

ORIGINAL ARTICLE

Highly Effective Postpartum Contraceptive Use among Urban Thai Women with and without Gestational Diabetes Mellitus: A Comparative Cross-Sectional Study

Anaraya Parapromarach MD¹,  Chadakarn Phaloprakarn MD¹ 

¹ Department of Obstetrics and Gynecology, Faculty of Medicine Vajira Hospital, Navamindradhiraj University, Bangkok 10300, Thailand

Corresponding author

Chadakarn Phaloprakarn
chadakarn@nmu.ac.th

Received 20 August 2025

Revised 15 February 2026

Accepted 25 February 2026

J Med Urban Health

2026;70(3):e7484

<https://doi.org/10.62691/jmuh.2026.7484>

ABSTRACT

Objectives: Gestational diabetes mellitus (GDM) is associated with increased risks in subsequent pregnancies, making effective postpartum contraception essential. This study compared the use of highly effective contraceptive methods at 6 weeks postpartum in urban Thai women with and without GDM. The use of other contraceptive methods in both groups was also examined.

Materials and Methods: This comparative cross-sectional study was conducted at a tertiary care hospital in Bangkok, Thailand. Postpartum women attending routine 6-week follow-up visits between February 5, 2021, and July 7, 2021, were enrolled. Women with recent GDM were compared with women without GDM. The primary outcome was the proportion of women using highly effective contraception (female or male sterilization, or long-acting reversible contraception) at 6 weeks postpartum. Secondary outcomes included the use of non-highly effective contraceptive methods. Multivariable logistic regression evaluated associations between GDM status and contraceptive choice while adjusting for potential confounders.

Results: A total of 156 women were included (78 with GDM and 78 without GDM). The use of highly effective contraceptive methods did not differ significantly between the GDM and non-GDM groups (44.9% vs. 32.1%, $p = 0.100$). However, female sterilization was more frequently selected by women with GDM than by women without GDM (39.8% vs. 18%, $p = 0.003$). The use of non-highly effective contraceptive methods tended to be lower in the GDM group, although the difference did not reach statistical significance (39.8% vs. 55.1%, $p = 0.054$). After adjustment, GDM was independently associated with female sterilization selection (adjusted odds ratio, 1.96; 95% confidence interval, 1.03–4.72).

Conclusion: The overall use of highly effective contraception at 6 weeks postpartum did not differ significantly between urban Thai women with and without GDM. However, women with GDM more frequently selected female sterilization. The use of non-highly effective contraceptive methods was similar between the two groups.

Keywords: gestational diabetes mellitus, highly effective contraception, postpartum contraception, urban women

INTRODUCTION

A short interpregnancy interval in women with recent gestational diabetes mellitus (GDM) is associated with recurrent GDM and an increased risk of type 2 diabetes mellitus (T2DM),^{1,2} leading to adverse maternal and neonatal outcomes.³⁻⁵ Effective postpartum family planning is therefore an essential component of care for women with prior GDM.⁶

Selection of an appropriate contraceptive method requires consideration of both safety and effectiveness in this high-risk population. Although some studies have reported an increased risk of T2DM after GDM among women using progestin-only hormonal contraceptive methods,^{7,8} current clinical guidelines indicate that women with a history of GDM may use the same contraceptive options as women without diabetes.⁹ Highly effective contraceptive methods, defined as female or male sterilization and long-acting reversible contraception (LARC), are recommended for women who wish to avoid short interpregnancy intervals.^{6,10}

Despite worldwide promotion of highly effective contraceptive use after pregnancies complicated by GDM, few studies have examined postpartum contraceptive practices in this population.¹¹⁻¹³ Studies from the United States have reported higher rates of female sterilization among postpartum women with GDM than among those without GDM, although findings regarding LARC use have been inconsistent.¹¹⁻¹³ These findings may not be generalizable to other settings due to socioeconomic, cultural, and geographical differences.¹⁴

Many developing countries, including Thailand, are undergoing rapid urbanization, which may influence postpartum contraceptive behaviors through differences in healthcare access, socioeconomic status, and lifestyle. In this context, the primary objective of this study was to compare the use of highly effective contraceptive methods at 6 weeks postpartum among urban Thai women with and without GDM. The use of other contraceptive methods in both groups was also examined.

MATERIALS AND METHODS

This study was approved by the Vajira Institutional Review Board (approval number 023/2564) and was performed in compliance with the Declaration of Helsinki. A cross-sectional study was conducted at the postpartum clinic of the Faculty of Medicine Vajira

Hospital. Our hospital is an 800-bed tertiary care center located in central Bangkok, the capital city of Thailand. The postpartum clinic conducts approximately 1000 postpartum visits per year.

The study included postpartum women who delivered at our institution and returned for a routine 6-week postpartum checkup between February 5, 2021, and July 7, 2021. Women aged 18 or older who had resided in the Bangkok Metropolitan area for at least 5 years and who provided written informed consent were eligible for inclusion. Women with overt diabetes or human immunodeficiency virus infection were excluded. Participants were categorized into two groups according to GDM status: women with recent GDM diagnosed using the Carpenter and Coustan criteria (GDM group) and women without GDM (non-GDM group).

The sample size was calculated based on prior study data reporting rates of highly effective contraceptive use of 20% among women with GDM and 15.7% among women without GDM.¹² With a 10% margin of error and a 95% confidence level, 62 women with GDM and 52 women without GDM were required. To account for potential exclusions, the sample size was increased by 25%, resulting in required sample sizes of 78 women with GDM and 65 women without GDM. A 1:1 matching ratio was subsequently adopted to improve statistical efficiency and simplify matching; therefore, the non-GDM group size was rounded up to 78. The final sample size of 156 participants exceeded the minimum required for the primary objective.

As part of routine clinical practice at our institution, women are scheduled to attend the postpartum clinic 6 weeks after delivery for a postpartum checkup and family planning consultation. During this visit, women receive contraceptive counseling from registered nurses or attending staff regarding available and appropriate contraceptive options. Contraceptive methods available at our clinic include LARC, such as intrauterine devices and contraceptive implants,¹³ as well as hormonal injections, oral contraceptive pills, and condoms. Other methods, including the contraceptive patch, vaginal ring, diaphragm, sponge, and spermicide, are not commonly used in Thailand and are not routinely available at our clinic.

Eligible women attending the clinic were informed about the study, and written informed consent was obtained prior to enrollment. To enhance comparability

between groups, women in the non-GDM group were matched to women in the GDM group by date of postpartum visit, parity (primiparous vs. multiparous), and gestational age at delivery (term vs. preterm).

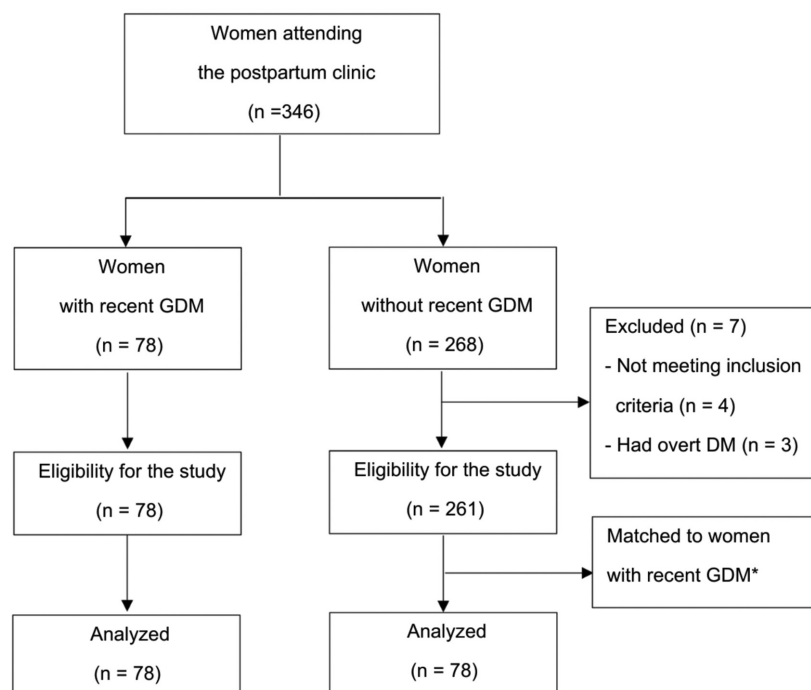
Following the routine postpartum examination and family planning services, enrolled participants completed a self-administered questionnaire, with research assistant support available as needed. The questionnaire collected information on demographic characteristics (age, education, occupation and monthly income), parity, gestational age at delivery, mode of delivery, breastfeeding practices, resumption of menstruation, prepregnancy contraceptive use, and postpartum sterilization or other contraceptive methods selected at the current visit.

Highly effective contraceptive methods included female sterilization, male sterilization, and LARC. Moderately effective methods comprised hormonal injections and oral contraceptive pills, whereas less effective methods included condoms, natural family planning, and withdrawal.¹³ Data on the lactational amenorrhea method (LAM) were also collected. LAM was defined by the presence of amenorrhea, exclusive or near-exclusive breastfeeding, and being within 6 months postpartum.¹⁵

All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 28.0 (IBM Corporation, Armonk, NY, USA). Data are presented as numbers and percentages. Differences in participant characteristics and contraceptive methods between groups were assessed using chi-squared or Fisher's exact tests, as appropriate. Multivariable logistic regression analysis was used to estimate adjusted odds ratios (aORs) and 95% confidence intervals (CIs) for the use of highly effective contraception and female sterilization, adjusting for potential confounders including age, education, monthly income, mode of delivery, and prepregnancy contraceptive use. Statistical significance was defined as $p < 0.05$.

RESULTS

During the study period, 346 women who delivered at our institution returned for a routine 6-week postpartum checkup and family planning consultation (Figure 1). Among them, 78 had a history of GDM, whereas 268 did not. A total of 156 women were enrolled in the study, including 78 women with GDM and 78 women without GDM. Table 1 presents the demographic and obstetric characteristics of the study population. Women with GDM were significantly older



Abbreviations: DM, diabetes mellitus; GA, gestational age; GDM, gestational diabetes mellitus

Figure 1 Flow Diagram of Women Attending the Postpartum Clinic during the Study Period. *Women without recent GDM were matched to women with recent GDM in a 1:1 ratio by date of visit, parity, and GA at delivery.

Table 1 Demographic and Obstetric Characteristics of Women in the Gestational and Non-Gestational Diabetes Mellitus Groups

Characteristic	Total (n = 156)	GDM Group (n = 78)	Non-GDM Group (n = 78)	P-value
Age (years)				< 0.001
≤ 19	10 (6.4)	1 (1.3)	9 (11.5)	
20-34	114 (73.1)	48 (61.5)	66 (84.6)	
≥ 35	32 (20.5)	29 (37.2)	3 (3.9)	
Education (years)				0.337
≤ 12	121 (77.6)	58 (74.4)	63 (80.8)	
> 12	35 (22.4)	20 (25.6)	15 (19.2)	
Occupation				0.711
Employee	76 (48.7)	39 (50.0)	37 (47.4)	
Business Owner	26 (16.7)	14 (17.9)	12 (15.4)	
Public Officer	1 (0.6)	0 (0)	1 (1.3)	
Others (housewife or unemployed)	53 (34.0)	25 (32.1)	28 (35.9)	
Monthly Income				0.336
< \$ 500	97 (62.2)	46 (59.0)	51 (65.4)	
\$ 500-\$ 999	46 (29.5)	23 (29.5)	23 (29.5)	
≥ \$1000	13 (8.3)	9 (11.5)	4 (5.1)	
Parity				1.000
Primipara	50 (32.1)	25 (32.1)	25 (32.1)	
Multipara	106 (67.9)	53 (67.9)	53 (67.9)	
Gestational Age at Delivery				1.000
Term	154 (98.7)	77 (98.7)	77 (98.7)	
Preterm	2 (1.3)	1 (1.3)	1 (1.3)	
Mode of Delivery				0.193
Vaginal Delivery	92 (59.0)	42 (53.8)	50 (64.1)	
Cesarean Section	64 (41.0)	36 (46.2)	28 (35.9)	

Abbreviations: GDM, gestational diabetes mellitus; n, number

Values are reported as n (%).

than women without GDM, whereas other demographic and obstetric characteristics did not differ significantly between the two groups.

The contraceptive characteristics of the study population are presented in **Table 2**. Overall, highly effective contraceptive use was comparable between the GDM and non-GDM groups (44.9% vs. 32.1%, $p = 0.100$). Among multiparous women, approximately half (45/106) chose female sterilization. However, women in the GDM group used female sterilization at a significantly higher rate than those in the non-GDM

group (39.8% vs. 18.0%, $p = 0.003$). Male sterilization was not adopted by any participants. Regarding non-highly effective methods, the use of moderately or less effective contraceptive methods did not differ significantly between the two groups, although a higher proportion was observed in the non-GDM group (55.1% vs. 39.8%, respectively; $p = 0.054$).

Exclusive breastfeeding at the time of the study was reported by 53.8% of women in the GDM group and 51.3% in the non-GDM group ($p = 0.784$). Resumption of menstruation occurred in 5.1% of

Table 2 Contraceptive Characteristics of Women in the Gestational and Non-Gestational Diabetes Mellitus Groups

Characteristic	Total (n = 156)	GDM group (n = 78)	Non-GDM Group (n = 78)	P-value
Prepregnancy Contraceptive Use				0.745 ^a
No	64 (41.0)	31 (39.7)	33 (42.3)	
Yes	92 (59.0)	47 (60.3)	45 (57.7)	
Highly Effective Method	3 (1.9)	0 (0)	3 (3.8)	
Moderately Effective Method	84 (53.9)	44 (56.4)	40 (51.3)	
Less Effective Method	5 (3.2)	3 (3.9)	2 (2.6)	
Postpartum Contraceptive Use				0.360 ^b
No Contraception	7 (4.5)	3 (3.8)	4 (5.1)	
Highly Effective Method	60 (38.5)	35 (44.9)	25 (32.1)	
Female Sterilization	45 (28.9)	31 (39.8)	14 (18.0)	
Male Sterilization	0 (0)	0 (0)	0 (0)	
Intrauterine Device	2 (1.3)	0 (0)	2 (2.6)	
Implant	13 (8.3)	4 (5.1)	9 (11.5)	
Moderately Effective Method	67 (42.9)	28 (35.9)	39 (50.0)	
Hormonal Injection	40 (25.6)	16 (20.5)	24 (30.8)	
Pill	27 (17.3)	12 (15.4)	15 (19.2)	
Less Effective Method	7 (4.5)	3 (3.9)	4 (5.1)	
Condom	6 (3.9)	2 (2.6)	4 (5.1)	
Natural Family planning/withdrawal	1 (0.6)	1 (1.3)	0 (0)	
LAM	15 (9.6)	9 (11.5)	6 (7.7)	

Abbreviations: GDM, gestational diabetes mellitus; LAM, lactational amenorrhea method; n, number

Values are reported as n (%).

^a Comparison of the presence and absence of prepregnancy contraceptive use.

^b Comparisons among no contraception, highly effective, moderately effective, less effective contraceptive methods, and LAM.

women with GDM and 14.1% of women without GDM ($p = 0.057$). The proportions of women using the LAM as a sole temporary contraceptive method were 11.5% in the GDM group and 7.7% in the non-GDM group ($p = 0.415$), while no contraception was reported by 3.8% and 5.1% of women, respectively ($p = 0.699$).

Multivariable logistic regression analysis adjusted for potential confounders, including age, education, monthly income, mode of delivery, and prepregnancy contraceptive use, demonstrated no independent association between GDM and the overall use of highly effective contraceptive methods at 6 weeks postpartum (Table 3). However, GDM was independently associated

Table 3 Multivariable Logistic Regression Analyses for the Associations of Gestational Diabetes Mellitus Status with Overall Use of Highly Effective Contraceptive Methods and Use of Female Sterilization at 6 Weeks Postpartum

Variable	Highly Effective Contraceptive use ^a		Female Sterilization ^b	
	Crude OR (95% CI)	aOR ^c (95% CI)	Crude OR (95% CI)	aOR ^c (95% CI)
GDM Status				
No	Reference	1.00	Reference	1.00
Yes	1.72 (0.90-3.31)	1.18 (0.54-2.56)	3.02 (1.45-6.29)	1.96 (1.03-4.72)
Age (years)				
≤ 19	0.46 (0.09-2.28)	0.48 (0.09-2.58)	–d	–d
20-34	Reference	1.00	Reference	1.00
≥ 35	2.38 (1.07-5.28)	1.97 (0.78-4.97)	3.48 (1.54-7.86)	2.43 (0.92-6.41)
Education (years)				
≤ 12	Reference	1.00	Reference	1.00
> 12	0.79 (0.36-1.74)	0.55 (0.22-1.35)	0.67 (0.28-1.62)	0.38 (0.13-1.11)
Monthly Income				
< \$ 500	Reference	1.00	Reference	1.00
\$ 500-\$ 999	1.25 (0.61-2.56)	1.57 (0.71-3.48)	1.20 (0.55-2.59)	1.62 (0.66-4.01)
≥ \$ 1000	1.52 (0.47-4.88)	1.61 (0.42-6.19)	1.71 (0.51-5.69)	1.78 (0.42-7.65)
Mode of Delivery				
Vaginal Delivery	Reference	1.00	Reference	1.00
Cesarean Section	3.23 (1.65-6.34)	3.59 (1.75-7.38)	3.94 (1.90-8.17)	4.79 (2.11-10.87)
Pregnancy Contraceptive Use				
No	Reference	1.00	Reference	1.00
Yes	1.69 (0.87-3.31)	1.89 (0.91-3.93)	1.82 (0.87-3.78)	1.93 (0.84-4.47)

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; GDM, gestational diabetes mellitus; OR, odds ratio. Values are reported as n (%).

^a Versus use of non-highly effective methods or no method.

^b Versus use of reversible contraceptive methods or no method.

^c Adjusted for the other variables in the table.

^d No woman in this age group underwent female sterilization.

with female sterilization (aOR 1.96, 95% CI 1.03–4.72). Cesarean section (CS) was independently associated with both the overall use of highly effective contraception (aOR 3.59, 95% CI 1.75–7.38) and female sterilization (aOR 4.79, 95% CI 2.11–10.87).

DISCUSSION

This study evaluated contraceptive practice at 6 weeks postpartum among urban women with and without recent GDM. We focused on contraceptive practice at this time point because it coincides with routine postpartum follow-up and family planning counseling. At this early postpartum stage, women who do not undergo sterilization at delivery may consider other highly effective contraceptive options, including LARC and male sterilization, which are associated with failure rates of less than 1%.¹⁶

Our findings indicate that the overall use of highly effective contraceptive methods did not differ significantly between women with and without GDM. However, women with GDM were significantly more likely to choose female sterilization. Multivariable analysis confirmed that GDM was independently associated with female sterilization but not with overall uptake of highly effective contraception. Additionally, cesarean delivery was independently associated with both outcomes.

The overall prevalence of highly effective contraceptive use in our cohort (38.5%) was higher than the 17.1–29.8% reported in prior questionnaire-based surveys of postpartum women with and without diabetes in the United States.^{11–13} Despite this higher overall rate, our finding that GDM was not associated with increased overall use of highly effective contraception contrasts with results from Morris et al.,¹³ who reported greater uptake among women with diabetes. Several factors may contribute to this variation, including differences in study design, population characteristics (age, parity, education, and income), and timing of assessment. While Morris et al. evaluated contraceptive practice at 2–4 months postpartum, our study focused specifically on the 6-week postpartum visit. Contraceptive decisions may evolve over time during the postpartum period, and early postpartum choices may not reflect longer-term contraceptive patterns. Beyond timing differences, the specific methods chosen also varied between populations.

The distribution of specific contraceptive methods in our study also differed from earlier reports.^{12,13}

Female sterilization was the predominant highly effective method in our cohort, whereas LARC was more commonly used in prior American population-based studies.^{12,13} Although multiparity was frequent (67.9%) in our population, a similarly high proportion of women with one or more prior live births (58.7%) was reported in an earlier study,¹³ suggesting that parity alone is unlikely to account for differences in method distribution. Differences in healthcare systems, cultural norms, reproductive intentions, and accessibility of contraceptive services may partly explain these discrepancies.

Although overall highly effective contraceptive use did not differ by GDM status, the higher rate of female sterilization among women with GDM is consistent with several previous survey-based studies conducted in the United States,^{11–13} although the magnitude of association has varied across populations. This finding may reflect differences in perceived future pregnancy risks or completed family size preferences rather than the presence of GDM itself. However, because our study did not evaluate reproductive intentions, perceived pregnancy risk, or decision-making processes, the reasons underlying contraceptive selection cannot be determined from these data.

Similar to findings regarding overall highly effective contraceptive use, we did not observe a significant association between GDM and LARC use, which is consistent with two earlier reports.^{11,13} The use of moderately or less effective contraceptive methods tended to be higher among women without GDM, although this difference was not statistically significant. These patterns may reflect variations in individual preferences, reproductive goals, or counseling uptake; however, firm conclusions cannot be drawn in the absence of direct measures of these factors.

Beyond GDM status, cesarean delivery was independently associated with both female sterilization and the overall use of highly effective contraception. This association has been described previously and may partly reflect the opportunity to perform sterilization concurrently with cesarean delivery, which can directly influence the immediate postpartum contraceptive choice.¹³ In addition, cesarean delivery is associated with increased risks in subsequent pregnancies, including uterine rupture, placenta previa, and placenta accreta.¹⁷ Awareness of these risks may lead some women to prefer highly effective contraceptive methods in order to avoid or delay future pregnancies.

This study has several strengths. Data were

collected prospectively at the time of postpartum examination and contraceptive counseling, minimizing recall bias and reliance on retrospective recall. Matching women without GDM to women with GDM improved comparability between groups. The use of a predefined definition of urban residence allowed focused evaluation of a stable urban population.¹⁸ In addition, collection of LAM data reduced the likelihood of misclassification of contraceptive status.

Several limitations should be acknowledged. The study was conducted at a single urban tertiary care center, which may limit generalizability to rural populations or other healthcare settings. Women relying on LAM were not followed longitudinally, and subsequent contraceptive transitions were not captured. The sample size was determined based on the primary objective and may have limited statistical power to detect associations with less common outcomes such as male sterilization or LARC use. We were also unable to measure the content or intensity of postpartum contraceptive counseling, which may influence contraceptive decision-making.^{19,20} Because of the cross-sectional design, these findings represent associations observed at a single postpartum time point and should not be interpreted as causal relationships.

CONCLUSION

In conclusion, contraceptive practices at 6 weeks postpartum among urban women with GDM were not significantly different from those among women without GDM, except for a higher rate of female sterilization in the GDM group. Future studies with larger sample sizes and longer follow-up periods are needed to evaluate postpartum contraceptive continuation, method switching, and subsequent pregnancy outcomes among women with and without GDM.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgment

We thank Dr. Siriwan Tangjitgamol for the scientific advice. This research was supported by the Navamindradhiraj University Research Fund.

Author Contributions

Conceptualization: A.P., C.P.

Data curation: A.P.

Formal analysis: C.P.

Funding acquisition: C.P.

Investigation: A.P., C.P.

Methodology: C.P.

Project administration: -

Resources: -

Software: -

Supervision: C.P.

Validation: A.P., C.P.

Visualization: -

Writing – original draft preparation: A.P., C.P.

Writing – review & editing: A.P., C.P.

Data Availability Statement

Data are available upon reasonable request.

REFERENCES

1. Sorbye LM, Cnattingius S, Skjaerven R, Klungsoyr K, Wikström AK, Kvalvik LG, et al. Interpregnancy weight change and recurrence of gestational diabetes mellitus: a population-based cohort study. *BJOG* 2020;127(13):1608–16. doi: [10.1111/1471-0528.16364](https://doi.org/10.1111/1471-0528.16364).
2. Bernstein J, Lee-Parritz A, Quinn E, Ameli O, Craig M, Heeren T, et al. After gestational diabetes: impact of pregnancy interval on recurrence and type 2 diabetes. *Biores Open Access* 2019;8(1):59–64. doi: [10.1089/biores.2018.0043](https://doi.org/10.1089/biores.2018.0043).
3. Ahmed MA, Bailey HD, Pereira G, White SW, Wong K, McNamara BJ, et al. The impact of diabetes during pregnancy on neonatal outcomes among the Aboriginal population in Western Australia: a whole-population study. *Int J Epidemiol* 2023;52(5):1400–13. doi: [10.1093/ije/dyad072](https://doi.org/10.1093/ije/dyad072).
4. Phaloprakarn C, Tangjitgamol S. Risk score for predicting primary cesarean delivery in women with gestational diabetes mellitus. *BMC Pregnancy Childbirth* 2020;20(1):607. doi: [10.1186/s12884-020-03306-y](https://doi.org/10.1186/s12884-020-03306-y).
5. Li J, Yan J, Ma L, Huang Y, Zhu M, Jiang W. Effect of gestational diabetes mellitus on pregnancy outcomes among younger and older women and its additive interaction with advanced maternal age. *Front Endocrinol (Lausanne)* 2023;14:1158969. doi: [10.3389/fendo.2023.1158969](https://doi.org/10.3389/fendo.2023.1158969).
6. American Diabetes Association. 14. Management of diabetes in pregnancy: standards of medical care in diabetes-2020. *Diabetes Care* 2020;43 Suppl 1:S183–92. doi: [10.2337/dc20-S014](https://doi.org/10.2337/dc20-S014).
7. Kjos SL, Peters RK, Xiang A, Thomas D, Schaefer U, Buchanan TA. Contraception and the risk of type 2 diabetes mellitus in Latina women with prior gestational diabetes mellitus. *JAMA* 1998;280(6):533–8. doi: [10.1001/jama.280.6.533](https://doi.org/10.1001/jama.280.6.533).
8. Xiang AH, Kawakubo M, Kjos SL, Buchanan TA. Long-acting injectable progestin contraception and risk of type 2 diabetes in Latino women with prior gestational diabetes mellitus. *Diabetes Care* 2006;29(3):613–7. doi: [10.2337/diacare.29.03.06.dc05-1940](https://doi.org/10.2337/diacare.29.03.06.dc05-1940).

9. Nguyen AT, Curtis KM, Tepper NK, Kortsmidt K, Brittain AW, Snyder EM, et al. U.S. medical eligibility criteria for contraceptive use, 2024. *MMWR Recomm Rep* 2024;73(4):1–126. doi: [10.15585/mmwr.rr7304a1](https://doi.org/10.15585/mmwr.rr7304a1).
10. Bose Brill S, May S, Lorenz AM, Spence D, Prater L, Shellhaas C, et al. Mother-infant dyad program in primary care: evidence-based postpartum care following gestational diabetes. *J Matern Fetal Neonatal Med* 2022;35(25):9336–41. doi: [10.1080/14767058.2022.2032633](https://doi.org/10.1080/14767058.2022.2032633).
11. Beydoun HA, Beydoun MA, Tamim H. How does gestational diabetes affect postpartum contraception in nondiabetic primiparous women? *Contraception* 2009;79(4):290–6. doi: [10.1016/j.contraception.2008.10.013](https://doi.org/10.1016/j.contraception.2008.10.013).
12. Schwarz EB, Braughton MY, Riedel JC, Cohen S, Logan J, Howell M, et al. Postpartum care and contraception provided to women with gestational and preconception diabetes in California's Medicaid program. *Contraception* 2017;96(6):432–8. doi: [10.1016/j.contraception.2017.08.006](https://doi.org/10.1016/j.contraception.2017.08.006).
13. Morris JR, Tepper NK. Description and comparison of postpartum use of effective contraception among women with and without diabetes. *Contraception* 2019;100(6):474–9. doi: [10.1016/j.contraception.2019.08.008](https://doi.org/10.1016/j.contraception.2019.08.008).
14. Boadu I. Coverage and determinants of modern contraceptive use in sub-Saharan Africa: further analysis of demographic and health surveys. *Reprod Health* 2022;19(1):18. doi: [10.1186/s12978-022-01332-x](https://doi.org/10.1186/s12978-022-01332-x).
15. Figaroa MNS, Bellizzi S, Delvaux T, Benova L. Lactational amenorrhoea among adolescent girls in low-income and middle-income countries: a systematic scoping review. *BMJ Glob Health* 2020;5(10):e002492. doi: [10.1136/bmjgh-2020-002492](https://doi.org/10.1136/bmjgh-2020-002492).
16. Frohwirth L, Mueller J, Anderson R, Williams P, Kochhar S, Castle SK, et al. Understanding contraceptive failure: an analysis of qualitative narratives. *Womens Reprod Health (Phila)* 2023;10(2):280–302. doi: [10.1080/23293691.2022.2090304](https://doi.org/10.1080/23293691.2022.2090304).
17. Keag OE, Norman JE, Stock SJ. Long-term risks and benefits associated with cesarean delivery for mother, baby, and subsequent pregnancies: systematic review and meta-analysis. *PLoS Med* 2018;15(1):e1002494. doi: [10.1371/journal.pmed.1002494](https://doi.org/10.1371/journal.pmed.1002494).
18. Homsup P, Phaloprakarn C, Tangjitgamol S, Manusirivithaya S. Maternal characteristics and pregnancy outcomes among illicit drug-using women in an urban setting. *Taiwan J Obstet Gynecol* 2018;57(1):83–8. doi: [10.1016/j.tjog.2017.12.014](https://doi.org/10.1016/j.tjog.2017.12.014).
19. Goulding AN, Bauer AE, Muddana A, Bryant AG, Stuebe AM. Provider counseling and women's family planning decisions in the postpartum period. *J Womens Health (Larchmt)* 2020;29(6):847–53. doi: [10.1089/jwh.2019.7872](https://doi.org/10.1089/jwh.2019.7872).
20. Dey AK, Averbach S, Dixit A, Chakraverty A, Dehingia N, Chandurkar D, et al. Measuring quality of family planning counselling and its effects on uptake of contraceptives in public health facilities in Uttar Pradesh, India: A cross-sectional analysis. *PLoS One* 2021;16(5):e0239565. doi: [10.1371/journal.pone.0239565](https://doi.org/10.1371/journal.pone.0239565).