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*The Impact of the COVID-19 Pandemic on the Financial
Performance of Polish Public Hospitals Owned by Local
and Regional Governments*

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Abstract

Theoretical background: The COVID-19 pandemic has put a great strain on healthcare systems and hospitals. Although the effects of COVID-19 have affected almost all aspects of the economies and health systems of most countries around the world, relatively little research has been done on the consequences of the pandemic on the financial performance of hospitals around the world. This literature gap is mainly the result of a short research period and difficulties in obtaining reliable and good quality empirical data. The review of the literature shows that the impact of the COVID-19 pandemic on the financial performance of hospitals is ambiguous. Most of them focused primarily on the first year of the pandemic and were mostly based on fragmentary financial data and sometimes only on the case study method.

Purpose of the article: The purpose of this article is to evaluate the impact of the COVID-19 pandemic on the financial performance of the largest public hospitals owned by local and regional governments. The research, covering mainly the years 2019–2021, was carried out based on financial statements obtained from 40 public hospitals in the form of independent public healthcare institutions (SPZOZ).

Research methods: To assess the impact of the COVID-19 pandemic on the financial performance of Polish hospitals, a ratio analysis was carried out. Due to the specificity of public health facilities, ratios included in the Ministry of Health Regulation of 12 April 2017 were used, which refer mainly to independent public healthcare facilities.

Main findings: The research revealed that the COVID-19 pandemic contributed to the deterioration of the financial performance of Polish public hospitals owned by local and regional governments. However, the impact was not dramatic, but only intensified the financial difficulties experienced by Polish hospitals before.

Introduction

Health is a central problem in the sustainable development of contemporary societies and economies. From the Millennium Development Goals to the Sustainable Development Goals, strong health systems are top priorities for policy makers who consider health a fundamental right. Health systems are an important challenge for development because they have a serious impact on improving quality of life and physical well-being.

The COVID-19 pandemic has put a great strain on healthcare systems and hospitals. The World Health Organization (WHO) declared the new coronavirus epidemic (COVID-19) a public health emergency of international concern on 30 January 2020 and a pandemic on 11 March 2020 (WHO, 2020). The spread of the virus has reduced the performance of health systems throughout the world to malfunction, as countries have attempted to overcome the transmission of COVID-19 and, at the same time, to maintain the integrity of their health systems.

Hospitals were entities under special pressure during the pandemic, because they had to maintain the capacity to continuously meet community healthcare needs while responding to the additional burden of COVID-19 disease by creating isolation units. At the beginning of the pandemic, health policy researchers suggested that due to COVID-19, hospitals would experience more significant revenue regarded to extra hospitalizations, but would also incur greater costs related to additional medical staff, resources (Khullar et al., 2020) and higher treatment costs caused by testing and isolation. It was also assumed that medical facilities would face a significant reduction in scheduled and outpatient payments, creating unprecedented financial challenges for them.

However, in Poland, there were many problems in the health system already before the outbreak of the pandemic itself, and the COVID-19 crisis only exacerbated its occurrence. Public health expenditure in Poland is below the EU average. The number of jobs in the health and social care sector per 1,000 inhabitants puts the country at the end of the EU member states, showing not only the current but also the anticipated shortage. A study conducted by the Polish Federation of Hospitals shows that in 2018, about 72% of Polish hospitals felt a lack of nurses and 68% of doctors. Furthermore, the healthcare system in Poland is characterized by long waiting times for specialist visits and a lack of innovative medical equipment. The Polish system is “hospital-centric”, which means that a large part of financial resources (35% in 2018) are absorbed by the most expensive inpatient care (while for the EU-27 is only 30%). Poland also struggles with instability in the regulatory and legal frameworks of the system. As already mentioned, the COVID-19 outbreak has additionally intensified the occurrence of the above-mentioned problems, increasing the vulnerability of hospitals’ budgets to the pandemic shock.

Those problems are particularly serious in self-governments, since it is local and regional authorities in Poland that own 83% of public hospitals in the form of independent public healthcare institutions (*samodzielne publiczne zakłady opieki zdrowotnej*, SPZOZ). At the end of the second quarter of 2022, SPZOZ’s total liabilities amounted to PLN 17.8 billion, and its overdue liabilities to almost PLN 1 billion (Ministry of Health, 2022). The statistics of public hospitals’ debt carried out since the 2003 imply that indebtedness is a structural problem in the Polish healthcare system.

Consequently, at the end of 2021, the Ministry of Health has prepared a draft change proposal aimed at solving the above-mentioned difficulties. Modernization and improvement of hospital financial performance are one of the milestones of the Polish National Reconstruction Plan, for the implementation of which a pool of almost PLN 9.5 billion is planned. The Ministry’s proposal includes, among other things, the categorization of hospitals according to their financial results. This inevitably raises questions about the financial health of Polish public hospitals and how the COVID-19 pandemic has influenced it.

The purpose of this article is to evaluate the impact of the COVID-19 pandemic on the financial performance of the largest public hospitals owned by local and regional governments. The research, covering mainly the years 2019–2021, was carried out based on financial statements obtained from 40 public hospitals in the form of independent public healthcare institutions (SPZOZ).

The paper is structured as follows. The following section covers the current literature on the effects of the pandemic on the financial performance of hospitals around the world. Furthermore, the Polish health system and the challenges posed to Polish public hospitals in the fight against the SARS-CoV-2 pandemic are described. The methodological framework and data sample are presented next. Following this, we discuss our results, and a brief conclusion summarizes our project and its contributions.

Literature review

Although the effects of COVID-19 have affected almost all aspects of the economies of most countries in the world, including the health sector, relatively little research has been done on the consequences of the pandemic for the financial performance of hospitals around the world. This literature gap is mainly the result of a short research period (of only three years), whereas the analysis of financial impacts generally requires a longer perspective. In addition, there are difficulties in obtaining reliable and good quality empirical data (for example, as a result of artificial “improvement” of statistics, data manipulation, or hiding unpleasant facts).

There is no doubt that the spread of COVID-19 has imposed considerable financial burdens on health facilities worldwide (Bartsch et al., 2020; Kaye et al., 2021). In addition to the direct costs associated with the use of health resources for patients with COVID-19, hospitals had to respond with increased measures to control infection such as screening, testing, and personal protective equipment (PPE), reduce hospital ward capacity, and increase resources for emergency departments, patient isolation facilities, and intensive care units (ICUs) (Kaye et al., 2021; Wee et al., 2020). Furthermore, hospitals also postponed or cancelled elective procedures and other “non-essential” services, leading to potential decreases in hospital revenues and impacts on patient outcomes (Kaye et al., 2021; Mulholland et al., 2020; Shin et al., 2020). In many countries, hospitals made significant investments in information systems and digital health solutions to better track infections, improve the ease and granularity of health data, and provide telehealth services. Massive funds were also deployed to the effective vaccine process in hospitals.

Many publications emphasize that the financial difficulties of hospitals during the SARS-CoV-2 pandemic were caused by a lack of sufficient capacity and preparedness to treat patients with COVID-19 and to adapt to ongoing challenges. In many cases, PPE for healthcare workers was not available in quantities (Ahmed et al., 2020). Similarly, health facilities around the world have experienced a widespread shortage of beds and ventilators. Many hospitals did not have the capacity to carry out extensive tests, making it difficult to identify and isolate infections. These shortages were exacerbated by blockades around the world that disrupted supply chains (Kaye et al., 2021). Deficiencies in medical equipment and PPE forced hospitals to accelerate purchases, often at inflated prices, which generated additional costs.

The impact of hospital pandemic on the finances was also the result of the cancellation of many elective surgeries and the redirection of medical personnel and medical equipment primarily to COVID-19. A WHO (2020) survey of 155 countries found that the prevention and treatment of noncommunicable diseases (NCDs) have been severely disrupted since the beginning of the SARS-CoV-2 epidemic. As the virus continued to spread, medical personnel, who usually dealt with NCDs, were reassigned to support the response to COVID-19 (Kaye et al., 2021). Furthermore, according to the guidelines of many public health institutions, procedures

and appointments that were not considered urgent or unexpected were postponed or transferred to telemedicine. All this resulted in a decrease in the incomes of medical institutions which was especially pronounced in low-income countries (Mitsuya, 2020; Ahmed et al., 2021).

Waitzberg et al. (2022) reviewed financial adjustments for hospitals and health-care professionals during the COVID-19 pandemic in 20 countries. They concluded that the COVID-19 outbreak was a shock that brought various financial challenges to the health service. They found that the impact varied depending on how health services were financed. In countries where hospitals were paid according to activity, the sudden decrease in hospital visits puts financial health providers at risk. Most countries assumed these risks by introducing various forms of compensatory payments. In countries where hospital budgets were not related to activity, existing salaries, capital payments, and budgets protected providers from income losses. But they also reduced incentives for the reactivation of activities when lower rates of infection would have been allowed. Budgets and salaries have also allowed some costs to be covered for new COVID-19-related services. However, many countries have introduced additional fees or increased payment rates for services.

As far as the American health system goes, He et al. (2022) showed that in California acute care hospitals, the total number of patients decreased by 5% during the first year of the pandemic; but net patient revenues increased by USD 1.3 billion, driven mainly by government support (Medi-Cal program). However, ultimately after all revenues were collected and expenditures deducted, California hospitals reported a significant decline in net income. Khullar et al. (2020), on the example of U.S. hospitals, proved that the COVID-19 pandemic was a medical and economic challenge unprecedented to the U.S. health system. In the absence of strong and sustained government support, almost all hospitals faced financial difficulties. However, smaller independent rural hospitals with critical access were particularly at risk.

Empirical findings revealed by Takaku and Yokoyama (2022) show that as a result of admitting to hospitals COVID-19 patients the monthly profits per bed decreased in 2020 by approximately 15 times compared to the average monthly profit in 2019. Consequently, the researchers recommend that patients with coronavirus be admitted mainly to large hospitals to encourage other hospitals to continue their regular medical care, as has been the case in the United Kingdom and other countries.

Narúć (2022), who evaluated the impact of the COVID-19 pandemic on the financial and asset situation of infectious diseases hospitals in Poland after the first year of the pandemic, came to opposite conclusions. He proved that the profitability of the COVID-19 units was higher than the "standard" hospitals wards. The coronavirus pandemic did not have a negative impact on the financial results of the Polish infectious disease, both at the operational level and at the level that covers all areas of its functioning. This was primarily due to the fact that the medical facilities appointed to prevent, counteract, and fight COVID-19 mainly closed wards bringing the greatest losses to hospitals, and in these places created new wards, as it

turned out profitable. The profitability of the functioning of the research sample was influenced not only by well-priced services related to the prevention, counteraction, and suppression of COVID-19 (including very profitable lump sums for hospitals), but also by various grants for medical equipment related to this new type of service provided. However, the improvement in financial results has not stopped the unfavourable trend observed for many years in the Polish healthcare system, consisting of increasing indebtedness of medical institutions.

In turn, Białoszewski et al. (2021) estimated the financial consequences of the establishment and maintenance of an infectious hospital ward in one of the hospitals located in southern Poland, in the Małopolska region. They showed that as a result, personnel costs and costs related to the specificity of treating highly infectious diseases, such as patient diagnostics, treatment and stay-related costs, increased as a result. These researchers also estimated the level of lost benefits associated with limiting access to other surgical and orthopedic services due to the reorganization of the hospital ward. In total, the hospital's financial losses assessed amounted to almost PLN 0.5 million within two months of operation of the COVID-19 ward. The researchers concluded that such a loss may be difficult to recover from the normal operation of the hospital and may worsen the financial situation of the hospital in the long run.

The review of the literature shows that the impact of the COVID-19 pandemic on the financial performance of hospitals is ambiguous. Most of them focused primarily on the first year of the pandemic and were mostly based on fragmentary financial data and sometimes only on the case study method.

Challenges for Polish public hospitals in the fight against the SARS-CoV-2 pandemic

As a post-communist country, Poland undertook major reforms of the health system in the 1990s. They included, for example, the introduction of public health insurance and independent pay institutions, as well as the decentralization of ownership of the health infrastructure (Sowada et al., 2019; World Bank, 2014; Dubas-Jakóbczyk et al., 2020). In 2020, Poland spent 7.2% of its gross domestic product on health, which was below the average of the European Union of 8.8% (OECD, 2022). The hospital sector in Poland is characterized by oversized infrastructure, the prevalence of publicly owned hospitals, and public financing. The ownership structure of public hospitals is divided into three levels of self-government, ministries, and medical universities. Compared to other European countries, Poland is characterized by overhospitalization with simultaneous short-term care deficits. Problems with an unsustainable financial situation and overdue obligations of public hospitals have been a permanent feature of the Polish health system for more than two decades (Sowada et al., 2019; Dubas-Jakóbczyk et al., 2020).

In Poland, the responsibility for funding health care was divided between hospital management, owners (mainly local and regional governments), the public health

insurance payer (National Health Fund [*Narodowy Fundusz Zdrowia*, NFZ]) and the Ministry of Health. Most public hospitals have been operated in the form of SPZOZ which was introduced by the Act of 30 August 1991 on health care institutions (Journal of Laws of 1991, no. 91, item 408). This legal form was based on the British NHS Trust and was designed to facilitate the development of an “internal market” for health care, before the introduction of universal health insurance in health funds (and later in the NFZ) (Sowada et al., 2019). The SPZOZ legal form has a number of advantages compared to the standard budgetary units. SPZOZs are required to pay all the costs of their activities from their income and follow general accounting regulations (Sagan & Sobczak, 2014). However, it also had some shortcomings (e.g. the public owners of SPZOZ were ultimately responsible for their financial obligations), and the state has regularly discharged their debts, which has led to their poor financial management. External factors, such as the undervaluation of some services by NFZ and the lack of public sources, contributed to the accumulation of debt in the hospital sector. From 1997, the government has decided to clear the accumulated debts of hospitals several times, but accumulation of debts by public hospitals has continued. Since the debts had been paid or repaid by the state on several occasions, some SPZOZs accumulated debts in full force, using debts to develop infrastructure, increase wages, and employment, etc., expecting that their debts would be extinguished in the future. In 2005, the aid and debt reduction program for public hospitals was launched. This programme helped stabilize the total liabilities of the SPZOZs at the level of around PLN 10 billion and the arrears at under PLN 2 billion. However, the problem of financial unsustainability of the SPZOZs has not been solved, with a large portion of arrears simply rolled over and covered with new long-term loans (Sowada et al., 2019). Total liabilities started increasing again after 2013, reaching almost PLN 17.7 billion at the end of 2021.

With regard to the continued increase in hospital debt, local and regional authorities are in a unique situation of contradictory responsibilities. On the one hand, they are the hospital owners who bear the administrative and financial burden, but without any influence on the amount of funds received from the NFZ. Additionally, any decision on hospital restructure involving bed reductions and/or employment is politically heavy due to pressure from local communities (e.g. when the hospital is the main employer in the county/city) (World Bank, 2014). In 2019, the Constitutional Tribunal ruled that it is against the Polish Constitution (the highest legal act) for the local government to cover the financial deficits (Trybunał Konstytucyjny, 2019), opening the way for future legislative changes.

In these circumstances, the spread of the COVID pandemic brought additional financial challenges to Polish hospitals. The rapid threat of the SARS-CoV-2 virus has forced national administrative bodies to take counteracting measures. The Act of March 2, 2020 on special solutions related to preventing, counteracting and combating COVID-19, other infectious diseases and emergencies caused by them (Journal of Laws of 2020, item 374) was quickly adopted. The Act was subject to

numerous amendments resulting from the entry of the pandemic into certain stages of development and adjusted new measures to the then prevailing situation. According to the provisions of the Act, healthcare services performed in connection with the counteracting of COVID-19 had to be provided by healthcare entities or doctors and dentists entered on a list prepared by the locally competent director of the provincial branch of the NFZ in agreement with the competent provincial governor. These services were to be financed by the NFZ with funds from the COVID-19 Prevention Fund and the state budget from a portion at the disposal of the Minister of Health.

According to the Act of March 2, 2020, local government units were required to perform tasks aimed at counteracting the spread of SARS-CoV-2. These activities included, among others, the transformation of the hospital organization structure, as well as the transfer of medical equipment needed between health facilities to better protect health and save lives (Dobska, 2021). The provincial governors were responsible for the conversion of hospitals with infectious wards into so-called single-name hospitals. A total of 21 single-name hospitals have been designated by provincial governors during the first wave of pandemic. These hospitals were obliged to admit patients infected with the virus, treat patients with COVID-19, as well as other conditions in patients suspected of being infected with the virus and patients with COVID-19. The change in the organizational structure of the hospitals led to the failure to implement its planned services for patients who had to wait in lines for treatment, consultation, or diagnosis. The second wave of the pandemic was characterized by a much higher number of daily infections compared to the first wave, and the number of places for COVID patients turned out to be too small. As a result, the organization of temporary hospitals began, the work of which involved the provincial governors, the Chancellery of the Prime Minister, the army, and state-owned companies based on contracts concluded with the authorities.

Based on the Act of March 2, 2020, the President of the NFZ issued an ordinance on 8 March 2020 on the reporting rules and conditions for settlement of healthcare services related to the prevention, counteraction, and suppression of COVID-19 (Ordinance no. 32/2020). A list of billing products related to the services concerned was provided in an annex to the Ordinance, including a fixed fee for standby services, a fee for a stay related to the prevention and counteracting of SARS-CoV-2 infection, a fee for hospitalization related to COVID-19 treatment, and a fixed fee for standby for sanitary transport. All of this significantly improved the liquidity of hospitals involved in the prevention, counteraction and suppression of COVID-19 (Naruć, 2022).

The pandemic has changed the functions, priorities, and strategies of hospitals. In the first phase of the pandemic, hospitals, in order to retain medical personnel and motivate them to work, often paid salaries from their own resources, which severely burdened their budgets and contributed to an increase in their obligations. Furthermore, throughout 2020, hospitals increased their overdue costs on medical

and nonmedical personnel due to high illness absence associated with quarantine and isolation, as well as other costs associated with the pandemic.

One of the measures aimed at helping hospitals maintain short-term financial liquidity was the payment to a medical institution of a part of the funds for services provided outside the lump sum (financed separately) contracted with the NFZ for 2020 in the amount of 1/12 of the contract, despite the non-performance or partial performance of the services under the contract. The right to the so-called 1/12 contract was granted to hospitals that, due to the outbreak of COVID-19, were unable to fulfill their contract with the NFZ. Hospitals that had used this mechanism were required to provide services for 2020 by the end of June 2021. Based on the provisions of the Regulation of the Minister of Health of 4 September, the settlement period was extended until the end of December 2021 (Ordinance of the Minister of Health of 4 September 2020). Due to the risk of reimbursement of services not performed in 2020 outside of the total amount, hospitals have set provisions for liabilities during 2020.

Financial difficulties and the growing debts of public hospitals have become the reason for the preparation in 2021 by the Ministry of Health of a draft law on the modernization and improvement of hospital efficiency (Ministry of Health, 2022). The law had to stop the debt processes of SPZOZs. In the original version of the project, the creation of a new institution, the Hospital Development Agency (*Agencja Rozwoju Szpitali*, ARS), was envisaged. It had to be, among other things, responsible for collecting data on the functioning of hospitals and their economic and financial situation. Based on the analysis of the collected data, the ARS would conduct an assessment of the financial performance of hospitals taking into account, *inter alia*, ratios such as operating profitability ratio; rapid liquidity ratio, ratio of overdue liabilities to total revenues and ratio of total liabilities to total income. The project is expected to introduce four hospital levels due to their financial situation (Ministry of Health, 2021).

The essence of the above solutions was manifested in the fact that for hospitals in the worst financial situation, the necessity to carry out repair and development proceedings was foreseen, which would enable their financial recovery. Due to the large protests of the medical community and local government units, the Ministry of Health finally abandoned the original version of the draft, replacing it with a modified version. The new project would classify hospitals into four groups (I–IV) according to the same financial principles as the first proposal. The hospitals in class I, i.e. in good financial condition, would create a development plan, similar to those in class II hospitals. The hospitals of class III would prepare a repair and development plan, while the hospitals of class IV must implement such a plan. Unfortunately, the simulation for the data from 2020 carried out in a group of 168 SPZOZs and 44 commercial law companies owned by counties shows that up to 39% of the surveyed hospitals will be assigned to the weakest classes: III and IV, and only 13% will have a very good financial situation (class I) (Skóbel & Sekuła, 2022).

Research methods

To assess the impact of the COVID-19 pandemic on the financial performance of Polish hospitals, a ratio analysis was carried out, which is considered the most important field of economic analysis (Stańczak-Strumiłło & Kotapski, 2021). Due to the specificity of the financial analysis in public health facilities, the ratios included in the Regulation of the Ministry of Health of April 12, 2017 (Journal of Laws of 2017, item 832) were used, which refer mainly to independent public healthcare facilities. The regulation contains four groups of ratios assigned reference values and weights of points. The total number of points allows for the synthesis of the financial performance of a given hospital in relation to the others, as well as evaluation of its changes over time, which is useful because of the purpose of the research. The method to calculate the individual ratios with the ranges and the score is presented in Table 1.

Table 1. Financial ratios for assessing the financial performance of Polish hospitals

| The name | Method of calculation | Ratio's value ranges | Assessment (number of points) |
|-------------------------------|---|----------------------|-------------------------------|
| Net profitability ratio | net results \times 100% / (net sales revenues + net sales revenues from goods and materials + other operational revenues + financial revenues) | less than 0.0% | 0 |
| | | from 0.0 to 2.0% | 3 |
| | | above 2.0 to 4.0% | 4 |
| | | more than 4.0% | 5 |
| Operating profitability ratio | operating result \times 100% / (net sales revenues + net sales revenues from goods and materials + other operational revenues) | less than 0.0% | 0 |
| | | from 0.0 to 3.0% | 3 |
| | | above 3.0 to 5.0% | 4 |
| Return on assets | net result \times 100% / average assets | less than 0.0% | 0 |
| | | from 0.0 to 2.0% | 3 |
| | | above 2.0 to 4.0% | 4 |
| | | more than 4.0% | 5 |
| Current liquidity ratio | (current assets - short-term commercial receivables with a repayment period of more than 12 months - short-term prior payments) / (short-term obligations - liabilities of deliveries and services for the duration of 12 months + provisions for short-term obligations) | less than 0.60 | 0 |
| | | from 0.60 to 1.00 | 4 |
| | | above 1.00 to 1.50 | 8 |
| | | above 1.50 to 3.00 | 12 |
| Quick liquidity ratio | (current assets - short-term commercial receivables with a repayment period of more than 12 months - short-term prior payments - inventories) / (short-term obligations - liabilities of deliveries and services for the duration of 12 months + provisions for short-term obligations) | less than 0.5 | 0 |
| | | from 0.5 to 1.0 | 8 |
| | | above 1.0 to 2.5 | 13 |
| | | more than 2.5 | 10 |
| Receivables turnover ratio | average trade receivables (short-term) \times number of days in the period (365) / net revenues from sales of products + net revenues from sales of goods and materials | less than 45 days | 3 |
| | | above 45 to 60 days | 2 |
| | | from 61 to 90 days | 1 |
| | | more than 90 days | 0 |
| Liabilities turnover ratio | average (short-term) trade liabilities \times number of days in the period (365) / net revenues from sales of products + net revenues from sales of goods and materials | less than 60 days | 7 |
| | | above 61 to 90 days | 4 |
| | | more than 90 days | 0 |

| The name | Method of calculation | Ratio's value ranges | Assessment (number of points) |
|------------------|---|------------------------------|-------------------------------|
| Asset debt ratio | (long-term liabilities + short-term liabilities + provisions for liabilities) × 100% / total assets | less than 40.0% | 10 |
| | | from 40.0 to 60.0% | 8 |
| | | above 60.0 to 80.0% | 3 |
| | | more than 80.0% | 0 |
| Solvency ratio | (long-term liabilities + short-term liabilities + provisions for liabilities) / equity | from 0.0 to 0.5 | 10 |
| | | from 0.51 to 1.00 | 8 |
| | | from 1.01 to 2.00 | 6 |
| | | from 2.01 to 4.00 | 4 |
| | | more than 4.0; less than 0.0 | 0 |

Source: (Regulation of the Minister of Health of April 12, 2017 [Journal of Laws of 2017, item 832]).

Data for ratio analysis were obtained from the National Court Register (*Krajowy Rejestr Sądowy*, KRS) in the online version (Ministry of Justice, 2022). To assess the impact of the COVID pandemic on hospital financial performance, financial data for 2019 (as a reference point) and 2020–2021 were taken into account. From 1 October 2018, all financial statements in Poland must be prepared in electronic form and carry a qualified electronic signature or a signature confirmed by a reliable profile. When an entity is registered in the KRS, it is usually registered in the competent Court Register, including annual financial statements and audit reports. A special situation applies to SPZOZs that carry out economic activities even if they are not registered in the Register of Entrepreneurs. They also need to file their financial documents electronically.

In this study, hospital samples were selected using the purpose sampling technique based on predetermined considerations (Palinkas et al., 2015). This technique has been applied because it is appropriate for quantitative studies or studies that do not require generalization. To ensure the comparability of the data, we chose only the largest public hospitals located in voivodeship cities operating as SPZOZ and owned by local or regional governments. Based on this criterion, the study sample included 64 entities from 423 hospitals in SPZOZ form, but after taking into account hospitals that reported complete financial statements for 2019, 2020 and 2021 the sample was reduced to only 40 hospitals. There are 31 regional hospitals and 8 municipal hospitals, among them. To ensure the comparability of the data, there are no single-name hospitals in this group.

When analysing the results of hospitals, it must be taken into account that they are not profit-oriented entities. The main objective of organizations providing services that are fully or more than 98% financed by the NZF is to meet the needs of the country's inhabitants in the area of healthcare, and sustainable development is achieved in three basic areas: medicine, economy and society. This guarantees constant improvements in the quality of life and health of residents.

When analysing the structure of the research sample in terms of the main financial variables, it can be seen that it varies. Table 2 presents the average values of total assets, net sales revenue, operating cost, net results, and total liabilities. We can see that the average total liabilities increased during the consideration period and that the average total assets declined. Net sales revenues and operating costs showed some fluctuations, but net results improved.

Table 2. Hospitals' descriptive statistics (in millions PLN)

| | Total assets | | | Net sales revenues | | | Operating costs | | | Net results | | | Total liabilities | | |
|------|--------------|-------|-------|--------------------|-------|-------|-----------------|-------|-------|-------------|------|------|-------------------|------|-------|
| | Min. | Av. | Max. | Min. | Av. | Max. | Min. | Av. | Max. | Min. | Av. | Max. | Min. | Av. | Max. |
| 2019 | 0 | 123.8 | 340.4 | -0 | 143.1 | 507.6 | 0.0 | 165.8 | 541.9 | -66.7 | -6.8 | 3.5 | 0.0 | 39.6 | 321.3 |
| 2020 | 17.5 | 146.2 | 366.9 | 10.9 | 170.7 | 562.9 | 0.0 | 182.4 | 603.8 | -35.9 | -3.9 | 42.1 | 0.0 | 48.3 | 368.6 |
| 2021 | 0.0 | 85.1 | 381.2 | 0.0 | 98.7 | 412.4 | 0.0 | 112.4 | 429.6 | -24.5 | -1.7 | 6.0 | 2.2 | 54.4 | 392.7 |

Source: Authors' own study.

Results

The impact of the COVID-19 pandemic on the financial performance of the analysed hospitals was carried out by calculating the ratios described in Table 1 for 2019, 2020 and 2021 for each hospital and then assigning the appropriate points. This made it possible to calculate for each of the hospitals a synthetic financial performance score (SFPS) for each of the studied years and then assess how it has changed in the first (2020) and second (2021) years of the pandemic compared to the base year 2019.

Table 3 shows the percentage distribution of hospitals examined due to the formation of profitability ratios in 2019–2021. The share of hospitals with positive profitability ratios has gradually increased, while the share of hospitals with negative value has declined. The positive trend is that in 2021, more hospitals made profits than losses (in all types of ratios).

Table 3. Distribution of analysed hospitals according to profitability ratios

| 1. Net profitability ratio | Share of the research sample | | |
|----------------------------------|------------------------------|------|------|
| | 2019 | 2020 | 2021 |
| less than 0.0% | 67% | 55% | 42% |
| from 0.0 to 2.0% | 31% | 28% | 53% |
| above 2.0 to 4.0% | 3% | 13% | 0% |
| more than 4.0% | 0% | 5% | 5% |
| total | 100% | 100% | 100% |
| 2. Operating profitability ratio | Share of the research sample | | |
| | 2019 | 2020 | 2021 |
| less than 0.0% | 62% | 50% | 37% |
| from 0.0 to 3.0% | 36% | 43% | 58% |

| | | | |
|---------------------|------------------------------|------|------|
| above 3.0 to 5.0% | 3% | 5% | 0% |
| more than 5.0% | 0% | 3% | 5% |
| total | 100% | 100% | 100% |
| 3. Return on assets | Share of the research sample | | |
| | 2019 | 2020 | 2021 |
| less than 0.0% | 67% | 55% | 42% |
| from 0.0 to 2.0% | 31% | 28% | 42% |
| above 2.0 to 4.0% | 0% | 13% | 11% |
| more than 4.0% | 3% | 5% | 5% |
| total | 100% | 100% | 100% |

Source: Authors' own study.

The situation with respect to liquidity ratios was slightly different (Table 4). In the years 2020–2021, the share of hospitals with ratios lower than 1 increased (in 2021, it was 63% of hospitals in the case of the current liquidity ratio and 68% in the quick liquidity ratio, respectively). This is a warning that there is not enough fund to cover both long-term and short-term obligations.

Table 4. Distribution of analysed hospitals according to liquidity ratios

| | | | |
|----------------------------|------------------------------|------|------|
| 1. Current liquidity ratio | Share of the research sample | | |
| | 2019 | 2020 | 2021 |
| less than 0.60 | 28% | 30% | 32% |
| from 0.60 to 1.00 | 21% | 20% | 32% |
| above 1.00 to 1.50 | 21% | 15% | 16% |
| above 1.50 to 3.00 | 28% | 28% | 21% |
| more than 3.0 | 3% | 8% | 0% |
| total | 100% | 100% | 100% |
| 2. Quick liquidity ratio | Share of the research sample | | |
| | 2019 | 2020 | 2021 |
| less than 0.5 | 31% | 25% | 26% |
| from 0.5 to 1.0 | 23% | 28% | 42% |
| above 1.0 to 2.5 | 38% | 40% | 32% |
| more than 2.5 | 8% | 8% | 0% |
| total | 100% | 100% | 100% |

Source: Authors' own study.

Regarding receivables and liabilities turnover ratios (Table 5), in almost 80% of hospitals, the number of days for which cash is frozen in receivables was less than 45, but at the same time the percentage of hospitals with liabilities exceeding 90 days has increased.

Table 5. Distribution of analysed hospitals according to turnover ratios

| 1. Receivables turnover ratio | Share of the research sample | | |
|-------------------------------|------------------------------|------|------|
| | 2019 | 2020 | 2021 |
| less than 45 days | 87% | 78% | 79% |
| above 45 to 60 days | 8% | 15% | 16% |
| from 61 to 90 days | 3% | 5% | 5% |
| more than 90 days | 3% | 3% | 0% |
| total | 100% | 100% | 100% |
| 2. Liabilities turnover ratio | Share of the research sample | | |
| | 2019 | 2020 | 2021 |
| less than 60 days | 46% | 40% | 47% |
| above 61 to 90 days | 26% | 23% | 16% |
| more than 90 days | 28% | 38% | 37% |
| total | 100% | 100% | 100% |

Source: Authors' own study.

The impact of the COVID-19 pandemic is reflected in the unfavourable development of the liabilities ratios (Table 6). In 2019–2021, the share of hospitals with a debt asset ratio of more than 80% increased considerably. Furthermore, the proportion of SPZOZs with a solvency ratio greater than 4.0 and less than 0 also increased from 41 to 47%. These hospitals are unable to pay their obligations. As already mentioned, the growth of hospitals' debt is a long-term trend, and the pandemic itself has only strengthened it.

Table 6. Distribution of analysed hospitals according to liabilities ratios

| 1. Debt asset ratio | Share of the research sample | | |
|----------------------------|------------------------------|------|------|
| | 2019 | 2020 | 2021 |
| less than 40.0% | 56% | 53% | 58% |
| from 40.0 to 60.0% | 21% | 20% | 16% |
| above 60.0 to 80.0% | 18% | 23% | 11% |
| more than 80.0% | 5% | 5% | 16% |
| total | 100% | 100% | 100% |
| 2. Solvency ratio | Share of the research sample | | |
| | 2019 | 2020 | 2021 |
| from 0.0 to 0.5 | 21% | 23% | 21% |
| from 0.51 to 1.00 | 26% | 18% | 5% |
| from 1.01 to 2.00 | 10% | 13% | 16% |
| from 2.01 to 4.00 | 3% | 5% | 11% |
| more than 4.0; less than 0 | 41% | 43% | 47% |
| total | 100% | 100% | 100% |

Source: Authors' own study.

The presented ratios, after assigning the appropriate points, were used to calculate a SFPS for each of the hospitals. Then SFPS was used to compare how hospital financial performance changed in the COVID-19 pandemic.

Table 7 presents descriptive statistics and the distribution of hospitals according to the SFPSs. After the pandemic outbreak, the average value of SFPS, q1, q3, and the maximum, deteriorated. These changes were not significant but show a gradual deterioration in the financial situation of the hospital group. In 2020–2021, the percentage of entities with SFPS less than 18 points gradually increased, while it decreased in the two highest thresholds.

Table 7. Summary statistics of SFPS and hospital distribution according to SFPS

| Summary statistics of SFPS | Value (in points, max. = 70) | | |
|----------------------------|------------------------------|------|------|
| | 2019 | 2020 | 2021 |
| min. | 3 | 3 | 3 |
| q1 | 18 | 17 | 16 |
| av. | 37 | 36 | 35 |
| q3 | 59 | 57 | 55 |
| max. | 70 | 69 | 68 |
| SFPS ratio value | Share of the research sample | | |
| | 2019 | 2020 | 2021 |
| less than 18 points | 23% | 25% | 27% |
| from 18 to 37 | 26% | 23% | 32% |
| above 37 to 58 | 26% | 23% | 32% |
| more than 58 | 26% | 30% | 21% |
| total | 100% | 100% | 100% |

Source: Authors' own study.

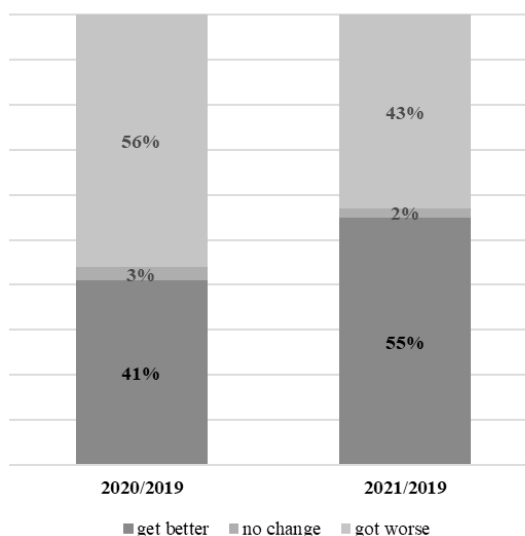


Figure 1. Distribution of hospitals by changes in SFPS

Source: Authors' own study.

Finally, 56% of hospitals have deteriorated their synthetic financial performance scores in the first year of the pandemic compared to the base year (Figure 1), while in the second year this percentage decreased to 43%. This may indicate that, although the pandemic has had a negative impact on the financial performance of Polish hospitals, the situation is gradually improving.

Discussion and conclusions

The research revealed that the COVID-19 pandemic contributed to the deterioration of the financial performance of Polish public hospitals owned by local and regional governments. However, the impact was not dramatic, but only intensified the financial difficulties experienced by Polish hospitals before. The situation in Polish hospitals during the pandemic was the consequence of the lack of COVID-19 vacancies for patients, lack of medical and PPE, ICUs, and medical personnel. The organizational chaos in the functioning of the public health service has been exacerbated by the cancellation of many elective (non-emergency) surgeries and consultations.

Compared to 2019, after two years of the pandemic, hospitals recorded improvements in profitability ratios (net profitability, operating profitability, and return on assets). These results are in line with the results achieved by Naruć (2022). Problems arising from the outbreak of the coronavirus related to significant reorganization of services and additional operating costs did not adversely affect the operating results of the hospitals surveyed. The profitability of the hospitals was influenced not only by good prices for prevention services, counteraction, and suppression of COVID-19 (including very profitable standby cash amounts for hospitals), but also through various medical equipment grants related to this new type of service.

However, the improvement in profitability ratios has not stopped the long-term trend in the Polish healthcare system, that is, increasing the debt in SPZOZs. Polish hospitals have been underfunded for many years. In most cases, the price of health services does not include the total cost of all activities required to provide a service of this type at a minimum level of profitability. In the survey sample, the average hospital liability increased from PLN 40 million to nearly PLN 55 million. The proportion of hospitals that have been actually proven to be insolvent has also increased.

In 2019–2021, more than 40% of the hospitals surveyed have deteriorated their overall financial performance compared to the base year both in the first and second years of the pandemic. However, some optimism may be due to the fact that the synthetic financial performance scores of more than half of the entities have improved in 2021 in relation to 2019.

A detailed review of the revenue and cost structure, including the resumption of hospital operations under the conditions of a gradual elimination of the pandemic, are issues that can be taken into account in further studies related to the impact of coronavirus on the financial and assets situation of hospitals in Poland. The accu-

rate estimate of the financial consequences of the entry into force of the proposal of the Ministry of Health from the end of September 2022 also requires a thorough investigation.

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