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External validation of prognostic models to predict risk of gestational diabetes mellitus in one Dutch cohort: prospective multicentre cohort study

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Abstract

Objective

To perform an external validation and direct comparison of published prognostic models for early prediction of the risk of gestational diabetes mellitus, including predictors applicable in the first trimester of pregnancy.

Design

External validation of all published prognostic models in large scale, prospective, multicentre cohort study.

Setting

31 independent midwifery practices and six hospitals in the Netherlands.

Participants

Women recruited in their first trimester (<14 weeks) of pregnancy between December 2012 and January 2014, at their initial prenatal visit. Women with pre-existing diabetes mellitus of any type were excluded.

Main outcome measures

Discrimination of the prognostic models was assessed by the C statistic, and calibration assessed by calibration plots.

Results

3723 women were included for analysis, of whom 181 (4.9%) developed gestational diabetes mellitus in pregnancy. 12 prognostic models for the disorder could be validated in the cohort. C statistics ranged from 0.67 to 0.78. Calibration plots showed that eight of the 12 models were well calibrated. The four models with the highest C statistics included almost all of the following predictors: maternal age, maternal body mass index, history of gestational diabetes mellitus, ethnicity, and family history of diabetes. Prognostic models had a similar performance in a subgroup of nulliparous women only. Decision curve analysis showed that the use of these four models always had a positive net benefit.

Conclusions

In this external validation study, most of the published prognostic models for gestational diabetes mellitus show acceptable discrimination and calibration. The four models with the highest discriminative abilities in this study cohort, which also perform well in a subgroup of nulliparous women, are easy models to apply in clinical practice and therefore deserve further evaluation regarding their clinical impact.