Maternal age and body mass index and risk of labour dystocia after spontaneous labour onset among nulliparous women: A clinical prediction model

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August 23, 2023

Abstract

Objective: To develop a prediction model for labour dystocia, suitable for risk stratification at onset of labour. Design: A cohort-based registry design was employed using data from the Copenhagen Pregnancy Cohort and the Danish Medical Birth Registry. Setting: The study was conducted at Copenhagen University Hospital – Rigshospitalet, Denmark Population: Nulliparous women with a singleton pregnancy and cephalic presentation in spontaneous labour at term from 2014 to 2020. Methods: Logistic regression analysis was employed to construct the prediction model. Candidate predictors were pre-selected based on clinical reasoning and existing evidence. These were maternal age, pre-pregnancy body mass index, height, gestational age, physical activity, self-reported medical condition, WHO-5 score, and fertility treatment. Main outcome measures: The candidate predictors ability to predict labour dystocia. For model performance, we calculated the area under the receiver operating characteristics curve (AUC) for discriminative capacity and Brier score for model calibration. Results: A total of 12,445 women involving 5,525 events of labour dystocia (44%) were included. All candidate predictors were retained in the final model, which demonstrated moderate discriminative ability with AUC was 62.3% (95% CI:60.7-64.0) and Brier score of 0.24. Conclusions: Our model represents an initial advancement in the prediction of labour dystocia utilizing readily available information obtainable upon admission in active labour. As means of facilitating risk stratification the development of a user-friendly online tool for clinicians is a logical next step. Nevertheless, further model development and external testing across other populations is warranted.

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