

The knowledge of dentists for preventive influence of the caries process

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ABSTRACT

The line of knowledge runs from the general social, legal, financial and managerial framework. It is necessary to present the object of professional activity, the peculiarities of professional work and the methods for its optimization. Subjects of the survey were 100 dentists who perform treatment of deciduous teeth from the city of Varna, Bulgaria. The individual addressed anonymous survey was fulfilled during educational, clinical and organization meetings at the Faculty of Dental Medicine-Varna and on the territory of the city of Varna. The interviewed dentists encounter difficulties with the diagnosis of the initial dental caries in primary dentition. The dentists included in the survey rely mainly on their theoretical and practical experience and routine clinical methods for non-invasive treatment of the initial dental caries. Work experience and the specialty do not have a significant impact on the awareness of dentists about the new criteria related to the diagnosis and prevention of dental caries in the primary dentition. The age, work experience and specialty of dentists are factors for their awareness of the new approaches to treatment of children, as doctors up to 30 years of age, with a recognized specialty and work experience up to five years are more informed.

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1. INTRODUCTION

The purpose of our research is to describe the new technical results. The dentists encounter difficulties with the diagnosis and treatment of the initial dental caries in primary dentition. Diagnostics with DIAGNOdent and DIAGNOdent Pen are still poorly represented in the daily practice of dentists in their private practices and dental offices in the city of Varna, Bulgaria. For dentists who work with children, it is necessary to make them control the dental plaque, as a major factor in the pathogenesis of dental caries and selection of children's toothpaste with the correct fluoride concentration.

These tasks are also a priority in our clinical practice. There was also a need to introduce new technological diagnostic methods. Diagnosis with DIAGNOdent and DIAGNOdent Pen has also started. This innovation improves the results in the daily practice of dentists in the city of Varna, Bulgaria. According to Dimova and co-authors, in 2013 during the period 1990-2008 the provision with doctors in Bulgaria steadily increased [1, 2]. The last few decades have also posed new challenges with the development of medical technology and more modern medical services and preventive measures and access to dental services and treatment [3, 4].

According to authors as Ira, et al; the study of oral health is similar to the study of morbidity in other diseases [5, 6]. The methods for gathering information are: Active from screenings, mass and targeted preventive and control examinations; Passive from the data from reporting documentation, statistics and meta-analysis of published data; Complex of statistics, meta-analyzes and mass or targeted preventive examinations [7, 8]. The line of knowledge runs from the general social, legal, financial and managerial framework. It is necessary to present the object of professional activity, the peculiarities of professional work and the methods for its optimization [9, 10].

Worldwide, a number of scientists are conducting similar to our study such as: Finding characteristics from medical students that show interest to work [11]; Assessing the knowledge of nurses towards management protocol of severe acute malnutrition [12]; Analysis of the influence of the quality of medical information on the quality of the diagnostic code, which includes the accuracy, consistency, completeness and timeliness in coding the diagnosis of hospital patients [13]; Analyzes of the effect of health education on personal hygiene with audiovisual methods [14]; The school plays a key role in forming a positive attitude in children towards reproductive health at puberty in Indonesia [15]; Determine the relationship between the knowledge, attitudes, infrastructure and behavior of health personnel to prevent surgical infections and to determine the amount of additional hospital care costs resulting from these infections [16]. Their scientific results are used for new planning in the Health Policies and Systems of different countries.

Nowadays, more than ever, adequate educational approaches and aids are needed to support the work and profession of dentists. The involvement of medical staff, interpersonal and situational influences is factors that influence their role in the community in promotional and preventive care. It is believed that the capacity of the role of medical staff is increased by changing their engagement. These are both the factors of personal influence and the factors of situational influence [17-19]. Some authors believe that human capital as a multidimensional phenomenon is heterogeneous and has a complex internal structure [20-27].

There have been created contemporary methods for preventive and non-invasive and invasive treatment requiring changes of the caries treatment protocol in primary teeth [28-31]. A new generation of the laser fluorescence device, DIAGNOdent, for caries detection and quantification has been introduced recently. It is the DIAGNOdent pen [32]. New devices for early diagnosis could be very helpful and useful for the clinical practice. If those technologies could detect and qualify accurately the development of lesions, they could permit fewer subjects and shorter intervals for conducting studies [33, 34].

2. RESEARCH METHOD

To prove our goal, we set ourselves the task to examine the knowledge of dentists about modern diagnostic methods and tools for non-invasive preventive intervention of the caries process. We were conducting and organizing the survey in 2014-2015. The study is conducted at the Faculty of Dental Medicine of Varna. The study is authorized by the Commission for Ethics of Scientific Research at Medical University of Varna and a previously declared informed consent has been obtained. After processing the results and determining the accents, the actual research was conducted by processing the data with a package for mathematical and statistical processing SPSS v 20.0. in the period March-May 2015.

Methods applied for the realization of the aim and tasks of the research: 1) Documentary method-collecting data on the children included in the study who meet the inclusion criteria, 2) Sociological (survey) method. In our survey, the object of observation is dentists from the city of Varna. The volume of observation is 100 dentists. The units of observation are a dentist treating caries of the primary dentition. The direct individual anonymous questionnaire was filled in during educational, organizational and clinical forums held in the Faculty of Dental Medicine in Varna and on the territory of Varna. The registration was done in a specially developed questionnaire, including 13 questions, each with the possibility of more than 1 answer. The signs of observation are: 1) Gender, age, work experience, specialty, 2) New diagnostic criteria and treatment of caries, 3) Consultations with pediatric dentists, 4) Knowledge and work with DIAGNOdent and DIAGNOdent Pen, 5) Clinical application and prescription of prophylactic and therapeutic agents for prevention and non-invasive treatment of caries. Respondents express their opinion on the new diagnostic criteria and treatment approaches for preventive and non-invasive treatment of caries and the need for: consultations with pediatric dentists, knowledge and work with DIAGNOdent and DIAGNOdent Pen, clinical application and prescription of prophylactic and therapeutic agents for prophylaxis and treatment of caries.

3. RESULTS AND DISCUSSION

Question no 5 *"Are you familiar with the new diagnostic criteria, according to the consensus of the three faculties of dental medicine?"* Compared to Question no 2 *"Age"*, The result we obtained at $p=0.05$ and $K=3$ is that its critical value is 7.82, and the empirical value of $X^2=4.21$, therefore $(4.21 < 7.82) \Rightarrow$ this shows that the age of the respondents is not a factor for their awareness of the new diagnostic criteria as shown in Figures 1 and 2.

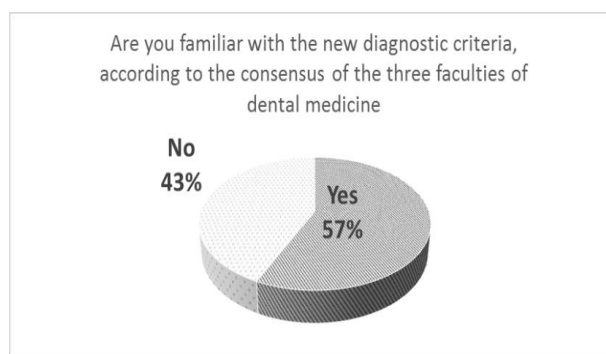


Figure 1. Are you familiar with the new diagnostic criteria, according to the consensus of the three Faculties in Bulgaria?

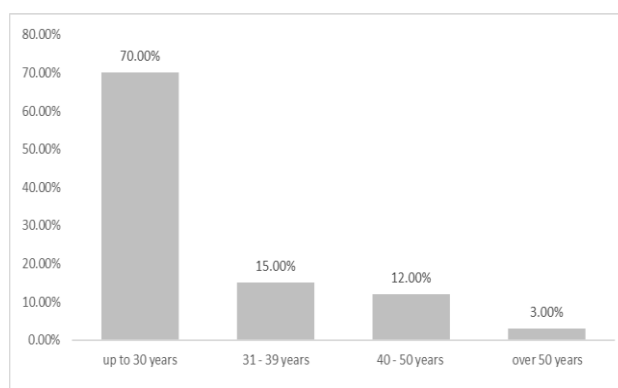


Figure 2. Age of respondents

When considering Question no 5 "Are you familiar with the new diagnostic criteria, according to the consensus of the three faculties of dental medicine?" Versus Question no 3 "Work experience", the results are as follows: $p=0.05$ at $K=3$ the critical value is 7.82 and the empirical value of $X^2=1.3$ therefore ($1.3 < 7.82$). This shows that the work experience of the respondents is not a factor for their awareness of the new diagnostic criteria as shown in Figures 1 and 3.

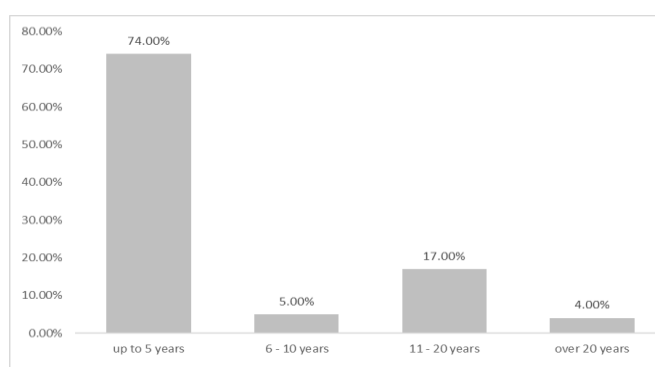


Figure 3. Work experience of the respondents

Question no 5 "Are you familiar with the new diagnostic criteria, according to the consensus of the three faculties of dental medicine?" Compared to Question no 4 "Specialty". At $p=0.05$ at $K=3$ the critical value is 5.35 and the empirical value of $X^2=5.35$ therefore ($5.35 < 7.82$). This shows that the specialty of the respondents is not a factor for their awareness of the new diagnostic criteria as shown Figures 1 and 4.

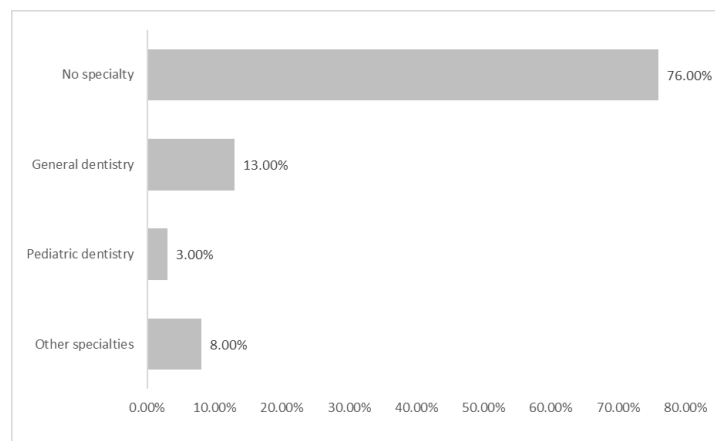


Figure 4. Recognized professional specialty of the respondents

Regarding Question no 6 "Are you familiar with the new approaches to treatment in children/preventive and non-invasive treatment?" with respect to Question no 2 "Age", the result we obtained at $p=0.05$ and $K=3$ is that its critical value is 7.82 and the empirical value of $X^2=8.98$, therefore $(8.98>7.82)$. This shows that the age of dentists is a factor in their awareness of new approaches to treatment in children, with dentists up to the age of 30 being more informed as shown in Figures 2 and 5.

When considering Question no 6 "Are you familiar with the new approaches to treatment in children/preventive and non-invasive treatment?" Compared to Question no 3 "Work experience", the results are as follows: $p=0.05$ at $K=3$ the critical value is 7.82 and the empirical value of $X^2=0.89$ therefore $(0.89<7.82)$. This shows that the work experience of the respondents is not a factor for their awareness of the new approaches to treatment in children, as the dentists with work experience are more informed up to 5 years as shown in Figures 3 and 5.

Question no 6 "Are you familiar with the new approaches to treatment in children/preventive and non-invasive treatment?" compared to Question no 4 "Specialty" at $p=0.05$ at $K=3$ the critical value is 5.35 and the empirical value of $X^2=2.08$ therefore $(2.08<7.82)$. This shows that the specialty of the respondents is not a factor for their awareness of the new approaches to treatment in children, but doctors with a recognized pediatric specialty are more informed and dentists without a specialty are less informed as shown in Figures 4 and 5.

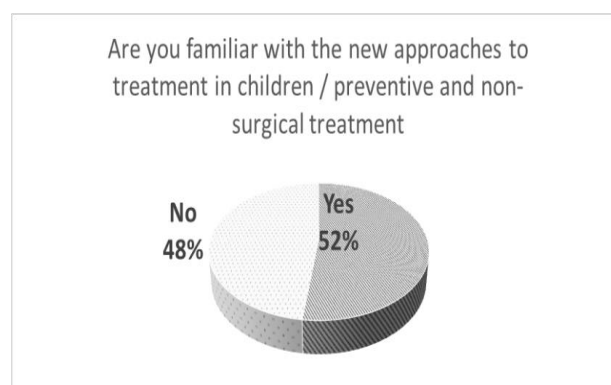


Figure 5. Are you familiar with the new approaches to treatment in children/preventive and non-invasive treatment

The analysis of the results obtained under Question no 7, "Would you refer these patients to a Pediatric Dentist-a specialist?" show that 82% of the surveyed dentists very often have difficulties with the diagnosis and treatment of children from 3 to 6 years and refer their patients to a specialist in pediatric dentistry; also of interest are the results that in Questions no 8 and no 9, "Do you know DIAGNOdent and DIAGNOdent Pen and do you work with DIAGNOdent?" 61% of doctors are well

acquainted with the tool for early diagnosis of early caries, but only 21% of them work, applying it in their clinical dental practice. Therefore, clinical experience and routine diagnosis as well as the treatment protocol for caries of primary teeth predominate daily applied in the practice of dentists covered in the study. DIAGNOdent is a laser with a wavelength of 665 nm, penetrates the tooth to a depth of 2 mm and has high sensitivity and low specificity [35]. Dental Caries can often start from the walls of the fissure or directly into the dentin without demineralization of the enamel. DIAGNOdent is a reliable tool for diagnosing exactly this type of carious lesions with an accuracy of over 90%.

Question 10 (*"Do you prescribe fluoride toothpaste to your patients and in what fluoride concentration?"*) Found that 84% of dentists prescribe fluoride toothpaste to their patients aged 3 to 6 years. Of these, 44% determined that the exact and correct concentration of fluoride in the paste for children was 500 ppm, 22% determined a very low concentration below 250 ppm and 18% prescribed from 250 ppm to 500 ppm. For dentists, the control of dental plaque is dominant as a major factor in the pathogenesis of dental caries and the selection of baby toothpaste for excellent oral hygiene with the right fluoride concentration and amount.

As shown in Figures 6 and Figure 7, 49% of dentists apply professional applications to patients in their practice with 3M™ Vanish™ 5% Sodium Fluoride White Varnish with Tri-Calcium Phosphate [36], and 51% of them apply them during a period of 6 to 12 months of the year. Of them (27%) apply professional applications with varnish in 3 to 6 months and only 22% of them for a period of 1 to 3 months. These results indicate the use of fluoride varnishes by dentists in more cases for prevention than for non-invasive treatment of initial carious lesions of primary teeth at the age of 3 to 6 years.

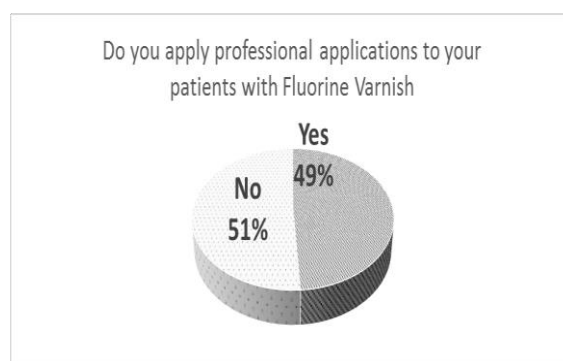


Figure 6. Do you apply professional applications to your patients with 3M™ Vanish™ 5% Sodium Fluoride White Varnish with Tri-Calcium Phosphate

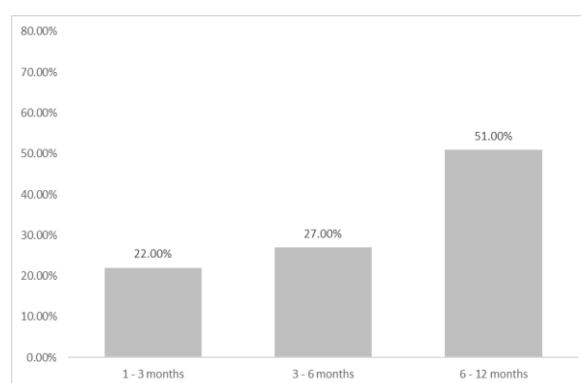


Figure 7. Intensity of professional applications to 3M™ Vanish™ 5% Sodium Fluoride White Varnish with Tri-Calcium Phosphate

In processing the following data, Student's criterion was used to compare the mean values of two independent samples. Regarding Question no 12 *"Do you prescribe GC Tooth Mousse [37] to your patients?"* Compared to Question no 2 *"Age"*, the result we obtained was that $5 > 1.96 \Rightarrow$ this shows that age affects

the prescription of Tooth Mousse dentists on the respondents. Younger dentists prescribe more GC Tooth Mousse to their patients than others. Comparing the same question no 12 “Do you prescribe GC Tooth Mousse to your patients?” Versus Question no 3 “Work experience”, it is clear that $1.21 < 1.96 \Rightarrow$ this shows that work experience does not affect the prescription on dentists of the GC Tooth Mousse onto the respondents as shown in Figures 8 and 9. Of the dentists, 66% prescribe GC Tooth Mousse to their patients, 59% of them for use every night, 32% for use 2 evenings a week and 9% prescribe its use only once a week.

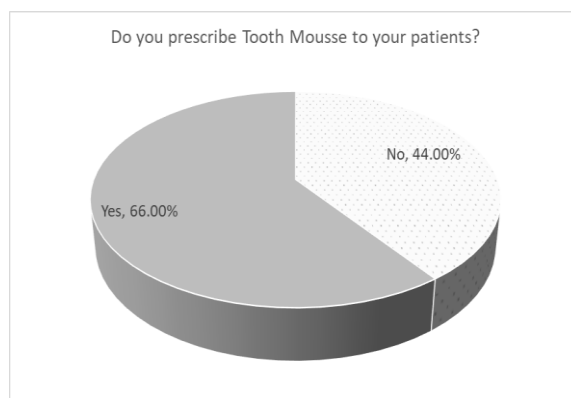


Figure 8. Do you prescribe GC Tooth Mousse?

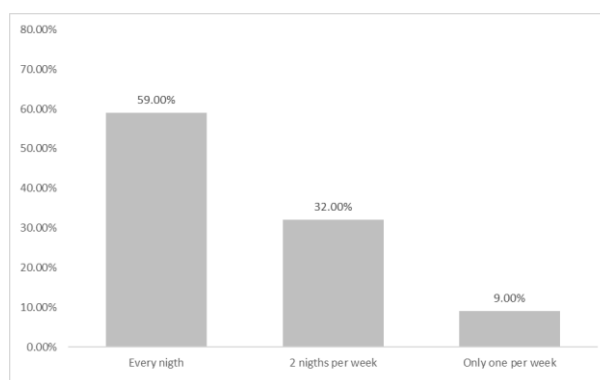


Figure 9. Intensity of professional applications to GC Tooth Mousse

The summary of the results of the survey on the task shows: 49% state that they apply professional applications to their patients with fluoride varnish. 66% prescribe GC Tooth Mousse to their patients and only 8% of dentists prescribe other remineralizing agents, one of them specified the name of the preparation- MI Paste® & MI Paste Plus® [38-43].

4. CONCLUSION

Based on the data from the survey among dentists from the city of Varna, Bulgaria, the following conclusions could be made: 1) For the dentists participating in the study, the control of dental plaque as a major factor in the pathogenesis of dental caries and the selection of children's toothpaste with the correct fluoride concentration is a priority in clinical practice. Diagnostics with DIAGNOdent and DIAGNOdent Pen are still represented in the daily practice of dentists in the city of Varna. The dentists included in the survey rely mainly on their theoretical and practical experience and routine clinical methods for non-invasive treatment of the initial dental caries. 2) Work experience and the specialty do not have a significant impact on the awareness of dentists about the new criteria related to the diagnosis and prevention of dental caries in the primary dentition. 3) The age, work experience and specialty of dentists are factors for their awareness of the new approaches to treatment of children, as doctors up to 30 years of age, with a recognized specialty and work experience up to five years are more informed. A statistically significant difference and objective statistical reliability of the conducted study were proved.

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