Children's Hospital of Philadelphia
PolicyLab

Effects of Delivery Volume and High-risk Condition Volume on Maternal Morbidity Among High-risk Obstetric Patients

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OBJECTIVE: To evaluate the effect of obstetric delivery volume, high-risk condition volume, and their combined effect on maternal outcomes. METHODS: This retrospective cohort study examined more than 10 million deliveries in three states from 1995 to 2009 using linked birth-hospital discharge records. Surgical high-risk patients had one of three prenatally identifiable conditions; the high-risk medical cohort had 1 or more of 14 complicating diagnoses. Hospitals were divided into quartiles of total obstetric delivery volume and tertiles of high-risk patient volume. The primary outcome was a composite outcome of severe maternal morbidity identified by International Classification of Diseases, 9th Revision, Clinical Modification, codes. Data were controlled for nonindependence using clustering by hospital and results were adjusted for patient and hospital level factors. RESULTS: We identified 142,194 high-risk surgical deliveries and 1,322,276 high-risk medical deliveries for evaluation. Among surgical high-risk patients, higher hospital total obstetric delivery volume was associated with 22% decreased risk for maternal morbidity (4th quartile adjusted odds ratio [AOR] 0.78; 95% CI 0.64-0.94); likewise for medical high-risk patients, higher total delivery volume was associated with a 28% decreased risk (4th quartile AOR 0.72; 95% CI 0.59-0.86). Conversely, as the volume of medical high-risk patients at hospitals increased, the AOR for severe morbidity increased (AOR=1.27, 95% CI 1.10-1.48). There was a significant interaction effect of both types of volume on maternal complications for both surgical (likelihood ratio [LR] χ=18.2, P=.006) and medical high-risk patients (LR χ=99.4, P<.001). CONCLUSION:Patients with high-risk medical and surgical conditions had decreasing adverse maternal outcomes as total obstetric delivery volume increased. There were increased odds of adverse maternal outcomes in centers with high volumes of high-risk patients. These two types of volume had significant combined effect on maternal risk. Both types of volume should be considered in assessing hospital obstetric performance.

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Bozzuto L, Passarella M, Lorch S, Srinivas S