Postpartum care visits among commercially insured women in the United States

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Introduction
Optimizing outpatient postpartum care as a strategy to improve maternal health and well-being is a focus of national attention. One-third of US maternal deaths occur between 7 days and 1 year postpartum.1 Approximately 1 in 7 cases of severe maternal morbidity occurs in the postpartum period.2 Even in the absence of severe morbidity, many patients experience health and functional challenges after delivery, including physical exhaustion, breast-feeding difficulties, and mood disturbance.3 Routine postpartum outpatient visits provide an opportunity to identify postpartum morbidities and assess patients’ well-being. Moreover, postpartum visit attendance is a Healthy People 2020 goal and a Healthcare Effectiveness Data and Information Set quality metric used to measure health plan performance.4,5 Traditionally, 1 outpatient clinic visit occurs between 6 and 8 weeks after delivery.6 In 2018, the American College of Obstetricians and

BACKGROUND: To reduce postpartum morbidity and mortality, optimizing routine outpatient postpartum care has become a focus of national attention and a healthcare priority.

OBJECTIVE: This study aimed to examine the timing, content, and predictors of routine outpatient postpartum visit attendance within a large, commercially insured patient population.

STUDY DESIGN: We performed a retrospective cohort study using a national US database of commercial insurance beneficiaries with a delivery hospitalization between 2011 and 2015. We calculated the proportion of patients who had an outpatient postpartum visit within 8 weeks of hospital discharge. Using a multivariable logistic regression model, we identified independent predictors of an outpatient postpartum visit. To gain insight into the nature and extent of any postpartum medical or surgical morbidity, we also identified the most frequent International Classification of Diseases, Ninth Revision, Clinical Modification codes associated with postpartum visits.

RESULTS: The study cohort comprised 431,969 patients who underwent delivery hospitalization, of whom 257,727 (59.7%; 95% confidence interval, 59.5—59.8) had at least 1 outpatient postpartum visit within 8 weeks of hospital discharge. The distribution of postpartum visits was bimodal, occurring most frequently in the first week (23.2%) and sixth week (21.7%) after hospital discharge. The median period between hospital discharge and the postpartum visit was 28 days (interquartile range, 8—41 days). In our multivariable model, patient-level factors that were most strongly associated with a postpartum visit were preexisting medical morbidities, which included: thyroid disease (adjusted odds ratio, 1.62; 95% confidence interval, 1.40—1.52), seizure disorder (adjusted odds ratio, 1.50; 95% confidence interval, 1.33—1.70), chronic hypertension (adjusted odds ratio, 1.46; 95% confidence interval, 1.58—1.67), and psychiatric disease (adjusted odds ratio, 1.41; 95% confidence interval, 1.36—1.47). Between 29% and 42% of patients with preexisting medical morbidity and between 35% and 41% of patients who experienced peri- or postpartum complications did not attend a postpartum visit.

CONCLUSION: Our findings indicate that among a large, commercially-insured patient population, postpartum visit attendance was suboptimal. A high proportion with preexisting medical and peripartum morbidities was not evaluated within 8 weeks of hospital discharge. Multifaceted interventions and healthcare reform are suggested to address patients’ concerns and healthcare needs after delivery.

Key words: epidemiology, maternal health services, outpatients, postnatal care
Why was this study conducted?
This study aimed to examine the timing, content, and predictors of routine outpatient postpartum visit attendance within a large, commercially-insured patient population.

Key findings
Only 60% of patients with commercial insurance had a routine postpartum visit within 8 weeks of hospital discharge after delivery hospitalization. Preexisting medical morbidities, including thyroid disease, seizure disorder, and chronic hypertension were most strongly associated with having a postpartum visit. Between 29% and 42% of patients with a preexisting morbidity and between 35% and 41% of patients who experienced peri- or postpartum complications did not attend a postpartum visit.

What does this add to what is known?
A high proportion of patients with commercial insurance are not evaluated within 8 weeks of hospital discharge following delivery. Multifaceted interventions and healthcare reform are suggested to optimize outpatient postpartum care.

Gynecologists (ACOG) significantly revised their postpartum care guidelines, reconceptualizing postpartum care as an ongoing process commencing early after delivery.

Epidemiologic analyses of postpartum outpatient visits inform active efforts for improving postpartum care. However, limited population-level data exist examining patterns and predictors of postpartum outpatient visit attendance. Furthermore, little is known about the diagnoses and the type of care, including procedures associated with these visits. In this large observational study, we examined the timing, content, and predictors of postpartum outpatient visit attendance among a large, nationwide cohort of commercially insured US beneficiaries.

Materials and Methods
We conducted a retrospective cohort study using Optum Clinformatics Data Mart and Clinformatics Database (OptumInsight, Inc, Eden Prairie, MN). The dataset comprises healthcare claims for >15 million annual covered lives spanning all 50 US states. Data are derived from claims for inpatient, outpatient, and pharmacy healthcare services. The study was exempted from review by the institutional review board at Stanford University School of Medicine.

We identified all delivery hospitalizations between 2011 and 2015 using a combination of validated International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9) codes. We further classified deliveries using diagnoses-related group (DRG) codes for vaginal and cesarean delivery. DRG and ICD-9 codes used for classifying delivery hospitalizations are presented in Supplemental Appendix 1. Inclusion criteria included at least 3 months of continuous enrollment before delivery and at least 8 weeks of enrollment after hospital discharge. A minimum study period of 3 months of continuous insurance was required to ensure that changes in insurance coverage before delivery hospitalization did not influence patients’ postpartum insurance coverage and access to a postpartum visit up to 8 weeks postpartum. We excluded patients aged <12 years or >50 years. On the basis of previous literature, we classified an outpatient postpartum visit as at least one of the following:

- an outpatient healthcare encounter linked to an obstetrician, maternal–fetal medicine physician, or family or general practitioner; or a current procedural terminology (CPT) code or ICD-9 code that classifies a postpartum visit.

Details of our classification approach are presented in Supplemental Appendix 2. Because a 6-week single postpartum visit was considered the norm during our study period, we selected a liberal period (between 1 and 56 days [0–8 weeks] after hospital discharge) for classifying a postpartum visit. If patients underwent multiple postpartum visits, data were captured for the first visit.

We calculated the overall proportion of patients who had at least 1 postpartum visit. We calculated frequencies for the first postpartum visit stratified by completed week after hospital discharge. We quantified the median (interquartile range [IQR], 10th–90th percentile ranges) period between hospital discharge and the first postpartum visit, and the number and proportion of patients who had a postpartum visit by week. We examined the proportions seen by obstetrician–gynecologists or maternal–fetal medicine physicians vs general or family practitioners.

Secondary analysis
We selected the following patient characteristics as candidate variables for predicting a postpartum visit: sociodemographic factors (maternal age, race and ethnicity, geographic region, highest educational level, household income, household size, prepregnancy comorbidities [alcohol abuse, asthma, diabetes mellitus, chronic hypertension, obesity, seizure disorder, thyroid disorder, psychiatric disease]), pregnancy-related factors (hypertensive disorders of pregnancy, multiple pregnancy), peripartum and delivery-related factors (preterm birth, episiotomy, transfusion, delivery mode [vaginal or cesarean delivery], hysterectomy, postpartum hemorrhage, genital tract laceration, operative injury), infection, and prolonged length of stay. ICD-9 codes from the delivery hospitalization were used to classify these variables; these are presented in Supplemental Appendix 2.
A prolonged length of stay was defined as the ≥90th centile for vaginal or cesarean delivery. We used univariate and multivariable logistic regression models to estimate unadjusted and adjusted odds ratios (aOR) for the association between each predictor and postpartum visit attendance. All potential predictors were included in the multivariable model.

We also examined the proportion of patients who attended a postpartum visit, overall and by completed week, stratified by delivery mode (vaginal vs cesarean delivery). To gain insight into potential problems and diagnoses identified during a postpartum visit, we examined the top 10 most frequent primary ICD-9 codes associated with all postpartum visits and stratified them according to delivery mode. To account for potential misclassification by the duration of continuous insurance coverage, we performed a sensitivity analysis that did not require 3 months of continuous enrollment before the delivery hospitalization.

Results

We identified 538,979 patients who underwent delivery hospitalization between 2011 and 2015. We excluded 1485 patients with missing admission or discharge dates, 130 patients aged <12 years or ≥50 years, and 105,395 patients who had continuous enrollment <3 months before delivery or <8 weeks after delivery. Our final analytical sample comprised 431,969 patients.

A total of 257,727 (59.7%; 95% confidence interval [CI], 59.5–59.8) patients had at least 1 postpartum outpatient visit within 8 weeks of hospital discharge. Among patients who underwent a postpartum visit, the first postpartum visit most frequently occurred in the first week (23.2%; 95% CI, 23.1–23.4) and sixth week (21.7%; 95% CI, 21.5–21.8) after hospital discharge (Figure 1). The median period between hospital discharge and the first postpartum visit was 28 days (IQR, 8–41 days; 10th and 90th percentiles, 3–47 days).

Figure 1 presents the weekly number and proportion of patients who had a postpartum visit up to 8 weeks postpartum. Week 1 and week 6 postpartum had the highest numbers and proportions of patients attending a postpartum visit (32,340 [23.2%] and 55,871 [21.7%], respectively). Examining the number of visits made by each patient, 150,094 (58.7%) underwent a postpartum visit. Among 152,756 patients who underwent a postpartum visit, 93,888 (61.5%) underwent a cesarean delivery, 41% of patients who experienced a peripartum or postpartum complication did not have a postpartum visit.

The characteristics of patients who did and did not attend a postpartum visit are presented in Table 1. Compared with patients who did not have a postpartum visit, those with a postpartum visit were more likely to be aged ≥40 years, be of White or Black race, reside in the Midwest, and have less than a bachelor’s degree, a household income <$100,000, 1 adult in the household, 1 child in the household, preexisting medical morbidity (including asthma, diabetes mellitus, chronic hypertension, obesity, thyroid disorder, and psychiatric disorder), hypertensive disorder of pregnancy, multiple pregnancy, preterm birth, cesarean delivery, a genital tract laceration or episiotomy, and a prolonged length of stay. Table 2 presents the results of the univariable and multivariable logistic regression analyses. In the multivariable model, we identified several sociodemographic factors, medical comorbidities, pregnancy-related conditions, and delivery-related complications independently associated with a postpartum visit. However, all independent associations were relatively weak, with an aOR >0.78 or <2. Variables most strongly associated with postpartum visit attendance included: thyroid disorder (aOR, 1.62; 95% CI, 1.58–1.67), seizure disorder (aOR, 1.50; 95% CI, 1.33–1.70), and chronic hypertension (aOR, 1.46; 95% CI, 1.40–1.52).

The number and proportion of patients who were not assessed in a postpartum clinic within the study period stratified by sociodemographic, prepregnancy, obstetrical, and peripartum factors are presented in Supplemental Appendix 3. Between 29% and 42% of patients with preexisting medical conditions and between 35% and 41% of patients who experienced a peripartum or postpartum complication did not have a postpartum visit.

We explored whether postpartum visit attendance differed according to delivery mode. Among 279,213 patients who had a vaginal delivery, 163,839 (58.7%) underwent a postpartum visit. Among 152,756 patients who underwent cesarean delivery, 93,888 (61.5%) underwent a postpartum visit. Proportions who had a postpartum visit by

FIGURE 1

Patients who attended postpartum visit by completed week after discharge

Percentage refers to frequencies; week refers to completed week after hospital discharge.

Butwick. Postpartum visits in the United States. Am J Obstet Gynecol Glob Rep 2022.
### TABLE 1
Demographic and obstetrical characteristics of women who did and did not receive a postpartum visit within 56 days of hospital discharge, 2011−2015 (N=431,969)

| Characteristics                      | Postpartum visit (n=257,727) | No postpartum visit (n=174,242) | P value |
|--------------------------------------|------------------------------|---------------------------------|---------|
| **Sociodemographic factors**         |                              |                                 |         |
| Maternal age (y)                     |                              |                                 | <.001   |
| <20                                  | 4671 (1.8)                   | 3492 (2.0)                      |         |
| 20−34                                | 189,216 (73.4)               | 129,132 (74.1)                  |         |
| 35−39                                | 50,810 (19.7)                | 33,320 (19.1)                   |         |
| ≥40                                  | 13,030 (5.1)                 | 8298 (4.8)                      |         |
| United States region                 |                              |                                 | <.001   |
| Northeast                            | 26,322 (10.2)                | 19,738 (11.3)                   |         |
| Midwest                              | 75,271 (29.2)                | 43,614 (25.0)                   |         |
| South                                | 109,387 (42.4)               | 77,163 (44.3)                   |         |
| West                                 | 46,539 (18.1)                | 33,532 (19.2)                   |         |
| Unknown                              | 208 (0.1)                    | 195 (0.1)                       |         |
| **Race/ethnicity**                   |                              |                                 | <.001   |
| White                                | 132,222 (51.3)               | 86,121 (49.4)                   |         |
| African-American                     | 18,424 (7.2)                 | 11,943 (6.9)                    |         |
| Hispanic                             | 22,868 (8.9)                 | 17,656 (10.1)                   |         |
| Asian                                | 16,809 (6.5)                 | 13,268 (7.6)                    |         |
| Unknown                              | 67,404 (26.2)                | 45,254 (26.0)                   |         |
| **Highest educational level**        |                              |                                 | <.001   |
| <12th grade                          | 899 (0.4)                    | 727 (0.4)                       |         |
| High school diploma                  | 52,678 (20.4)                | 35,705 (20.5)                   |         |
| Less than bachelor’s degree          | 139,678 (54.2)               | 93,452 (53.6)                   |         |
| Bachelor’s degree or higher          | 62,892 (24.4)                | 43,334 (24.9)                   |         |
| Unknown                              | 1580 (0.6)                   | 1024 (0.6)                      |         |
| **Household income ($)**             |                              |                                 | <.001   |
| <50,000                              | 42,385 (16.4)                | 27,820 (16.0)                   |         |
| 50,000−100,000                       | 66,656 (25.9)                | 44,138 (25.3)                   |         |
| >100,000                             | 87,171 (33.8)                | 59,144 (33.9)                   |         |
| Unknown                              | 61,515 (23.9)                | 43,140 (24.8)                   |         |
| **Number of adults in the household**|                              |                                 | <.001   |
| 1                                    | 53,069 (20.6)                | 33,094 (19.0)                   |         |
| 2                                    | 161,749 (62.8)               | 110,670 (63.5)                  |         |
| ≥3                                   | 42,063 (16.3)                | 29,959 (17.2)                   |         |
| Unknown                              | 846 (0.3)                    | 519 (0.3)                       |         |
| **Number of children in the household**|                              |                                 | <.001   |
| 0                                    | 25,287 (9.8)                 | 15,993 (9.2)                    |         |
| 1                                    | 80,704 (31.3)                | 50,126 (28.8)                   |         |
| 2                                    | 93,628 (36.3)                | 63,319 (36.3)                   |         |
| ≥3                                   | 57,262 (22.2)                | 44,285 (25.4)                   |         |

(continued)
completed week stratified by mode of delivery are presented in Figure 2. Similar to our main analysis, peaks of attendance were during weeks 1 and 6 in our stratified analysis, with over a quarter of patients attending a postpartum visit during week 1 after cesarean delivery.

Supplemental Appendix 4 presents the top 10 most frequent ICD-9 codes linked with all postpartum visits. The most common ICD-9 procedure codes were insertion of an intrauterine contraceptive device (IUD) (2.6%), screening for malignant neoplasm of the cervix (2.5%), and vaccination against influenza (1.0%). The most common ICD-9 diagnosis code was urinary tract infection (1.1%). Because week 1 and week 6 were the most frequent periods for a postpartum visit, the top 10 most frequent ICD-9 codes during each of these weeks are presented in Supplemental Appendix 4. Of the 59,869 visits that occurred during week 1, 4563 (7.6%) had at least 1 infant ICD-9 code and no maternal diagnosis or procedure codes associated with the visit. In our sensitivity analysis, which did not restrict our study cohort to a minimum of 3 months of continuous insurance coverage before delivery, the frequency of postpartum visits was essentially unchanged (289,494/485,809 [59.7%]). The timing of the postpartum visit in completed weeks was also essentially unchanged from that in our main analysis (data not presented).

**Comment**

**Principal findings**

We observed that among a large, commercially insured patient

| TABLE 1 | Demographic and obstetrical characteristics of women who did and did not receive a postpartum visit within 56 days of hospital discharge, 2011–2015 (N=431,969) (continued) |
|-----------------|---------------------------------|---------------------------------|-----------------|
| Characteristics | Postpartum visit (n=257,727) | No postpartum visit (n=174,242) | P value |
| Unknown         | 846 (0.3) | 519 (0.3) | .607 |
| Preexisting factors | | | |
| Alcohol abuse   | 70 (0)   | 52 (0)   | <.001 |
| Asthma          | 8003 (3.1) | 4413 (2.5) | <.001 |
| Diabetes mellitus | 21,347 (8.3) | 11,793 (6.8) | <.001 |
| Chronic hypertension | 8554 (3.3) | 3621 (2.1) | <.001 |
| Obesity         | 12,123 (4.7) | 6863 (3.9) | <.001 |
| Seizure disorder | 879 (0.3) | 369 (0.2) | <.001 |
| Thyroid disorder | 15,083 (5.9) | 6306 (3.6) | <.001 |
| Psychiatric disease | 9400 (3.7) | 4231 (2.4) | <.001 |
| Pregnancy-related factors | | | |
| Gestational hypertension, preeclampsia, or eclampsia | 22,125 (8.6) | 11,545 (6.6) | <.001 |
| Multiple pregnancy | 6524 (2.5) | 3413 (2.0) | <.001 |
| Peripartum factors | | | |
| Preterm birth   | 15,646 (6.1) | 8656 (5.0) | <.001 |
| Transfusion     | 2519 (1.0) | 1118 (0.6) | <.001 |
| Mode of delivery | | <.001 |
| Vaginal delivery | 163,839 (63.6) | 115,374 (66.2) | |
| Cesarean delivery | 93,888 (36.4) | 58,868 (33.8) | |
| Hysterectomy    | 262 (0.1) | 145 (0.1) | .053 |
| Postpartum hemorrhage | 7677 (3.0) | 4158 (2.4) | <.001 |
| Genital tract laceration | 19,100 (7.4) | 12,585 (7.2) | .020 |
| Episiotomy      | 18,415 (7.2) | 13,011 (7.5) | <.001 |
| Operative injury | 232 (0.1) | 135 (0.1) | .165 |
| Infection       | 1517 (0.6) | 816 (0.5) | <.001 |
| Prolonged length of hospital stay | 60,167 (23.4) | 35,733 (20.5) | <.001 |

Data are presented as number (percentage).

Butwick. Postpartum visits in the United States. Am J Obstet Gynecol Glob Rep 2022.
| Characteristic                          | Unadjusted OR (95% CI) | P value | Adjusted OR (95% CI) | P value |
|----------------------------------------|------------------------|---------|----------------------|---------|
| Maternal age (y)                       |                        |         |                      |         |
| <20                                    | 0.91 (0.87–0.95)       | <.001   | 0.94 (0.90–0.98)     | .008    |
| 20–34                                  | Reference              | Reference |                       |         |
| 35–39                                  | 1.04 (1.02–1.06)       | <.001   | 1.05 (1.03–1.07)     | <.001   |
| ≥40                                    | 1.07 (1.04–1.10)       | <.001   | 1.04 (1.01–1.07)     | .006    |
| United States region                   |                        |         |                      |         |
| Northeast                              | Reference              | Reference |                       |         |
| Midwest                                | 1.29 (1.27–1.32)       | <.001   | 1.31 (1.28–1.34)     | <.001   |
| South                                  | 1.06 (1.04–1.09)       | <.001   | 1.07 (1.05–1.10)     | <.001   |
| West                                   | 1.04 (1.02–1.07)       | <.001   | 1.07 (1.05–1.10)     | <.001   |
| Unknown                                | 0.80 (0.68–0.97)       | .026    | 0.81 (0.66–0.99)     | .043    |
| Race/ethnicity                         |                        |         |                      |         |
| White                                  | Reference              | Reference |                       |         |
| Asian                                  | 0.83 (0.81–0.85)       | <.001   | 0.83 (0.81–0.85)     | <.001   |
| African-American                       | 1.00 (0.98–1.03)       | .703    | 1.00 (0.98–1.03)     | .803    |
| Hispanic                               | 0.84 (0.83–0.86)       | <.001   | 0.88 (0.86–0.90)     | <.001   |
| Unknown                                | 0.97 (0.96–0.98)       | <.001   | 0.99 (0.97–1.00)     | .097    |
| Highest educational level              |                        |         |                      |         |
| <12th grade                            | 0.85 (0.77–0.94)       | .001    | 0.92 (0.83–1.02)     | .107    |
| High school diploma                    | 1.02 (1.00–1.04)       | .076    | 0.99 (0.97–1.01)     | .501    |
| Less than bachelor’s degree            | 1.03 (1.01–1.05)       | <.001   | 1.00 (0.99–1.02)     | .561    |
| Bachelor degree or higher              | Reference              | Reference |                       |         |
| Unknown                                | 1.00 (0.89–1.12)       | .980    | 1.06 (0.94–1.19)     | .375    |
| Household income ($)                   |                        |         |                      |         |
| <50,000                                | 1.01 (0.99–1.03)       | .371    | 1.01 (0.99–1.03)     | .364    |
| 50,000–100,000                         | Reference              | Reference |                       |         |
| >100,000                               | 0.98 (0.96–0.99)       | .003    | 0.99 (0.97–1.01)     | .285    |
| Unknown                                | 0.94 (0.93–0.96)       | <.001   | 0.96 (0.94–0.98)     | <.001   |
| Number of adults in the household      |                        |         |                      |         |
| 1                                      | Reference              | Reference |                       |         |
| 2                                      | 0.91 (0.90–0.93)       | <.001   | 0.98 (0.97–1.00)     | .056    |
| ≥3                                     | 0.88 (0.86–0.89)       | <.001   | 0.89 (0.87–0.91)     | <.001   |
| Unknown                                | 1.02 (0.91–1.13)       | .771    | —                    |         |
| Number of children in the household    |                        |         |                      |         |
| 0                                      | 0.98 (0.96–1.00)       | .118    | 1.03 (1.01–1.06)     | .018    |
| 1                                      | Reference              | Reference |                       |         |
| 2                                      | 0.92 (0.90–0.93)       | <.001   | 0.93 (0.91–0.94)     | <.001   |
| ≥3                                     | 0.80 (0.79–0.82)       | <.001   | 0.81 (0.79–0.82)     | <.001   |
| Unknown                                | 1.01 (0.91–1.13)       | .825    | —                    |         |
population, only 60% of patients received a postpartum visit within 8 weeks after hospital discharge. The distribution of visits was bimodal, with the highest proportion occurring during week 1 and week 6. Preexisting medical morbidities, such as thyroid disease and seizure disorder, were more strongly associated with a postpartum visit than pregnancy-related disorders or intrapartum complications. However, all independent associations in our multivariable model were relatively weak. These findings highlight the need for multifaceted approaches to increase the likelihood of patients with commercial insurance having a postpartum visit within 6 weeks of delivery.

Results in the context of what is known

Previous observational studies reported wide variability in the rate of postpartum visit attendance, ranging between 52% and 78%. Furthermore, data from these studies were predominantly from cohorts sourced from a single health system or Medicaid-insured patients from a single US state. Although this variability may be, in part, owing to between-study differences in the classification of postpartum visits and characteristics of study populations, the rate of postpartum visit attendance in our cohort (59.7%) falls within the bounds of this range. In contrast to previous studies that examined the period between delivery and the first postpartum visit, we examined the period between hospital discharge and the first postpartum visit for several reasons. First, if the transition from the hospital to home is suboptimal, negative repercussions, which include rehospitalization, adverse medical events, or death, can be far-reaching. Second, using the discharge date as the reference standard for calculating the period until the first postpartum visit allows healthcare systems, administrators, and payers to compare postpartum care in different populations and develop quality metrics for postpartum care. Third, by focusing on the time between hospital discharge and the first postpartum visit, we could account for prolonged hospital length of stay and postpartum complications,

| Characteristic | Unadjusted OR (95% CI) | P value | Adjusted OR (95% CI) | P value |
|---------------|------------------------|---------|----------------------|---------|
| Alcohol abuse | 0.91 (0.64–1.30)       | .607    | 0.79 (0.55–1.13)     | .196    |
| Asthma        | 1.23 (1.19–1.28)       | <.001   | 1.17 (1.12–1.21)     | <.001   |
| Diabetes mellitus | 1.24 (1.22–1.27)     | <.001   | 1.16 (1.14–1.19)     | <.001   |
| Chronic hypertension | 1.62 (1.56–1.68) | <.001   | 1.46 (1.40–1.52)     | <.001   |
| Obesity       | 1.20 (1.17–1.24)       | <.001   | 1.05 (1.02–1.09)     | .001    |
| Seizure disorder | 1.61 (1.43–1.82)     | <.001   | 1.50 (1.33–1.70)     | <.001   |
| Thyroid disorder | 1.66 (1.61–1.71)     | <.001   | 1.62 (1.58–1.67)     | <.001   |
| Psychiatric disease | 1.52 (1.47–1.58)     | <.001   | 1.41 (1.36–1.47)     | <.001   |
| Gestational hypertension, preeclampsia, or eclampsia | 1.32 (1.29–1.35) | <.001   | 1.20 (1.17–1.23)     | <.001   |
| Multiple pregnancy | 1.30 (1.25–1.36)     | <.001   | 1.18 (1.13–1.23)     | <.001   |
| Preterm birth | 1.24 (1.20–1.27)       | <.001   | 1.12 (1.09–1.15)     | <.001   |
| Episiotomy     | 0.95 (0.93–0.98)       | <.001   | 0.99 (0.97–1.02)     | .520    |
| Transfusion    | 1.53 (1.42–1.64)       | <.001   | 1.28 (1.19–1.38)     | <.001   |

Mode of delivery

| Vaginal delivery | Reference |
|------------------|-----------|
| Cesarean delivery | 1.12 (1.11–1.14) | <.001 |
| Hysterectomy     | 1.22 (1.00–1.50) | .053 |
| Postpartum hemorrhage | 1.26 (1.21–1.30) | <.001 |
| Laceration       | 1.03 (1.00–1.05) | .201 |
| Operative injury | 1.16 (0.94–1.44) | .166 |
| Infection        | 1.26 (1.16–1.37) | <.001 |
| Prolonged length of hospital stay | 1.18 (1.16–1.20) | <.001 |
such as postpartum hemorrhage, as potential predictors of postpartum visit attendance. We observed a bimodal distribution in the timing of postpartum visits, with peak attendance during week 1 (23%) and week 6 (22%) postpartum. A similar distribution was reported by Rankin et al in an analysis of postpartum care encounters among 55,577 Illinois patients with Medicaid insurance and by Steenland et al in an analysis of 2 million commercially insured patients. In our analysis, the median period between discharge and the first postpartum visit was 28 days, which falls within a historically expected period (4–6 weeks postpartum).

**Clinical implications**

Our study identified several sociodemographic factors, preexisting medical disorders, pregnancy disorders, and peripartum morbidities as independent predictors within a population-based sample of commercially insured beneficiaries. Clinical guidelines recommend that patients with chronic conditions, such as hypertensive disorders and seizure disorders, or who experience postpartum complications, such as genital tract lacerations, receive an early postpartum visit. Although we observed weak associations between these variables and a postpartum visit, at least 29% of patients with chronic conditions and 35% of patients who experienced peripartum complications did not attend a postpartum visit. Several interrelated patient, provider, and system-level factors may explain the high non-attendance rate. Patients may experience barriers to care, including difficulties navigating a fragmented healthcare system or scheduling appointments, distance or travel restrictions between home and the outpatient clinic location, lack of childcare, poor-quality provider-to-patient communication about the value of a postpartum visit, or the need to prioritize a well-baby or pediatrician visit over a postpartum visit. The number of children or adults in the household was inversely related to the likelihood of visit attendance, which may be related to childcare–related barriers to care. Patients may also have high out-of-pocket costs for maternity care, which may discourage attendance of a postpartum visit.

In a previous survey examining family medical leave, up to 23% of employed US mothers returned to work within 10 days postpartum. These factors may place additional time and financial restrictions on patients, reducing the likelihood of clinic attendance. We also observed racial and ethnic disparities in postpartum visit attendance, with attendance being less likely for Asian and Hispanic patients compared with White patients. Structural racism and inequities in social determinants of health, including housing and food security, health literacy, distrust of healthcare systems, and language barriers may have, in part, contributed to these disparities.

**Research implications**

Future studies are needed to examine provider-level and system-level factors that influence the likelihood of visit nonattendance. For example, poor coordination and communication between providers may occur before or during the transition from inpatient and outpatient care. Physicians may be disincentivized to facilitate patient attendance if these visits are bundled into a global obstetrical fee, especially given that value-based payments are not currently incorporated into postpartum care.

A 2012 systematic review observed that some interventions (including medication reconciliation, structured electronic discharge summaries, discharge planning, electronic discharge notification, and web-based access to discharge information for general practitioners) reduced hospitalization and improved continuity of care and patient satisfaction. Prospective studies are needed to investigate the effect of multifaceted interventions on increasing clinic attendance, and other approaches for providing outpatient care, such as telehealth, community outreach, and nurse-led postpartum home visiting services.

The most common ICD-9 procedure codes linked to the visits were for IUD insertion and screening for cervical neoplasm; these occurred in a very low proportion of patients (2.4% and 1.9%, respectively). ACOG does not include cervical cancer screening in its most recent postpartum care guidelines, but does recommend that a Pap smear and pelvic examination be considered as part of well-woman screening. In contrast, the American Society of Clinical Oncology recommends primary cervical cancer screening at 6 weeks postpartum. Further research is needed to assess the extent to which postpartum screening affects cervical cancer detection, treatment, and outcomes.
especially among patients who undergo infrequent screening.

Among all visits that occurred during week 1 postpartum, a relatively low proportion (7.6%) were associated only with an infant ICD-9 code. If these visits were classified as maternal as opposed to pediatric, the rate of week 1 postpartum visit attendance may be slightly underestimated. Future studies are needed to assess the accuracy of ICD-10 codes associated with postpartum visits during the early postpartum period.

**Strengths and limitations**

Our study has several strengths. The availability of a large, commercially insured population-based sample, and comprehensive billing and claims data allowed us to identify the incidence, patterns, and predictors for routine postpartum visit attendance. Our study also provided granular information about the specialty of physicians linked to outpatient visits and information related to the principal diagnosis for the visit. This provides insight into the types of physicians who review patients postpartum and the type of morbidity observed and interventions performed at these visits.

Our analysis is subject to several limitations. The dataset does not have clinical information for assessing patients’ discharge readiness, hospital discharge processes, and postpartum health indicators that can affect patients’ quality of life, such as breastfeeding difficulties, fatigue, and poor cognition. We were unable to ascertain whether the quality of care differs by provider specialty (obstetrician vs general or family practitioner). This lack of data highlights the pressing need to develop quality measures for outpatient postpartum care. Using previously published approaches, we classified outpatient visits on the basis of claims for a postpartum visit or an outpatient encounter with a physician. Therefore, postpartum visits with a nurse-midwife or nurse practitioner may not have been fully captured. Because preexisting medical or psychiatric disorders, pregnancy-related disorders, and peripartum comorbidities were captured using ICD-9 codes from the delivery hospitalization, we acknowledge that underascertainment, underreporting, and exposure misclassification are potential concerns. In addition, we could not ascertain whether the severity or acuity of patients’ medical or obstetrical diagnoses or postpartum complications influenced the likelihood of postpartum visit attendance. We could not ascertain whether nonattendance was because of scheduling problems or patient “no-shows.” The economic implications of postpartum visit “no-shows” on individuals’ health and the US healthcare system are unknown.

We studied a commercially insured cohort of US beneficiaries; therefore, our findings may not be generalizable to those with a Medicaid-financed birth who may face unique barriers to postpartum care access because of postpartum uninsurance. Furthermore, nearly one-quarter of patients who did or did not have a postpartum visit had missing data for race/ethnicity and household income. Although we included a category for missingness for race, ethnicity, and socioeconomic variables, further research is needed to examine how racial, ethnic, and socioeconomic disparities affect postpartum visit nonattendance. Our study period preceded the 2018 ACOG guidelines for postpartum care. However, the extent to which postpartum care changed following the publication of these guidelines is unclear. Future studies are needed to assess the impact of these guidelines on postpartum care and the effect of possible healthcare delivery and policy changes during the COVID-19 pandemic, such as expansions of telehealth reimbursement, increased use of postpartum remote monitoring, and new options for states to extend pregnancy Medicaid eligibility.

**Conclusion**

Nearly 40% of commercially insured US patients did not attend a postpartum outpatient visit within 8 weeks of discharge for delivery hospitalization. A high proportion of patients with preexisting medical disorders, pregnancy-related disorders, and peripartum morbidity were not evaluated in an outpatient postpartum clinic. Multifaceted interventions and healthcare reform are suggested to ensure that early and high-quality postpartum care addresses patients’ concerns and postpartum health needs.

**Supplementary materials**

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jxagr.2022.100106.

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