ABSTRACT

Background: Artificial Neural Network (ANN) has gained considerable attention in many fields, including medicine. Proficiency of ANN in modeling complex non-linear relationships makes it highly attractive for diagnostic or prognostic purposes. *Aim*: In this paper, we attempt to provide an overview of the features of ANN as well as to review of application of ANN in medical disease prediction, carefully assess its modelling techniques and identify its aspects for potential improvement. *Method*: Databases were searched for relevant publications during the last two decades. Selection criteria were proposed diagnostic or prognostic study using ANN, written in English, published in reputable journals and has performance measure of logistic regression. *Result*: Ten studies included, six were multicenter studies, eight were prognostic studies. Three studies reported on fewer than 500 patients, model validation were assessed in 9 studies and primarily used n-fold cross validation, backpropagation is carried out in 6 studies and only half of the studies reporting measure of discrimination and calibration. Results of nine studies yielded better performance over logistic regression yet statistical insignificance were mostly found. *Conclusion*: Artificial Neural Network is a promising method to overcome non-linearity commonly found in medical disease prediction and hence can potentially employed in various medical fields. Prior to applying neural network, comprehensive understanding of principles of ANN is required. Variable selection should be primary concern in model building process as network performance depends heavily on and rely upon expertise or literature findings is certainly proposed. Accuracy of training data and network parameter could also affect network performance. Further properly prospective cohort or clinical trials are needed before this method finds application in a real clinical setting

Keywords: Artificial Neural Network, Prediction, Outcome, Disease, Diagnosis, Prognosis