

Caries risk assessment in young people based on the „Cariogram“

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Summary

The purpose of this study was to evaluate the changes of the caries risk and weighted impact of different etiological factors on the risk after dental health instruction in young people using „Cariogram“.

Material and method: 223 dental students 18-25 years old were randomly selected and allocated to experimental and control groups. All subjects were examined for caries risk assessment at the baseline and after three months, by using „Cariogram“. Data collection included a clinical examination and a self-administered questionnaire. The Method of Clinical Caries Rate Prediction (P. Leous 1990) was used to determine the clinical findings indicating increased caries risk. Each person of the experimental group was given visual presentation and detailed information about caries risk factors by „Cariogram“. The control group had the same oral hygiene instructions without visual presentation of "Cariogram". After 3 months the re-examination was done.

Results. The average caries risk at the baseline in experimental and control group was high (75% and 73% respectively). After three months it decreased to moderate (49%) among people of experimental group and stayed high (66%) in control group ($p < 0.05$). The „Susceptibility“ factor (14%) among weighted impacts ranked first, "Bacteria" and "Diet" factors (13% and 12% accordingly) ranked second and "Circumstances" factor (9%) ranked third.

Conclusion. The caries risk among young people of experimental group decreased from high (75%) to medium (49%) after dental health instruction and visual presentation of caries risk factors by the Cariogram. The highest weighted impact on the caries risk was caused by "Susceptibility" factor.

Keywords: risk factors, caries risk assessment, caries prediction.

Introduction

Caries management by risk assessment is now granted considerable attention. [1,2,3,4] A wide variety of multivariate risk assessment models have been developed that will aid practitioners in assessing risks and lead them to the use of current and new technologies by specifying treatments recommended for the various risk categories. [5,6,7] However these models have not been

as accurate as had been hoped and consequently have not enjoyed wide use in either public health or private practice settings. [8]

To support the dentist's risk analysis and to visualize the influence of different factors on the caries process in the individual, an interactive computerized program „Cariogram“ (D. Bratthall et al., 1997) [8,9] was recently introduced. The „Cariogram“ is a tool to motivate the patient and may serve to complement clinical decision-mak-

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ing when selecting preventive strategies for the patient. The present studies have shown that Cariogram predicts caries increment more accurately than any included single-factor model. How this finding can be translated into daily practice in the best and most practical way is a matter of future research [10].

The **purpose** of this study was to evaluate the changes of the caries risk and weighted impact of different etiological factors on the risk after dental health instruction in young people using „Cariogram“.

Methods and surveyed population

It was a single blind, randomized controlled trial study. Two hundred and twenty three dental students 18-25 years old were randomly selected and allocated to the experimental and control groups. One hundred and seventy one subjects constituted the experimental group and fifty-two people were the control group. All subjects were examined for caries risk assessment at the baseline and after three months, using „Cariogram“. Data collection included a clinical examination and self-administered questionnaire. The clinical examination comprised the DMFT level (by the WHO criteria, 1997) and oral hygiene status (PLI, Silness & Loe, 1964). The examinations

were performed using artificial light, mouth mirrors, and standard explorers. A questionnaire comprised the data on general health, caries incidence, diet and prior fluoride exposure. The Method of Clinical Caries Rate Prediction (MCCRP, P. Leous 1990) [11] was used to determine the clinical findings that indicated increased caries risk. The MCCRP was determined using special form for caries risk prediction (*Figure 1*). This form includes the data of dental examination and questionnaire. Each question of the questionnaire includes certain variants of answers and each variant has a certain adjustment in percent (the coefficient for caries rate calculation). It takes into account the tendency of caries intensity at the examined area. When the examiner fills in all blanks of the form the coefficient for caries rate calculation is used to make the caries rate prognosis in DMFT. The caries rate prognosis is compared with the existing caries rate and as a result the necessary preventive measures are chosen. For our research we used this method only partially. We calculated the adjustment for caries rate and associated it with the scores of clinical assessment factor of the „Cariogram“ (*Table 1*).

Table 1. Modification of the “Clinical assessment” factor (Cariogram)

Factor	Scores of adjustment for caries rate calculation (MCCRP)	Scores of "Clinical assessment" factor (Cariogram)
"Clinical assessment"	(-41%) and more	"0"
	(-40%) - (-10%)	"1"
	0% - (+30%)	"2"
	(+40%) and more	"3"

All the obtained data were worked on by the PC program „Cariogram“. Each person of the experimental group was given the visual presentation and detailed information about caries risk factors according to the „Cariogram“. They were motivated for the regular and careful oral hygiene, trained for the toothbrushing and had a diet counseling. The control group had the same oral hygiene instructions without visual presentation of „Cariogram“. After 3 months the re-examination was done. All data were processed and analyzed by ANOVA.

Results

At the start of the study 51% (88) people of the experimental group had very high caries risk, 32% (54) - high, 11% (19) - medium and 6% (10) of subjects had low caries risk. In the control group 44% (23) of young people had very high caries risk, 35% (17) - high, 17% (8) - medium and 4% (2) - had low caries risk. The differences between the two groups were not statistically significant ($p < 0.05$). After 3 months the number of subjects of the experimental group with very high caries risk declined from 51% to 8% and from 32% to 16% – among patients with

high caries risk. The percentage of patients with moderate and low caries risk increased from 11% to 42% and from 6% to 33% respectively ($p < 0.05$). At the follow up among subjects of the control group, the percentage of people with very high caries risk declined from 44% to 31% and was not changed in a high-risk group (35%). The percentage of patients with moderate and low caries risk increased from 17% to 25% and from 4% to 10% respectively ($p < 0.05$). The average caries risk at the baseline in experimental and control group was high (75% and 73% respectively). After three months it declined to moderate (49%) among experimental group people and stayed high (66%) in the control group (Figures 2, 3) ($p < 0.05$).

The “Susceptibility” and “Diet” factors (23% and 20% accordingly) ranked first among weighted impacts on the caries risk at the baseline, “Bacteria” factor (19%) ranked second and “Circumstances” factor (12%) ranked third. After 3 months the “Susceptibility” factor (14%) among weighted impacts ranked first, “Bacteria” and “Diet” factors (13% and 12% accordingly) ranked second and “Circumstances” factor (9%) ranked third.

Figure 2. The „Cariograms“ of the people in the experimental group (baseline and after three months)

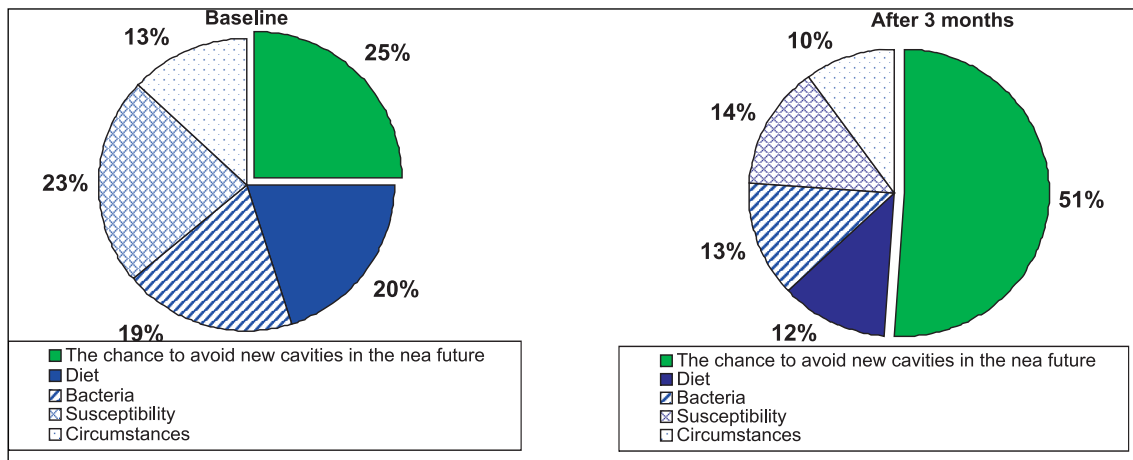
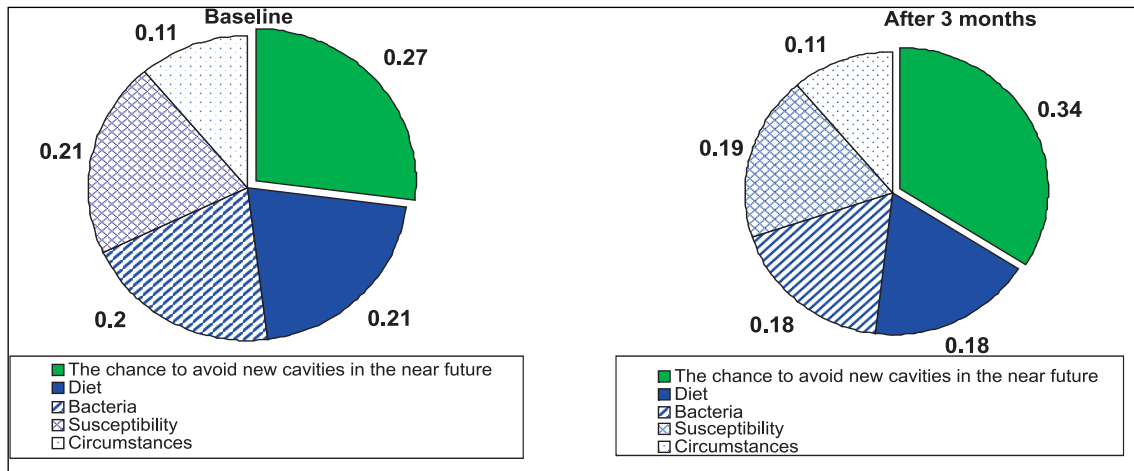


Figure 3. The „Cariograms“ of the people in the control group (baseline and after three months)



Conclusion

1. Caries risk among young people decreased from high (75%) to medium (49%) after dental health instruction and visual presentation of caries risk factors by the Cariogram.

2. The highest weighted impact on the caries risk was caused by the „Susceptibility” factor.

3. An interactive predictive computer program Cariogram has shown good results as a tool for revealing and removing caries risk factors. Further studies are need for more detailed assessment of this method

References

1. John P. Brown. Developing Clinical Teaching Methods for Caries Risk Assessment: Introduction to the Topic and Its History. *J of Dent Education* 1998; **59**(10): 928-931.
2. Hausen H. Caries prediction – state of the art. *Community Dent Oral Epidemiol* 1997; **25**: 87-96.
3. Tinanoff N. Critique of evolving methods for caries risk assessment. *J of Dent Educ* 1995; **59**(10): 980-985.
4. Beck JD. Identification of risk factors. In: Bader JD (ed). Risk assessment in Dentistry. Chapel Hill: Dept. of Dental Ecology. Univ of North Carolina School of Dentistry, 1990; ðp 8-13.
5. Powell LV. Caries prediction: a review of the literature. *Community Dent Oral Epidemiol* 1998; **26**: 361-371.
6. Ratio M, Pienihakkinen K, Scheinin A. Multifactorial modeling for prediction of caries increment in adolescents. *Acta Odontol Scand* 1996; **54**: 118-1121.
7. The University of North Carolina Caries Risk

Assessment study: further developments in caries risk prediction. Disney JA, Graves RC, Stamm JW, Bohannan HM, Abernathy JR, Zack DD. *Community Dent Oral Epidemiol* 1992; **20**: 64-75.

8. Bratthall D, Ramanathan Sjernsward J, Gunnell Hansel Petersson. Assessment of Caries Risk in the Clinic. A Modern Approach. In: Nairn H.F. Wilson, Jean-Francois Roulet, Massimo Fuzzi. *Advances in Operative Dentistry*, 2001; ðp 61-73.
9. Hansel-Petersson G, Carlsson P, Bratthall D. Caries risk assessment: A comparison between the computer program “Cariogram”, dental students and dental instructors. *Eur J Dent Educ* 1998; **2**: 184-190.
10. Hansel Petersson G, Twetman S, Bratthall D. Evaluation of a Computer Program for Caries Risk Assessment in Schoolchildren. *Caries Research* 2002; **36**: 327-340.
11. Ęãóñ Ę.Ă. Ęãĕřđřđřđă Ęãđřăđ Ęđřăřřĕđđřăăřĕđ đăđĕăřăĕ Ęăđĕřăřřđă: Ęăđřă. Đăĕňăřăăăđĕđ đĕđ đđăăđđăđă-đđăăđđĕřăă. ĘĂĘ: Ęđđ. Ę.Ă.Ęăóñ ĕ đđ. - 2-ă đĕă., Ęăđăđăă. Ę đđĕĕăřăř., Ęĕřăĕ., 1992; 56đ . **Este scris in rusa (in word) mai trimite-ti odata.**

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