Assessing Breast Cancer Risk Prediction Models: A Systematic Review of Model Development and Performance

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Abstract

Background: Recently, risk prediction models have been developed to estimate breast cancer risk of individual women but there is no systematic assessment of their performance. This study aims to review previously developed risk prediction models in order to identify the most reliable model, if applicable, and indicate the strengths and weaknesses of each model for guiding future use in clinical practice or development of new models, if needed. Methods: Systematic reviews of published literatures were identified through MEDLINE and EMBASE in October 2010. Observational studies constructing models using regression methods were selected to assess their model development and performance (i.e. calibration and discrimination). Results: Of 453 identified abstracts, 18 models and 7 validation studies were reviewed. Two models namely, Gail's and Rosner & Colditz's were the most significant and were subsequently modified by other scholars. Calibration performance of most models was good but discriminatory accuracy was poor to fair. Modified Gail model developed by Tice et al. is the most reliable with fair discriminatory performance. Discussion: The existing prediction models are not good enough for policy use. Although they have good calibration but poor discriminatory accuracy resulted in the need to find a better approach to construct the new model.

Keywords: Systematic review; Breast cancer risk prediction model.

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