

A competing risks model for premature birth prediction in early and middle adolescent pregnancies of a developing country population

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Objective

To develop a competing risks model for premature birth (PB) prediction in early and middle adolescent pregnancies from a Mexican population.

Methods

A historical cohort study of adolescents < 17 years old attended at a National Health Institute in Mexico. Independent variables were maternal and gestation characteristics. Maternal weight was transformed into multiples of the median (MoM) by maternal age, height, and gestation. A competing risks model was fitted to data on gestational age in weeks at the time of spontaneous delivery without pre-eclampsia or other medical termination of pregnancy. PB was defined as spontaneous delivery < 37 weeks' gestation; early PB, as spontaneous delivery < 34 weeks' gestation. The performance of the model was tested.

Results

A total of 1419 pregnancies were included, maternal age ranging from 11 to 16 years. There were 348 (24.5%) PB and 140 (9.9%) early PB. The mean time for spontaneous delivery was 35.2 weeks, the SD of 5.1 weeks. The final model included 2.8 (1.6 to 3.9) weeks for maternal MoM weight, 0.8 (0.0 to 1.6) weeks for primigravida, -0.2 (-0.4 to 0.0) weeks for the first intercourse to pregnancy interval in years, -0.3 (-0.6 to 0.1) weeks for common law marriage, -1.3 (-2.6 to 0.0) weeks for illiterate, -3.6 (-4.6 to -2.6) weeks for congenital abnormalities, and -4.1 (-5.1 to -3.0) weeks for twins. No significant contribution to the model was found for menarche, number of partners, partner age difference, substance abuse, suicide attempted, and maternal disease. The areas under the receiver-operator characteristic curves of the model were 0.653 (0.613 - 0.694) for PB and 0.727 (0.667 - 0.787) for early PB. At the respective 10% and 20% of false positive rates, the detection rates were 31.1% (26 - 36) and 43.1% (38 - 48) for PB, while of 44.9% (37 - 53) and 55.1% (47 - 63) for early PB.

Conclusion

A competing risks model for PB detection fitted well in this historical cohort of early and middle adolescent pregnancies, especially for early PB. The value of adding biological markers and of targeted interventions remains to be investigated.

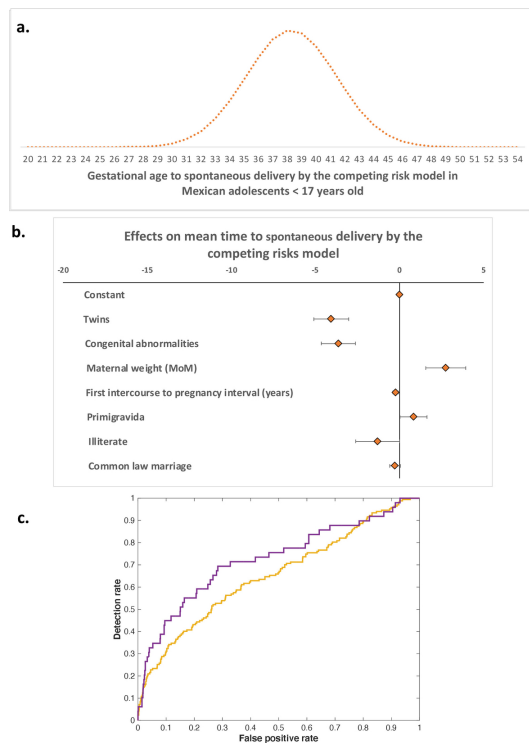


Figure 1.

- Plot of the competing risks model distribution for spontaneous delivery in Mexican adolescents < 17 years old.
- Forest plot of the effects of maternal characteristics on mean time to spontaneous delivery. MoM: multiples of the median.
- Plot of the receiver-operator characteristic curve of the model for birth < 37 (orange) weeks and < 34 weeks (violet).