Temporal Trends of Hospitalization, Mortality, and Financial Impact Related to Preeclampsia with Severe Features in Hawaii and the United States

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Introduction

- Preeclampsia is a pregnancy-specific hypertensive disorder that presents in 3-6% of pregnancies, and is one of the leading causes of maternal morbidity and mortality in the U.S. and the world.
- In the U.S., the prevalence of preeclampsia has increased over the past three decades.
- In Hawaii, Native Hawaiians, other Pacific Islanders, and Filipinos are at higher risk compared to whites and Asians.
- Preeclampsia with severe features has a different diagnostic criterion from preeclampsia and is associated with increased risk of maternal mortality and higher rates of maternal morbidities.
- It has been estimated that the existence of preeclampsia increased costs by $6583.
- However, temporal trends of hospitalization, cost and outcome associated specifically to preeclampsia with severe features have been inadequately studied.
- Thus, we sought to assess changes in the number of discharges, age of the patient and hospital charges associated with preeclampsia with severe features over an eleven-year period.

Objectives

1) Assess the changes in the number of discharges, age of the patient and hospital charges associated with preeclampsia with severe features over an eleven-year period.

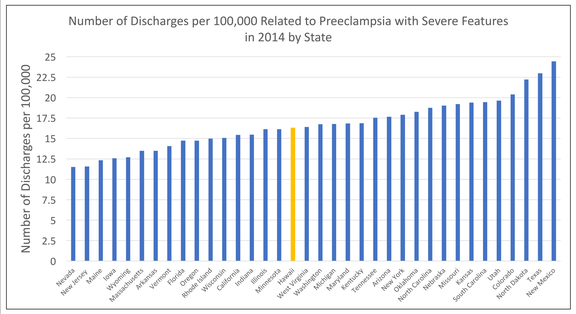
2) Compare data between Hawaii and the United States to assess any geographic differences.

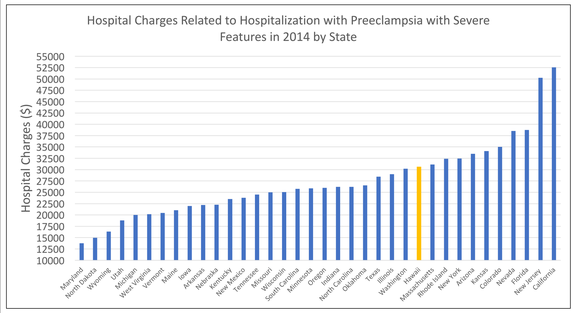
Materials and Methods

- We accessed the publicly available Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample (NIS) database to examine the temporal trend of total number of discharges, age, death and mortality related to hospitalization with preeclampsia with severe features between 2004 and 2014.
- The ICD-9-CM code used to abstract national and state data on preeclampsia with severe features was 642.5x.
- Eleven-year temporal trends of discharges, mortalities, and inpatient cost for preeclampsia with severe features were compared using linear regression. A two-sided p-value of <0.05 was taken as statistical significance.

Definition of Preeclampsia with Severe Features

- BP > 160 mmHg systolic or 110 mmHg diastolic
- Pulmonary edema
- Liver transaminase levels two times the upper limit of normal
- Elevated creatinine levels
- Severe persistent right upper-quadrant pain
- New-onset cerebral or visual disturbances (headache, blurry vision, etc.)





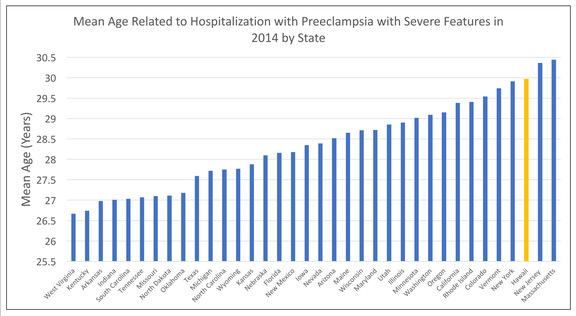


Figure 1. Cross sectional state by state comparisons of preeclampsia with severe features in 2014 regarding hospitalizations, hospital charge, and mean age of patients.

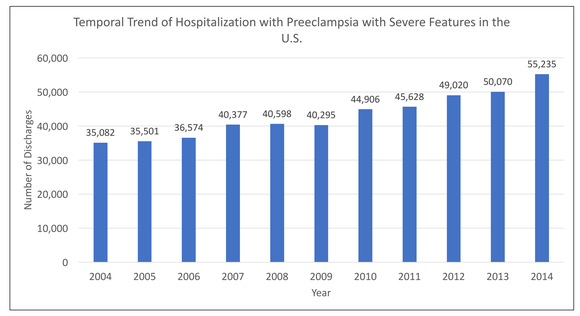


Figure 2a. 11-year temporal trends of hospitalizations related to preeclampsia with severe features in the U.S. (*p<0.0001*).

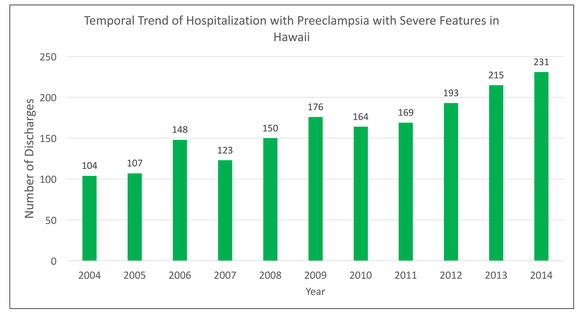


Figure 2b. 11-year temporal trends of hospitalizations related to preeclampsia with severe features Hawaii (*p<0.0001*).

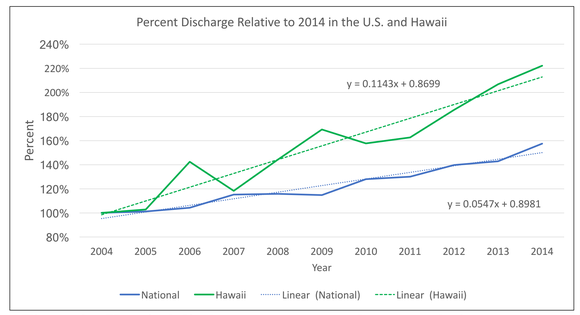


Figure 2c. Hospital discharge percentages by year relative to 2004 in the U.S. and Hawaii.

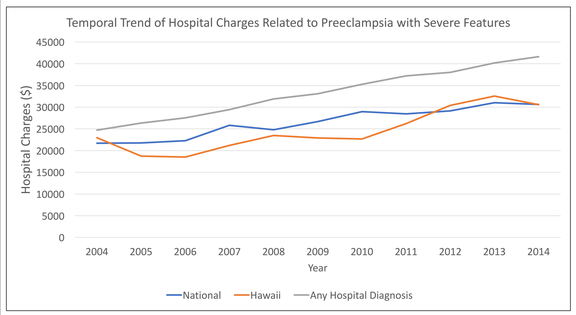


Figure 3. 11-year temporal trend of hospital charge (inflation adjusted) associated with preeclampsia with severe features in the U.S. and Hawaii (*p<0.0001 for both*).

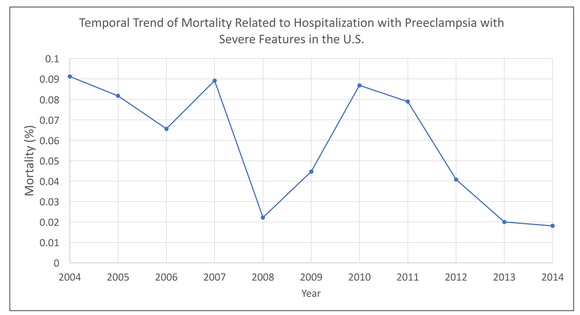


Figure 4. 11-year national trend of mortality due to preeclampsia with severe features (*p=0.03*).

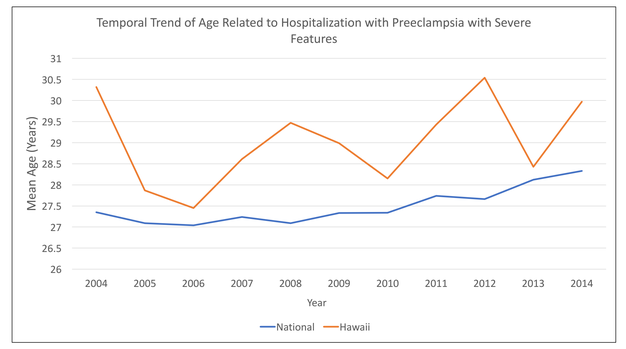


Figure 5. 11-year temporal trend of mean age related to preeclampsia with severe features in the U.S. (*p=0.0009*) and Hawaii (*p=0.372*).

Discussion

- Among the 36 states analyzed in ascending order in 2014, Hawaii ranked 17th in discharges (16.29 discharges per 100,000 people), 26th in hospital charges ($30,599), and 34th in mean age (29.97 years).
- Hawaii displayed a significantly steeper rate of increase in discharges than the U.S. (*p=0.0001*).
- Contrary to national trends, the mean age of patients diagnosed with preeclampsia with severe features in Hawaii has not been significantly increasing in the 11-year period.
- We speculate that a rise in cardiovascular risk factors and ethnic disparity in risk factors for preeclampsia are responsible for the alarming increase of preeclampsia with severe features rates in Hawaii.
- There was a marginal decrease in mortality rates despite substantial increase in healthcare expenditure related to preeclampsia with severe features.

Conclusion

- Prevalence of preeclampsia with severe features is rising at an alarming rate in Hawaii and should be addressed as a public health concern.
- Further prospective studies are needed to examine preventative interventions for the early detection of neurological complications of preeclampsia with severe features to improve risk-stratification strategies.

Acknowledgements

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