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STUDY ON THE COSTS OF DENTAL SERVICES AND THEIR IMPACT ON ACCESSIBILITY

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The dental care system in Romania faces major challenges regarding accessibility and quality of services, showing discrepancies compared to European standards. Access is difficult in rural areas, where the number of dentists is low, in contrast to the high concentration in large cities such as Bucharest. The quality of services varies between the private sector, where modern technologies predominate, and the public sector, where limited resources affect care.

This study aims to analyze the costs of dental services and their impact on accessibility in Romania, compared to other European countries, in order to identify disparities and propose solutions that ensure equitable access to oral health.

Treatment costs in Romania are 60-75% lower than in developed countries, attracting dental tourism; however, they remain prohibitive for the local population. In recent years, prices have increased by 25-30%, exceeding inflation, due to the rising costs of materials and technologies.

The distribution of expenditures is unbalanced: curative treatments represent approximately 70% of costs, while prevention accounts for only 10-15%, a situation opposite to countries with efficient dental care systems (see Chart no. 3). The financial impact on families is severe: 15-20% of them bear catastrophic costs, meaning over 25% of their income, leading to indebtedness or sacrifices in other areas.

The study results have important implications for public health policies in Romania, highlighting the need for structural reforms to align with European standards regarding accessibility and equity in dental services, within the context of budget constraints and competing priorities in the health system.

Keywords: dental services, access, impact, implant

I. INTRODUCTION

The dental care system in Romania faces major challenges regarding accessibility and quality of services, showing discrepancies compared to European standards. By the end of 2024, there were only 35 public dental offices compared to over 17,000 in the private sector, creating an almost total dependence on private services [1]. Access is even more difficult in rural areas, where the number of dentists is low, in contrast to the high concentration in large cities such as Bucharest [2].

Although the total number of dentists is adequate, the uneven distribution and funding based predominantly (93-94%) on direct patient payments generate significant financial barriers [3, 5]. Social insurance covers only basic dental services, while complex treatments are fully paid by patients, leading to the postponement of necessary interventions.

The quality of services varies between the private sector, where modern technologies predominate, and the public sector, where limited resources affect care. On average, Romanians undergo only 0.3 dental consultations annually, well below the European average, and perceived high costs lead to avoidance of preventive treatments and late presentation of patients [4–7].

II. SCOPE and OBJECTIVES

This study aims to analyze the costs of dental services and their impact on accessibility in Romania, compared to other European countries, in order to identify disparities and propose solutions that ensure equitable access to oral health care.

General Objective:

To systematically evaluate the costs of dental services and their impact on accessibility in Romania, within the European context, to identify existing barriers and formulate public policy recommendations.

Specific Objectives:

- Comparative analysis of dental service costs between Romania and European countries, focusing on the impact on access for different socioeconomic groups.
- Evaluation of public and private financing models and their influence on accessibility and equity.
- Identification of financial and non-financial barriers to accessing dental services in Romania, based on epidemiological and utilization data.
- Analysis of the effect of costs on social and geographic inequalities in oral health, with emphasis on vulnerable groups.
- Formulation of public policy recommendations, inspired by successful European models, to improve access to dental services in Romania.

III. METHODOLOGY

This research employs a mixed-methods design, combining quantitative and qualitative approaches to provide a comprehensive perspective on the costs of dental services and their impact on accessibility in Romania, compared to European countries.

The study is comparative in nature, based on a cross-sectional approach using secondary data from official sources and scientific literature covering the period 2019–2025.

Study Design

- The **quantitative component** consists of statistical analysis of data on dental service costs,

accessibility indicators, and health system characteristics in Romania and other European countries. Descriptive and inferential methods are applied to highlight trends, disparities, and correlations among variables.

- The **qualitative component** involves a systematic review of the scientific literature to identify factors influencing the costs and accessibility of dental services. This qualitative analysis complements and explains the quantitative data, offering a detailed understanding of the context.
- The **comparative approach** allows for highlighting differences and similarities between Romania and other European countries in terms of organization, financing, and accessibility of dental services. This forms the basis for identifying best practices and developing public policy recommendations.
- The **temporal dimension** covers the period 2019–2025, providing insight into the evolution of costs and accessibility, including the effects of the COVID-19 pandemic. Data from 2019 serve as a pre-pandemic baseline, while subsequent data allow for analysis of recent trends.

Unit of Analysis

The primary unit of analysis consists of European countries, with a special focus on Romania. The study includes all EU member states, countries of the European Economic Area (Norway, Iceland), and Switzerland, to encompass the diversity of European oral health systems.

Data Sources

To ensure data validity and reliability, the research utilizes multiple official and peer-reviewed sources:

- **International sources:**
  - ◊ OECD Health Statistics (health expenditure including dental care)
  - ◊ Eurostat (demographic, socioeconomic data, and health expenditure)
  - ◊ WHO Global Health Observatory (oral health indicators and oral disease prevalence)
  - ◊ European Federation of Consumer Associations in Health (analyses on access to dental services)
- **National sources for Romania:**
  - ◊ National Health Insurance House (CNAS)
  - ◊ Romanian College of Dentists
  - ◊ National Institute of Statistics (INS)
  - ◊ Ministry of Health
- **Scientific literature:**
  - ◊ Databases such as PubMed, Scopus, Web of Science, and Cochrane Library, using relevant keywords in both Romanian and English.

Data Collection and Processing Methods

- Quantitative data were extracted directly from official databases in standard formats (Excel, CSV, SPSS).
- Data standardization was achieved by converting to common units (EUR for costs, rates per capita for indicators), adjusting for purchasing power parity, and harmonizing definitions.
- Data validation involved cross-checking multiple sources and handling anomalies by selecting the most authoritative sources or calculating weighted averages.
- Qualitative data were extracted from studies selected based on explicit criteria, paying close attention to methodology and relevance to the research topic.
- Data organization was supported by Python and Excel for **analysis**, and Mendeley for bibliographic reference management.

Data Analysis Methods

- Descriptive analysis: Calculation of measures of central tendency (mean, median) and dispersion (standard deviation, range) for variables of interest.
- Comparative analysis: Statistical tests (t-tests, non-parametric tests) to identify significant differences between Romania and other countries.
- Correlation analysis: Pearson and Spearman coefficients to evaluate relationships between costs and accessibility.
- Regression analysis: Linear and logistic models to investigate causal relationships and identify determining factors.
- Clustering analysis: Identification of groups of countries with similar oral health systems to detect typologies and best practices.
- Temporal analysis: Study of the evolution of costs and accessibility over 2019–2025 through time series analysis.
- Qualitative analysis: Narrative synthesis of literature, organized thematically according to the study objectives.
- Data triangulation: Integration of quantitative and qualitative results for a comprehensive understanding and validation of conclusions.

IV. RESULTS

General Characteristics of Oral Health Systems in Europe

The analysis of European oral health systems reveals significant diversity in the organization, financing, and accessibility of dental services. This diversity is driven by distinct historical traditions, different political philosophies, and varied priorities in health resource allocation, offering a broad spectrum of models and approaches that can be compared.

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Typology of Oral Health Systems in Europe

European systems can be classified into four main categories based on financing and organization methods:

1. **Predominantly Publicly Funded Systems** Countries such as Sweden, Denmark, and Finland provide universal coverage for basic dental services and invest substantially in prevention. These systems achieve the best results in terms of equity and oral health indicators, although they involve high public costs.
2. **Mandatory Social Insurance Systems** In Germany, France, Austria, and Belgium, financing is based on compulsory contributions from employees and employers, combined with complementary private insurance. These systems ensure broad coverage for basic dental services and allow access to additional services through the private sector. Accessibility and equity are moderate, with variations depending on the specific model.
3. **Mixed Public-Private Systems** Countries like the Netherlands, the United Kingdom, and Ireland offer public dental services for vulnerable groups (children, low-income individuals), while the rest of the population predominantly accesses private sector services. These systems are cost-effective from a public spending perspective but may generate inequalities in access for middle-income adults.
4. **Predominantly Private Funding Systems** Romania, Bulgaria, Cyprus, and Greece rely heavily on out-of-pocket payments by patients, with minimal state involvement. These systems are characterized by low public expenditure but significant inequalities in access and oral health outcomes below the European average.

Dentist Density and Distribution

Dentist density varies significantly across Europe, from over 120 dentists per 100,000 inhabitants in Greece and Bulgaria to less than 50 in the Netherlands and the UK. Romania has about 135 dentists per 100,000 inhabitants; however, unequal distribution and predominantly private financing limit equitable accessibility.

Dental Service Infrastructure

Infrastructure in the public and private sectors varies widely among countries. In Nordic countries and Germany, the public sector offers comprehensive services with modern equipment. In Eastern Europe, the public sector is often underfunded and poorly equipped, leading patients to seek higher-quality services in the private sector.

Range of Services Covered by Public Systems

Service coverage varies by country:

- Nordic countries offer nearly complete coverage for all dental services, including complex treatments and orthodontics.
- Germany and France cover basic and partly specialized services, with options for supplementary insurance for premium services.
- Romania provides only a minimal package, limited to consultations, simple extractions, and emergency treatments.

Payment Mechanisms

Systems use combinations of global budgets, fee-for-service payments, and mixed models:

- Developed public systems use global budgets for prevention and fee-for-service for treatments.
- Social insurance-based systems apply fee-for-service payments with negotiated tariffs.
- Private systems rely on market prices.

Role of Prevention

Nordic countries invest heavily in community prevention, oral health education, and fluoridation, resulting in superior indicators and lower long-term costs. In contrast, private systems invest minimally in prevention, focusing on curative treatments that generate immediate revenue.

Integration of Dental Services

Integration is more advanced in countries with unified public systems, where dental services are coordinated with other medical services, facilitating integrated management of chronic conditions. In countries with fragmented systems, dental services often operate independently, limiting coordination and integrated care.

4.1. Cost Analysis of Dental Services in Romania

The costs of dental services in Romania are relatively low in absolute terms compared to Western countries, but they represent a significant financial burden for the population due to low incomes. Total annual expenditures amount to approximately 5 billion lei (~1 billion EUR), which is about 0.5% of GDP—much lower than the average for developed countries (1-2% of GDP) [9].

Romania ranks 27th out of 30 European countries in terms of per capita spending, with only 32.9 EUR annually—more than 10 times less than the top-ranking countries. Service costs vary depending on the procedure and provider but remain substantially lower than in Germany or France (see Table 1).

Low public funding is reflected in the frequency of dental consultations: Romania records only 0.3 dental consultations per capita annually, compared to 1.8 in Germany and 2.1 in Sweden, where public funding is much higher (65-75%). Countries with substantial investments in prevention achieve better outcomes and lower total costs in the long term.

In Romania, funding is dominated by out-of-pocket payments from patients, covering 93-94% of costs, while the contribution of the National Health Insurance House is low (6-7%), which limits access and increases the financial risk for families (see Table 2).

Although absolute costs in Romania are significantly lower, they remain prohibitive for a large part of

Table 1. Per Capita Expenditures for Dental Services in European Countries (2019)

Country	Per capita expenditures (EUR)	Per capita expenditures (RON)	Top EU
Country	493.7	2345.1	1
Switzerland	405.0	1923.8	2
Norway	372.2	1768.0	3
Germany	345.4	1640.7	4
Luxembourg	327.0	1553.3	5
Sweden	321.7	1528.1	6
Denmark	316.8	1504.8	7
Italy	236.4	1123.0	8
Austria	213.5	1014.1	9
Netherlands	195.4	928.2	10
France	185.2	879.7	11
Belgium	178.0	845.5	12
Spain	143.2	680.2	13
United Kingdom	113.0	536.8	14
Estonia	107.6	511.1	15
Finland	104.0	494.0	16
Ireland	91.6	435.1	17
Portugal	84.7	402.3	18
Czech Republic	79.3	376.7	19
Greece	77.1	366.2	20
Lithuania	71.5	339.6	21
Slovenia	58.7	278.8	22
Latvia	58.1	276.0	23
Slovakia	56.6	268.9	24
Poland	44.8	212.8	25
Hungary	37.3	177.2	26
Croatia	32.9	156.1	27
Romania	19.3	91.7	28
Bulgaria	15.7	74.6	29
Cyprus	14.4	68.4	30
Turkey			

Source: Own calculations based on OECD and Eurostat data. Conversion rate: 1 EUR = 4.75 RON (average rate 2019)

Table 2. Public funding and frequency of dental consultations in selected countries

Country	Public funding (%)	Consultations per capita/ year	Public coverage over 60%
Romania	7	0.3	No
Germany	65	1.8	Yes
France	65	1.5	Yes
Netherlands	25*	3.3	No**
Croatia	60	1.1	Yes
Spain	15	1.0	No
Sweden	75	2.1	Yes
Poland	30	0.8	No
Italy	45	1.4	No
Czech Republic	35	1.0	Nu

**Pentru adulți; copiii au acoperire completă **Asigurări private voluntare cu penetrare de 85%*
Sursa: FEDCAR, OECD Health Statistics, analize naționale

Table 3. Comparison of dental treatment costs: Romania vs. European countries

Treatment	Romania (EUR)	Germany (EUR)	France (EUR)	Savings compared to Germany
Basic consultation	15–25	50–80	60–90	65–70%
Simple filling	30–50	80–120	90–130	60–65%
Root canal treatment	80–150	200–400	250–450	60–70%
Dental crown	150–250	700–1000	800–1200	75–80%
Complete dental implant	700–1200	2000–3000	3500–4500	65–70%
Dental veneers (per tooth)	200–300	500–800	600–900	60–70%
All-on-4 prosthesis	3600–4600	12000–15000	15000–20000	70–75%
Orthodontics (fixed braces)	800–1500	3000–5000	3500–6000	70–75%

Sursa: Analiză bazată pe date din clinici private și studii de piață (2024)

the population when considered relative to income levels. A dental implant in Romania costs the equivalent of 3–5 minimum wages, whereas in Germany it represents approximately 1–2 minimum wages (see Table 3). Relative to the average income, prices are disproportionately high — a dental implant can represent 15–20% of a Romanian's annual income, compared to 3–5% in Germany (see Table 3).

The evolution of costs over time shows a consistent upward trend in the prices of dental services in Romania. Between 2019 and 2024, costs increased by approximately 25–30%, outpacing the general inflation rate. This increase is driven by several factors: higher costs of dental materials (mostly imported), improvements in the technologies used, and growing demand for higher-quality services.

The distribution of costs by type of service reveals that curative and restorative treatments account for about 70% of total expenditure, while preventive services represent only 10–15%. This distribution is the reverse of that found in countries with well-developed oral health systems, where prevention accounts for a larger share of spending, resulting in lower total long-term costs.

The financial impact on families is substantial, with studies showing that approximately 15–20% of households accessing complex dental services face catastrophic costs (over 25% of household income). These expenses often lead families into debt, force them to sell assets, or cause them to forgo other essential needs.

Regional variability in costs is relatively low in Romania, with differences of 10–20% between regions. Prices are slightly higher in Bucharest and major urban centers, but the disparities are not as pronounced as in other European countries. This relative uniformity in prices contrasts with the significant differences in geographical accessibility of services.

In conclusion, treatment costs in Romania are 60–75% lower than in developed countries, attracting dental tourism, yet they remain prohibitive for the local population. In recent years, prices have risen by 25–30%, exceeding inflation, due to the increased cost of materials and technologies. The spending distribution is unbalanced: curative treatments account for around 70% of costs, while prevention only 10–15%—the opposite of countries with efficient dental care systems (see Chart no. 3). The financial burden on families is severe: 15–20% face catastrophic expenses, meaning over 25% of their income, leading to debt or sacrifices in other areas.

IV. DISCUSSIONS

The study results have important implications for public health policies in Romania, highlighting the need for structural reforms to align with European standards regarding accessibility and equity in dental services, given budgetary constraints and competing priorities within the health system.

Reforming the financing system is the most urgent challenge, as the current model—with only 7% public funding—is unsustainable in terms of equity and efficiency. European experience shows that public funding between 50–75% ensures superior outcomes in access and oral health.

Possible solutions include expanding the National Health Insurance House (CNAS) coverage to basic restorative treatments, preventive services for adults, and complex emergencies, requiring additional resources estimated between 500 and 800 million RON annually. Introducing mandatory complementary insurance, inspired by the French or German models, with additional contributions of 1–2% of salaries, could support financial sustainability and population financial protection.

Targeted programming for vulnerable groups (children, elderly people, Roma community, low-income individuals) is an immediate priority that can reduce inequalities without major reforms. Investments in prevention (water fluoridation, school education, awareness campaigns) are the most cost-effective methods for long-term improvement.

Developing public infrastructure (dental offices in rural and disadvantaged urban areas) and integrating dental services into the general health system would increase access and care coordination. Temporary regulation of prices in the private sector could control costs in the short term, accompanied by measures ensuring quality and stimulating innovation.

Human resources require investment in training, working conditions, and incentives to attract dentists to disadvantaged areas. Implementing monitoring and evaluation systems is vital to track reform progress, using indicators of accessibility, equity, quality, and efficiency.

Coordination with broader social policies, such as poverty reduction and educational improvement, will support oral health. Adapting successful international models through collaboration and experience exchange can accelerate reform.

European models offer valuable lessons:

- **Sweden:** the gold standard in equity and accessibility, with free services for youth up to age 23 and subsidies up to 85% for adults [10]. Universal funding, emphasis on prevention, and integration into the general health system ensure excellent results at moderate costs.
- **Germany:** a combination of mandatory social insurance and private options, with broad coverage (>95%) and strong financial protection [11]. The model could be adapted to Romania by expanding the current system with gradual additional contributions.
- **France:** a hybrid system with mandatory social insurance and complementary private insurance (mutuelles), covering about 70% of costs and guaranteeing financial protection and freedom of choice [12].
- **Netherlands:** excludes dental services for adults from the public package but has high voluntary private insurance penetration (>85%), highlighting the importance of regulation and subsidies for vulnerable groups [13].
- **Finland:** a recent major reform that included dental services in the universal health package, demonstrating the importance of gradual implementation and stakeholder consultation [14].
- Transition models from Eastern Europe, such as Poland and the Czech Republic, offer relevant lessons for Romania: the importance of investing in infrastructure and human resources, and the need for sustainable incremental reforms [15].
- Common principles of successful models include substantial public funding (>50%), prevention, universal child coverage, protection for vulnerable groups, and integration into the general health system. Success depends on political support, adequate financing, gradual implementation, consultation, and careful monitoring.

V. CONCLUSIONS

The study results have important practical implications for multiple categories of actors involved in Romania's oral health system.

- **For policymakers,** the study provides a clear agenda of priority reforms and evidence-based justification for investments in oral health. The recommendations can guide the development of national strategies and inform budget allocation processes.
- **For oral health professionals,** the study highlights the need for active involvement in advocacy for system reforms and the development of innovative approaches to improve accessibility. The results can inform practice strategies and guide professional development.
- **For international organizations,** the study offers a detailed analysis of a country facing major oral health challenges, which can inform technical

assistance and cooperation programs. The lessons learned may be relevant for other countries with similar challenges.

- **For researchers,** the study identifies significant gaps in current knowledge and proposes future research directions that can contribute to the advancement of the field. The methodologies developed can be adapted to other research contexts.
- **For civil society,** the study provides arguments for advocacy and mobilizing public support for oral health reforms. The results can inform awareness campaigns and support efforts to hold authorities accountable.

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