ECONOMIC IMPACT OF COVID-19 ON ROMANIA'S CAPITAL DENTAL PRACTICES

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ABSTRACT

This paper examines the economic impact of the COVID-19 pandemic on private dental practices in Bucharest, Romania, focusing on the influence of practice size and employee numbers. A comparative analysis was conducted across three years: 2019, 2020, and 2021, utilizing data sourced from the Romanian Finance Ministry. In 2019, there were 1,735 active dental practices, but this number declined to 1,704 in 2020 and further to 1,644 in 2021. Key financial indicators (KFIs) such as turnover, profit, revenue, expenses, debts, and employee numbers were analyzed. The findings revealed a significant decrease in turnover and revenue in 2020 compared to 2019 ($p < 0.001$), with larger practices (those employing more than three individuals) facing a greater economic burden than smaller ones. However, in 2021, larger practices demonstrated a significant recovery, showing higher increases in turnover, profit, and revenue compared to the smaller ones ($p < 0.001$). This research shows how important adaptable workforce management is in a dental practice for staying profitable during economic crises. This paper suggests that dental practices should create strategies to improve their resilience against future crises based on these findings.

Key words: COVID-19; dental economics; dentistry; dental professionals; infection control; pandemics impact; post-pandemic lessons; public health; oral health.

INTRODUCTION

In December 2019, a new coronavirus strain emerged, leading to the COVID-19 pandemic declaration in March 2020 [1]. The virus primarily spreads through droplets from coughing or sneezing, infecting nearby individuals [2,3]. This was a major reason for closing dental practices globally in 2020 [4]. In Germany, only emergency dental treatments were permitted starting April 2020 [5], and emotional factors like the fear of infection also contributed to practice closures [6].

In Poland, an organization formed on April 22, 2020, to support dental practices, recommending a fund for economic hardships and addressing shortages and higher costs of medical equipment [6]. Swiss dental activity dropped to 10% of pre-pandemic levels [7]. According to Campus et al. [8], responses varied, with only 14 out of 36 countries maintaining routine care during the survey period [8].

In Norway, on March 14, 2020, an emergency dental service for suspected COVID-19 cases was established. The UK

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and China also set up local emergency centers, while in Italy, many private dentists continued working during the pandemic [9]. The pandemic disrupted the regular face-to-face consultations between dentists and patients, leading to increased time between treatments and the introduction of online consultations, adding stress and economic burden [10–12].

Economically, the dental industry faced challenges with changing protective measures. In the US, dental office revenues dropped by 6% in 2020, with a significant 47% decrease in hygiene appointments from March to May [13]. Campus et al. [8] found that low-performing practices experienced greater revenue declines compared to top-performing ones, which fared better in 2020 than in 2019 [8].

In Romania, a state of emergency in March 2020 led to the closure of dental practices, except for emergencies [14,15]. The state of emergency transitioned to an alert on May 18, 2020, allowing reopening under Government Decision No. 394. The Ministry of Health and the Romanian College of Dentists created a plan for dental offices during this period.

Financial indicators like turnover, profit, revenue, and expenses are essential for evaluating a company’s resilience during economic stress [16,17]. These indicators measure how external shocks affect performance. The keey for financial health is being able to manage costs. [17]. Firms with conservative reporting tend to perform better post-crisis. Also the healthcare system resilience can be measured through financial and adaptive indicators [18].

Research on the financial evolution of private dental practices during the pandemic is limited. The previous study[19] analyzed key financial indicators (turnover, profit, revenue, expenses, debts, number of employees, and turnover-to-employee ratio) from 2019 to 2021. In this current paper key financial indicators are analyzed based on the number of employees, providing insights into future strategies for crisis resilience.

MATERIAL AND METHODS

Collection of data: In the same direction as the methodology presented in a previous study [19], the data were obtained from the official website of the Romanian Ministry of Finance. This is a financial and identification data repository for all businesses registered in Romania. This source was employed as it is the most unbiased financial data, and the Finance Ministry computes the final taxes of each company in Romania based on it. This dataset is the basis for calculating the Romanian gross domestic product and other macro-financial indicators. Hence, the data employed is the most reliable public source on financial indicators for companies in Romania, and all the other financial datasets are based on this dataset.

In order to focus only on dental practices, a business aggregation platform was accessed and was used the CAEN code 8623, assigned to dental services, as a search engine.

Data specification and inclusion/exclusion criteria: The present study collected data from the country's capital city, as approximately a quarter of the dental practices in Romania are in Bucharest. It is noteworthy that in 2021, these clinics contributed 34% of the revenue generated by practices in Romania, amounting to 259.8 million euros. A focused data compilation was directed at economic entities in Bucharest using a local business platform [20]. The primary objective was to extract accurate information for the fiscal years spanning 2019 through 2021.

The dental practices selected for the study were chosen based on the criteria of

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maintaining consistency in analyzing the impact of COVID-19 on finances. The inclusion criteria comprised practices in Bucharest, operating with data from 2019 to 2021 and falling under the CAEN code 8623 for services. Practices starting after 2019 or closing before 2019 were excluded from the analysis. Also, practices without complete information for the study years were left out to ensure accurate trend analysis.

Performance and financial indicators: Our paper specifically examined financial variables such as turnover, profit, number of employees, debt, income, and expenses.

The average number of calculated employees *per* company was 2.36. Therefore, the dataset was divided into small and large private offices based on the average number of employees.

In order to increase comprehension of performance indicators, the turnover-to-employee ratio (T/E) was determined for organizations that provided data on turnover and employee figures spanning from 2019 to 2021.

Statistical analysis: Statistical analysis was performed using IBM SPSS Statistics 25, and data visualization was done with Microsoft Office Excel 2013. Variables were classified as quantitative or qualitative, with qualitative data presented as frequencies or percentages and quantitative data subjected to Shapiro-Wilk normality tests. Results were shown as mean ± standard deviation or median with interquartile ranges, depending on data distribution. The Mann-Whitney U test was applied to independent groups. Statistical significance was set at a p-value of less than 0.05.

RESULTS

The KFIs dynamic of the observed dental practices between 2019-2020, examined concerning the number of employees

For further analyses, it was investigated whether there were significant differences in the examined parameters between dental practices with more than three employees and dental practices with less than three employees, spanning the pre-pandemic and pandemic years. As the average number of employees from Bucharest dental practices was approximately three, it was chosen to compare the groups in relation to this number. Table 1 presents the analysis of the financial indicators in relation to the number of employees. Dental practices with more than three employees had a significantly higher decrease in turnover ($p < 0.001$), a significantly higher decrease in the number of employees ($p < 0.001$), a significantly higher decrease in debt ($p = 0.043$), a significantly higher decrease in revenue ($p < 0.001$), and a significantly higher decrease in expenses ($p < 0.001$) compared to those practices with less than three employees. On the other hand, the evolution of profit ($p = 0.060$) and the evolution of T/E ($p = 0.174$) presented no statistically significant differences, as illustrated in Table 1.

Table 1. Comparison of KFIs of the observed dental practices between 2019 and 2020 *per* number of employees

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DifTurnover (RON)-2020/2019	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-22,071.67 ± 212,890.75	0 (-27,877 – 26,366.5)	815.45	< 0.001*
> 3 employees (p < 0.001**)	805,64.81 ± 700,405.49	54,193 (-63,726 – 216,916)	1028.91	
DifProfit (RON)-2020/2019	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-10,166.07 ± 102,661.75	-768 (-26330.5 – 17917)	840.16	0.060*
> 3 employees (p < 0.001**)	22,431.56 ± 359,779.29	6,484 (-80,890 – 84,181)	900.93	
Dif No.Emp-2020/2019	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-0.085 ± 1.128	0 (0-0)	803.65	< 0.001*
> 3 employees (p < 0.001**)	0.698 ± 3.209	1 (0-2)	1,090.01	
Dif Debts (RON)-2020/2019	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-7,730.3 ± 86,957.34	-218 (-8,605 – 5,870)	839.43	0.043*
> 3 employees (p < 0.001**)	-43,579.94 ± 326,942.86	3,284 (-48,631 – 49,162)	904.76	
Dif Revenue-2020/2019	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-23,571.62 ± 215,710.5	0 (-31,560 – 24,512)	821.21	< 0.001*
> 3 employees (p < 0.001**)	52,093.04 ± 724,318.4	41,859 (-86,675 – 205,505)	999.11	
Dif Expenses (RON)-2020/2019	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-13,284.5 ± 150,331.5	196 (-17,433.5 – 14,731)	821.65	< 0.001*
> 3 employees (p < 0.001**)	23,851.6 ± 751,671	27,884 (-64,612 – 166,447)	996.81	
Dif T/E (RON)-2020/2019	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-9,639.41 ± 99,779.41	2,221 (-30,933.37 – 24,755.08)	544.48	0.174*
> 3 employees (p < 0.001**)	-10,484.74 ± 72,144.53	-3,293 (-35,713 – 24,278.38)	514.86	

Legend: DifTurnover (RON)-2020/2019—Difference in Turnover from 2019 to 2020, in Romanian Leu; DifProfit (RON)-2020/2019—Difference in Profit from 2019 to 2020, in Romanian Leu; DifNo.Emp-2020/2019—Difference in Number of Employees from 2019 to 2020); DifDebts (RON)-2020/2019—Difference in Debts from 2019 to 2020, in Romanian Leu; DifRevenue-2020/2019—Difference in Revenue from 2019 to 2020, in Romanian Leu; DifExpenses (RON)-2020/2019—Difference in Expenses from 2019 to 2020, in Romanian Leu; DifT/E (RON)-2020/2019—Difference in Turnover *per* Employee from 2019 to 2020, in Romanian Leu; ≤ 3 employees—Dental practices with three or fewer employees; > 3 employees—Dental practices with more than three employees; *Mann-Whitney U Test, **Shapiro-Wilk Test

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The KFIs dynamic of the observed dental practices between 2020 – 2021, examined concerning the number of employees

In this section, it was investigated whether there were significant differences in the examined parameters between dental practices with more than three employees and dental practices with less than three employees, spanning the pandemic and post-pandemic years. Data from Table 2 and presents the comparison of KFIs dynamic of the observed dental practices between 2020 and 2021, examined in relation to the number of their employees.

Dental practices with more than three employees had a significantly higher increase in turnover ($p < 0.001$), a significantly higher increase in profit ($p < 0.001$), a significantly higher increase in revenue ($p < 0.001$), a significantly higher increase in expenses ($p < 0.001$), and a significantly higher increase in T/E ($p < 0.001$). However, the evolution of the number of employees ($p = 0.251$) and of debts ($p = 0.245$) presented no statistically significant differences between the examined groups, as depicted in Table 2.

Table 2. Comparison of KFIs evolution from 2020 to 2021 between dental practices to the number of employees

Dif Turnover (RON)-2021/2020	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-99,622.63 ± 381,506.91	-30,429 (-88,034 - -564)	889.46	< 0.001*
> 3 employees (p < 0.001**)	-693,955 ± 1,952,823.26	-285,934 (-582,034 - -88,945)	426.87	
Dif Profit (RON)-2021/2020	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-41,857.96 ± 167,063.08	-11,812 (-50,426 – 2,936)	840.91	< 0.001*
> 3 employees (p < 0.001**)	-127,844.86 ± 358,088.93	-60,180 (-178,242 – 23,744)	673.99	
Dif No.Emp-2021/2020	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-0.068 ± 0.69	0 (0-0)	808.87	0.251*
> 3 employees (p < 0.001**)	-0.109 ± 2.559	0 (-1 – 1)	837.09	
Dif Debts (RON)-2021/2020	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-13,215.63 ± 154,108.67	0 (-6,612 – 9,183)	807.50	0.245*
> 3 employees (p < 0.001**)	-129,790.63 ± 1,237,551.02	2,358 (-60,883 – 58,862)	844.04	
Dif Revenue (RON)-2021/2020	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-101,812.34 ± 388,723.68	-29,382 (-86,421 – 0)	887.13	< 0.001*
> 3 employees (p < 0.001**)	-689,349.31 ± 1,927,128.6	-280,905 (-575,142 - -83,071)	438.71	

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Dif Expenses (RON)-2021/2020	Average ± SD	Median (IQR)	Mean Rank	p
≤ 3 employees (p < 0.001**)	-58,363.83 ± 254,237.87	-10,935 (-44,599 – 784)	888.63	< 0.001*
> 3 employees (p < 0.001**)	-552,581.18 ± 1,689,370.17	-185,098 (-425,960 - -48,263)	431.10	
DifT/E (RON)-2021/2020	**Average ± SD**	**Median (IQR)**	**Mean Rank**	**p**
≤ 3 employees (p < 0.001**)	-58,785.34 ± 124,345.31	-28,045.16 (-79,182.8 - -2,855)	571.08	< 0.001*
> 3 employees (p < 0.001**)	-64,052.8 ± 83,342.71	-46,535.98 (-89,659 - -14,873.37)	491.88	

Legend: DifTurnover (RON)-2021/2020—Difference in Turnover from 2020 to 2021, in Romanian Leu; DifProfit (RON)-2021/2020—Difference in Profit from 2020 to 2021, in Romanian Leu; DifNo.Emp-2021/2020—Difference in Number of Employees from 2020 to 2021); DifDebts (RON)-2021/2020—Difference in Debts from 2020 to 2021, in Romanian Leu; DifRevenue-2021/2020—Difference in Revenue from 2020 to 2021, in Romanian Leu; DifExpenses (RON)-2021/2020—Difference in Expenses from 2020 to 2021, in Romanian Leu; DifT/E (RON)-2021/2020—Difference in Turnover *per* Employee from 2020 to 2021, in Romanian Leu; ≤ 3 employees—Dental practices with three or fewer employees; > 3 employees—Dental practices with more than three employees; *Mann-Whitney U Test, **Shapiro-Wilk Test

For companies with fewer than three employees in 2019, the median change in turnover was slightly negative, indicating a modest decline on average during the pandemic. Furthermore, it is certain that several of these smaller businesses encountered significant decreases in turnover. On the other hand, businesses with more than three employees had an increasing average turnover, suggesting that most of them had either a higher or a stable turnover during the pandemic. For this reason, it can be concluded that those dental offices with more employees had greater economic stability, while the smaller ones were financially affected in a pronounced way.

DISCUSSION

The COVID-19 pandemic has had a significant financial impact on dental practices globally, including in Romania. The shift to emergency treatments only has led to substantial financial losses for dental care providers [21]. In Romania, dental offices have reported a decrease in income and patient volume, with a high contamination rate among dental practitioners [22]. This has resulted in financial constraints, including the need to purchase personal protective equipment and the laying off of staff [23]. The closure of dental offices has raised ethical concerns about patients' access to dental services [24].

Other responses to the pandemic's effects on dental practices included strict adherence to infection control practices, management of air quality, use of personal protective equipment (PPE), and minimizing aerosol production [25,26]. Specific strategies to reduce risk have included enforcing hand hygiene, using pre-procedural mouth rinses, rubber dam isolation, high-volume evacuation, and mandating the proper attire for clinical practice [27]

The pandemic also brought changes to the complexity of dental treatments [28,29]. It has prompted dental professionals to prioritize critical measures to ensure safety for both staff and patients, with an emphasis on adherence to local guidelines for optimal management [30,31].

A preliminary data analysis was conducted in a previous study. Hence, it was concluded that in 2019, there were 1735 active dental practices in Bucharest, which

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decreased to 1704 in 2020 and further to 1644 in 2021. In 2021, 73 practices closed, but 13 new ones began, resulting in 1644 active practices. The financial analysis of dental practices between 2019 and 2021 showed significant variations in several key indicators [19].

The present study found that in Bucharest, private dental practices experienced a significant decrease in KFI such as turnover and revenue in 2020 compared to 2019, due to the economic impact of the COVID-19 pandemic. This aligns with our previous study [19] and with the World Health Organization guidelines which recommend limiting dental procedures to emergencies [32]. The COVID pandemic led to changes in patient management and increased use of personal protective equipment, adding to the economic burden for dentists. Studies indicated that clinics adapted by implementing telephone triages and training for PPE usage [12,28,33]. In Romania, following government regulations [15], most dental practices closed in early 2020, reopening later in May under new guidelines. The results of this study align with the analysis by Hassan et al. [34] who conducted a questionnaire to which 141 endodontists responded. The study findings highlight the profoundly negative effect that the COVID-19 pandemic has had on dental practitioners spanning the beginning of the pandemic.

The KFIs dynamic of the observed dental practices between 2019 – 2021, examined concerning the number of employees

The results of our study highlight the fact that despite the difficulties that the COVID-19 pandemic has caused, larger dental practices—with more than three employees—had an interesting evolution in the analyzed interval time when compared with smaller dental practices—with three employees or fewer. Thus, dental practices with more than 3 employees had a significantly higher decrease in turnover ($p < 0.001$), revenue ($p < 0.001$), debts ($p = 0.043$), number of employees ($p < 0.001$), and expenses ($p < 0.001$) from 2019 to 2020. However, a recent study pointed out that in Germany [35], small dental practices were less affected by the COVID-19 pandemic than larger ones.

Moreover, the results of our study showed that in 2021, dental practices with more than three employees had a significantly higher increase in turnover ($p < 0.001$), profit ($p < 0.001$), revenue ($p < 0.001$), and T/E from 2020 to 2021. Therefore, in 2020, the negative impact of the pandemic was more pronounced for larger dental practices when compared to smaller businesses. On the other hand, the larger dental practices experienced a significant improvement in their economic development in 2021.

With regard to the large practices, it was observed that, during the pandemic, the number of employees decreased along with their turnover; however, the profit remained the same, most probably because of the severe reduction in expenses.

An intriguing finding was that the T/E value remained flat all over 2020, while most practices severely cut expenses; moreover, businesses operated only for 10 months in 2020 due to the curfews and quarantines. There are several potential explanations for these findings. The reduction in the volume of patients led to a marked decrease in the use of consumables [36]. The reduction in the number of employees led to fewer fixed costs, especially in terms of labor costs, and, finally, tax optimization was less relevant for smaller businesses, thus increasing their economic efficiency [37,38].

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CONCLUSIONS

1.This paper analyzes more than 1700 private dental practices from Bucharest, Romania, and the impact that COVID-19 had on their financial indicators such as turnover, profit, revenue, expenses, debts, the number of employees, and the turnover-to-employee (T/E) ratio over the years 2019, 2020, and 2021.

2.The overall conclusion is that the pandemic period affected dental practices that were already in economic distress before 2020. For example, it was demonstrated that although larger practices (with more than 3 employees) were initially more severely affected, they had a faster economic recovery in 2021 with significant increases in turnover, profit, and revenue than the smaller ones. Larger practices managed to maintain profitability during the pandemic, despite revenue declines, by reducing costs, also because they had the flexibility to reduce employees, given their larger workforce.

3.The paper discussed the impact of pandemic-specific legislation, which, by suspending and limiting day-to-day activity and imposing new expensive procedures, impacted the financial indicators of private dental practices.

4.The results also showed that pre-pandemic financial stability can be translated into potential post-pandemic financial growth. Thus, private practices should adopt strategic multi-annual financial planning and risk management strategies to be better prepared for possible future pandemic-like crises.

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Abbreviations

COVID-19: Corona-virus disease 2019
WHO: World Health Organization
KFIs: key financial indicators
T/E: ratio between turnover and number of employees
PPE: Personal protective equipment

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