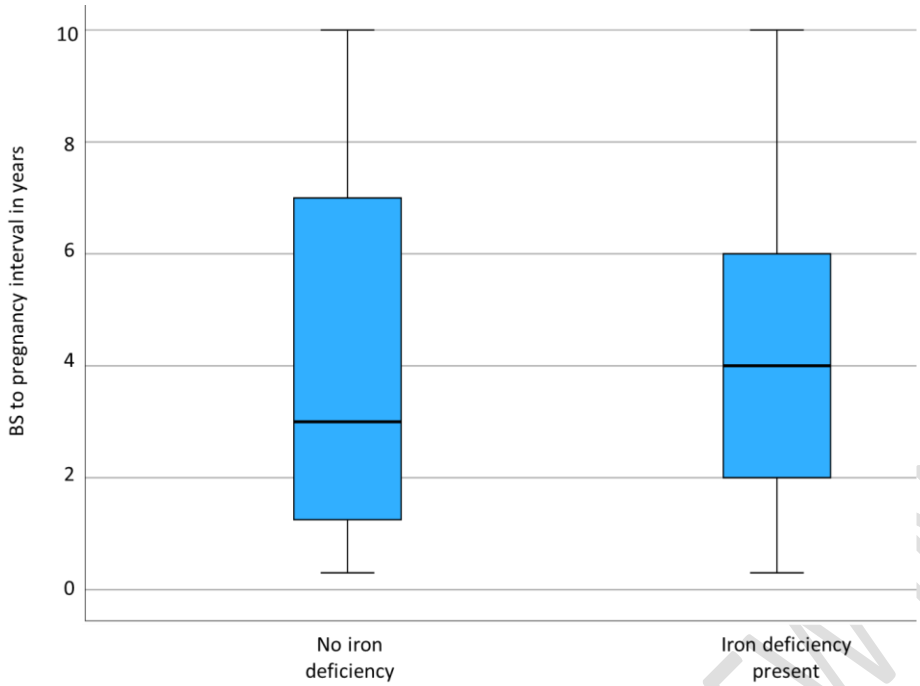
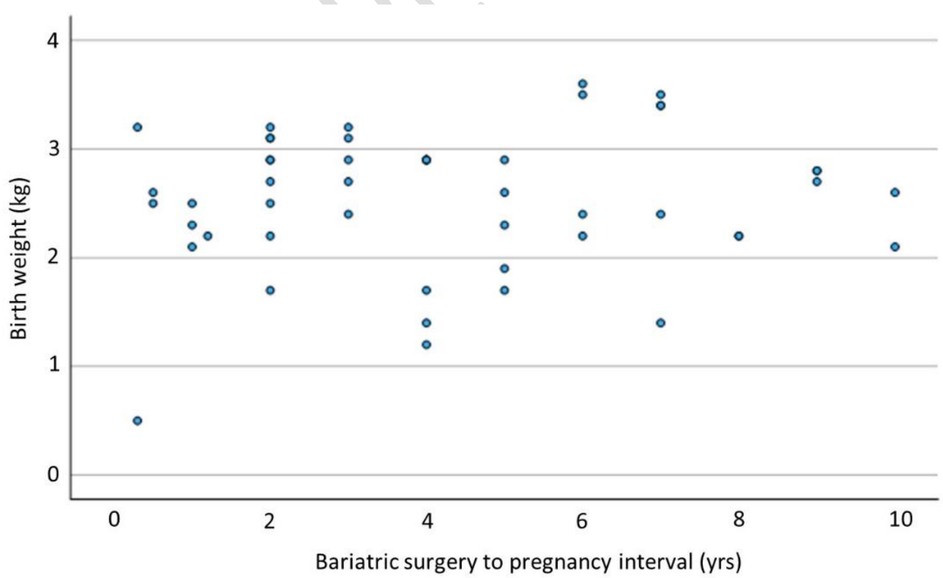


Fig 4: Scatterplot (Birthweight vs. Time to Pregnancy)

The scatterplot illustrates the relationship between neonatal birthweight and the interval from bariatric surgery to conception. This visual pattern is consistent with the Pearson and Spearman correlation outputs, which showed weakly positive, non-significant associations($p > 0.5$). Collectively, the scatterplot supports the conclusion that timing of conception after bariatric surgery does not meaningfully influence neonatal birthweight in this cohort.

These findings suggest that birthweight variation is likely driven more by micronutrient deficiency, maternal comorbidities, or procedural types rather than timing alone.



Discussion:

This study investigated the impact of bariatric surgery (BS) on the prevalence of nutritional deficiencies during pregnancy, associated medical comorbidities, neonatal birth weights, and the relationship between the interval from bariatric surgery to pregnancy (STP interval) with iron deficiency and neonatal outcomes. Among the cases reviewed, 24% resulted in miscarriage, while 76% progressed to live births. These findings are consistent with those reported by Bebber et al., who documented a miscarriage rate of 23% and a live birth rate of 69% [6].Gestational weight gain (GWG) in our cohort exhibited considerable variability, ranging from 1 to 18 kg, with 14% of women experiencing weight loss, likely attributable to hyperemesis gravidarum and other nutritional factors. Currently, there is no established consensus regarding optimal GWG following different bariatric procedures or across diverse metabolic profiles. Consequently, gestational weight gain targets should be individualized to each patient's circumstances [7]. Notably, women conceiving within 18 months post-surgery tended to gain less weight during pregnancy compared to those with longer intervals.The gestational age at delivery ranged from 24 to 41 weeks, with 28% preterm and 72% term births. The preterm delivery rate in our cohort exceeds that reported by Costa et al., who observed a rate of 13% [8]. This elevated preterm birth incidence was primarily attributable to high-risk obstetric factors, including preterm rupture of membranes and preterm contractions in women with a history of two or more cesarean deliveries.

Cesarean section was the predominant mode of delivery, accounting for 68.5% of births in this study. This rate parallels findings by Bebber et al., who reported a cesarean rate of 69% [6]. Importantly, this high cesarean prevalence is linked to obstetric indications such as multiple prior cesareans, malpresentation, maternal request, labor dystocia, and fetal distress rather than the bariatric surgery itself. Literature does not support an inherent increase in cesarean delivery rates attributable to BS [9,10]. Nonetheless, it is plausible that nutritional deficiencies arising from BS may contribute indirectly to increased labor inductions and surgical interventions due to fetal growth restriction.

Bariatric procedures performed are classified into three categories: **A**-*malabsorptive* (Roux-en-Y gastric bypass [RYGB], biliopancreatic diversion, and biliopancreatic diversion with duodenal switch), **B**-*restrictive* (primarily laparoscopic sleeve gastrectomy and adjustable gastric banding), and **C**-*less invasive methods* such as the intragastric balloon. In our cohort, RYGB was the most common surgery, followed by sleeve gastrectomy and gastric banding. Although the sample size was insufficient to compare outcomes by surgery type, existing literature indicates that malabsorptive procedures carry a higher risk of nutrient deficiencies, fetal growth restriction, and surgical complications such as internal hernias (reported in 2–12% of cases), which may require urgent intervention during pregnancy to prevent bowel necrosis [6,7,11]. In contrast, restrictive surgeries tend to yield more favorable perinatal outcomes and are generally preferred for women of reproductive age [12].

The influence of the surgery-to-pregnancy interval on maternal weight gain, nutritional status, and fetal growth remains contentious in the literature [13]. Intervals shorter than 12 months may predispose to hepatobiliary complications such as gallstones and biliary colic, likely due to rapid weight loss and altered bile acid metabolism [2]. In this study, the mean interval was approximately four years, with 19% conceiving within one-year post-surgery. Statistical analysis revealed no significant correlation between the STP interval and the development of iron deficiency or neonatal birth weight. Despite this, current guidelines recommend delaying conception for 12 to 24 months post-BS to allow for weight stabilization and to mitigate the risks associated with rapid weight loss [14].

Substantial evidence supports the association between bariatric surgery—particularly malabsorptive procedures—and nutritional deficiencies during pregnancy [3,7]. Common deficiencies include iron, vitamin D, vitamin B12, and calcium [3]. Additional deficiencies reported in the literature encompass vitamin B1, folate, fat-soluble vitamins (A, D, E, and K), selenium, phosphate, magnesium, and albumin [1,7]. Such deficiencies can lead to anemia, fetal anomalies, and fetal growth restriction, especially when protein intake is inadequate. In our cohort, iron deficiency was most prevalent (88%), followed by vitamin D (73%), vitamin B12 (27%), and calcium (19%). Al Mansoori et al. found vitamin B12 deficiency to be most common in their population, followed by vitamin D and iron deficiencies [3]. Ferritin levels below 15 ng/ml were present in 77% of our cases, necessitating intravenous iron therapy in 55%. Similarly, Al Mansoori et al. reported low ferritin in 57% of cases, with half requiring IV iron infusion. Their study also concluded that neither the type of BS nor the STP interval significantly affected micronutrient status, although a higher proportion of women with longer (>18 months) STP intervals exhibited iron deficiency anemia requiring infusion. In contrast, our study found no significant association between STP interval and iron deficiency ($p = 0.844$). Routine monitoring of nutrient levels preconceptionally, during each trimester, and postpartum is strongly recommended [15]. Personalized nutritional counseling has been shown to improve maternal nutrient intake and is associated with higher neonatal birth weights [16].

International studies demonstrate that bariatric surgery reduces the risk of gestational diabetes and hypertensive disorders in pregnancy [17]. In our cohort, hypertensive disorders were observed in 19% of cases and GDM in 9%. Gonzales et al. reported a GDM incidence of 3% without hypertensive complications [11]. Diagnosing GDM post-BS is challenging because oral glucose tolerance tests are contraindicated due to risks of hypoglycemia and glucose variability following the glucose load [18]. Alternative screening methods, such as seven-point capillary blood glucose monitoring or continuous glucose monitoring (CGM) between 24 and 28weeks gestation, are recommended [19].

Post-bariatric pregnancies exhibit altered glucose homeostasis, with dumping syndrome occurring in 19% to 32% of cases depending on the surgical procedure [14,15]. Early dumping syndrome manifests within

60 minutes of food ingestion and includes symptoms such as dizziness, flushing, and palpitations. Management involves dietary modifications including avoidance of rapidly absorbed carbohydrates and delaying fluid intake by 30 minutes after meals to slow gastric emptying. Late dumping syndrome, or postprandial hyperinsulinemic hypoglycemia (PHH), occurs 60 to 180 minutes postprandially, characterized by neuroglycopenic symptoms and biochemical hypoglycemia, resolving upon carbohydrate intake. Specific guidelines for managing PHH during pregnancy are lacking, though significant glycemic fluctuations may impact fetal well-being [15]. In our study, dumping syndrome was documented in a single case following gastric bypass surgery.

Hyperemesis gravidarum was reported in 66% of cases, a notably high prevalence that may be attributed to reduced gastric capacity post-surgery. Globally, nausea and vomiting affect approximately 80% of pregnant women, with hyperemesis gravidarum reported in 0.1% to 17% of pregnancies following bariatric surgery, particularly restrictive procedures such as gastric banding. Given the potential exacerbation of maternal and fetal nutritional deficiencies, prompt evaluation and management are imperative [15]. In cases of severe vomiting, deflation of the gastric band may be warranted to prevent complications and ensure adequate nutrient intake. For patients with RYGB, early medical attention is critical upon the onset of abdominal symptoms to facilitate timely diagnosis and management of internal hernias, thereby reducing adverse maternal and fetal outcomes [15].

Surgical complications post-BS, including gastric band slippage, erosion, internal herniation, intestinal obstruction, gastric ulcers, and anastomotic leaks, have been documented and often necessitate urgent laparoscopic or open surgical intervention to prevent bowel necrosis [20]. While ideally managed by bariatric surgeons, emergency physicians and on-call surgeons must recognize and initiate appropriate management for patients presenting with acute abdominal pain. During our study period, no surgical complications requiring intervention were observed; however, other studies report an approximate 1.5% incidence of surgical intervention for intestinal obstruction including diagnostic laparoscopy/laparotomy [21].

Fetal abnormalities linked to maternal nutritional deficiencies after BS—such as neural tube defects, microphthalmia, and cerebral hemorrhage due to folate, vitamin A, and vitamin K deficiencies, respectively—have been described [4]. In our cohort, no such anomalies were detected, likely reflecting routine administration of 5 mg folic acid periconceptionally and multivitamin supplementation throughout pregnancy.

Multiple studies have demonstrated that bariatric surgery influences fetal growth, with reductions in fetal macrosomia but increased incidence of small-for-gestational-age (SGA) infants, reaching rates up to 40% [1,4,7,14]. In our study, 32% of neonates were classified as SGA, while 14% were large for gestational age. Overall, 47% of infants were at or below the 50th percentile for growth, underscoring the necessity for regular antenatal surveillance and maternal nutritional optimization. Throughout pregnancy, these women received multidisciplinary care involving obstetricians, nutritionists, and endocrinologists, with supplementation of iron, vitamins, and calcium alongside close fetal growth monitoring.

Interestingly, the interval between bariatric surgery and pregnancy in our cohort did not correlate with neonatal birthweight. This finding challenges the clinical assumption that delaying conception improves fetal growth and aligns with emerging evidence suggesting that fetal growth post-bariatric surgery is primarily influenced by maternal metabolic status, nutritional supplementation, placental function, and individualized gestational weight gain trajectories [22].

CONCLUSIONS:

Bariatric surgery was predominantly performed in older, multiparous women within this cohort. Our findings demonstrate that pregnancies following bariatric surgery are associated with favorable reductions in metabolic complications, notably low rates of gestational diabetes mellitus (GDM). However, these benefits are accompanied by significant risks of nutritional deficiencies, especially iron and vitamin D, which may contribute to fetal growth restriction tendencies. The mode of delivery profile indicates a higher rate of obstetric interventions, reflecting the complex clinical management required in these pregnancies.Notably, the interval between surgery and conception did not significantly influence the development of iron deficiency nor was it associated with neonatal birthweight. This suggests that obstetric outcomes after bariatric surgery are shaped more by intricate nutritional and metabolic dynamics than by isolated clinical markers or timing of conception.Larger, prospective multicenter studies are needed to further clarify these relationships.

In order to balance the metabolic benefits of BS with the nutritional and fetal risks identified in the literature, Preconception counselling, accurate documentation in medical records of type of BS performed, specialized care by a multidisciplinary team, individualizing gestational weight-gain goals according to type of BS undergone and immediate attention to abdominal pain due to hernia risk are essential steps. Given that bariatric surgeries are usually conducted in tertiary centers while antenatal care occurs in diverse settings, clinicians in primary and secondary care must be well-informed about the risks associated with bariatric surgery and equipped to initiate appropriate management. Future research should also focus on the long-term health effects in children born to mothers who have undergone bariatric surgery [4].

Tables and Figures Legends:

Fig.1 Flow chart of Study subjects

Fig 2: Fetal growth profile

Fig 3: Box plot comparing Surgery to pregnancy interval vs Iron Deficiency status

Fig 4: Scatterplot (Birthweight vs. Time to Pregnancy)

Table 1 shows the Maternal Demographic features of the study Population.

Table 2 demonstrates the Bariatric Surgery Profile in the study group

Table 3shows the Interval Between Bariatric Surgery and Conception

Table 4 shows the micronutrient deficiencies

Table 5 shows the medical morbidities in pregnancies after BS

Table 6 and 7 shows neonatal weight profiles

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