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SIMPLE NON-LABORATORY-BASED AND LABORATORYBASED RISK ASSESSMENT ALGORITHMS AND NOMOGRAM FOR DETECTING UNDIAGNOSED DIABETES MELLITUS

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BACKGROUND: Early detection for undiagnosed diabetes mellitus (DM), through routine screening periodically, is critical to prevent or delay severe diabetes-related complications. In order to classify high-risk subjects for DM screening, risk algorithms for undiagnosed DM detection have been richly developed and validated in diverse populations and health care settings. However, the majority of risk algorithms developed within Chinese population were developed and validated in low income setting. Furthermore, there are no nomograms for the use in detecting undiagnosed DM, of which are simple-to-use graphical tool to guide decision-making in both routine clinical practice and community setting. The purpose of this study was to develop simple a nomogram to predict the risk of undiagnosed DM for use in asymptomatic general population, based on non-laboratory-based and laboratory-based risk algorithms. METHOD: Anthropometric data, plasma fasting glucose, full lipid profile, and self-reported data on lifestyle and dietary habit were collected from 3357 Chinese subjects aged 18–70, without prior history of DM. Logistic regression analysis was performed on the data of a random sample of 2518 subjects to construct non-laboratory-based and laboratory-based risk assessment algorithms to detect the presence of undiagnosed DM, which were validated on the data of the remaining sample (n = 839). Accuracy of the DM risk algorithms was assessed by sensitivity, specificity, positive predictive value, and negative predictive value. Hosmer-Lemesthow c2 statistic and area under the receiver-operating characteristic curve (AUC) were employed to assess the calibration and discrimination of the different DM risk algorithms. The performance of our algorithms was compared to that of previously published DM risk assessment algorithms. RESULT: Of 3357 subjects recruited, 271 (8.1%) had undiagnosed DM that was defined by fasting glucose ≥ 7.0 mmol/L or 2-hour plasma glucose ≥ 11.1 mmol/L. The non-laboratory-based risk algorithm, with score ranging from 0 to 33, included age, body mass index, family history of diabetes, regular exercise, sub-optimal blood pressure, and the laboratory-based risk algorithm, with score ranging from 0 to 37, added triglyceride to the risk factors. Both algorithms demonstrated acceptable calibration (Hosmer-Lemesthow test: P = 0.229 and P = 0.483, respectively) and discrimination (AUC: 0.709 and 0.711, respectively) for the detection of undiagnosed DM. The optimal cutoff point on the receiver-operating characteristic curve was 18 for the detection of undiagnosed DM in both algorithms. The sensitivity and specificity of the non-laboratory-based risk algorithm were 63.9% and 67.7%, respectively, and those of the laboratory-based risk algorithm were 72.1% and 57.8%, respectively. CONCLUSION: A simple nomogram for detecting undiagnosed DM has been developed using the validated non-laboratory-based and laboratory-based risk algorithms. Future study is warranted to evaluate the usefulness of this nomogram to clinical practice in primary care settings.