

## Editorial



# Analysis of Spontaneous Preterm Labor and Birth and Its Major Causes Using Artificial-Neural-Network

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Spontaneous preterm birth refers to the onset of labor before 37 weeks with intact fetal membranes, the causes are too diverse. Recently, there has been an increase in the number of preterm labor and birth due to aged pregnancy, multiple pregnancy through assisted reproductive technology. Newborns born before 37 weeks suffer various morbidities and mortalities, largely due to organ system immaturity.<sup>1</sup> Therefore, it is best to analyze and predict the causes of preterm labor and prevent it through early interventions. However, the causes are so diverse and sometimes complex that it is very difficult to attempt a study to analyze the causes. Until now, most conventional existing studies have attempted to predict preterm birth through logistic regression and the random forest (under an unrealistic assumption that all other variables stay constant), focusing on identifying individual risk factors of these many causes.<sup>2</sup> However, since the predictive power of these methods are too low, researches are being conducted to apply the artificial neural network(ANN) through machine learning techniques using large datasets for identifying major determinants of preterm birth. According to predicting high-risk preterm birth using ANN by Catley et al.,<sup>3</sup> this method is presented a reengineered approach to the early prediction of preterm birth as a complimentary technique to the conventional procedure. This study showed that the training on the refined high-risk preterm birth model increased the network's sensitivity to 54.8%, compared to just over 20% for the non-artificially distributed preterm birth model. The purpose of this Lee and Ahn's study<sup>4</sup> is to investigate the major determinants of preterm labor and preterm birth using ANN for Korean pregnant women. The results show that in addition to cervical length screening and previous history of preterm birth, diabetes mellitus (DM), and hypertension are the main predictors of preterm delivery, and the accuracy of this ANN method is similar to that of classic regression analysis. According to the conclusion of this study, it is important to preventive measure for DM and hypertension as well as periodic screen cervical length to prevent preterm birth. An ANN trained on selected and predictive input variables describing the preterm patient's obstetrical history can more accurately predict the risk of preterm birth.<sup>5</sup> In the future, if we try to develop an ANN that predicts preterm labor early and accurately with more diverse and precise important causal variables (predictors) through machine training techniques using big data of many institutions, it will be a great help to create a “preterm birth prevention program” (Fig. 1).

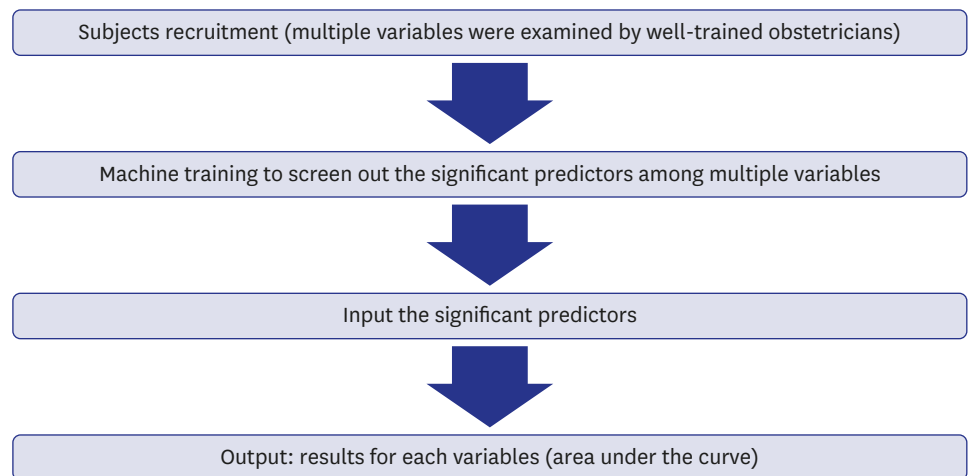


Fig. 1. Algorithm of spontaneous preterm birth prediction using artificial neural network.

## REFERENCES

1. Harrison MS, Goldenberg RL. Global burden of prematurity. *Semin Fetal Neonatal Med* 2016;21(2):74-9.  
[PUBMED](#) | [CROSSREF](#)
2. Amini P, Maroufizadeh S, Samani RO, Hamidi O, Sepidarkish M. Prevalence and determinants of preterm birth in Tehran, Iran: a comparison between logistic regression and decision tree methods. *Osong Public Health Res Perspect* 2017;8(3):195-200.  
[PUBMED](#) | [CROSSREF](#)
3. Catley C, Frize M, Walker CR, Petriu DC. Predicting high-risk preterm birth using artificial neural networks. *IEEE Trans Inf Technol Biomed* 2006;10(3):540-9.  
[PUBMED](#) | [CROSSREF](#)
4. Lee KS, Ahn KH. Artificial Neural Network Analysis of Spontaneous Preterm Labor and Birth and Its Major Determinants. *J Korean Med Sci* 2019;34(16):e128.  
[CROSSREF](#)
5. He L, Parikh NA. Brain functional network connectivity development in very preterm infants: the first six months. *Early Hum Dev* 2016;98:29-35.  
[PUBMED](#) | [CROSSREF](#)