

## Bayesian Network Modeling in Discovering Risk Factors of Dental Caries in Three-Year-Old Children

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**A**- Conception and study design; **B** - Collection of data; **C** - Data analysis; **D** - Writing the paper; **E**- Review article; **F** - Approval of the final version of the article; **G** - Other (please specify)

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### ABSTRACT

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**Purpose** - The aim of this study was to use probabilistic graphical models to determine dental caries risk factors in three-year-old children. The analysis was conducted on the basis of the questionnaire data and resulted in building probabilistic graphical models to investigate dependencies among the features gathered in the surveys on dental caries.

**Materials and Methods** - The data available in this analysis came from dental examinations conducted in children and from a questionnaire survey of their parents or guardians. The data represented 255 children aged between 36 and 48 months. Self-administered questionnaires contained 34 questions of socioeconomic and medical nature such as nutritional habits, wealth, or the level of education. The data included also the results of oral examination by a dentist. We applied the Bayesian network modeling to construct a model by learning

it from the collected data. The process of Bayesian network model building was assisted by a dental expert.

**Results** - The model allows to identify probabilistic relationships among the variables and to indicate the most significant risk factors of dental caries in three-year-old children. The Bayesian network model analysis illustrates that cleaning teeth and falling asleep with a bottle are the most significant risk factors of dental caries development in three-year-old children, whereas socioeconomic factors have no significant impact on the condition of teeth.

**Conclusions** - Our analysis results suggest that dietary and oral hygiene habits have the most significant impact on the occurrence of dental caries in three-year-olds.

**Keywords** - dental caries, Bayesian network, learning from data, risk assessment

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