

# Analysis of the Pattern, Type and the Extent of Dental Services Provided to Children and Youth on the Territory of Republic of Serbia

## SUMMARY

**Background/Aim:** The requirements for dental specialties and the number of specialists in each country are unique and strong indicator of the availability and affordability of primary health care for children and adolescents. The aim of this study was to determine the pattern, type and the extent of dental services, as well as the influence of regional factors and data on whether services are provided by a pediatric dentist or general dentist have effect on these parameters, based on information obtained from dentists providing dental care to children and youth. **Material and Methods:** Within the project “Program for the improvement of oral health of children and youth in the Republic of Serbia”, supported by the Ministry of Health of Serbia, a research was conducted among dentists involved in dental care for children and youth in Serbia. Data collection from primary health care facilities was performed through a specially designed questionnaire. A total of 445 questionnaires were collected from dentists from 102 health centers in Serbia in the period June - October 2019. **Results:** There are significant differences between regions in the pattern, type and the extent of dental services. In the quantitative analysis, there are no significant differences in the type of dental services between pediatric and preventive dentistry specialists and general dentists. **Conclusions:** The data from the conducted research speak in favor of a large daily workload of dentists who deliver oral health care for children and youth in Serbia. Additional multifactorial analysis, which includes epidemiological data from the region, but also environmental, demographic and cultural parameters of oral health could be the basis for improving the provision of preventive dental and preventive oral care.

**Keywords:** Caries, Epidemiology, Public Health Dentistry, Community Dentistry

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## Introduction

Different types of dental specialties have been recognized in different countries<sup>1-3</sup>. According to the EU Directive on the recognition of professional qualifications, orthodontics and oral surgery are uniformly recognized by all European Union countries. Periodontology, endodontics, pediatric dentistry, public health, oral medicine, radiology and other specialties are much less often recognized in European countries. Therefore, the requirements for dental specialties and the number of specialists in each country are unique<sup>4-8</sup>.

Pediatric dentistry in Serbia is practiced by pediatric dentists and general dentists, both in the public and private sectors. Clear boundaries between “specialist” and “general” pediatric dentistry are not clearly defined, but we can start from the assumption that in our environment there is a relatively low trend of referring children to therapists who deal exclusively with children, and which in the most developed systems does not exceed 30%<sup>2</sup>. Pediatric dentists are specialized in knowledge and skills in maintaining oral health and dental care for children, including those who are anxious or who have special medical or dental needs. They are able to provide

referral and care for children that general dentists are unable to treat and they are also able to contribute to the development of services within their region<sup>9-11</sup>.

According to the data from the database from the Institute of Public Health of Serbia "Dr Milan Jovanović Batut", in the field of pediatric and preventive dentistry, health care was provided by 349 specialists in pediatric and preventive dentistry<sup>10</sup>. Staff in dental health care for children was analyzed on the basis of the population estimate by five years in mid-2006, by local self-government units of the Republic Bureau of Statistics. According to this source, there was a total of 1,522,691 children under the age of 18 in the Republic of Serbia<sup>12</sup>.

According to these data, one dentist provides dental health care for 1790 children. The average coverage of children and youth up to the age of 18 in the field of pediatric and preventive dentistry is less favorable than the prescribed standard (1500), which is especially pronounced in less developed administrative districts<sup>13</sup>.

The National Program of Preventive Dental Health Care is based on the modern concept of organization of preventive dental care based on similar programs of Scandinavian countries, using the experience of the Program of Preventive Dental Health Care of the Republic of Serbia (1996-2000) and the recommendations of the World Health Organization. Health for all until 2025<sup>14,15</sup>.

New findings in the field of oral health in Serbia, unfortunately, do not yield encouraging results. A recent study used data from the National Health Survey of Serbia from 2013, which included a total of 14,623 people over the age of 15, and this research provided evidence that there are significant socio-demographic inequalities in self-assessed oral health. Although Serbia applies the concept of universal health coverage for pediatric dental care and a similar distribution of doctors and dentists per 1,000 inhabitants, the results of previous studies have shown a high prevalence and wide differences in the prevalence of early childhood caries in the country<sup>16,17</sup>. Markovic and his associates reported an even more alarming fact that despite two national oral health promotion programs (1996-2000, 2009-2015) that emerged as a reaction to concerns about the oral health of Serbian children, deterioration in children's oral health has been observed over the past 10 years. The results of the 2009 oral health survey conducted using the same methodology<sup>17,18-21</sup>.

In most studies, the data were analyzed on the basis of dental examinations of patients within cross-sectional studies or on representative samples. A significant part of the study is based on the analysis of the assessment and self-assessment of the oral health of patients or parents<sup>3,22</sup>. Dentists themselves, direct providers of services to children and youth, have very rarely been the subject of research. Contemporary methods for implementation models for public health systems strongly suggest involvement of the actors in implementation to provide a simplified framework that highlights multiple factors

that influence the uptake of evidence into public health systems policy and practice<sup>23</sup>.

The aim of this study was to determine the pattern, type and extent of dental services, as well as the influence of regional factors and data on whether services provided by a pediatric dentist or general dentist have impact on these parameters, based on information obtained from dentists providing dental care to children and youth.

## Material and Methods

Within the project "Program for the improvement of oral health of children and youth in the Republic of Serbia", supported by the Ministry of Health of Serbia, a research was conducted among dentists involved in dental care for children and youth in Serbia. Data collection from primary health care facilities was performed through a specially designed questionnaire. The research was preceded by a feasibility study and testing of questionnaires, after which the questionnaire was distributed to the management of all health centers in the network plan in the Republic of Serbia, which forwarded the questionnaire to dentists in their institutions. Data were collected in the period June - October 2019. A total of 445 questionnaires were collected from dentists from 102 health centers in Serbia.

The survey involved the use of an anonymous, culturally and professionally harmonized and pilot-tested verified questionnaire. The questionnaire is divided into 5 parts:

1. The first part contains general information about the dentist (place of life / work, specialty, length of work in the children's ward, length of specialist internship), without data related to his personal identification.

2. The second part refers to the scope and characteristics of obligations during the working week (number of patients, type of services, ratio of therapeutic and preventive services).

3. The third part of the questionnaire refers to the ways of assessing the risk of developing oral diseases in the framework of preventive work, and the means they use to motivate and train users towards attitudes about the factors that affect the quality of work.

4. The fourth part assesses the scope and quality of cooperation of the pediatric dentist within the health institution, with parents, the local community and other relevant institutions and organizations in order to promote oral health and health education.

5. The fifth part refers to the availability of professional literature and protocols for work, compliance of work with defined recommendations, barriers to their implementation and the need for continuous professional development.

The focus group for the verification of the questionnaire consisted of 33 dentists who tested the questionnaire in terms of comprehensibility, cultural adaptation and professional acceptability. After the proposed corrections and discussion, the questionnaire was confirmed and distributed to dentists employed in public health in the departments of pediatric dentistry. The proposals and amendments were harmonized by the focus groups through discussion.

In the conducted work, the variables from the first and second part of the questionnaire were analyzed: 1) Statistical region: According to the Law on Regional Development and the Law on Official Statistics, the Republic of Serbia is divided into 4 statistical territorial units: (1) Sumadija (central) and Western Serbia, (2) Southern and Eastern Serbia, (3) Northern region called Vojvodina and (4) the city of Belgrade (capital)<sup>12</sup>; 2) Number of registered patients; 3) Average number of patients during the working week; 4) Number of emergencies; 5) Number of patients referred to colleagues of other specialties for examination or therapy; 6) Number of patients referred to an orthodontist; 7) Number of patients to whom the examined dentist provides therapeutic services; 8) Number of indicated first aid per week; 9) Average number of restored carious teeth; 10) Average number of caries complications; 11) Number of tooth extractions as a consequence of caries complications; 12) Number of tooth extractions due to physiological exfoliation or according to the orthodontist's instructions; 13) Total number of curative procedures,

R; 14) Average number of other therapeutic services; 15) Number of patients to whom the examined dentist provides preventive services; 16) Number of systematic examinations; 17) Number of preventive examinations; 18) Total number of preventive procedures per week, P; 19) Number of local applications of fluoride; 20) Number of sealed fissures; 21) Number of other preventive services; 22) Percentage dedicated to preventive work; 23) Information on whether the examined dentist is a specialist in pediatric and preventive dentistry; 24) Length of service; 25) P / R ratio; average number of curative procedures, (R), average number of preventive procedures, (P), percentage of working time dedicated to preventive work, ratio of preventive and curative procedures (P / ratio), as well as 26) P / (P + R) the share of preventive procedures in the sum of curative and preventive procedures (P / (P + R)).

### Results

Figure 1 shows a descriptive statistical analysis of the entire examined sample, which consisted of 339 questionnaires. Figure 2 shows a descriptive analysis for the examined parameters in relation to the previously defined statistical regions. Since the values of the Shapiro-Wilk test were almost uniformly lower than 0.01, non-parametric analysis methods were applied for several groups, Kruskal-Wallis, with a significance set to  $p < 0.05$ .

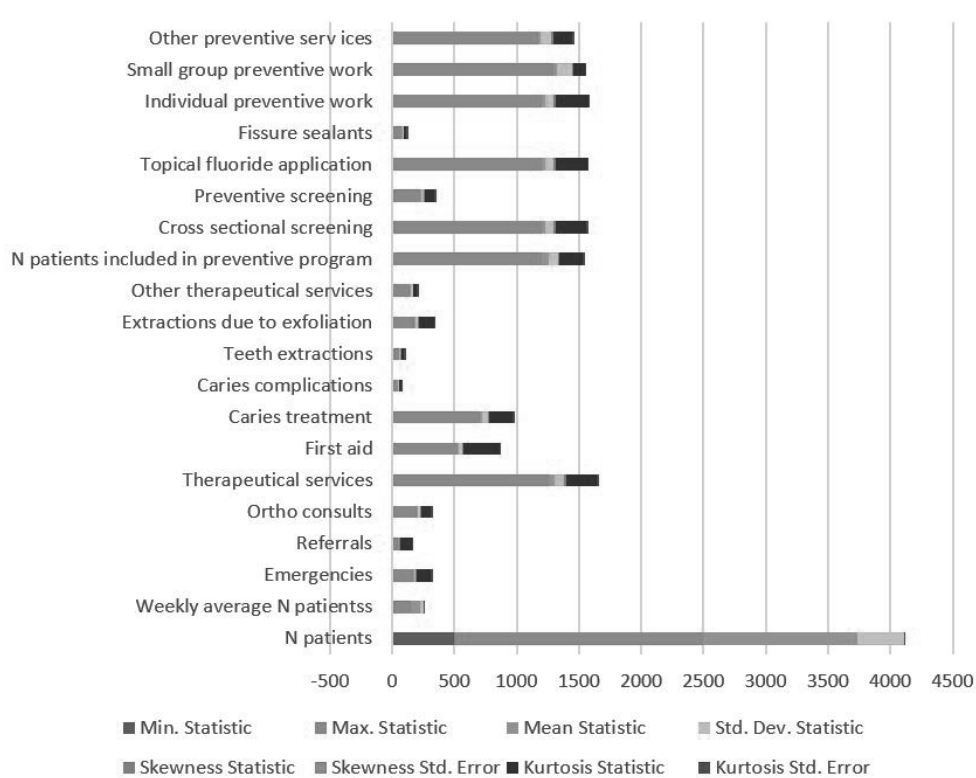


Figure 1. Descriptive statistical analysis of the entire examined sample

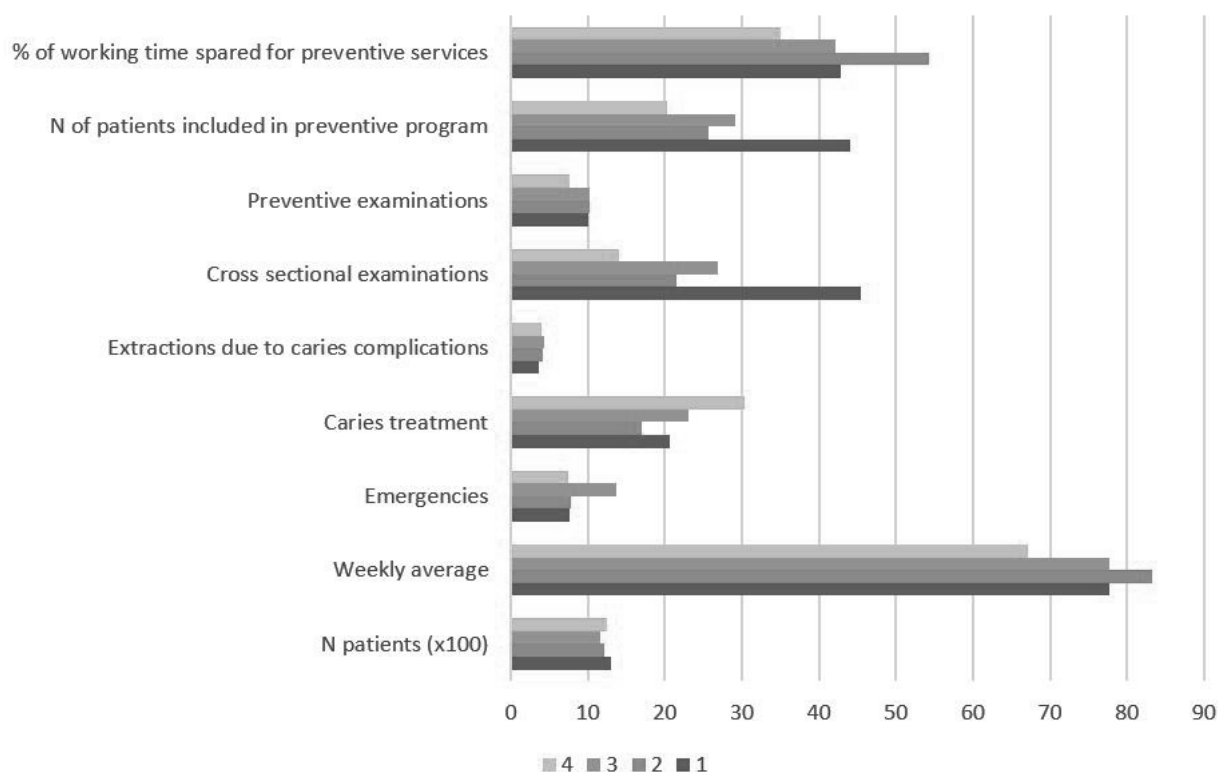


Figure 2. Descriptive statistical analysis in relation to statistical regions of Republic of Serbia

Statistically significant differences between previously defined regions were found in the following examined variables: average number of patients per week, number of teeth treated, number of caries complications, number of cross sectional examinations, number of preventive examinations and percentage of working time dedicated to preventive work (Table 1). Post hoc analysis was applied using the DSCF pairwise comparison test (Table 2), which shows that the average number of patients is statistically significantly lower in Vojvodina compared to Belgrade and Sumadija and Western Serbia. When it comes to the average number of rehabilitated teeth, statistically significantly lower values are recorded in Sumadija and Western Serbia compared to the other 3 regions. In contrast, the average number of treatments for caries complications was the highest in Central Serbia. Then, the average number of systematic examinations during the week was the lowest in Vojvodina, statistically significantly lower compared to the other three regions. In the same way, the number of preventive examinations is statistically significantly lower

in Vojvodina compared to other regions. When it comes to the percentage of time dedicated to preventive work, the highest values were recorded in Belgrade, and the lowest in Vojvodina. Statistically significant differences were found between all pairs except for Belgrade and Central Serbia.

Table 1. Statistical differences between previously defined regions of Republic of Serbia (Kruskal- Wallis test)

|   | $\chi^2$ | df | p            |
|---|----------|----|--------------|
| N patients                                    | 4.75     | 3  | 0.191        |
| N weekly average visits                       | 23.95    | 3  | <.001        |
| Emergency visits                              | 5.38     | 3  | 0.146        |
| Caries treatment                              | 14.09    | 3  | <b>0.003</b> |
| Caries complications treatment                | 12.74    | 3  | <b>0.005</b> |
| Teeth extractions due to caries complications | 1.36     | 3  | 0.715        |
| Cross sectional examination                   | 33.76    | 3  | <.001        |
| Preventive examinations                       | 11.81    | 3  | <b>0.008</b> |
| Percentage of preventive work                 | 40.91    | 3  | <.001        |

Table 2. DSCF pairwise comparison test.

|     | N of patients |              | Caries  |              | Complications |              | Cross sectional |              | Preventive |              | % Preventive work |              |
|-----|---------------|--------------|---------|--------------|---------------|--------------|-----------------|--------------|------------|--------------|-------------------|--------------|
|     | W             | p            | W       | p            | W             | p            | W               | p            | W          | p            | W                 | P            |
| 1 2 | 2.268         | 0.109        | -4.2980 | <b>0.002</b> | 0.605         | 0.669        | -3.555          | <b>0.012</b> | -0.515     | 0.716        | 4.891             | <.001        |
| 1 3 | -0.172        | 0.903        | 0.1535  | 0.913        | 3.464         | <b>0.014</b> | -0.897          | 0.526        | 0.871      | 0.538        | 0.128             | 0.928        |
| 1 4 | -4.680        | <.001        | 0.4253  | 0.764        | -0.898        | 0.526        | -7.009          | <.001        | -3.206     | <b>0.023</b> | -4.561            | <b>0.001</b> |
| 2 3 | -2.077        | 0.142        | 3.8064  | <b>0.007</b> | 3.286         | <b>0.020</b> | 2.723           | 0.054        | 1.518      | 0.283        | -4.753            | <.001        |
| 2 4 | -5.986        | <.001        | 4.6145  | <b>0.001</b> | -1.747        | 0.217        | -4.192          | <b>0.003</b> | -2.779     | <b>0.049</b> | -8.444            | <.001        |
| 3 4 | -4.581        | <b>0.001</b> | -0.0413 | 0.977        | -4.961        | <.001        | -6.499          | <.001        | -4.747     | <.001        | -3.733            | <b>0.008</b> |

All these parameters were analyzed in relation to whether the examined dentist is a specialist in pediatric and preventive dentistry or a general dentist. The Mann-Whitney test was used and the value of statistical significance was set to 0.05. Statistically significant differences were found in the following 3 variables: average number of patients during the week, number of fissures sealed and number of patients referred to orthodontist as follows: general dentists have a statistically significantly higher average number of patients, more fissures sealed and more patients referred to orthodontist in relation to pediatric and preventive dentistry specialists (Table 3).

Table 3. The Mann-Whitney test analysis of parameters in relation to whether the examined dentist is a specialist in pediatric and preventive dentistry or a general dentist.

|  | <b>P</b>     |
|--|--------------|
| N patients   | 0.43         |
| N average weekly visits                                | <b>0.006</b> |
| Dental emergencies                                     | 0.853        |
| Referrals  | 0.175        |
| Orthodontic consult                                    | <b>0.011</b> |
| Therapeutical services                                 | 0.481        |
| First aid  | 0.112        |
| Caries treatment                                       | 0.604        |
| Caries complications treatment                         | 0.135        |
| Teeth extractions due to caries complications          | 0.068        |
| Teeth extractions due to exfoliation or ortho referral | 0.077        |
| Other therapeutical services                           | 0.701        |
| Preventive services                                    | 0.545        |
| Cross sectional examinations                           | 0.845        |
| Preventive examinations                                | 0.082        |
| Topical fluoride applications                          | 0.635        |
| Fissure sealants                                       | <b>0.005</b> |
| Children included in oral health promotion activities  | 0.645        |
| Children included in the group activities              | 0.316        |
| Other preventive services                              | 0.943        |

Figures 3, 4 and 5 show a descriptive analysis of the following parameters: average number of curative procedures, (R), average number of preventive

procedures, (P), percentage of working time dedicated to preventive work, ratio of preventive and curative procedures (P/R ratio), as well as the share of preventive procedures in the sum of curative and preventive procedures (P / (P + R)). All these parameters were analyzed in relation to whether the services are provided by a specialist doctor (Figure 4) and in relation to the statistical region (Figure 5).

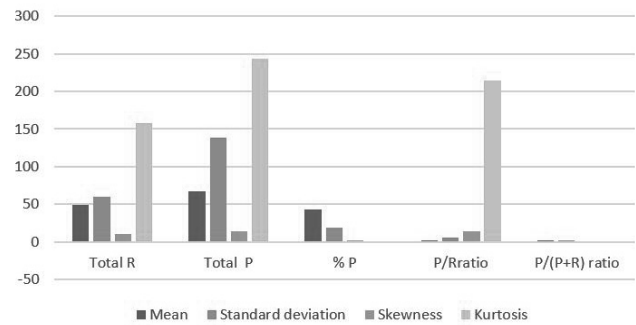


Figure 3. Total of preventive and restorative procedures

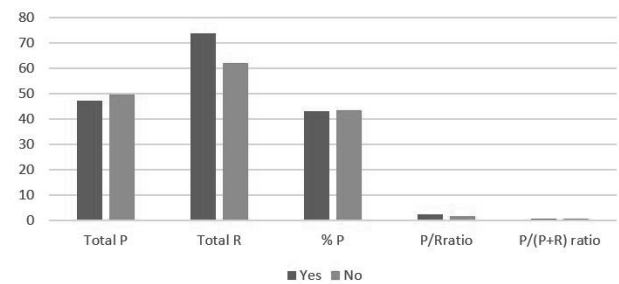


Figure 4. Preventive and restorative procedures in relation to specialty degree

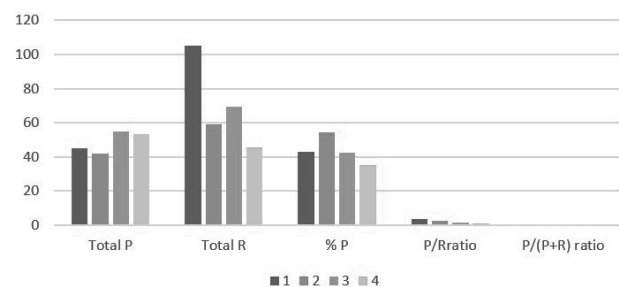


Figure 5. Preventive and restorative services in relation to statistical region of Republic of Serbia

Table 4. Correlation analysis

|                           |                | N patients average weekly | Total R | Total P         | % P             | P/(P+R) ratio   |
|---------------------------|----------------|---------------------------|---------|-----------------|-----------------|-----------------|
| N patients                | Spearman's rho | 0.25                      | -0.002  | 0.067           | 0.145           | 0.079           |
|                           | p-value        | <b>&lt;.001</b>           | 0.975   | 0.218           | <b>0.010</b>    | 0.148           |
| N patients average weekly | Spearman's rho | —                         | 0.066   | 0.271           | 0.211           | 0.190           |
|                           | p-value        | —                         | 0.244   | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> |
| Total R                   | Spearman's rho | —                         | —       | 0.141           | -0.358          | -0.502          |
|                           | p-value        | —                         | —       | <b>0.010</b>    | <b>&lt;.001</b> | <b>&lt;.001</b> |
| Total P                   | Spearman's rho | —                         | —       | —               | 0.227           | 0.745           |
|                           | p-value        | —                         | —       | —               | <b>&lt;.001</b> | <b>&lt;.001</b> |
| % P                       | Spearman's rho | —                         | —       | —               | —               | 0.419           |
|                           | p-value        | —                         | —       | —               | —               | <b>&lt;.001</b> |

Statistically significant differences between previously defined regions were found in the following examined variables: average number of preventive services, ratio of preventive and curative procedures, share of preventive procedures in the total number of services (Table 5). Post hoc analysis using the DSCF pairwise comparison test was applied (Table 6). When it comes to the average number of curative procedures, a statistically significant difference was found between Sumadija and Western Serbia and Central Serbia. When it comes to the average number of preventive services, the highest values were recorded on the territory of Belgrade, then Central Serbia, then Sumadija and Western Serbia, and finally on the territory of Vojvodina. All these differences were statistically significant except for the differences in the number of preventive services between Sumadija and Western Serbia and Central Serbia. When it comes to the ratio of preventive and therapeutic

procedures (P / R ratio), as well as the share of preventive procedures in the total number of provided services (P / (P + R)) lower values were recorded in Vojvodina compared to the other 3 regions. The Mann-Whitney test showed that there was no statistically significant difference in the examined parameters between pediatric and preventive dentistry specialists and general dentists (Table 7).

Table 5. Kruskal-Wallis analysis

|   | $\chi^2$ | df | p               |
|---|----------|----|-----------------|
| Total R   | 9.40     | 3  | <b>0.024</b>    |
| Total P   | 40.62    | 3  | <b>&lt;.001</b> |
| P/R ratio   | 30.36    | 3  | <b>&lt;.001</b> |
| P/(P+R) ratio   | 30.36    | 3  | <b>&lt;.001</b> |
| Proportion of preventive services during working time | 40.91    | 3  | <b>&lt;.001</b> |

Table 6. DSCF pairwise comparison test

|   |   | Total R |              | Total P |                 | P/R    |                 | P/(P+R) |                 |
|---|---|---------|--------------|---------|-----------------|--------|-----------------|---------|-----------------|
|   |   | W       | p            | W       | p               | W      | P               | W       | P               |
| 1 | 2 | -1.541  | 0.276        | -3.292  | <b>0.020</b>    | -1.923 | 0.174           | -1.923  | 0.174           |
| 1 | 3 | 2.719   | 0.055        | -0.617  | 0.663           | -2.603 | 0.066           | -2.603  | 0.066           |
| 1 | 4 | 0.461   | 0.744        | -7.367  | <b>&lt;.001</b> | -6.797 | <b>&lt;.001</b> | -6.797  | <b>&lt;.001</b> |
| 2 | 3 | 4.111   | <b>0.004</b> | 2.836   | <b>0.045</b>    | -0.338 | 0.811           | -0.338  | 0.811           |
| 2 | 4 | 2.295   | 0.105        | -5.263  | <b>&lt;.001</b> | -5.563 | <b>&lt;.001</b> | -5.563  | <b>&lt;.001</b> |
| 3 | 4 | -2.551  | 0.071        | -7.268  | <b>&lt;.001</b> | -5.184 | <b>&lt;.001</b> | -5.184  | <b>&lt;.001</b> |

Table 7. The Mann-Whitney analysis of difference in the examined parameters between specialists and general dentists

|   | p     |
|---|-------|
| Total R   | 0.515 |
| Total P   | 0.832 |
| Proportion of preventive services during working time | 0.844 |
| P/R ratio   | 0.642 |
| P/(P+R) ratio   | 0.642 |

## Discussion

The number of dentists and doctors in the region is a strong indicator of the availability and affordability of primary health care for children and adolescents<sup>24-26</sup>. It was confirmed that factors of importance for oral health are not equally represented in all regions or districts of a country<sup>1, 27-29</sup>, and in the last research, conducted in 2013, the Geographic Information System was used<sup>30</sup>. The use of GIS enables a better perspective of the geographical distribution of etiological factors that contribute to poor oral health and the occurrence of an increased risk of developing oral diseases. Two large-scale surveys, both in 2000 and 2006, pointed to regional specifics in terms of differences in the prevalence of oral diseases, risk factors, but also habits and attitudes

related to the use of dental health care<sup>18-20</sup>. The third national population health survey, conducted in 2013, provided additional harmonization of research instruments (methodology, questionnaires, guidelines) with the instruments of the European Health Survey Second Wave (EHIS wave 2) in order to even more comparable research results with results in European Union countries, and according to defined, internationally adopted indicators (ECHI, OMC, WHO, UNGASS, MDG). The described regional differences are not linearly distributed and cannot be quantified in terms of universally better or worse oral health in one region compared to another, more or less prevalence of etiological factors, more accessible care or greater barriers to dental care, but specifics must be analyzed in relation to a wide range of environmental, social, cultural and demographic parameters of a particular region that affect the prevalence of the disease, habits related to the preservation of oral health and the way of using dental services<sup>30</sup>. It was already pointed out in 2006 that social factors significantly influence regular visits to the dentist, so it was stated that only 34.8% of the population of Serbia has their own dentist, and that this number is the lowest among the poorest (14.3%), and the largest among the richest (60.4%), and it was also noticed that the population of Belgrade visits dentists most regularly<sup>11,21</sup>. This study also confirmed certain regional specifics on the examined sample, which

are partly in agreement with the findings of three large epidemiological studies. Vojvodina has the lowest values in terms of the lowest number of systematic examinations and the lowest percentage dedicated to preventive work in relation to other regions, which can be considered an unfavorable finding, however, at the same time, in the region of Šumadija and Western Serbia the lowest number of rehabilitated teeth is observed, and in Central Serbia the largest number of interventions for caries complications. Finally, the average number of teeth extracted as a result of caries does not differ between regions. This supports the fact that both favorable and unfavorable outcomes occur in all regions without linear dependence, once again suggesting that additional analysis of the specifics of risk factors and the organization of dental care is needed in order to improve dental health care for children and youth. When analyzing the total share of preventive procedures in the entire working week, the fact that it is the lowest in Vojvodina compared to the other 3 regions is emphasized again. This data is completely in accordance with previous epidemiological research, where at the same time the worst and most favorable outcomes when it comes to oral health are in this region<sup>18-20,27,28</sup>. Thus, it was previously shown that, for example, residents of Vojvodina have 1.36 times, Šumadija and western Serbia 1.40 times and residents of Southern and Eastern Serbia have a 1.42 times higher chance of assessing their oral health as average than residents of Belgrade. Then, similar contradictions in relation to the regions were found when it comes to visits to the dentist, where the inhabitants of Vojvodina show a lower level of control visits, together with Šumadija and Eastern Serbia and Southern Serbia, but also the representation of people with intact teeth, which is highest in Vojvodina<sup>30</sup>.

Dental health care for children and youth in Serbia is provided by specialists and general dentists who work with children. Pediatric and preventive dentistry specialists, according to the specialization curriculum, are well versed in assessing the child's risk of caries and providing appropriate levels of preventive dental and therapeutic procedures in accordance with the guidelines of reference institutions such as the European Association of Pediatric Dentists (EAPD) and the American Academy of Pediatric Dentistry (AAPD). This explains why pediatric dentistry would be expected to provide more preventive care, especially for children at high risk of caries. At the same time, general dentists who treat children in Serbia adhere to clinical standards, go through continuous education and, unlike other general dentists in the private and state sector, work exclusively with children. There are few published studies in the literature that have investigated the potential differences in the use of preventive and curative dental care for children cared for by specialists and those treated by general dentists<sup>3,24,25,31</sup>. The available research was based on the hypothesis that a higher share of preventive services will

be provided by specialists compared to general dentists and all confirmed this view, stating that the rate of providing preventive services, in terms of applying highly concentrated fluoride solutions and sealing fissures by about 50% higher among specialists compared to general dentists. The results obtained in the conducted research are in contradiction with the data in the literature. The analysis shows that in most of the examined parameters there is no difference in the pattern, type and the extent of dental services between specialists and general dentists, moreover, a larger number of prophylactic procedures during the working week is reported by general dentists, together with a higher rate of referral for orthodontic consultation during the week. Explanations for these deviations from the literature can be found in the organization of dental health care in Serbia, where general dentists have the same working conditions as specialists, well-trained staff and the opportunity to receive additional education in the field of pediatric and preventive dentistry<sup>10-12</sup>.

In the conducted research, the weekly and daily workload of dentists was analyzed through several variables: the number of patients examined by dentists selected doctors, the average number of patients during the working week and the number of emergencies during the working week. Although the values obtained are within acceptable norms when it comes to the number of patients for whom the dentist is the chosen doctor, about 1200 children, the daily workload of about 15 patients and the weekly emergency number of about 8 speak in favor of a much higher workload and barrier to providing appropriate dental care in terms of lack of time, especially in more demanding clinical procedures and non-cooperative patients who need longer treatment. There is no general consensus in the literature on the appropriate or desirable duration of dental treatment in children, nor is there a study that explicitly investigates the most appropriate length of dental treatment for children<sup>32,33</sup>. The duration of treatment is a central situational factor that can cause deterioration in children's behavior during or after dental treatment, however, the duration of treatment is largely overlooked in the pediatric dental literature given that few studies have investigated the effect of treatment duration on children's behavior. In the literature, there is a division of treatment into short, if it is <30 minutes, and long if it is > 45 minutes<sup>33</sup>. The obtained data suggest that due to the large daily load, patients cannot be provided with adequate, primarily preventive and prophylactic dental care. Also, this additionally endangers patients with a pronounced fear of dentists, and people with disabilities, who require multiple and long-term treatments.

This study has several limitations. First, our analysis is based on data obtained from a questionnaire, which limits our ability to determine the cause-and-effect relationship between service providers and the need

for dental services. Another limitation is the possible bias of the respondents. This study analyzes, not official reports submitted to reference institutions, but opinions, knowledge and attitudes of dentists registered in the register of the Ministry of Health of the Republic of Serbia who provide dental care to children and youth. The conducted research analyzed the questionnaires of only about 30% of the total number of dentists, which in relation to the examined variables can differ significantly from most dentists whose questionnaires were not filled in and analyzed. A third limitation is that analysis of the type, type, extent, and rate of use of dental care does not provide adequate information on current or future dental care needs.

## Conclusions

The data from the conducted research speak in favor of a large daily workload of dentists who care for children and youth in Serbia. There are significant differences between regions in the pattern, type and the extent of dental services. In the quantitative analysis, there are no major differences in the scope, type and type of dental services between pediatric and preventive dentistry specialists and general dentists. Additional multifactorial analysis, which includes epidemiological data from the region, but also environmental, demographic and cultural parameters of oral health could be the basis for improving the provision of preventive dental care and therapeutic care.

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