

CARIES RISK PREDICTION MODEL IN THAI PRESCHOOL CHILDREN



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BACKGROUND

Various caries risk assessment (CRA) forms have been introduced as an essential element in risk-based caries management. However, most of the established CRAs were developed based on the evidence in Western countries and the application in the different demography might be limited.

OBJECTIVES

To assess the performance of caries risk/protective factors from established CRA in predicting the onset of caries in Thai preschool children and compare the associations between caries onset and those factors.

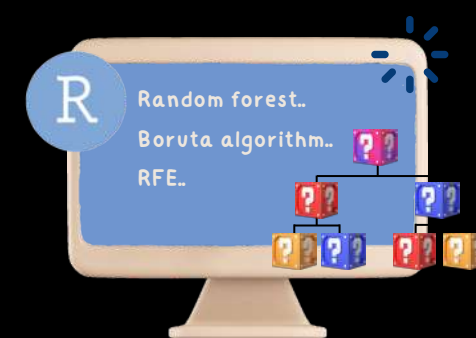
METHODS



Parents of 122 children were interviewed according to the questionnaire



Participants were categorized into 2 groups



Random Forest was used to generate the prediction model and the importance factors were determined using Boruta algorithm and RFE

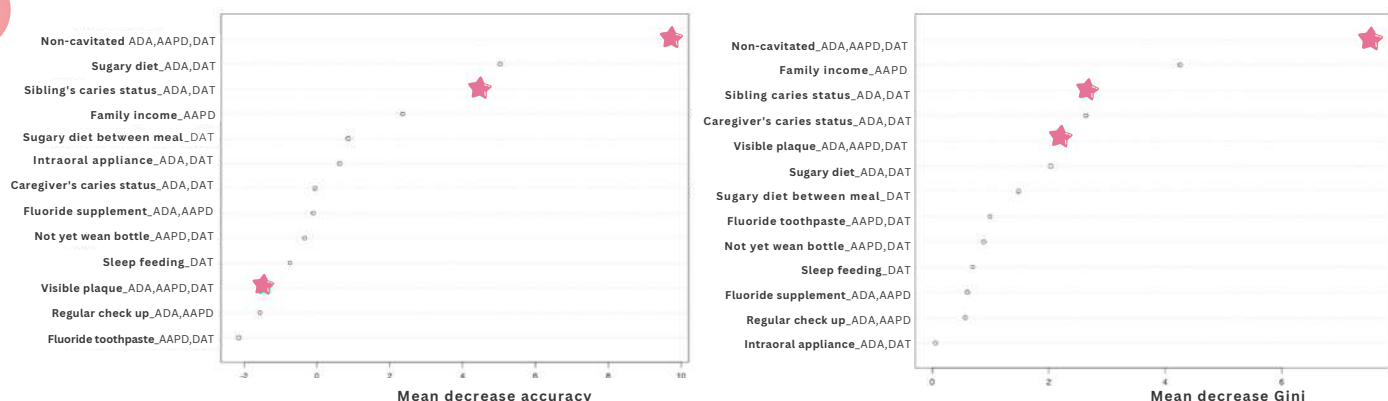
RESULTS

1

	AAPD	ADA	DAT	Combined-factors
OOB estimate of error rate	18.85 %	18.85 %	18.03%	16.39%

- Caries risk/protective factors from three established Caries Risk Assessment (CRA) demonstrated comparable efficacy.
- Marginal reduction in the OOB error rate was found in the Combined-factors model.

2



The plotted graphs show the importance according to the accuracy of Combined-factors model in current caries status prediction: mean decrease accuracy and Gini coefficient. Confirmed important features by Boruta and Recursive Feature Elimination (RFE) algorithms are indicated by pink star. ★

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The identification of caries risk/protective factors deemed important to prediction model was accomplished utilizing Boruta and recursive feature elimination (RFE) algorithms. The outcomes of these analyses confirmed that the number of surfaces affected by **non-cavitated caries lesion**, the **caries status of siblings**, and the **plaque accumulation** were deemed as important factors contributing significantly to the predictive capacity of the model.

CONCLUSION

Our analyses, employing machine learning techniques based on caries risk/protective factors derived from established caries risk assessment systems demonstrated noteworthy performance by AAPD, ADA, and DAT caries risk assessment in identifying the current caries status among Thai preschool children. The most important factor influencing the accuracy of the predictive model was the quantity of non-cavitated caries lesions. Additionally, the caries status of siblings and the plaque accumulation were also recognized as important factors. These findings underscore the multifactorial nature of caries development and emphasize the necessity of accounting for familial influences, particularly in the unique context of sibling caries status within the Thai population.

Keywords: Caries risk assessment, Dental caries, Machine learning, Prediction models, Thai preschool children

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