



MEDICAL UNIVERSITY

"Prof. Dr. Paraskev Stoyanov" - Varna

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Department of Economics and Healthcare Management

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ACCESS TO DENTAL CARE IN BULGARIA

THESIS SUMMARY

RESEARCH SUPERVISOR:

Assoc. Prof. Elka Atanasova, PhD

Varna, 2023

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The dissertation has a total volume of 154 pages and is structured in: introduction (7 pages), main text in three chapters (104 pages), conclusion (2 pages), reference list (14 pages) and appendices (19 p.). The main text contains 27 tables and 7 figures. 211 titles were cited, 186 of which in English, and 25 in Bulgarian.

The dissertation work was discussed at a meeting of the departmental council of the Department of Healthcare Economics and Management at the Medical University - Varna, held on 03.11.2023.

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The materials for the defense are available at the Doctoral School at MU-Varna and are published on the website of MU-Varna.

Note: In the abstract, the numbers of the tables and figures do not correspond to the numbers in the dissertation.

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1. GENERAL CHARACTERISTICS OF THE DISSERTATION

1.1. Relevance and significance of the study

Oral health is an important component of the general health of individuals and can have an impact on their quality of life ¹. Diseases of the oral cavity, due to their increasing frequency and prevalence worldwide, are proving to be a serious public health problem, yet health systems around the world often underestimate the importance of oral health to the population.

Oral diseases are largely preventable and the timely use of dental care is of utmost importance in the prevention and treatment of these diseases ². Therefore, it is necessary to ensure that dental care is accessible to the population, which is also one of the challenges modern health systems face. To do this, it is necessary to first identify those factors that act as barriers to access, bearing in mind that oral health and the use of dental services varies throughout a patient's life, as it depends on attitudes, personal finance and general health state, which are not a constant ³. Other factors that have influence are related to the patients' demographic and socioeconomic characteristics, their levels of health literacy, geographic location, and the availability of dental providers.⁴

This justifies the need to conduct a more in-depth study in this area. The systematic limitation of patients' ability to receive the dental care they need is a prerequisite for creating inequalities in the use of dental services and it leads to unmet health needs.

¹ Gregg H Gilbert et al., 'Racial Differences in Predictors of Dental Care Use', *Health Services Research* 37, no. 6 (December 2002): 1487–1507, <https://doi.org/10.1111/1475-6773.01217>; Aziz Kamran et al., 'Survey of Oral Hygiene Behaviors, Knowledge and Attitude among School Children: A Cross-Sectional Study from Iran', *International Journal of Health Sciences* 2 (2014): 13.

² CG Devaraj and Pranati Eswar, 'Reasons for Use and Non-Use of Dental Services among People Visiting a Dental College Hospital in India: A Descriptive Cross-Sectional Study', *European Journal of Dentistry* 6, no. 4 (October 2012): 422–27; Sladjana Siljak et al., 'Dental Service Utilization among Adults in a European Developing Country: Findings from a National Health Survey', *International Dental Journal* 69, no. 3 (June 2019): 200–206, <https://doi.org/10.1111/idj.12449>.

³ Elin Hadler-Olsen and Birgitta Jönsson, 'Oral Health and Use of Dental Services in Different Stages of Adulthood in Norway: A Cross Sectional Study', *BMC Oral Health* 21, no. 1 (2021): 257, <https://doi.org/10.1186/s12903-021-01626-9>.

⁴ Simona Surdu et al., 'Consumer Survey of Barriers to and Facilitators of Access to Oral Health Services', *Center for Health Workforce Studies School of Public Health University at Albany, State University of New York*, March 2019, 84.

1.2.Purpose, tasks and hypothesis of the dissertation

The aim of the dissertation is to study and analyze the access to dental care in Bulgaria for persons over 18 years of age, identifying barriers to access and evaluating their impact on different user groups and on the utilization of dental services. Based on the obtained results, recommendations for improving access to dental care are formulated.

To achieve the goal, the following research tasks have been formulated:

- 1) To explore the theoretical foundations of access to health and dental services based on a review of specialized scientific literature, and to create an approach to the study of access to dental care by identifying the main barriers that limit it.
- 2) To examine the structural barriers to access to dental care regarding availability, physical accessibility and convenience and to assess their degree of influence among different consumer groups.
- 3) To examine the financial barriers to accessing dental care concerning affordability and to assess their degree of influence on different user groups.
- 4) To examine personal barriers to access to dental care regarding acceptability and awareness and to assess their degree of influence on different user groups.
- 5) To investigate the utilization of dental care in Bulgaria.
- 6) To formulate recommendations for the improvement of the access to dental care.

Research hypothesis

Access to dental care can be assessed through its main dimensions, with personal barriers not expected to hinder users, while structural and financial barriers are assumed to limit the realization of access to dental services.

1.3. Research material and methods

A set of methods was applied to study access to dental care in Bulgaria.

➤ **Documentary method**

For the identification, assessment and interpretation of the available information related to access to dental care, Bulgarian and foreign literature was studied and analyzed. The development of the concept of access to health and dental services was systematized chronologically, and various proposals for a set of dimensions of access and mechanisms by which to assess it were examined. Based on the literature review, an approach was chosen to study access barriers, which can be represented by six dimensions of access. Once barriers are overcome, users can move on to using dental services, which is the proof of realized access to dental care. The literature review includes normative and official statistical documents in the field of health care and dentistry.

➤ **Sociological method**

An anonymous survey was conducted, for the purpose of which two types of survey cards were used for the consumers and providers of dental services. The survey cards were distributed through the survs.com online platform. A wide range of potential respondents from across the country were invited to participate in the study, as 953 patients (response rate = 80%) and 151 dentists (response rate = 86%) took part in the study.

➤ **Statistical method**

The study and analysis of access to dental care was carried out by comparing the degree of influence of barriers to access in different user groups according to certain criteria. For this purpose, Pearson's chi-squared test was used in the statistical analysis, and Fisher's test was used for the data that did not meet the requirements for applying the χ^2 test. The Shapiro-Wilk test was used to check the normality of the data. A non-parametric Mann-Whitney U-test was used for comparison of two independent samples, and a Kruskal-Wallis test for comparison of three or more independent samples. Descriptive analysis was used to describe the main characteristics of the sample and the parameters included in the study. A post-hoc analysis was also applied, using the Bonferroni correction, Dunn's multiple comparison test was applied. Differences are considered statistically significant at P-value at <0.05 . A graphical method for visualizing the results is also applied. The data were processed with the specialized statistical software SPSS 29.0.0 and R, version 4.2.2.

1.4.Limitations of the study

The two samples (patients and providers of dental services) are not representative of the general population and accumulations of respondents according to certain criteria such as gender, place of residence, education were registered. Another limitation of the current study is that only individuals who have access to electronic devices to complete the online survey could participate. This leads to further restrictions on participation possibly for older persons. A potential limitation also exists regarding self-reported data related to recall.

2. STRUCTURE AND CONTENT OF DISSERTATIONS

2.1. Structure of dissertation

The dissertation has a total volume of 154 pages and was structured in: introduction (7 pages), main text in three chapters (104 pages), conclusion (2 pages), reference list (14 pages) and appendices (19 p.). The main text contains 27 tables and 7 figures.

2.2. Content of the dissertation

INTRODUCTION

Relevance and significance of the study

Purpose, tasks and hypothesis of the dissertation

Research material and methods

Limitations of the study

CHAPTER 1. THEORETICAL FOUNDATIONS IN RESEARCHING ACCESS TO HEALTH AND DENTAL SERVICES

1.1. Access to health services – concept and dimensions

1.2. Access to dental services

1.3. Need for dental services

1.4. Barriers to accessing dental care

1.4.1. Structural barriers

1.4.2. Financial barriers

1.4.3. Personal barriers

1.5. Usability of dental services

1.6. Health outcomes

CHAPTER 2. STUDY OF ACCESS TO DENTAL CARE IN BULGARIA

2.1 Profile of Respondents

2.2 Structural barriers

2.2.1 Availability

2.2.2 Physical Accessibility

2.2.3 Convenience

2.3 Financial Barriers

2.3.1 Financial Availability

2.4 Personal Barriers

2.4.1 Awareness

2.4.2 Acceptability

2.5 Study of the utilization of dental care in Bulgaria

CHAPTER 3. GUIDELINES FOR IMPROVING ACCESS TO DENTAL CARE IN BULGARIA

3.1. Discussion of results

3.1.1. Availability, physical accessibility and convenience

3.1.2. Affordability

3.1.3. Awareness and acceptance

3.1.4. Utilization of dental services

3.2. Conclusions and recommendations

CONCLUSION

DISSERTATION CONTRIBUTIONS

REFERENCE LIST

APPENDICES

Annex №1 Survey card for the study of access to dental care for patients

Appendix № 2 Survey card for the study of access to dental care for dentists

Appendix №3 Profile of respondents and frequency distribution of their answers

3. BRIEF DESCRIPTION OF THE DISSERTATION

Chapter 1. Theoretical foundations in the study of access to health and dental services

The dissertation presents analyzes for each of the research tasks achieving the set goal to study and analyze access to dental care in Bulgaria. In **Chapter 1. Theoretical foundations in the study of access to health and dental services**, a literature review is presented, as basic concepts in this field are examined and some of the fundamental concepts of various authors related to access to health and dental services are summarized.

In **point 1.1**, the development of the theoretical foundations for the study of access to health services is examined, and some of the fundamental concepts in this field are formulated. The earliest attempt to conceptualize access to health care was proposed by Bashshur et al. (1971), who determined accessibility by defining the social and geographic variables that influence the provision of health care and reflect the factors that may hinder or facilitate patients⁵. Other authors, such as Donabedian, believe that considering service availability alone as a measure of access to health care is limited, as there is a portion of the population that has access to health services but nevertheless experiences difficulties in using them. Penchansky and Thomas (1981) published an article in which they developed the concept of access beyond service availability and emphasized personal, financial and organizational barriers to service use⁶ and considered five aspects of access: *affordability* - reflects the user's ability to pay for services; *availability* – represents the provision of the healthcare service provider with the necessary resources (personnel, equipment, etc.); *physical accessibility* – measures physical access related to the possibility of reaching the service provider; *accommodation* - the organization of the doctor's practice in a way that meets the patient's perceptions (working hours, communication, appointments) and *acceptability* - associated with the feeling of comfort that the patient experiences with his doctor and vice versa⁷. What most authors who studied access in the period 1970-1990 present, is a conceptual framework of access to health care that also includes non-financial aspects, emphasizing that barriers to access can be psychological, informational, social, organizational, spatial, temporal, etc.⁸.

⁵ Rashid L. Bashshur, Gary W. Shannon, and Charles A. Metzner, 'Some Ecological Differentials in the Use of Medical Services', *Health Services Research* 6, no. 1 (1971): 61–75.

⁶ Martin Gulliford et al., 'What Does "access to Health Care" Mean?', *Journal of Health Services Research & Policy* 7, no. 3 (1 July 2002): 186–88, <https://doi.org/10.1258/135581902760082517>.

⁷ Roy Penchansky and J. William Thomas, 'The Concept of Access: Definition and Relationship to Consumer Satisfaction', *Medical Care* 19, no. 2 (1981): 127–40; Leon Wyszewianski, 'Access to Care: Remembering Old Lessons', *Health Services Research* 37, no. 6 (December 2002): 1441–43, <https://doi.org/10.1111/1475-6773.12171>.

⁸ Lu Ann Aday and Ronald Andersen, 'A Framework for the Study of Access to Medical Care', *Health Services Research* 9, no. 3 (1974): 208–20.

Concepts related to access evolve over time, Shengelia et al. (2003) consider access in the context of effective health coverage, which is a function of individual and health system factors in the following components: physical access, availability of resources, cultural acceptability, affordability, quality of the service ⁹. Peters et al. (2008) put a new emphasis on concepts of access to health services, paying attention to the role of poverty in influencing patients' risk of disease and their ability to purchase health services, proposing four dimensions of access: geographic accessibility, availability, financial accessibility and acceptability ¹⁰. Levesque et al. (2013) also propose their conceptual framework, which is the result of a comprehensive analysis of the scientific literature on this topic, proposing the following dimensions by which to assess access: accessibility, acceptability, availability, convenience, affordability and relevance ¹¹.

In 2019, Minev and Rohova researched the most commonly used indicators for evaluating access to health services, which they divided into three main groups: physical availability, financial accessibility and timeliness. In this way, it can be seen that these three components of access have more indicators and are more often investigated in the various studies ¹².

Due to the lack of consensus on the overall concept of access to health services, the focus of the study narrowed and focused on approaches to assess access specifically in the field of dentistry.

In **point 1.2** the theoretical positions of various authors for the study of access to dental care are examined. There is lack of common ground among these researchers on the approach to research on access to dental care, too. However, among the proposals for assessing access, those related to the approach based on measuring access through different dimensions predominate.

Based on the literature review, the approach proposed by McKernan et al. for analysis and assessment of access to dental care in our country was chosen, because it is up-to-date, comprehensive and specifically applicable to dental care. According to this approach, access to dental care is presented as a process of four separate stages (Fig.1 , and access barriers are divided into structural, financial and personal, and can be analyzed through the corresponding six dimensions: *availability, physical accessibility, convenience, financial accessibility, acceptability and awareness* (Fig.2).

⁹ Bakhuti Shengelia, Christopher JL Murray, and Orville B. Adams, 'Beyond Access and Utilization: Defining and Measuring Health System Coverage', *Health Systems Performance Assessment: Debates, Methods and Empiricism*. Geneva: World Health Organization 2003 (2003): 221–35.

¹⁰ David H. Peters et al., 'Poverty and Access to Health Care in Developing Countries', *Annals of the New York Academy of Sciences* 1136, no. 1 (2008): 161–71, <https://doi.org/10.1196/annals.1425.011>.

¹¹ Jean-Frederic Levesque, Mark Harris, and Grant Russell, 'Patient-Centred Access to Health Care: Conceptualising Access at the Interface of Health Systems and Populations | International Journal for Equity in Health |', 2013, <https://equityhealthj.biomedcentral.com/articles/10.1186/1475-9276-12-18>.

¹² Mincho Minev and Maria Rohova, 'Access to Health Services as Part of the Evaluation of the Functioning of the Health System', *Health Economics and Management* 19 (1 December 2019), <https://doi.org/10.14748/hem.v19i2.6248>.

Fig. 1 An approach to research on access to dental care

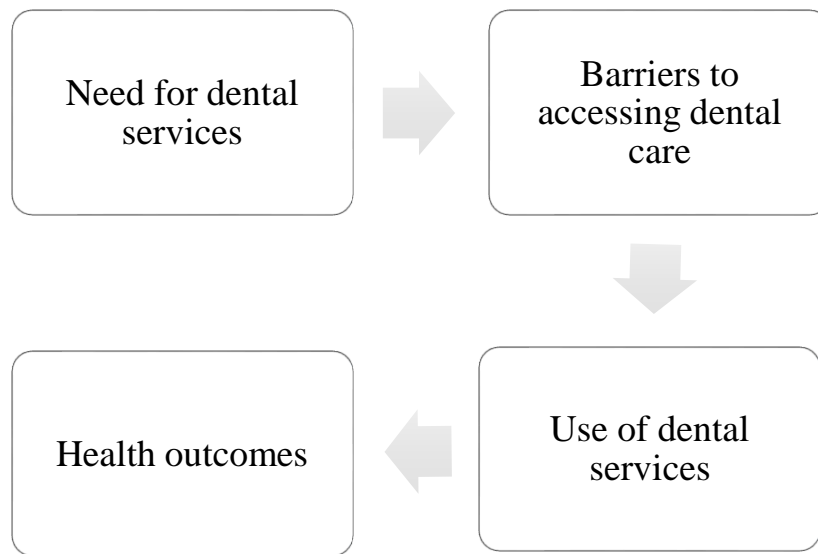
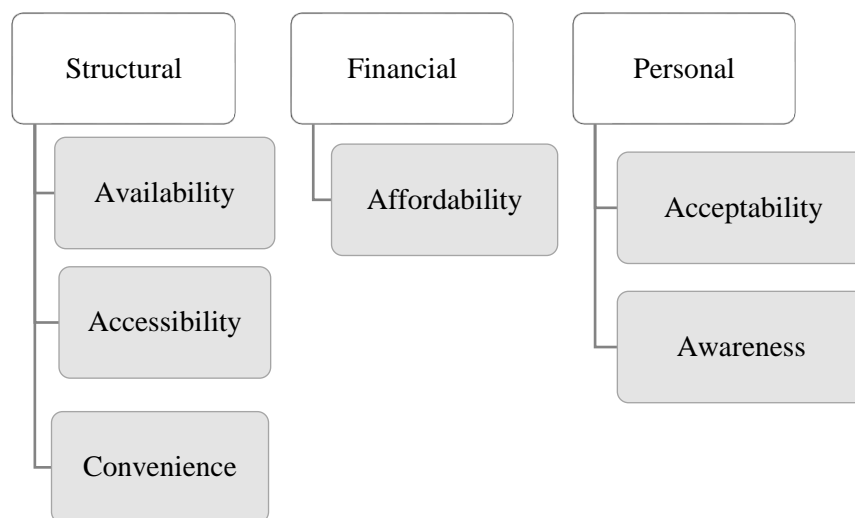


Fig. 2 Barriers to access to dental care



Source: Adapted from McKernan et al. (2021)¹³

Structural barriers are directly related to the number, type, concentration, location, or organizational practice of health care providers. Financial barriers can limit access by preventing patients from paying for needed dental services, and personal barriers can block those in need from seeking timely care. Once the various barriers are overcome by patients, they can move on to using dental services. This represents a kind of transition from *"having access"* (the patient has the opportunity to use the

¹³ Susan McKernan, Julie Reynolds, and Michelle Mcquistan, 'Access to Dental Care', in *Burt and Eklund's Dentistry, Dental Practice, and the Community (Seventh Edition)*, ed. Ana Karina Mascarenhas, Christopher Okunseri, and Bruce A. Dye (St. Louis: WB Saunders, 2021), 20–27, <https://doi.org/10.1016/B978-0-323-55484-8.00003-4>.

health service if needed) to "*obtaining/gaining access*" (the patient proceeds to actual use) ¹⁴.

The concept of access over the years has changed its scope from *entry into the system* to *the outcome* after the service and this makes access difficult to assess and analyze, therefore this paper focuses only on the empirical study of barriers to access and utilization of dental services.

¹⁴ Minev and Rohova, 'Access to Health Services as Part of the Evaluation of the Functioning of the Health System'.

Chapter 2. Study of access to dental care in Bulgaria

This chapter presents empirical data and statistical analyzes related to the implementation of tasks №2, №3, №4 and №5. In **point 2.** brief information about the profile of the survey respondents is presented. 953 *users of dental services* took part in the conducted online survey, with the number of women being more (85.9%). The average age of the participants was 41.9 years. More than half of them (60.4%) live in a regional city, 18.0% live in the capital, 14.9% in a small town, and 6.6% in villages. 97.6% of the participants have the mandatory health insurance. In terms of education, 70.7% have higher education and 24.7% have secondary education. The share of respondents with an income below BGN 710 is 15.0%, and the largest share is those with an income from BGN 711 to BGN 1,200 and BGN 1,201 to BGN 2,000 – 35.6% and 29.9%, respectively. 11.2% of the participants fall into the income group of 2001 to 3400 BGN, and 8.3% of the participants receive more than 3400 BGN. Full-time employees are 71.7% of all.

The questionnaire was fully completed by 151 *dental service providers* (86% of the respondents). And in this sample, the greater share of participants are women (75.5%). The majority of persons are under the age of 50 (over 90% in total), with almost a third under the age of 30. Almost two-thirds of the dentist participants practice in regional cities. More than half of the dentists do not have a recognized specialty in the health care system and work mostly between 4 and 8 hours a day, with over 80% of all reporting seeing patients outside of working hours.

In **point 2.2**, an analysis of the structural barriers to access to dental care is presented based on a study of the *Availability, Physical Accessibility and Convenience* according to task No.2.

In **paragraph 2.2.1**, the *Availability* dimension is investigated, and based on public statistical data, the availability of dental doctors, nurses/dental assistants and dental technicians in the country and their distribution by region was studied. The number of dentists per 1000 population has been increasing in recent years. The greater the number of dentists per capita, the greater the likelihood of providing access to dental care. Nevertheless, the analysis showed significant inequalities in the provision of dental doctors to the population, due to their uneven distribution by regions and by planning areas in the country, with the highest concentration in the more urbanized regions with medical universities and high economic activity, such as the South-West, South-Central and North-East regions.

The distribution of dental technicians per 1,000 population on the territory of the country, again as with the dentists, is uneven, with only three regions covering the

average provision for the country in 2022. On the other hand, the analysis of the ratio of nurses per 1,000 population and their distribution by regions, showed a less pronounced uneven distribution. Half of the dentists who took part in the survey indicated that they work regularly with a dental assistant or nurse in their practice, and the lack of staff in this sphere was the least frequently cited reason why dentists choose to work alone (6.6%).

The access dimension *Physical Accessibility* is directly related to the *Availability dimension*, reflecting the ability of consumers to reach the dental service provider. This dimension was analyzed through the results of a survey among patients and dentists, presented in **paragraph 2.2.2**. The established imbalances by regions in the country were also confirmed by the results of the conducted survey among dentists, as the dental practices are unevenly distributed between cities and villages. Dentists mainly practice in large regional cities (65.6%) or in the capital (22.5%), only 9.3% practice their profession in a small town, and in villages this proportion is 2.6%. This is also the main reason why residents of villages and smaller towns use transport to another settlement to get dental care. The largest share of rural citizens (90%) and 40% of smaller town citizens who took part in the survey used transportation to another town or city to receive dental care. Over half (54%) of rural residents travel because there is no dental practitioner in their locality. However, the largest proportion of respondents from the patient group manage to travel within 30 minutes to their dentist (77.4%) and do not have to travel to another town or city to get the dental care they need (81.4%).

Getting to a dentist can be complicated for patients due to lack of transportation or the need to travel a long distance. The analysis showed that transportation difficulties exerted varying degrees of limitation by *age* ($p < 0.038$), *education* ($p < 0.001$), *place of residence* ($p < 0.001$), *self-assessment of dental health* ($p < 0.041$), *having the compulsory health insurance* ($p < 0.001$), *income* ($p < 0.002$) and *work status* ($p < 0.001$). Mann-Whitney and Kruskal-Wallis test for independent samples were used to test for differences.

The post-hoc analysis shows that persons with secondary education as well as those living in villages, have significantly more difficulties regarding transportation, compared to other groups. The inactive in the labor market are also more hindered than the active. The limiting influence of this barrier decreases with increasing income, and there are statistically significant differences between participants with an income of up to BGN 710 and the ones in all groups with an income of above BGN 1,201.

It is important that dental service providers can be reached by consumers not only physically but also in a timely manner. Paragraph **2.2.3** presents the study of the *Convenience dimension*, which is associated with the organization of the dental

practitioner's work in a way that meets the needs and limitations of the patient. Its main emphasis is on providing dental services in a timely manner and usually addresses appointment times and waiting times. Patients in the study were most often able to receive dental care within a week of making an appointment (63.2%), and according to a quarter of the consumers surveyed, the time between making an appointment and receiving dental care was typically between one to three weeks.

A reason why consumers tend to postpone dental appointments, according to our research, is lack of time on their part or because their dentist does not work at a time that is convenient for them. It was found that there is a significant relationship between lack of time for a dental visit and various factors such as *education* ($p < 0.020$), *residence* ($p < 0.031$), *age* ($p < 0.001$), *employment status* ($p < 0.033$), *income* ($p < 0.004$) and *the presence of VHI* ($p < 0.033$). The results suggest that persons in the age groups over 51 are limited to a lesser extent than those in the active age- between 31-40. It turned out that the residents of the capital have a harder time finding time compared to the residents of the regional cities. It was established that the lack of time increases with an increase in income and level of education, with statistically significant differences between participants with an income of above BGN 3,400 and the participants in both groups with an income of up to BGN 1,200, while persons without voluntary health insurance find the time needed for an appointment more often than the ones who have a VHI. The largest share (45.5%) of all the unemployed, perhaps due to lack of other tasks, do not think that the lack of time reason could prevent them from visiting a dentist at all, in contrast to the employed, among which almost 20% are strongly limited by the lack of time to visit their dentist.

Dentists value their patients' time, and this is demonstrated by 74.2% of the dentists surveyed who unequivocally say that their patients do not often have to wait outside of their scheduled appointment. A mechanism by which dentists typically try to accommodate to their patients' time constraints, is through out of hours service.

In **point 2.3** the analysis of financial barriers by studying the dimension of access *financial accessibility*, corresponding to task №3 is presented. For this purpose, the dental treatments covered by the National Health Insurance Fund for persons over 18 years of age in Bulgaria and the conditions under which consumers are required to make additional payments for dental services and their amount were examined.

The package of dental treatments that the NHIF covers within the framework of "Primary dental care" has limitations related to *the number of covered dental treatments*, also limited for a certain period of time (for example, patients have the right to an examination once a year or when placing prostheses within several years, as well

as up to a certain number of treatments per calendar year). Also, dental services are limited to a number of specific treatments, with the use of only *certain materials* for some of the dental services. According to 76.3% of the dentists, the scope of the package of "Dental treatments" covered by the health system is not sufficient for the needs of users regarding basic dental services, and are in favor of it being expanded, indicating in ascending order the following three dental services , to be included: scaling, endodontic treatment and orthodontic examination/treatment in children.

The majority of users of dental services (63.4%), who have the mandatory health insurance, do not use dental services provided in the "Dental activities" package by the insurance fund, and more than half (55%) admit that they are not aware of the dental services from the "Dental treatment" package that the NHIF provides.

This paragraph also discusses the ways for patients to cover the costs of dental treatments (through own funds, through co-payment when using dental services covered by the NHIF, through the use of additional health insurance, through borrowing money). According to the statistical analysis made, it was found that in three of them, *income* is the common significant factor.

The largest share of consumers (86%) report paying for the dental services which they need with their own money, with patients having the mandatory health insurance typically paying out-of-pocket when they need a treatment but have already exceeded the amount of dental services they are entitled to, or when it is necessary to undergo dental treatments and/or use materials other than those specified in the packages by the NHIF. In addition to these direct payments, health insured persons also make fixed regulated co-payments.

When accounting for the degree of influence of payment for dental services on visits to a dental practitioner, regardless of the method of coverage of dental costs, significant differences by gender, education, self-rated dental health, availability of *voluntary health insurance, income and employment status* were observed(*Table 1*). Differences were tested using the Mann–Whitney and Kruskal–Wallis tests for independent samples.

Table 1. Comparison of the degree of influence of payment for dental services in different user groups by factors

| Factor | Influence Rating* | | | | | An average grade | stat | P-value |
|---|-------------------|-----------|------------|-----------|------------|------------------|------------|---------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| Age | | | | | | | | |
| up to 30 years | 23(26.7%) | 15(17.4%) | 16(18.6%) | 17(19.8%) | 15(17.4%) | 2.84 | H = 4.622 | .328 |
| 31 – 40 years | 73 (36.3%) | 33(16.4%) | 36(17.9%) | 24(11.9%) | 35(17.4%) | 2.58 | | |
| 41 – 50 years | 47 (31.5%) | 23(15.4%) | 27(18.1%) | 23(15.4%) | 29(19.5%) | 2.76 | | |
| 51 – 60 years | 18 (26.5%) | 7 (10.3%) | 23(33.8%) | 5 (7.4%) | 15(22.1%) | 2.88 | | |
| over 60 years | 8 (21.6%) | 8 (21.6%) | 7 (18.9%) | 5 (13.5%) | 9 (24.3%) | 2.97 | | |
| Gender | | | | | | | | |
| male | 38 (44.7%) | 16(18.8%) | 14(16.5%) | 9 (10.6%) | 8 (9.4%) | 2.21 | z = 3.517 | <.001 |
| female | 131 (28.7%) | 70(15.4%) | 95(20.8%) | 65(14.3%) | 95(20.8%) | 2.83 | | |
| Education | | | | | | | | |
| Higher | 131(33.9%) | 62(16.0%) | 80(20.7%) | 55(14.2%) | 59(15.2%) | 2.61 | H = 13.034 | .001 |
| College | 4 (14.3%) | 2 (7.1%) | 7 (25.0%) | 4 (14.3%) | 11(39.3%) | 3.57 | | |
| Secondary | 34 (27.0%) | 22(17.5%) | 22(17.5%) | 15(11.9%) | 33(26.2%) | 2.93 | | |
| Place of residence | | | | | | | | |
| Capital city | 35 (34.7%) | 16(15.8%) | 19(18.8%) | 13(12.9%) | 18(17.8%) | 2.63 | H = 7.768 | .051 |
| Regional city | 110 (34.3%) | 48(15.0%) | 64(19.9%) | 44(13.7%) | 55(17.1%) | 2.64 | | |
| Town | 17 (21.3%) | 14(17.5%) | 19(23.8%) | 10(12.5%) | 20(25.0%) | 3.03 | | |
| Village | 7 (17.9%) | 8 (20.5%) | 7 (17.9%) | 7 (17.9%) | 10(25.6%) | 3.13 | | |
| self-assessment of dental health | | | | | | | | |
| excellent | 13 (59.1%) | 4 (18.2%) | 1 (4.5%) | 2 (9.1%) | 2 (9.1%) | 1.91 | H = 39.866 | <.001 |
| very good | 35 (46.1%) | 12(15.8%) | 16(21.1%) | 4 (5.3%) | 9 (11.8%) | 2.21 | | |
| good | 63 (34.2%) | 32(17.4%) | 40(21.7%) | 30(16.3%) | 19(10.3%) | 2.51 | | |
| average | 32 (21.2%) | 28(18.5%) | 33(21.9%) | 28(18.5%) | 30(19.9%) | 2.97 | | |
| worsened | 21 (23.9%) | 10(11.4%) | 16(18.2%) | 7 (8.0%) | 34(38.6%) | 3.26 | | |
| very bad | 5 (25.0%) | 0 (0.0%) | 3 (15.0%) | 3 (15.0%) | 9 (45.0%) | 3.55 | | |
| Mandatory health insurance | | | | | | | | |
| Yes | 166 (31.7%) | 84 (16%) | 104(19.8%) | 73(13.9%) | 97(18.5%) | 2.72 | H = 2.720 | .257 |
| I do not know | 0 (0.0%) | 0 (0.0%) | 2 (66.7%) | 0 (0.0%) | 1 (33.3%) | 3.67 | | |
| no | 3 (21.4%) | 2 (14.3%) | 3 (21.4%) | 1 (7.1%) | 5 (35.7%) | 3.21 | | |
| Voluntary health insurance | | | | | | | | |
| Yes | 64 (36.8%) | 29(16.7%) | 34(19.5%) | 26(14.9%) | 21(12.1%) | 2.49 | H = 7.112 | .029 |
| I do not know | 11 (36.7%) | 4 (13.3%) | 4 (13.3%) | 5 (16.7%) | 6 (20.0%) | 2.70 | | |
| no | 94 (27.9%) | 53(15.7%) | 71(21.1%) | 43(12.8%) | 76(22.6%) | 2.86 | | |
| Income | | | | | | | | |
| up to BGN 710 | 26 (31.0%) | 10(11.9%) | 19(22.6%) | 9 (10.7%) | 20(23.8%) | 2.85 | H = 49.058 | <.001 |
| 711 – 1200 BGN. | 37 (19.2%) | 29(15.0%) | 37(19.2%) | 33(17.1%) | 57(29.5%) | 3.23 | | |
| 1201 - 2000 BGN. | 56 (35.0%) | 27(16.9%) | 37 (23.1%) | 20(12.5%) | 20 (12.5%) | 2.51 | | |
| 2001 – BGN 3400 | 23 (37.7%) | 12(19.7%) | 13 (21.3%) | 10(16.4%) | 3 (4.9%) | 2.31 | | |
| over BGN 3400 | 27 (62.8%) | 8 (18.6%) | 3 (7.0%) | 2 (4.7%) | 3 (7.0%) | 1.74 | | |
| employment status | | | | | | | | |
| Active | 137 (33.0%) | 70(16.9%) | 84 (20.2%) | 55(13.3%) | 69 (16.6%) | 2.64 | H = 9.195 | .010 |
| unemployed | 5 (22.7%) | 1 (4.5%) | 4 (18.2%) | 2 (9.1%) | 10 (45.5%) | 3.50 | | |
| Inactive | 27 (26.0%) | 15(14.4%) | 21 (20.2%) | 17(16.3%) | 24 (23.1%) | 2.96 | | |

*A 1-to-5 impact rating scale, where 1 means that the stated reason does not restrict users at all and 5 means that the stated reason most strongly restricts users.

The degree to which patients are discouraged is weaker among persons with an income of above BGN 3,400 and significantly higher in income groups up to BGN

2,000, with the strongest dependency among patients with the lowest income. Graduates and men are less discouraged because of this reason than those with bachelor degree and women. Because of the financial security that voluntary health insurance provides, respondents who have it, do not respond as strongly to payment as a reason for postponing a dental appointment compared to those who do not. Employed individuals also reported lower rates of avoiding dental treatments and check-ups compared to the unemployed. There are also significant differences among the different groups of participants in the evaluation of their own dental health, and it is noticed that the most severely limited to perform a dental visit are the users with a low self-assessment of their dental health.

Consumers' attitudes regarding the payment of dental services were also looked into, analyzing the degree of their agreement with proposed statements: "*access to dental services is difficult due to their high costs*" and "*postponing a visit to a dental doctor will increase the cost of treatment subsequently*". The analysis showed that among respondents, regardless of their characteristics, a consensus was reached in perceptions that prices hinder access to dental care.

In point 2.4, an analysis of the personal barriers to access to dental care is presented, based on a study of the *Informedness and Acceptability dimensions* for task No.4.

The *Awareness* dimension investigates the relationship between various factors and the individual attitudes of patients towards receiving dental care. The extent to which consumers can receive, communicate, process and understand health information in a way that enables them to make appropriate health decisions is assessed. Awareness is seen as an integral part of access and includes the components of communication with the dental team and consumer health literacy. Some of the proposed tools for measuring oral literacy are related to surveying the knowledge of users of dental services related to oral health and its prevention in general, the etiology of oral diseases and the health system (Table 2)

Table 2. Assessment of patients' attitudes towards dental care

| Assertion | Patient agreement rate* | | | | | Average assessment |
|--|-------------------------|----------------|--------------|----------------|----------------|--------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Dentists have an important role only in the treatment part, not in the prevention of dental diseases | 260 (27.3%) | 184 (19.3%) | 114 (12%) | 189 (19.8%) | 206 (21.6%) | 2.89 |
| Diseases of the oral cavity are not serious and their treatment can be delayed | 574 (60.2%) | 153 (16.1%) | 59 (6.2%) | 62 (6.5%) | 105 (11%) | 1.92 |
| Unpleasant experiences from dental procedures lead to postponing visits to the dentist | 145 (15.2%) | 112 (11.8%) | 94 (9.9%) | 273 (28.6%) | 329 (34.5%) | 3.56 |
| If no pain is felt in the oral cavity - there is no need to visit a dentist | 519 (54.5%) | 173 (18.2%) | 61 (6.4%) | 98 (10.3%) | 102 (10.7%) | 2.05 |
| Regular dental visits help maintain dental health | 98 (10.3%) | 22 (2.3%) | 37 (3.9%) | 76 (8%) | 720 (75.6%) | 4.36 |

*Agreement scale from 1 to 5, where 1 means that the patient strongly disagrees with the stated statement and 5 means that he strongly agrees with it.

The analysis of user responses confirmed that patients demonstrate relatively high health literacy regarding the seriousness of oral cavity diseases, the need for timely treatment, and regular visits to the dentist that are not motivated by pain. However, the study showed that, to a large extent, the population sample does not have enough information about the dentist's role in the prevention of dental diseases, as there is no definite position on the place of prevention in the treatment cycle. This would have a direct effect on their health behavior, which is a mediator to their overall health status. Older respondents, those with secondary education, lower incomes, and the unemployed were the least likely to believe that their dentist could help them by performing preventive activities.

During the analysis of the *Acceptability* dimension, it was found that the fear and anxiety that patients experience when visiting the dentist is a leading reason that can limit access to dental care, causing patients to postpone their dental visits. Different factors such as *age, education, self-assessment of dental health and employment status* are associated with the health behavior of patients who experience fear of dental manipulations (*Table 3*).

Table. 3 Comparison of the degree of influence of the fear of dental manipulations in different groups of users by factors

| Factors | Impact Rating* | | | | | An average | stat | P-value |
|---|----------------|-----------|------------|------------|-------------|------------|------------|---------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| age | | | | | | | | |
| up to 30 years | 27 (31.4%) | 8 (9.3%) | 13 (15.1%) | 18 (20.9%) | 20 (23.3%) | 2.95 | H = 10.521 | .033 |
| 31 – 40 years | 107(53.2%) | 17 (8.5%) | 18 (9.0%) | 15 (7.5%) | 44 (21.9%) | 2.36 | | |
| 41 – 50 years | 72 (48.3%) | 20(13.4%) | 21(14.1%) | 5 (3.4%) | 31 (20.8%) | 2.35 | | |
| 51 – 60 years | 31 (45.6%) | 7 (10.3%) | 11(16.2%) | 6 (8.8%) | 13 (19.1%) | 2.46 | | |
| over 60 years | 11 (29.7%) | 9 (24.3%) | 9 (24.3%) | 3 (8.1%) | 5 (13.5%) | 2.51 | | |
| gender | | | | | | | | |
| a man | 39 (45.9%) | 11(12.9%) | 14(16.5%) | 8 (9.4%) | 13 (15.3%) | 2.35 | z = 0.583 | .560 |
| a woman | 209(45.8%) | 50(11.0%) | 58(12.7%) | 39 (8.6%) | 100 (21.9%) | 2.50 | | |
| education | | | | | | | | |
| high | 185 (47.8%) | 43(11.1%) | 55(14.2%) | 31 (8.0%) | 73 (18.9%) | 2.39 | H = 9.398 | .009 |
| half up | 17 (60.7%) | 3 (10.7%) | 2 (7.1%) | 2 (7.1%) | 4 (14.3%) | 2.04 | | |
| average | 46 (36.5%) | 15(11.9%) | 15(11.9%) | 14 (11.1%) | 36 (28.6%) | 2.83 | | |
| residence | | | | | | | | |
| capital | 54 (53.5%) | 5 (5.0%) | 18(17.8%) | 3 (3.0%) | 21 (20.8%) | 2.33 | H = 2.979 | .395 |
| regional city | 146 (45.5%) | 37(11.5%) | 38(11.8%) | 29 (9%) | 71 (22.1%) | 2.51 | | |
| small town | 30 (37.5%) | 14(17.5%) | 9 (11.3%) | 9 (11.3%) | 18 (22.5%) | 2.64 | | |
| village | 18 (46.2%) | 5 (12.8%) | 7 (17.9%) | 6 (15.4%) | 3 (7.7%) | 2.26 | | |
| self-assessment of dental health | | | | | | | | |
| excellent | 17 (77.3%) | 2 (9.1%) | 0 (0.0%) | 0 (0.0%) | 3 (13.6%) | 1.64 | H = 34.078 | <.001 |
| very good | 50 (65.8%) | 3 (3.9%) | 11(14.5%) | 6 (7.9%) | 6 (7.9%) | 1.88 | | |
| good | 85 (46.2%) | 23(12.5%) | 26(14.1%) | 21 (11.4%) | 29 (15.8%) | 2.38 | | |
| average | 62 (41.1%) | 23(15.2%) | 17(11.3%) | 11 (7.3%) | 38 (25.2%) | 2.60 | | |
| worsened | 29 (33.0%) | 8 (9.1%) | 15(17.0%) | 7 (8.0%) | 29 (33.0%) | 2.99 | | |
| very bad | 5 (25.0%) | 2 (10.0%) | 3 (15.0%) | 2 (10.0%) | 8 (40.0%) | 3.30 | | |
| Mandatory health insurance | | | | | | | | |
| Yes | 241 (46%) | 61(11.6%) | 69(13.2%) | 45 (8.6%) | 108(20.6%) | 2.46 | H = 1.463 | .481 |
| I do not know | 0 (0.0%) | 0 (0.0%) | 2 (66.7%) | 1 (33.3%) | 0 (0.0%) | 3.33 | | |
| no | 7 (50.0%) | 0 (0.0%) | 1 (7.1%) | 1 (7.1%) | 5 (35.7%) | 2.79 | | |
| Voluntary health insurance | | | | | | | | |
| Yes | 90 (51.7%) | 20(11.5%) | 20(11.5%) | 12 (6.9%) | 32 (18.4%) | 2.29 | H = 3.852 | .146 |
| I do not know | 14 (46.7%) | 2 (6.7%) | 5 (16.7%) | 4 (13.3%) | 5 (16.7%) | 2.47 | | |
| no | 144(42.7%) | 39(11.6%) | 47(13.9%) | 31 (9.2%) | 76 (22.6%) | 2.57 | | |
| income | | | | | | | | |
| up to BGN 710 | 43 (51.2%) | 9 (10.7%) | 13(15.5%) | 10 (11.9%) | 9 (10.7%) | 2.20 | H = 3.710 | .447 |
| 711 – 1200 BGN | 81 (42.0%) | 21(10.9%) | 29 (15%) | 16 (8.3%) | 46 (23.8%) | 2.61 | | |
| 1201 - 2000 BGN | 73 (45.6%) | 23(14.4%) | 14 (8.8%) | 15 (9.4%) | 35 (21.9%) | 2.48 | | |
| 2001 – BGN 3400 | 31 (50.8%) | 3 (4.9%) | 10(16.4%) | 2 (3.3%) | 15 (24.6%) | 2.46 | | |
| over BGN 3400 | 20 (46.5%) | 5 (11.6%) | 6 (14.0%) | 4 (9.3%) | 8 (18.6%) | 2.42 | | |
| employment status | | | | | | | | |
| active | 204(49.2%) | 47(11.3%) | 50(12.0%) | 30 (7.2%) | 84 (20.2%) | 2.38 | H = 7.254 | .027 |
| unemployed | 10 (45.5%) | 2 (9.1%) | 2 (9.1%) | 2 (9.1%) | 6 (27.3%) | 2.64 | | |
| inactive | 34 (32.7%) | 12(11.5%) | 20(19.2%) | 15 (14.4%) | 23 (22.1%) | 2.82 | | |

*A 1-to-5 impact rating scale, where 1 means that the stated reason does not restrict users at all and 5 means that the stated reason most strongly restricts users.

Consumers with a college or university degree were less likely to experience a fear that was strong enough to delay a visit to the dentist than participants with a

secondary education. The youngest part of the population under 30 is most strongly influenced by fear, and the difference with those between 31 and 40 is significant according to the post-hoc analysis. A difference was also found between the groups evaluating their dental health as very bad and deteriorated compared to those with excellent and very good, with fear being more pronounced in the first two. Employment is also related to this emotion in patients, with the active in the labor market being less constrained by it than the inactive.

Point 2.5 presents the result of overcoming the various barriers to access to dental care and actual use of dental services by patients. The number of dental visits made by the patients, the reasons for them and the relationship between the usability of dental care and various factors were analyzed.

For the implementation of task No.5, an analysis was made of the degree of limitation imposed by the various barriers on the usability of dental care. The examined six dimensions of access to dental care are associated with structural, financial and personal barriers that can reduce the usability of dental care. In the conducted research, more than half of the users (56.7%) indicated that they had to postpone a visit to the dentist. The analysis shows that the degree of influence of individual barriers is not the same and found a statistically significant difference between them, with the two most limiting barriers being payment for dental services and lack of time. Next comes the fear of dental manipulations, and the trip to the dentist has the weakest limiting effect (Table 4).

Table 4 Comparison of the degree of influence of access barriers according to users

| Barrier | | Impact Rating * | | | | | An average grade | p -value (Kruskal–Wallis) |
|---------------------|---|-----------------|---------------|----------------|---------------|----------------|------------------|---------------------------|
| | | 1 | 2 | 3 | 4 | 5 | | |
| Structural barriers | Lack of time | 156 (28.8%) | 87 (16.1%) | 113 (20.9%) | 85 (15.7%) | 100 (18.5%) | 2.79 | <.001 |
| | Difficulty getting to the dentist | 427 (78.9%) | 41 (7.6%) | 20 (3.7%) | 20 (3.7%) | 33 (6.1%) | 1.50 | |
| Financial barriers | Payment for dental services | 169 (31.2%) | 86 (15.9%) | 109 (20.1%) | 74 (13.7%) | 103 (19%) | 2.73 | |
| Personal barriers | Fear of dental procedures | 248 (45.8%) | 61 (11.3%) | 72 (13.3%) | 47 (8.7%) | 113 (20.9%) | 2.48 | |
| | The unconscious need for dental treatment | 354 (65.4%) | 64 (11.8%) | 60 (11.1%) | 14 (2.6%) | 49 (9.1%) | 1.78 | |

*A 1-to-5 impact rating scale, where 1 means that the stated reason does not restrict users at all and 5 means that the stated reason most strongly restricts users.

Once the various barriers are overcome by patients, they can move on to using dental services. This represents a kind of transition from "*having access*", i.e. the patient has the opportunity to use the health service when needed to "*get access*" - the patient proceeds to actual use.

According to the results of this study, a patient on average visits a dentist 1.58 times a year. Most often, the participants in the study visited a dentist once in the last 12 months, but there is also a significant share of 24% who have not been to a dentist for more than a year. Respondents in the study mostly visit the same dentist in 67% of cases and less often follow a recommendation from relatives, relatives or friends in their choice.

The usability of dental services, represented as the number of visits in the last 12 months, significantly differs among users according to the factors *education* ($p < 0.004$), *income* ($p < 0.009$) and *employment status* ($p < 0.035$). Participants with a university degree had, on average, more visits to the dentist (1.66) than those with a secondary education (1.37), the difference being significant according to the post-hoc analysis. People with incomes between BGN 1,201 and BGN 2,000 have been to the dentist the most times in the last 12 months, and their average number of visits (1.72) is significantly more than those with incomes up to BGN 710 (1.31). A relationship was also established between the number of visits and *the employment status*, the largest share being the unemployed who had not visited a dentist in the last year. This adds to the previous finding related to income, showing once again that consumer income can have a strong deterrent effect on usability.

In order to investigate the impact of different barriers on the usability of dental services by consumers in the last one year, the participants were divided into two groups. In the first group are the users who in the last 12 months have visited a dentist, regardless of the number of times, and accordingly in the other group are the patients who have not visited. Differences were tested using the Mann-Whitney test for independent samples. After comparing the mean ratings given by the respondents to the degree of limitation caused by the different barriers, a statistically significant difference was found between the two groups defined above participants regarding *the payment of dental services, fear of the dentist and the unrealized need for dental treatment* (Table 5). For those who have not used dental services in the last year, the average scores are significantly higher, i.e. indeed, these limitations have an impact on usability in this time slot. According to the analysis, the lack of time and difficult travel to the dentist have no reason to be considered as statistically significant limitations to the use of dental care.

Table 5. Comparison of the degree of influence of access barriers on the usability of dental services

| Barrier | Dental visit in the last 12 months | Impact Rating* | | | | | average grade | z-stat | P-value |
|---|------------------------------------|----------------|---------------|---------------|---------------|---------------|---------------|--------|---------|
| | | 1 | 2 | 3 | 4 | 5 | | | |
| Payment for dental services | NO | 38 (16.7%) | 20 (8.8%) | 20 (8.8%) | 24 (10.5%) | 36 (15.8%) | 3.00 | 2.306 | .021 |
| | YES | 131 (32.5%) | 66 (16.4%) | 89 (22.1%) | 50 (12.4%) | 67 (16.6%) | 2.64 | | |
| Lack of time | NO | 37 (16.2%) | 24 (10.5%) | 27 (11.8%) | 19 (8.3%) | 31 (13.6%) | 2.88 | 0.791 | .429 |
| | YES | 119 (29.5%) | 63 (15.6%) | 86 (21.3%) | 66 (16.4%) | 69 (17.1%) | 2.76 | | |
| Difficulty getting to the dentist | NO | 104 (45.6%) | 10 (4.4%) | 7 (3.1%) | 7 (3.1%) | 10 (4.4%) | 1.62 | 1.263 | .207 |
| | YES | 323 (80.1%) | 31 (7.7%) | 13 (3.2%) | 13 (3.2%) | 23 (5.7%) | 1.47 | | |
| Fear of dental procedures | NO | 52 (22.8%) | 16 (7.0%) | 19 (8.3%) | 10 (4.4%) | 41 (18.0%) | 2.80 | 2.701 | .007 |
| | YES | 196 (48.6%) | 45 (11.2%) | 53 (13.2%) | 37 (9.2%) | 72 (17.9%) | 2.36 | | |
| The unconscious need for dental treatment | NO | 74 (32.5%) | 18 (7.9%) | 20 (8.8%) | 6 (2.6%) | 20 (8.8%) | 2.13 | 3.666 | <.001 |
| | YES | 280 (69.5%) | 46 (11.4%) | 40 (9.9%) | 8 (2.0%) | 29 (7.2%) | 1.66 | | |

*A 1-to-5 impact rating scale, where 1 means that the stated reason does not restrict users at all and 5 means that the stated reason most strongly restricts users.

Lack of time was rated among users as the most deterring reason for postponing a dental examination when considering "access" and the possibility to use the dental service if needed (Table 4). In the analysis of "getting access" and the actual use of dental services (Table 5), it appears that this structural barrier is overcome by users and they most likely manage to organize their commitments, prioritize their oral health and find time to get the dental care they need.

Waiting for the problem to solve itself is a sign of unconscious need for a dental examination, due to low health awareness. Although the analysis found a statistically significant difference between the two groups of users (those who visited and those who did not visit a dentist in the last 12 months), the proportion of users who rate this reason as a strong deterrent and postpone a dental visit is relatively low compared to the other statistically significant reasons.

According to dental doctors, the most common reason for patients to visit them is the occurrence of pain (36.4%), followed by the treatment of caries (25.2%), which is to some extent justified by the majority of dentists in the study who practice in the field of general dentistry. Only 6.6% of dentists say that their patients visit them for

preventive examinations. When patients report the reasons for their last visit to a dentist, the largest share of them (34.7%) indicate the performance of a preventive examination. It is followed by the treatment of caries (32.8%), and in third place with a minimal difference is the cleaning of tartar (32.1%), which can also be considered as part of the preventive regimen for maintaining dental health. At the bottom of the ranking is bleeding from the gums (5.4%) and the presence of dental trauma (2.9%) as a reason for an examination at a dentist.

Analysis of factors that could be associated with two of the key reasons (prevention or treatment) for a dental visit found that *education* ($p<0.001$), *self-rated dental health* ($p<0.001$), *residence* ($p<0.008$) and *income* ($p<0.001$) are factors that are related to the decisions of users of dental services, whether to visit a dentist with a preventive purpose or only in case of an acute symptom (pain). We hypothesize that the maintenance of oral health and the performance of regular preventive examinations are mainly carried out by the more highly educated users of dental services, residents of large cities and those with a higher income. Respondents who rate their dental status as very good and excellent demonstrate a significantly greater commitment to maintaining this status by performing preventive dental examinations.

Chapter 3. Guidelines for improving access to dental care in Bulgaria

The structure of the dissertation follows a general discussion of key conclusions presented in **Chapter 3. Guidelines for improving access to dental care in Bulgaria**, with a comparative analysis between the results obtained from the present study and foreign experience in **point 3.1**. Given the obtained conclusions, recommendations for improving access to dental care are formulated in **point 3.2**. This chapter of the dissertation is related to the implementation of task No.6.

One of the aspects of access that ensures the proper functioning of the health care system is the sufficient availability of dental specialists in the territory of the country. In **paragraph 3.1.1** a comparison of the number of graduated students in recent years in several countries in Europe, among which Bulgaria ranks in the top positions. One of the main reasons for the country's high supply of dentists is precisely the high number of graduating dental students. Unlike other countries, which are provided with too few dentists to meet the needs of their population, in Bulgaria the situation is reversed. The recommendation for minimum provision of dentists for the country for the last years has been covered, with the number of dentists per 1000 people of the population being one of the highest in the European Union ¹⁵.

Examining the access dimension related to the availability of health personnel in the health care system alone is not sufficiently informative. When performing an in-depth analysis of the provision of dentists by region in the country, a shortage was revealed in three of them, and in the Availability dimension, *difficulty* in access can be expected in the North-West, North-Central and South-East regions. In addition to these imbalances between the individual regions of the country, a high concentration of dentists was also found in the larger cities. According to the patient survey conducted, 90% of those living in villages reported traveling to another settlement to receive dental care. Of these, more than 65% cite the lack of a practicing dentist in their locality or the lack of a dentist suitable for their case as the reason that necessitates the trip. These patients cannot benefit from a wide selection of professionals, specialized clinics or modern equipment, like those living in the country's big cities. This paragraph draws comparisons with other European countries where similar restrictions are also observed for residents of small settlements. The results of the conducted survey showed that patients living in villages visit a dentist less often than the rest of the respondents, but since no statistically significant difference was found in relation to the place of

¹⁵ Eurostat. Healthcare Personnel Statistics - Dentists, Pharmacists and Physiotherapists', August 2020, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Healthcare_personnel_statistics_-_dentists,_pharmacists_and_physiotherapists.

residence, it can be concluded that although it creates some difficulties, physical accessibility is not critical to the usability of dental services.

Convenience dimension is usually associated with the organization of the dental practice, with reception hours and waiting times. Patient survey results show that the majority of patients are able to receive dental care between one day and one week after making an appointment. The comparative analysis made in this paragraph with the different waiting time intervals in other countries showed that the waiting time according to our research is significantly shorter than the data reported in these studies. After the patients make the first contact with the health specialist, they manage to get timely dental care, which is a prerequisite for achieving good medical results. Although patients' lack of time to visit a dentist appears to be a significant motive for postponing dental examinations, this does not significantly limit the usability of dental services, and they still manage to prioritize their oral health and find a convenient time to get the dental care they need. Given this, it can be concluded that the time required to receive dental care in the *Convenience dimension* is not a threat for access.

Paragraph **3.1.2** discusses the limitations that financial barriers impose on consumers. According to research in a number of countries in the European Union, more than half of the people with an unmet need of dental care have indicated that the main reason for this is costs¹⁶. This is because dental care is mainly funded by consumers' own funds and dental health care is only partially integrated into public health systems. The package of dental activities covered by the National Health Insurance Fund in our country has limitations related to the number of dental services covered, which is limited for a certain period of time, or the dental services are limited to specific treatments, and the use of only certain materials for part of dental services. For one of the oral diseases with the highest frequency, caries of the permanent teeth, only the service: "obturation with amalgam or chemical composite" is provided for treatment in the package, without the possibility of applying other materials. Periodontal diseases are also not covered in the package and remain out of reach with cost-sharing options. Scaling, which is part of periodontal treatment to prevent the progression of gum disease, for example, is covered by compulsory health insurance in Slovakia, although this country provides more limited coverage than other European countries. In Estonia and Lithuania, patients share the costs with the health funds for receiving this dental service¹⁷. Gum disease is the second most common oral disease

¹⁶ Eurostat. Unmet Health Care Needs Statistics in 2021, Unmet Needs for Dental Examination and Treatment.', accessed 11 March 2021, https://ec.europa.eu/eurostat/statistics-explained/index.php/Unmet_health_care_needs_statistics#General_overview.

¹⁷ Juliane Winkelmann et al., 'Exploring Variation of Coverage and Access to Dental Care for Adults in 11 European Countries: A Vignette Approach', *BMC Oral Health* 22, no. 1 (9 March 2022): 65, <https://doi.org/10.1186/s12903-022-02095-4>.

in the population and is one of the leading causes of tooth loss in adults ¹⁸. In most cases, the loss of teeth leads to negative consequences related to the patient's quality of life and pushes them to seek subsequent more expensive treatment to restore the missing teeth, which may be financially prohibitive for a large part of users of dental services ¹⁹. The analysis of the results from the present study in the country is consistent with observations for Europe, according to which more than half of all costs for dental services are paid out of the patient's pocket, and therefore a major factor in ensuring access to dental care is the patient's socioeconomic status ²⁰.

In **paragraph 3.1.3**, the results of the analysis of the *Awareness dimension are discussed*. The study proved that patients can largely process and understand the health information they receive. Relatively high health literacy is demonstrated by most participants in the survey. A gap was found in the analysis of this dimension regarding consumer awareness of the dentist's role in the prevention of dental diseases. This paragraph presents a comparative analysis with other studies that confirm the tendency of dental service users to neglect routine oral examinations, reflecting a lack of awareness of the benefits of regular dental visits.

Most restricted and likely to miss a dental examination due to lack of awareness of the need for dental treatment in this study were a large proportion of patients with secondary education, rural residents, and respondents with self-reported poor dental health. Even considering that the self-assessment of dental health is not completely objective, the persons who give the lowest assessments of their dental status are precisely those who also register the lowest degree of awareness on a number of issues related to dental care. Gio et al. (2014) reached a similar conclusion, reporting the direct relationship between higher levels of health literacy and better oral health status ²¹. Respondents with low self-perceived dental health in the present study mostly visit a dentist in the presence of pain and less often for a preventive examination. These patients, on the one hand, consider high prices a serious obstacle, but on the other hand, they more often pay higher amounts for dental treatment, which is another indication of the trap in which they find themselves.

Section **3.1.3** presents a discussion of the results of the analysis per dimension *Acceptability*. Fear of the dentist can prevent you from receiving dental care. The

¹⁸ Chandrashekar Janakiram and Bruce A. Dye, 'A Public Health Approach for Prevention of Periodontal Disease', *Periodontology* 2000 84, no. 1 (October 2020): 202–14, <https://doi.org/10.1111/prd.12337>.

¹⁹ Anneloes E Gerritsen et al., 'Tooth Loss and Oral Health-Related Quality of Life: A Systematic Review and Meta-Analysis', *Health and Quality of Life Outcomes* 8 (5 November 2010): 126, <https://doi.org/10.1186/1477-7525-8-126>.

²⁰ Juliane Winkelmann, Jesús Gómez Rossi, and Ewout van Ginneken, 'Oral Health Care in Europe: Financing, Access and Provision', *Health Systems in Transition* 24, no. 2 (June 2022): 1–176.

²¹ Yi Guo et al., 'Health Literacy: A Pathway to Better Oral Health', *American Journal of Public Health* 104, no. 7 (July 2014): e85–91, <https://doi.org/10.2105/AJPH.2014.301930>.

participants with secondary education, the younger part of the population up to 30 years old, as well as patients who rate their dental health as very bad and deteriorated are the most severely limited by it. These results are similar to those reported in other studies. Dentist chair anxiety modifies patients' behavior, and respondents with poor dental health were most affected in the current study. Due to the state of their dental status, they are most likely to have to experience more difficult and traumatic procedures, which subsequently prevent them from seeing a dental specialist again in time. Therefore, it is essential to use different approaches to reduce their negative effects, and for this purpose, several mechanisms are applied to assess and manage fear and anxiety, namely filling in questionnaires, applying pharmacological means, psychotherapeutic methods that are used depending on the degree of anxiety. In patients with established low levels of anxiety, changes in the surrounding environment, improving the sense of control, the most frequently applied in this clinical practice being the stop sign and encouraging cognitive distraction, usually have a positive effect. In patients for whom high levels of anxiety are registered, various psychotherapeutic methods and/or pharmacological agents such as local anesthesia, sedation and general anesthesia are usually applied ²². Dealing with these anxious emotions requires a dialogue in which the patient gains confidence and trust in their dentist.

Paragraph **3.1.4** discusses the results of the study related to the usability of dental care. According to the present study, reduced use of dental services in the past 12 months was found among patients with secondary education, low income and the unemployed. The analysis between the obtained results of the present study based on the opinion of dentists and foreign experience found that patients mainly seek a dentist in the presence of pain. Patients often seek dental care in the later stages of the disease, when severe symptoms such as pain and discomfort appear, rather than earlier, i.e. demonstrate treatment-oriented rather than prevention-oriented behavior. Participants with secondary education, those with poor dental health, as well as patients whose incomes are low and live in villages, enter the dentist's office more often because of a toothache.

In this paragraph, a comparative analysis is made with other studies, which largely confirm the conclusions obtained in our study, namely that the most limiting barriers to obtaining dental care are the cost of dental services and fear of the dentist. A summary of the findings on the dimensions of access is shown in Table No.6.

²² Ava Elizabeth Carter et al., 'Pathways of Fear and Anxiety in Dentistry: A Review', *World Journal of Clinical Cases* : *WJCC* 2, no. 11 (16 November 2014): 642–53, <https://doi.org/10.12998/wjcc.v2.i11.642>; T. Newton et al., 'The Management of Dental Anxiety: Time for a Sense of Proportion?', *British Dental Journal* 213, no. 6 (September 2012): 271–74, <https://doi.org/10.1038/sj.bdj.2012.830>.

Table No. 6 Summary of findings by dimensions of access

| Dimension | Conclusions |
|--------------------------------|---|
| Availability | The distribution of dental doctors is disproportionate in the country, with a low supply of these medical specialists being observed in the North-West, North-Central and South-East regions of the country. In addition to these imbalances between the individual regions of the country, a high concentration of dentists was also found in the larger cities. |
| Physical accessibility | Consumers of dental services mainly with secondary education, low income, inactive in the labor market and living in villages are the most limited to get dental care, due to difficulties in traveling to their dentist related to lack of transport or long distance. |
| Convenience | Consumers of dental services, mainly under the age of 30, working, with higher education and income, as well as residents of the capital, are the most limited to receive dental care due to not being able to find time to go to the dentist or because the dentist does not work at a time that is convenient for them. |
| Financial accessibility | Consumers of dental services, primarily low-income, unemployed, and self-reported poor oral health, are the most restricted from receiving dental care due to co-pays for dental services. |
| Acceptability | Consumers of dental services mainly under the age of 30, with less education, the unemployed and self-reported poor oral health are the most restricted from receiving dental care due to being afraid to go to the dentist. |
| Awareness | Consumers of dental services mainly with secondary education, residents of villages and self-assessed poor oral health are the most restricted from receiving dental care due to their lack of awareness of the need for dental treatment. |

In **point 3.2**, recommendations are formulated for improving access to dental care in accordance with task No. 6.

In the country, the number and location of medical facilities in outpatient dental care is not regulated for this reason there is an uneven distribution of dental practices and, accordingly, their higher concentration in certain areas. Geographical imbalances in the supply of dentists in the North-West, North-Central and South-East regions can probably be reduced by improving the overall economic situation in these parts of the country and thus giving an impetus to dentists to practice their profession there. Apart from the imbalances between the individual regions of the country, the practices of dental medicine doctors are mainly concentrated in the cities, and this makes physical access difficult for patients from our smaller settlements. In our country, as well as in other European countries, steps have been taken to mitigate the negative effects of geographical imbalances, by allocating additional funding to dentists who work in remote and hard-to-reach areas. Additionally, projects for providing dental services for the rural population without access to dental care in equipped specialized mobile buses are also being considered.

Given the findings of this study, there is also a need to improve patient awareness of the importance of using preventive dental services and to consider their oral health as a higher priority. This can be accomplished by developing new oral health promotion and prevention strategies to be integrated into national or local health programs. Using various communication channels, dental users can receive accessible health information from their dentist, through media campaigns, information brochures and through school-age education. In addition, information about the effects of poor oral health on general health can be disseminated in a targeted manner to chronically ill patients (from *diabetes, with cardiovascular problems, with respiratory diseases, etc.*), which usually have common risk factors with some of the most common oral diseases. Another aspect of consumer awareness that was found to be lacking in the present study is the relatively low level of knowledge of the package of dental activities that NHIF covers. In this regard, it is also necessary to take actions by the health authorities, through which, at national level, with an emphasis on the most vulnerable groups, to improve the level of awareness about the types of dental activities that are fully or partially paid by the NHIF. Strengthening the monitoring of the fulfillment of the obligation of dental care providers to place in their practices in generally accessible places information about the type and price of all services provided, as well as about the method of their payment, could indirectly improve the knowledge of patients in this aspect.

According to the analysis, paying for dental services severely limits the ability of consumers to obtain dental care. One of the main reasons is that patients pay with their own funds for dental services that are not included in the available package provided by the NHIF or when sharing the costs of covered services by the health system. The dentists in the study believe that the range of dental services covered by the health fund is not sufficient and accordingly propose that it be expanded to include the services of dental calculus cleaning and endodontic treatment for adults. The main focus in the publicly covered program is on treatment, while the prevention of oral diseases and the promotion of dental health in general are underrepresented. A mechanism by which the development of good practice among consumers for the prevention of oral diseases could be stimulated is the implementation of a mandatory system for performing regular dental examinations of health insured persons. By implementing professional standards and reward mechanisms in the health system, it can also positively influence the implementation of preventive activities to maintain oral health among the population.

The fear of dental manipulations, as well as the influence of past traumatic experiences, are another serious barrier that has a highly negative effect on access to dental care and, respectively, on the health status of patients. Since a significant portion of the population suffers from anxiety, it is recommended that dentists implement various mechanisms to manage this condition in their practice. The first step in this direction is to determine the degree of anxiety of the patient by filling out a questionnaire and, depending on it, to apply different psychotherapeutic methods and/or pharmacological means.

Given the conclusions drawn to improve access to dental care, it is also necessary for dental practitioners to be prepared not only to provide dental care to patients, but also to educate them about the importance of regular dental care, discuss barriers to obtaining dental care with them and to encourage them towards positive changes in their attitudes.

Conclusion

Diseases of the oral cavity are among the main problems of public health on a global scale. One of the most common oral diseases have great preventive potential if preventive dental visits are carried out, but the facts show that they are still among the most common diseases among the world's population and have a serious health and economic burden. This necessitates the need to conduct a more in-depth study in order to reveal the essence of this problem. The theoretical foundations for researching access to health and dental services are examined based on a review of the specialized scientific literature. Based on the literature review, the approach proposed by McKernan et al was chosen. for analysis and evaluation of access to dental care in our country, which offers a new reading of the conceptual framework of Penchansky and Thomas from 1981.

On the basis of the indicated theoretical formulation for the study of access to dental care, a questionnaire survey was conducted among users and providers of dental services, and statistical methods for data interpretation, as well as official statistical data and strategic documents, were used to analyze the results. The analysis showed that more than half of the users reported that they had to postpone a visit to the dentist, i.e. they failed to "realize access". The ability of patients to receive dental care when needed, according to both groups of respondents, can be most limited by the payment of dental services, the fear of dental manipulations and the lack of time for patients. Once the various structural, personal and financial barriers are overcome, the use of dental services is realized. Analysis of the usability of dental care among patients shows that the main barriers to the utilization of access are the payment of dental services and fear. Given the findings of the current study, our hypothesis was not fully confirmed, structural barriers did not impede access to dental care for consumers, while financial and personal barriers did result in a significantly greater limitation of access to dental services for part of the population.

Identifying determinants that operate across dimensions is key to reducing inequalities in access and improving population health outcomes. Payment for dental services which was examined in the "*Affordability*" dimension was the most limiting for low-income patients, the unemployed, and participants who rated their dental health as poor. It is these groups of respondents who, to a greater extent, do not have enough information about the "Dental activities" package, which covers NHIF even in cases where they have a real need from receiving dental treatment tend to pay the necessary sums for it, regardless of the amount of their income. This is a prerequisite for creating inequalities in the use of dental services among patients of lower socio-economic status. Fear and anxiety, explored in the *Acceptability dimension*, also limit normal

access to dental services, as patients avoid visits to the dentist more often and thus increase the risk of deterioration of their oral health. The most vulnerable population groups are younger patients, the less educated, the unemployed and, predictably, those with self-reported poor dental status.

There are differences in access to dental care, depending both on socio-economic determinants such as education, income, employment status, and on respondents' self-reported dental status. It is with a focus on these target groups that policies should be developed, through which work to reduce the limitations imposed by the barriers to access to dental care, since oral health is a key indicator of the general health status of the population.

4. DISSERTATION CONTRIBUTIONS

Theoretical contributions

1. The development of the theoretical foundations for the study of access to dental care is studied and chronologically traced. Based on the literature review, a comprehensive and specifically applicable to dental care access research approach is derived.
2. A methodological toolkit was developed and used to conduct research on access to dental care.

Theoretical and applied contributions

3. The structural, financial and personal barriers to access to dental care were investigated and, through a statistical analysis, their degree of influence on different groups of users was assessed by factors in the individual dimensions, as well as on usability of dental services.
4. The study applies, for the first time in our country, the selected approach to study access to dental care, which makes it possible to conduct comparative studies on a national and international level.
5. Based on the research conducted and the results obtained, recommendations have been formulated that can be taken into account and used to integrate measures to improve access to dental care in Bulgaria.

5. DISSERTATION RELATED PUBLICATIONS

1. E. Todorova, E. Atanasova, Consumer Payments for Dental Services in Bulgaria, Bulgarian Journal of Public Health, Issue 2, 2023
2. E. Todorova, E. Atanasova, Coverage of dental services by the National Health Insurance Fund in Bulgaria, Varna Medical Forum, issue 1, 2023
3. E. Todorova, Anxiety and fear - Barrier to access and acceptance of dental care Varna medical forum, item 12, 2023, issue 1

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