COVID-19 and shelter-in-place delay emergency obstetric and gynecologic care

Eve Zaritsky, MD, Mary Kathryn Abel, BA, Cassidy Tierney, MD, Mubarika Alavi, MS, Miranda Ritterman Weintraub, PhD, MPH, Andrew Avins, MD, MPH

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| Challenge | **The COVID-19 pandemic and California’s shelter-in-place (SIP) order may have created a barrier for patients attempting to access emergency obstetric and gynecologic care (OBGYN), possibly leading to both delayed presentation and subsequent increased acuity.** |
| Existing Evidence | During the COVID-19 pandemic, reports have suggested that there has been a decrease in the number of patients presenting to hospitals for medical emergencies, such as acute myocardial infarction (N Engl J Med. 2020 Aug 13;383(7):691-693) and decreased endometrial cancer referrals and surgery (Obstet Gynecol. 2020 Oct;136(4):842-843) from Kaiser Permanente Northern California (KPNC). |
| Target Population | Adults presenting to a KPNC Emergency Department (ED) for OBGYN issues requiring treatment. |
| Intervention or Exposure | Before and during the COVID-19 pandemic (January 1-September 1, 2020 and then extended through December 2020). |
| **Outcomes/Key Findings** | The incidence of obstetric and gynecologic visits to the emergency department declined precipitously by 42% between March and May 2020 but then returned to near-2019 levels despite a substantial increase in Covid-19 cases and hospitalizations across California.  Data for 63,679,440 person-weeks from January 1-September 1, 2020 were evaluated (Figure). A total of 6,885 ED encounters between January 1-March 3, 2020 compared to 4,903 encounters in March 4-May 20, 2020, a 42% decrease in ED visit rates (IRR=0.58, 95% CI: 0.56-0.60, p < 0.0001). There was a less pronounced decrease during the late pandemic period of May 20-September 1, 2020 (IRR=0.82, 95% CI: 0.79-0.84, p < 0.0001). Similar decreases were seen for obstetric and gynecologic presentations separately (obstetric: IRR=0.57, 95% CI: 0.54-0.60, p < 0.0001; gynecologic: IRR=0.59, 95% CI: 0.56-0.62). Compared to the corresponding period in 2019, there were decreases in the early and late Covid-19 periods (both p < 0.001). There were no meaningful clinical differences in changes in ED utilization stratified by race between pre-pandemic and both the early and late pandemic periods.  Our subsequent study evaluating severity of illness at the time of presentation to the ED due to COVID-19 did not show evidence that the decline in ED visits was accompanied by an increase in severity of presentation. A total of 18,668 OB-GYN ED encounters occurred between January 1-December 31, 2020 compared to 21,014 between January 1-December 31, 2019 (Table 1). There were no differences in percent change by age or race/ethnicity across the two years. Compared to 2019, there were fewer patients who presented to the ED with ovarian torsion, ectopic pregnancy, fibroids and/or abnormal uterine bleeding, and abortion in 2020 (all p<0.05). The OB-GYN team was consulted less frequently in the ED in 2020 compared to 2019, and fewer patients received surgery within seven days of ED presentation. Similarly, there were fewer hospitalizations associated with the ED encounter between January 1-May 31, 2020 compared to the corresponding period in 2019. However, individuals were more likely to be hospitalized within seven days after the initial ED encounter during the first surge of the pandemic between March 4-May 31, 2020.  Limiting analyses to patients with a primary diagnosis, we found a similar proportion of patients with hemoglobin<7 g/dL for fibroids/AUB, ectopic pregnancy, abortion, and bleeding at <20 weeks gestation or postpartum, and proportions of patients with infections of WBC>12,000 per µL in 2020 compared to 2019 (Table 2). None of these differences met the level of statistical significance.  As the incidence of OB-GYN visits to the ED declined at our institution during the Covid-19 pandemic, we found no evidence that this was accompanied by an increase in the severity of presentation. |
| **Resulting Action/Change** | These results highlight the need for hospitals to both promote access to safe care during this and future pandemics, update plans for disaster preparedness care and later COVID-19 surges and encourage outreach to communities to mitigate fears of contracting COVID-19.  Compared to the corresponding periods in 2019, laboratory measures of illness severity did not differ by time period, and there were fewer ED OB-GYN consults, surgeries performed within seven days of presentation, and hospitalizations associated with ED encounters. The reasons underlying these findings are likely multifactorial and may include a move toward outpatient, medical management over surgical intervention, improved virtual-health triaging, and more appropriate thresholds for patients seeking emergent care. However, there may also have been some hesitation to admit or operate on patients during the pandemic. Future studies are needed to assess the long-term consequences of these patterns. |
| Additional Recommendations | The reasons underlying these findings of no significant increased severity of illness when presenting to the ED during COVID-19 are likely multifactorial and may include a move toward outpatient, medical management over surgical intervention, improved virtual-health triaging, and more appropriate thresholds for patients seeking emergent care. However, there may also have been some hesitation to admit or operate on patients during the pandemic. Future studies are needed to assess the long-term consequences of these patterns.  Therefore, more robust protocols may need to be developed to keep our patients out of the ED by making for a more expansive call center and triage for our OBGYN patients. |
| Implementation Tools | **The results of this and related KPNC studies suggest that, during future COVID surges and future pandemics, optimal outreach materials and clinical processes may require greater attention to prevent delayed emergency care with more robust telemedicine protocols to manage and avoid potential unnecessary OBGYN ED visits.** |
| Implementation Measurement | None at this point, as no implementation strategy is anticipated. |
| Figure | Published in April 2021 *Obstetrics & Gynecology*  **Second study Figures and Tables Below**    The Dashed blue and red = Number ED encounters per month per 100,000 KP population (all ages)  The solid blue and red lines are (Number or ED encounters for WH dx 18 OVER / total Ed encounters any dx ALL AGES) X100 %, the 95% CI is for this proportion expressed as a percent.  The dashed black line is covid cases per 100,000 norcal pop  The solid grey is hospitalization per 100,000 norcal pop  Some comments:  The volume of all Ed encounters is lower in 2020 vs 2019.  The proportion of WH dx seems to be higher in the latter part of 2020 and was on an upward trend till October then trending downwards once covid rates started going up. However,the 95% CI intervals for these proportion for both years overlap so they are not significantly different.  My suggestion would be to look at the data from march-july then aug-dec as it seems that in July we became almost like 2019 then stuff changed? |

Table 1: Demographic, clinical, and disease severity measures for obstetric and gynecologic ED encounters at Kaiser Permanente Northern California in 2020 compared to 2019. Results are reported as percent change ((% in 2020 – % in 2019) / % in 2019) and 95% confidence intervals.

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| **Characteristics** | **Period 1:**  **January 1-March 3** | **Period 2:**  **March 4-May 31** | **Period 3:**  **June 1-August 31** | **Period 4:**  **September 1-December 31** |
| *Age*  18-39  40-49  50-64  65+ | **-4.5 (-7.7, -1.2)**  9.0 (-1.3, 19.3)  4.3 (-11.2, 19.8)  18.4 (-0.7, 37.6) | -2.1 (-5.5, 1.2)  5.7 (-3.6, 15.1)  7.5 (-5.4, 20.4)  -7.6 (-23.7, 8.5) | 2.2 (-0.7, 5.2)  **-11.1 (-18.6, -3.7)**  5.1 (-6.7, 16.9)  5.0 (-9.3, 19.3) | **3.2 (0.7, 5.7)**  -4.4 (-11.2, 2.4)  -3.7 (-13.8, 6.4)  **-12.7 (-24.7, -0.7)** |
| *Race/Ethnicity*  White  African American  Latinx  Asian  Other/Unknown | -2.8 (-9.4, 3.8)  -0.4 (-11.1, 10.2)  6.2 (-1.7, 14.1)  -9.9 (-20.7, 0.9)  8.7 (-5.6, 22.9) | -2.6 (-9.0, 3.9)  5.6 (-4.7, 15.9)  2.9 (-4.3, 10.1)  -9.3 (-19.3, 0.6)  7.4 (-7.2, 22.0) | 2.5 (-3.1, 8.0)  1.1 (-7.7, 9.9)  4.4 (-2.0, 10.9)  **-11.5 (-20.3, -2.8)**  -3.6 (-15.2, 8.1) | -2.0 (-6.7, 2.8)  6.9 (-1.1, 14.9)  -1.1 (-6.5, 4.3)  -0.9 (-8.9, 7.1)  0.2 (-9.8, 10.2) |
| *Condition\**  Fibroids/AUB  Infection  Ovarian Torsion  Ectopic Pregnancy  Abortion  Bleeding < 20 week or postpartum | -9.2 (-18.5, 0.2)  **-24.5 (-42.1, -6.8)**  **-25.0 (-37.4, -12.6)**  **-35.9 (-54.4, -17.4)**  -5.8 (-15.2, 3.6)  8.4 (-15.0, 31.9) | **-18.6 (-27.3, -9.8)**  -12.4 (-30.3, 5.6)  **-30.4 (-42.4, -18.4)**  **-30.5 (-50.8, -10.1)**  -7.9 (-17.0, 1.2)  **29.2 (3.0, 55.3)** | **-18.4 (-25.8, -11.0)**  -13.1 (-28.4, 2.3)  **-24.7 (-35.7, -13.6)**  **-33.7 (-51.3, -16.1)**  **-11.1 (-19.2, -3.1)**  21.2 (-0.8, 43.2) | **-14.7 (-21.3, -8.0)**  **-13.5 (-26.6, -0.3)**  **-13.9 (-23.9, -3.9)**  5.6 (-12.6, 23.9)  **-9.8 (-16.7, -3.0)**  12.4 (-4.7, 29.5) |
| *OB-GYN Consult in Emergency Department* | **-36.5 (-44.5, -28.5)** | **-35.9 (-44.1, -27.8)** | **-25.6 (-33.2, -18)** | **-17.2 (-23.8, -10.7)** |
| *Acuity in ED*  Urgent  Emergent | 1.1 (-0.8, 3.0)  -6.5 (-18.1, 5.1) | 1.0 (-0.8, 2.7)  -6.2 (-17.7, 5.2) | 0.6 (-0.9, 2.1)  -3.7 (-13.7, 6.4) | -1.1 (-2.4, 0.3)  8.6 (-0.5, 17.6) |
| *Surgery within 7 days of ED presentation* | **-41.2 (-56.7, -25.6)** | **-36.2 (-51.7, -20.7)** | **-30.1 (-44.2, -16.1)** | **-15.3 (-27.6, -2.9)** |
| *Hospitalization after ED presentation*  Hosp. in Encounter  Hosp. within 7 Days | **-47.6 (-68.2, -27.0)**  33.1 (-9.2, 75.4) | **-33.8 (-55.8, -11.8)**  **49.6 (8.9, 90.2)** | -18.6 (-37.3, 0.0)  7.2 (-21.8, 36.2) | -1.5 (-19.8, 16.8)  -9.8 (-33.9, 14.4) |

Bold = statistically significant difference in percent change

\* ICD-10-CM codes for conditions are as follows: fibroids / abnormal uterine bleeding (AUB) (D25.x, N92.4x, N93.9x, N95.0x), infection including pelvic inflammatory disease, tubo-ovarian abscess, cervicitis, endometritis, or vulvovaginal cellulitis (N76.4x,A18.1 x,A54.2 x,A56.1 x,N70.0 x,N70.9 x,N71.0 x,N71.9 x,N72 x,N73.0 x,N73.2 x,N73.3 x,N73.5 x,N73.8 x,N73.9 x,N75.1 x,N82.x), ovarian torsion/cysts (N83.5x,N83.2x), ectopic pregnancy (O00.x), spontaneous or missed abortion (O02.1x,O03.x,O20.0x,Z33.2 x), and pregnancy-related bleeding prior to 20 weeks or postpartum (O04.x,O20.9|x,O26.85x, O44.1x,O44.3x,O45.x)

Table 2: Laboratory measurements of illness severity by obstetric and gynecologic emergency subtype in 2019 and 2020.

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|  | **Period 1: January 1-**  **March 3** | | **Period 2: March 4-**  **May 31** | | **Period 3: June 1-**  **August 31** | | **Period 4: September 1-**  **December 31** | |
|  | 2019 (N=2,026) | 2020 (N=1,894) | 2019 (N=2,870) | 2020 (N=1,551) | 2019 (N=3,064) | 2020 (N=2,331) | 2019 (N=3,804) | 2020  (N=3,430) |
| *Fibroids/AUB\**  Hgb performed, N (%)  <7 g/dL, %  (95% CI) | N=662  627 (94.7)  4.3  (2.7, 5.9) | N=640  582 (90.9)  4.0  (2.4, 5.5) | N=992  937 (94.5)  5.0  (3.6, 6.4) | N=502  476 (94.8)  6.1  (3.9, 8.2) | N=1,105  1,042 (94.3)  5.1  (3.8, 6.4) | N=807  761 (94.3)  5.9  (4.2, 7.6) | N=1,337  1,254 (93.8)  4.4  (3.4, 5.7) | N=1,132  1,084 (95.1)  6.0  (4.6, 7.4) |
| *Infection*†  WBC performed, N (%)  >12,000 per µL, %  (95% CI) | N=199  136 (68,3)  46.3  (37.9, 54.7) | N=160  109 (68.1)  41.3  (32.0, 50.5) | N=281  205 (73.0)  45.9  (39.0, 52.7) | N=153  99(64.7)  44.4  (34.7, 54.2) | N=306  229 (74.8)  42.8  (36.4 49.2) | N=238  156 (65.5)  52.6  (44.7, 60.4) | N=396  288 (72.7)  42.4  (36.7, 48.1) | N=340  241 (70.9)  42.7  (36.5, 49.0) |
| *Ectopic Pregnancy*  Hgb performed, N (%)  <7 g/dL %  (95% CI)  HCG performed, N (%)  >5,000 IU/mL, %  (95% CI) | N=170  163 (95.9)  0.6  (-0.6, 1.8)  166 (97.6)  36.1  (28.8,43.5) | N=116  109 (94.0)  0.0  --  112 (96.6)  37.5  (28.5, 46.5) | N=206  199 (96.6)  0.5  (-0.5, 1.5)  200 (97.1)  33.0  (26.5,39.5) | N=89  86 (96.6)  0.0  --  84 (94.4)  32.1  (22.2,42.1) | N=214  204 (95.3)  0.0  --  207 (96.7)  29.5  (23.3,35.7) | N=127  120 (94.5)  0.0  --  126 (99.2)  27.0  (19.2,34.7) | N=230  222 (95.7)  0.5  (-0.4, 1.3)  222 (96.5)  33.8  (27.6,40.0) | N=241  233 (94.2)  0.9  (-0.3, 2.0)  237 (98.3)  37.6  (31.4,43.7) |
| *Abortion*  Hgb performed, N (%)  Hgb<7 g/dL %  (95% CI) | N=663  571 (86.1)  0.9  (0.1, 1.6) | N=665  599 (90.1)  0.3  (-0.1, 0.8) | N=963  852 (88.5)  0.2  (-0.1, 0.6) | N=551  505 (91.7)  0.6  (-0.1, 1.3) | N=995  876 (88.0)  0.6  (0.1, 1.1) | N=791  706 (89.3)  0.0  -- | N=1280  1,157 (90.4)  0.4  (0.1, 0.8) | N=1145  1,029 (89.9)  0.4  (0.0, 0.8) |
| *Bleeding<20wk/ postpartum*  Hgb performed, N (%)  <7 g/dL, %  (95% CI) | N=136  127 (93.4)  0.0  -- | N=157  134(85.4)  0.7  (-0.7, 2.2) | N=157  137 (87.3)  0.7  (-0.7, 2.2) | N=126  112 (88.9)  0.9  (-0.8, 2.6) | N=178  158 (88.8)  0.6  (-0.6, 1.9) | N=193  180 (93.3)  0.8  (-0.5, 1.6) | N=269  240 (89.2)  0.8  (-0.3, 2.0) | N=300  268 (89.3)  0.7  (-0.3, 1.8) |

Test of two proportions were performed to assess differences in laboratory values in 2019 vs. 2020. No analyses were statistically significant below an alpha level of 0<05.

\* AUB = abnormal uterine bleeding

† Infection defined as pelvic inflammatory disease, tubo-ovarian abscess, cervicitis, endometritis, or vulvovaginal cellulitis