Longitudinal Study of Dental Caries Among First Grade Primary School Children in Alexandria, Egypt

Part II: Development of a Caries Prediction Model

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The aim of the study was to select the most important predictors of caries in first graders. The study included 814 first graders in Alexandria, Egypt who were followed over a period of two school years to study caries, and a number of related variables. These variables were explained in part I of this study. The variables were incorporated into logistic regression models to predict caries in the permanent dentition and multiple linear regression models to predict caries in the primary dentition. Sensitivity, specificity and the Receiver Operating Characteristic (ROC) curve were used to test the accuracy of the logistic model whereas the performance of the multiple regression models was judged by the coefficient of determination ($R2$). The most important caries predictors in the permanent dentition were: number of sound primary occlusal surfaces, father's education, prevention received by child, caries referral index, the number of cavitated primary buccolingual surfaces and occlusal morphology. As for the primary dentition, predictors of caries were: subjective future caries increment prediction, number of non-cavitated carious buccolingual surfaces in primary second molars and caries recurrence in either the occlusal or buccolingual surfaces of the primary second molars. It can be concluded from this study that caries can be predicted with acceptable accuracy in the permanent and primary dentitions in this age group.

Several studies have pointed to the very low to low caries prevalence in Egypt in children as well as in adults[1-3]. This situation - as well as the very limited resources available for oral health in general and for prevention in particular- call for the application of cost containment policies that are based on scientific evidence. One such approach is targeting high-risk individuals among priority groups so that they can receive the suitable preventive measures[4]. This is assumed to save costs in money, effort and time of treating the disease if it is left to develop[1,2]. The first step in this targeting strategy is to select the most important disease predictors after considering the different variables simultaneously using a suitable research design and statistical technique. Different modeling techniques are available for choice in developing a model for caries risk assessment. The term modeling indicates