GEMs
GOOD EVIDENCE MATTERS

GEMs of the Week

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Family Physicians Inquiries Network

What's in this week's issue?

Week of November 6 - 10, 2023

SPOTLIGHT: NSAIDs vs Opioids for OA

NSAIDs vs Opioids for OA

Effectiveness and Safety of Non-Steroidal Anti-Inflammatory Drugs and Opioid Treatment for Knee and Hip Osteoarthritis: Network Meta-Analysis

da Costa BR, Pereira TV, Saadat P, et al. Effectiveness and safety of non-steroidal anti-inflammatory drugs and opioid treatment for knee and hip osteoarthritis: network meta-analysis. *BMJ*. 2021;375:n2321. Published 2021 Oct 12. doi:10.1136/bmj.n2321

KEY TAKEAWAY: Oral diclofenac, meloxicam, piroxicam, and topical diclofenac are the most effective and tolerable pharmacologic treatments for osteoarthritis, while opioids have minimal effect and a much higher risk of adverse effects.

STUDY DESIGN: Systemic review and network meta-analysis of 192 randomized control trials (N=102,878)

LEVEL OF EVIDENCE: STEP 1

BRIEF BACKGROUND INFORMATION: Knee and hip osteoarthritis are common conditions in elderly populations, causing pain and negatively impacting physical function and quality of life. A variety of pharmacotherapies have been studied, including oral and topical non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen, and opioids. There is limited data comparing various dosages and formulations of these agents for the efficacy of pain relief, functional improvement, and safety.

PATIENTS: Adults with osteoarthritis

INTERVENTION: NSAIDs, opioids, and acetaminophen

CONTROL: Placebo

PRIMARY OUTCOME: Pain

Secondary Outcome: Functionality and safety

METHODS (BRIEF DESCRIPTION):

- Investigators searched trial registries comparing different preparations and dosages of NSAIDs, acetaminophen, opioids, and placebo for knee and hip osteoarthritis.
- Only English language studies with > 100 participants per intervention arm were included.
- The mean age of participants ranged from 48–72 years old in the included studies with an average time since diagnosis of 6.6 years and an average pain score of 6.5/10.
- Interventions included various dosages and formulations of 68 NSAIDs, 19 opioids, and three acetaminophen preparations compared to the placebo.
- Pain and physical function results were presented as standardized mean differences for each intervention.
- Negative scores indicate reduced pain or physical dysfunction.
- The minimum clinically important difference was calculated to be –0.37, which correlates with a reduction of nine points on a 100-point pain scale.
- Safety events included dropouts due to adverse events, any adverse events, and serious adverse events.

INTERVENTION (# IN THE GROUP):

- NSAIDs: 66,883
- Opioids: 9,529
- Acetaminophen: 3,124

COMPARISON (# IN THE GROUP): 23,342

FOLLOW-UP PERIOD: Median of 8.6 weeks

RESULTS:

Primary Outcome –

- Multiple oral NSAIDs showed a statistically significant reduction in pain as compared to placebo including:
  - Diclofenac 100–105 mg (mean difference [MD] –0.47; 95% CI, –0.63 to –0.31)
  - Diclofenac 150 mg (MD –0.56; 95% CI, –0.68 to –0.45)
  - Meloxicam 15 mg (MD –0.48; 95% CI, –0.66 to –0.30)
  - Piroxicam 20 mg (MD –0.48; 95% CI, –0.67 to –0.28)
- Topical NSAIDs had a statistically significant improvement in pain as compared to placebo including:
  - Diclofenac 70–81 mg total per day (MD –0.54; 95% CI, –0.77 to –0.31)
  - Diclofenac 140–160 mg (MD –0.61; 95% CI, –0.87 to –0.35)
  - Ketoprofen at 200–220 mg (MD –0.23; 95% CI, –0.39 to –0.06)

- Acetaminophen decreased pain at 3,900–4,000 mg per day as compared to placebo (MD –0.15; 95 % CI, –0.25 to –0.05).
- The following opioids demonstrated a statistically significant pain reduction as compared to placebo:
  - Oxycodone ≥ 48 mg per day (MD –0.17; 95% CI, –0.33 to –0.01)
  - Tramadol 275–300 mg per day (MD –0.31; 95% CI, –0.43 to –0.20)
  - Tramadol 400 mg per day (MD –0.23; 95% CI, –0.46 to –0.01)

Secondary Outcome –

- Among oral NSAIDs with efficacy in pain reduction, meloxicam 15 mg and piroxicam 20 mg did not show an increased risk of serious adverse effects or dropouts due to adverse events, though adverse effects were seen with piroxicam (odds ratio [OR] 1.41; 95% CI, 1.04–1.91).
  - Adverse effects (OR 4.7; 95% CI, 3.3–6.6)
  - Dropouts (OR 6.8; 95% CI, 4.7–9.7)
  - Serious adverse effects (OR 2.4; 95% CI, 1.1–5.6)
- Tramadol showed an increased risk of any adverse effects but did not show an increased risk of serious adverse effects.
  - Tramadol 275–300 mg (OR 2.9; 95% CI, 2.3–3.7)
  - Tramadol 400 mg (OR 4.4; 95% CI, 2.7–7.3)
- All topical NSAIDs and acetaminophen demonstrated no increased risk for dropouts, adverse effects, or serious adverse effects.

LIMITATIONS:

- Results should not be generalized to long-term use.
- Data for the efficacy of topical diclofenac only included patients with knee osteoarthritis and cannot be applied to hip osteoarthritis.
- The statistical method used to combine data for pain and function yields a standardized mean difference which may lead one to overestimate or underestimate the effects of the treatment.
- Safety data was only available for nine of the studies, significantly limiting the power of those results.

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Surgery is Not the Endpoint for Endometriosis Care

Endometriosis Recurrence Following Post-Operative Hormonal Suppression: A Systematic Review and Meta-Analysis

Zakhari A, Delpero E, McKeown S, Tomlinson G, Bougie O, Murji A. Endometriosis recurrence following post-operative hormonal suppression: a systematic review and meta-analysis. *Hum Reprod Update*. 2021;27(1):96-107. doi:10.1093/humupd/dmaa033

KEY TAKEAWAY: Following conservative surgery for endometriosis, the use of postoperative hormonal suppression such as combined hormonal contraceptives (CHC) and levonorgestrel-releasing intra-uterine device (LNG-IUD) significantly reduces endometriosis recurrence and pain.

STUDY DESIGN: Systematic review and meta-analysis of 1,713 randomized controlled studies and four cohort studies (N=2,137)

LEVEL OF EVIDENCE: STEP 1

BRIEF BACKGROUND INFORMATION: There is no evidence of benefit for postoperative hormonal suppression compared to conservative management alone at three months. However, the effect of longer periods of postoperative hormonal suppression on endometriosis recurrence is relatively unknown.

PATIENTS: Women of reproductive age with endometriosis

INTERVENTION: Postoperative hormonal suppression

CONTROL: Expectant management or placebo

PRIMARY OUTCOME: Postoperative endometriosis recurrence

Secondary Outcome: Change in endometriosis-related pain

METHODS (BRIEF DESCRIPTION):

- The included studies were from six countries: Italy, China, Thailand, Russia, United States, and Japan.
- Demographic information was not provided.
- Various agents of hormonal suppression were utilized across the studies, including the following:
  - CHC (Dinogest 2 mg PO daily),
  - Progestin (Gestrinone 2.5 mg twice weekly for six months)
  - LNG-IUD
  - GnRH agonists (Triptorelin/Leuprolide 3.75 mg IM monthly for six months).
- Medical management must have been initiated within six weeks following surgery and continued for a minimum of six months.
- Postoperative endometriosis recurrence was measured radiographically (ultrasound or MRI) and clinically (symptoms, physical exam, and need for alternative therapies such as initiating hormonal contraceptives).
- Endometriosis-related pain, with a focus on dysmenorrhea, was measured using various pain and quality-of-life scales.
  - Pain scales included the visual analog scale and the Biberoglu and Berhman scale, with higher scores indicating more pain.
  - The quality of life (QoL) scale used was the Short Form 36 QoL scale, with higher scores indicating better subjective health status.

INTERVENTION (# IN THE GROUP): 1,189

COMPARISON (# IN THE GROUP): 948

FOLLOW-UP PERIOD: 12–36 months

RESULTS:

Primary Outcome –

- Hormonal suppression was significantly more likely to reduce postoperative endometriosis recurrence than expectant management or placebo (14 studies, N=1,766; risk ratio [RR] 0.41; 95% CI, 0.26–0.65; I^2=68%).
- Subgroup analyses showed that CHC and LNG-IUD were significantly more likely to reduce postoperative endometriosis recurrence than expectant management or placebo.
  - CHC (6 studies, n=854; RR 0.36; 95% CI, 0.15–0.87; I^2=67%)
  - LNG-IUD (2 studies, n=90; RR 0.21; 95% CI, 0.07–0.57; I^2=0%)
- Progestin and GnRH agonists were not significant in decreasing such recurrence.
  - Progestin (1 study, n=32; RR 0.17; 95% CI, 0.02–1.36; I^2 not provided)
  - GnRH agonist (7 studies, n=929; RR 0.62; 95% CI, 0.35–1.13; I^2=52%)

Secondary Outcome –

- Postoperative hormonal suppression was significantly more likely to reduce endometriosis-related pain than expectant management or placebo (7 studies, n=652; standardized mean difference [SMD] –0.49; 95% CI, –0.91 to –0.07; I^2=68%).

LIMITATIONS:

- There were discrepancies within studies (CHC prescribed cyclically vs continuously, varying types of GnRH agonists, incomplete vs complete surgical intervention).
- Observational studies (e.g., cohort studies) might have been subject to selection bias.

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Outcomes of CBT for Depression in Women with PCOS

Cognitive Behavioral Therapy for Depression in Women with PCOS: Systematic Review and Meta-Analysis

Jiskoot G, van der Kooi AL, Busschbach J, Laven J, Beerthuizen A. Cognitive behavioural therapy for depression in women with PCOS: systematic review and meta-analysis. *Reprod Biomed Online*. 2022;45(3):599-607. doi:10.1016/j.rbmo.2022.05.001

KEY TAKEAWAY: Cognitive behavioral therapy (CBT) lowers depression scores in women with polycystic ovary syndrome (PCOS).

STUDY DESIGN: Systematic review and meta-analysis of five randomized controlled trials (N=272)

LEVEL OF EVIDENCE: STEP 2 (downgraded due to small sample size and inconsistent diagnostic criteria)

BRIEF BACKGROUND INFORMATION: PCOS is a common endocrine disorder with physical and psychological comorbidities, including high depression scores. CBT is a first-line psychological treatment for depression. This study examines the effect of CBT interventions on depression scores in women with PCOS.

PATIENTS: Women with PCOS

INTERVENTION: CBT

CONTROL: Usual care

PRIMARY OUTCOME: Depression scores

METHODS (BRIEF DESCRIPTION):

- Women 15–40 years old with PCOS were included in the study.
- Inclusion criteria were varied in terms of body mass index (BMI $\geq$ 25), and baseline depression score (Center for Epidemiologic Studies Depression [CES-D] $\geq$ 14).
- Studies compared individuals who received CBT to those with care as usual for depression or no intervention.
  - Participants received varying types of CBT (group and individual) for a period of 8–52 weeks ranging from 8–20 sessions.
- Depression was assessed using various instruments:
  - Beck Depression Inventory-II (BDI-II; range 0–63), with higher scores indicating more severe depression.
  - Depression Anxiety Stress Scale (DASS-21; range 0–42) with higher scores indicating a greater severity or frequency of negative emotional symptoms.
  - CES-D (range 0–60) with a score equal to or above 16 indicates a person at risk for clinical depression.
  - Psychological General Well-Being Index (PGWBI; range 0–110) with higher scores indicating greater psychological well-being.
- Cohen's d effect size (ES):
  - 0.2: A small difference between control and intervention groups
  - 0.8: A large difference between control and intervention groups

INTERVENTION (# IN THE GROUP): 136

COMPARISON (# IN THE GROUP): 136

FOLLOW-UP PERIOD: 0–12 months

RESULTS:

Primary Outcome –

- CBT was effective in reducing depression scores among women diagnosed with PCOS (5 RCTs, N= 272; ES 1.0; 95% CI, 0.02–2.0; I^2=88%).

LIMITATIONS:

- The study included a small sample size.
- Inconsistent criteria for diagnosing PCOS and measuring depression outcomes.
- There is risk of selection bias.

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Building Your Body to Save Your Mind

Move for Your Heart, Break a Sweat For Your Mind: Providing Precision in Adolescent Health and Physical Activity Behavior Pattern

Dahlstrand J, Fridolfsson J, Arvidsson D, Börjesson M, Friberg P, Chen Y. Move for Your Heart, Break a Sweat for Your Mind: Providing Precision in Adolescent Health and Physical Activity Behaviour Pattern. *J Adolesc Health.* 2023;73(1):29-36. doi:10.1016/j.jadohealth.2023.03.006

KEY TAKEAWAY: Regular vigorous physical activity is associated with improved cardiovascular health and mental health in adolescents.

STUDY DESIGN: Cross-sectional observational study

LEVEL OF EVIDENCE: STEP 3

BRIEF BACKGROUND INFORMATION: While there is a general understanding that exercise is beneficial in adults, the health benefits in adolescent patients have been unclear due to difficulties in accelerometer data processing and analyses. The goal of this study is to utilize new methods of data processing to analyze the association between varying levels of physical activity with cardiovascular and mental health.

PATIENTS: Swedish adolescents

INTERVENTION: Varying levels of physical activity

CONTROL: Sedentary lifestyle

PRIMARY OUTCOME: Association between physical activity levels with cardiovascular and mental health
Secondary Outcome: Identify demographic variables (socioeconomic status, gender) associated with high levels of physical activity

METHODS (BRIEF DESCRIPTION):

- Adolescent patients 13.6±0.4 years old (n= 1,235) were enrolled from the Study of Adolescence Resilience and Stress Study which invited 7th grade students from western Sweden to participate.
- No exclusion criteria were designated aside from refusal to participate.
- Information on patients' sex, age, immigrant background and socioeconomic status was collected.
- Patients were given an ActiGraph GT3X + accelerometer to be worn on the right hip during waking hours for one week to quantify the frequency and intensity of physical activity (PA).
- Biometrics: Height, weight, waist circumference, age/ sex-specific BMI, heart rate, and blood pressure, and non-fasting blood work (focused on white blood cell count) were collected to assess physical and cardiovascular health parameters.
- Mental health was assessed through self-reported surveys where participants identified their self-perceived levels of stress and psychosomatic symptoms.
- Cardiovascular and mental health variables were correlated with accelerometer measurements.
- For a valid accelerometer reading the device must have been worn for at least 10 hours and at least four days.
- To distinguish between sleep vs sedentary lifestyle, only data collected between 0700 and 2300 was analyzed.
- Accelerometer data was ranked according to the intensity of physical activity (PA), including sedentary, light activity, moderate activity, vigorous activity, and very vigorous activity.
- Three mathematical partial least squares regression (PLS) models were used to explain the predicted influence of physical activity levels on measured parameters (calculated as % explained variance).

INTERVENTION (# IN THE GROUP): 1,235

COMPARISON (# IN THE GROUP): Not available

FOLLOW-UP PERIOD: One week of accelerometer data collection with cross-sectional measurements

RESULTS:

Primary Outcome –

- Female participants (n=729) spent more time sedentary compared to male participants (n=506).
- Increased sedentary times were associated with increased BMI, waist circumference, resting heart rate, diastolic blood pressure, and white blood cell count.
- Increased levels of physical activity were associated with lower BMI, waist circumference, resting heart rate, diastolic blood pressure, and white blood cell count.

Secondary Outcome –

- Higher socioeconomic status was associated with increased levels of high-intensity activity.

- Low economic status and increased age had a small association with increased stress and psychosomatic symptoms.
- A negative correlation between stress and psychosomatic symptoms was observed with vigorous activity.
- Lower levels of physical activity were not correlated to mental health parameters (perceived levels of stress and psychosomatic symptom presentation).

LIMITATIONS:

- Limited assessment of factors influencing cardiovascular & mental health (pre-existing physical and mental health conditions, genetic predisposition, stress coping mechanisms).
- The narrow age range of adolescent participants.
- Although the study used data from an aggregated source, the study itself lasted only one week.
- Participants living in a high-income nation with a relatively low obesity rate limit the broader application.
- Cross-section study prevents analysis of causal inferences.

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The Risk of Mental Health Deterioration with Cannabis Use Disorder

Cannabis Use Disorder and Subsequent Risk of Psychotic and Nonpsychotic Unipolar Depression and Bipolar Disorder

Jefsen OH, Erlangsen A, Nordentoft M, Hjorthøj C. Cannabis Use Disorder and Subsequent Risk of Psychotic and Nonpsychotic Unipolar Depression and Bipolar Disorder. *JAMA Psychiatry*. 2023;80(8):803-810. doi:10.1001/jamapsychiatry.2023.1256

KEY TAKEAWAY: Cannabis use disorder (CUD) significantly increases the risk of developing both psychotic and nonpsychotic unipolar depression and bipolar disorder.

STUDY DESIGN: Prospective cohort study

LEVEL OF EVIDENCE: STEP 3

BRIEF BACKGROUND INFORMATION: The rising use of cannabis due to its recent legal status in many states has brought up concerns about its long-term mental health effects. This study uses a prospective longitudinal sample of patients with and without CUD to examine if they develop unipolar depression or bipolar disorder.

PATIENTS: Individuals 16 years old and older

INTERVENTION: CUD

CONTROL: No CUD

PRIMARY OUTCOME: Diagnosis of unipolar depression and bipolar disorder

METHODS (BRIEF DESCRIPTION):

- Individuals from the Psychiatric Central Research Register, National Patient Register, and the municipal Register of Substance Abusers in Treatment all living in Denmark from January 1, 1995, to December 31, 2021.
  - 50.3% were female.
  - 10.0% had a parental history of CUD, alcohol use disorder (AUD), or other substance use disorders (SUD).
  - 4.7% had a parental history of affective disorder, determined by preset diagnostic codes.
- Those with CUD were divided into those who later developed:
  - Unipolar depression with psychosis
  - Unipolar depression without psychosis
  - Bipolar disorder with psychosis
  - Bipolar disorder without psychosis
- Diagnosis of CUD was based on criteria from the International Classification of Diseases (ICD)-8.
- Diagnoses of unipolar depression and bipolar disorder with and without psychotic disorders were differentiated based on ICD-10.
- Parental CUD, AUD, SUD, and parental affective disorders were measured using either ICD-8 or ICD-10.

INTERVENTION (# IN THE GROUP): 60,696

COMPARISON (# IN THE GROUP): 6,591,069

FOLLOW-UP PERIOD: 26 years **(**1995–2021)

RESULTS:

Primary Outcome –

- After adjusting for sex, AUD, SUD, having been born in Denmark, calendar year, parental CUD, AUD, and SUD, and parental affective disorders:
  - Individuals with CUD significantly increased the risk of any type of psychotic and nonpsychotic unipolar depression compared to individuals with no diagnosis of CUD (hazard ratio [HR] 1.84; 95% CI, 1.78–1.90).
  - Individuals with CUD significantly increased the risk of any type of psychotic and nonpsychotic bipolar disorder compared to individuals with no diagnosis of CUD:
    - Men (HR 2.96; 95% CI, 2.73–3.21)
    - Women (HR 2.54; 95% CI, 2.31–2.80)

LIMITATIONS:

- There might be a misclassification bias. Those who did not have a register-based diagnosis of CUD could still have CUD.
- Detection bias was a possibility as individuals who were diagnosed with CUD could have received more attention, thus having a higher likelihood of being diagnosed with psychiatric disorders.
- Generalizability was limited because this study was conducted in Denmark.

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What Biologic Agents Help Treat Pain in Knee OA?

Effect of Dextrose Prolotherapy, Platelet Rich Plasma and Autologous Conditioned Serum on Knee Osteoarthritis: A Randomized Clinical Trial

Pishgahi A, Abolhasan R, Shakouri SK, et al. Effect of Dextrose Prolotherapy, Platelet Rich Plasma and Autologous Conditioned Serum on Knee Osteoarthritis: A Randomized Clinical Trial. *Iran J Allergy Asthma Immunol*. 2020;19(3):243-252. Published 2020 Jun 23. doi:10.18502/ijaai.v19i3.3452

KEY TAKEAWAY: Autologous conditioned serum (ACS) and platelet-rich plasma (PRP) injections can possibly improve OA pain and dysfunction compared to dextrose prolotherapy.

STUDY DESIGN: Randomized clinical trial

LEVEL OF EVIDENCE: STEP 3 (downgraded due to small sample size, lack of long-term follow-up, unknown allocation concealment, lack of blinding, and lack of control group)

BRIEF BACKGROUND INFORMATION: OA is a chronic, degenerative joint disease that can cause disability and pain. Prolotherapy is a technique whereby tissue healing and growth are stimulated via the injection of biological agents. OA is a progressive disease that often does not respond to conservative therapy or any single therapy.

PATIENTS: Knee OA individuals 40–75 years old

INTERVENTION: PRP and ACS injections

CONTROL: Dextrose prolotherapy injections

PRIMARY OUTCOME: Change in visual analogue scale (VAS) and Western Ontario and McMaster Universities (WOMAC) score

METHODS (BRIEF DESCRIPTION):

- The study included 92 knee OA patients 40–75 years old referred to the PM&R Center at Imam Reza Hospital.
- Inclusion criteria: Patients with symptomatic knee OA lasting longer than three months with radiologic signs of grade II, III, and IV knee OA who did not use NSAIDs and met American College of Rheumatology criteria.
- Exclusion criteria: Patients with underlying rheumatic disease, prior knee surgery, infection, liver disease, diabetes, severe CV disease, coagulopathy, anticoagulant therapy, or pregnancy.
- Dextrose prolotherapy: 2 mL 50% dextrose in 2 mL bacteriostatic water with 1 mL 2% lidocaine. Injected weekly for three weeks.
- PRP preparation: 20 mL of venous blood was centrifuged to concentrate platelets and lower leukocytes. Injected two times every seven days.
- ACS preparation: 20 mL whole blood incubated with bioactive materials to encourage IL-1Ra production later centrifuged and the serum injected two times every seven days.

INTERVENTION (# IN THE GROUP):

- PRP: 30
- ACS: 32

COMPARISON (# IN THE GROUP): Dextrose prolotherapy: 30

FOLLOW-UP PERIOD: One and six months after treatment

RESULTS:

Primary Outcome –

- Compared to Dextrose, ACS patients had improved VAS scores (MD 28; *P*<.001) and WOMAC scores (MD 37; *P*<.001) at six months.
- Compared to Dextrose, PRP patients had improved WOMAC scores (MD 27; *P*<.001) but there was no significant difference in VAS scores at six months.
- ACS patients had more pain relief on VAS compared to PRP (MD 20; *P*<.001) but no significant difference in WOMAC scores at six months.

LIMITATIONS:

- Budget limited patient follow-up period.
- Unable to do a double-blind study given different injectables.
- There was no control group.
- The sample size was limited.

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Diabetes-Related Care During Postpartum Primary Care Follow-up

Patterns of Postpartum Primary Care Follow-up and Diabetes-Related Care After Diagnosis of Gestational Diabetes

D'Amico R, Dalmacy D, Akinduro JA, et al. Patterns of Postpartum Primary Care Follow-up and Diabetes-Related Care After Diagnosis of Gestational Diabetes. *JAMA Netw Open*. 2023;6(2):e2254765. Published 2023 Feb 1. doi:10.1001/jamanetworkopen.2022.54765

KEY TAKEAWAY: Despite clear guidelines for postpartum follow-up of gestational diabetes mellitus (GDM), women with GDM had fewer primary care follow-ups than women with type 2 diabetes and the majority with follow-ups did not receive recommended glucose testing.

STUDY DESIGN: Retrospective cohort study

LEVEL OF EVIDENCE: STEP 3

BRIEF BACKGROUND INFORMATION: GDM is diagnosed in up to 10% of pregnancies causing increased perinatal risk and elevated risk of developing life-long type 2 diabetes. Guidelines from the American College of Obstetricians and Gynecologists and the American Diabetes Association for postpartum individuals with GDM include glucose testing within 12 weeks of delivery, but it is unclear how many individuals receive primary care follow-up or diabetes-related postpartum care.

PATIENTS: Postpartum individuals

INTERVENTION: Gestational diabetes

CONTROL: Type 2 diabetes

PRIMARY OUTCOME: Postpartum primary care follow-up

Secondary Outcome: Primary care follow-up with indication for diabetes-related care

METHODS (BRIEF DESCRIPTION):

- Postpartum individuals 15–51 years old who delivered between 2015–2018 were included in the study.
- Claims data was used to determine prior diagnosis of type 2 diabetes and new diagnosis of GDM using ICD-9 and ICD-10 codes.
- Participants had a mean age of 31 years old, most were from the south (44%) and north central (21%) regions of the US, and 10% of participants were from rural areas.
- To assess the primary outcome, insurance claims were used to identify primary care follow-up visits in the next 12 months following delivery.
- To assess the secondary outcome, diabetes-related care was measured using procedure codes for blood glucose or hemoglobin A1c testing within 12 weeks postpartum in concordance with postpartum guidelines for GDM care.
- A multivariable regression model was used to determine the relative risk of receiving at least one primary care follow-up in relation to diabetes diagnosis and this risk was adjusted for age, region, and delivery year.

INTERVENTION (# IN THE GROUP): 18,432

COMPARISON (# IN THE GROUP): 12,242

FOLLOW-UP PERIOD: One year

RESULTS:

Primary Outcome –

- Rates of primary care access within the first 12 months post-partum were lower among individuals with GDM as compared to those with type 2 diabetes (50.9% vs. 67.2%, respectively; adjusted relative risk [aRR] 0.78; 95% CI, 0.76–0.79).
- Patients with gestational diabetes were less likely to receive postpartum diabetes care than those with type 2 diabetes (aRR 0.85; 95% CI, 0.83–0.86).
- 36% of patients with GDM received blood glucose testing within the first 12 weeks (95% CI, 34.4%–37.6%) most commonly a hemoglobin A1C.

LIMITATIONS:

- Postpartum females with Medicaid insurance or no insurance could not be tracked using the MarketScan database, effectively excluding many patients of lower socioeconomic status from the study.
- Blood glucose testing or follow-up care that was incorrectly coded or used different codes than this study would not be identified or included as diabetes-related care.

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