PHD THESIS

Breast Cancer in the Pandemic Context:
The Impact of Health Crises on the Diagnosis, Treatment, and Patient Pathway at the Bucharest Oncology Institute (2020–2023)

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Introduction

In recent decades, breast cancer has remained one of the most important public health problems, representing the most frequently diagnosed malignancy among women worldwide. Advances made in screening, imaging, pathology, molecular classification, surgery, and systemic therapies have significantly improved survival; however, prognosis continues to be closely related to how early the diagnosis is established and to rapid access to treatment.

In this context, any major disruption of the patient pathway may influence both the timing of diagnosis and oncological treatment.

The COVID-19 pandemic, caused by SARS-CoV-2 infection, represented an unprecedented challenge for healthcare systems. The reorganisation of hospitals, redistribution of staff and resources, limitation of elective procedures, and temporary suspension of screening programmes profoundly changed the way oncology services were provided. For patients with breast cancer, the effects were multiple: reduced access to screening and investigations, delayed diagnosis, modification of therapeutic principles, postponement of certain interventions, and the need to reduce the exposure of immunocompromised patients to the hospital environment.

In Romania, the impact of the pandemic on cancer management has been poorly investigated. The experiences of national oncology centres during the pandemic period are not sufficiently documented in the specialised literature.

The Bucharest Oncology Institute (IOB), Romania's main oncology centre, had to adapt rapidly from an organisational perspective to continue patient treatment. All of this took place during a period characterised by considerable pressure.

The present thesis, entitled “Breast Cancer in the Pandemic Context: The Impact of Health Crises on the Diagnosis, Treatment, and Patient Pathway at the Bucharest Oncology Institute (2020–2023)”, aims to evaluate how the COVID-19 pandemic influenced the diagnosis, treatment, and overall management of patients with breast cancer in a reference oncology centre in Romania.

The research analyses the experience accumulated by the IOB centre during the COVID-19 pandemic. The term “health crises” used in the title reflects the intention of the study to contribute to the development of organisational strategies aimed at adapting oncology services in the event of similar situations that may arise in the future.

In this way, the thesis aims both to retrospectively analyse the impact of the pandemic on the diagnosis and treatment of breast cancer and to develop recommendations that would allow adequate oncological care in the context of potential future health crises.

The topic is motivated both by professional experience in breast oncological surgery and by the need to analyse and evaluate how an unprecedented pandemic may have influenced both the diagnosis and treatment of this disease. An analysis of the effects of a pandemic will provide useful information for better organisation of oncology services in the future, in the event of similar situations. Strategies may thus be developed to help reduce the impact of potential crises on the care of cancer patients.

The present thesis performs a comparative analysis between two cohorts of patients treated at IOB during the pandemic and post-pandemic periods. The study periods were 1 March 2020–1 March 2021 (the first year of the pandemic) and 1 March 2022–1 March 2023 (the post-pandemic year).

The objectives of the study are as follows: (i) to compare the characteristics of patients newly diagnosed with breast cancer between the two cohorts (pandemic and post-pandemic), including age at diagnosis, tumour laterality, tumour location, stage, histological grade, subtype based on hormone receptor status, and HER2 status; (ii) to evaluate differences in time intervals along the diagnostic and therapeutic pathway; and (iii) to determine the extent to which the reorganisation of the healthcare system during and after the COVID-19 pandemic was associated with delays in the provision of oncological care and with possible changes in disease stage and characteristics at the time of diagnosis.

The thesis evaluates the impact of the COVID-19 pandemic on the diagnosis and therapeutic management of patients with breast cancer at the Bucharest Oncology Institute by comparing the pandemic period with the post-pandemic period, based on a retrospective, comparative, single-centre study.

The thesis is structured into two main parts.

The first part summarises current data regarding the epidemiology, mortality, diagnostic methods, and types of treatment of breast cancer. The first part also presents the impact that the COVID-19 pandemic had on the management of breast cancer at the global level.

The second part of the thesis is dedicated to the personal contribution and presents the original research conducted at the Bucharest Oncology Institute. The original part describes how the study was carried out, the materials, the method, the data collection methodology, their analysis, as well as the

presentation of the results obtained. The results obtained will be interpreted and discussed. The clinical implications will be highlighted. The limitations of the study and future research perspectives will be presented, so that the management of patients with breast cancer can be optimised.

The thesis has an interdisciplinary character. It integrates elements of general surgery, medical oncology, imaging, pathology, epidemiology, and public health. Although the study is limited due to its retrospective design and single-centre nature, the results obtained from the analysis provide a relevant picture of how a reference oncology centre in Romania responded to the challenges generated by the COVID-19 pandemic. These results may represent a starting point for future multicentre studies and for the development of strategies aimed at increasing the resilience of the oncology system in the face of future health crises.

1. Breast Cancer – Epidemiological Context, Screening, and Risk Factors

Breast cancer is the leading malignancy among female patients and one of the major causes of cancer-related mortality. Globally, more than 2.3 million new cases were diagnosed in 2020, while approximately 670,000 deaths were reported in 2022. In Romania, breast cancer represents approximately 28% of cancers diagnosed in women, and mortality remains above the European Union average. Differences in survival between countries reflect not only the biological characteristics of the disease, but also access to screening, early diagnosis, oncology infrastructure, radiotherapy, and modern systemic treatments.

Mammographic screening aims to identify neoplastic lesions in asymptomatic women before the onset of clinical manifestations. Organised screening programmes can reduce breast cancer mortality through early detection and timely initiation of treatment. Mammography remains the standard method; however, its sensitivity is lower in young women and in those with dense breast tissue. In these situations, ultrasonography and magnetic

resonance imaging may complement the evaluation. In Romania, screening is predominantly opportunistic, and the absence of a standardised national programme with broad coverage contributes to late diagnosis.

Five-year survival frequently exceeds 82–90% in Western and Northern Europe, whereas the values reported for Central and Eastern European countries, including Romania, are lower. These differences support the importance of a functional oncological pathway in which detection, histopathological confirmation, and initiation of treatment are carried out without avoidable delays.

Risk factors include modifiable factors, such as excess body weight, physical inactivity, alcohol consumption, and diet, as well as genetic predisposition. Germline BRCA1 and BRCA2 mutations are the best known and are involved in a significant proportion of hereditary breast cancers. Genetic testing should be selectively indicated according to age, tumour subtype, and family history and should be preceded by genetic counselling. The development of next-generation sequencing has enabled the use of multigene panels and the evaluation of genes such as TP53, PALB2, CDH1, PTEN, STK11, ATM, and CHEK2, which are associated with different hereditary risks and syndromes.

2. Diagnosis of Breast Cancer

The diagnosis of breast cancer is based on histopathological confirmation. Ultrasonography is particularly useful in young women and in patients with dense breast tissue and allows evaluation of the axilla and guidance of biopsies. Mammography is the standard screening method and plays an essential role in identifying microcalcifications and non-palpable lesions. Magnetic resonance imaging has increased sensitivity in certain situations, particularly in young patients or when mammography and ultrasonography are inconclusive. For staging, computed tomography, bone scintigraphy, and PET-CT are used selectively, depending on the stage and suspicion of dissemination.

Confirmation of malignancy requires the sampling of tumour tissue. Core needle biopsy represents the standard method for suspicious lesions because it preserves tissue architecture and allows determination of the histological type, grade, and immunohistochemical markers. Vacuum-assisted biopsy is particularly useful for certain non-palpable lesions and may be performed under ultrasound, stereotactic (mammographic), or MRI guidance. The immunohistochemical profile includes oestrogen and progesterone receptors, HER2, and the Ki-67 index and allows tumours to be classified into subtypes with specific therapeutic implications.

The thesis also integrates the results of a retrospective study conducted in the Department of General Surgery of the "Sf. Ioan" Clinical Emergency Hospital, Bucharest, in which 39 cases biopsied by core needle biopsy were evaluated. Invasive NST carcinoma was the predominant histological type, and biopsy allowed preoperative biological characterisation and guidance of treatment. The median time to the release of the histopathological result was 14 days.

The importance of the time to diagnosis and treatment is considerable. Delays may favour presentation at more advanced stages and may influence prognosis. For this reason, the analysis of the intervals between successive stages of the patient pathway represents not only a logistical description, but also a potential indicator of the quality and resilience of oncology services.

3. Treatment of Breast Cancer – Current Principles

The treatment of breast cancer is multimodal and individualised according to stage, the biological characteristics of the tumour, and the particular characteristics of the patient. The strategy may include surgery, neoadjuvant or adjuvant chemotherapy, hormone therapy, anti-HER2 therapies, immunotherapy, and radiotherapy. Luminal A, Luminal B, HER2-positive, and triple-negative subtypes influence the choice and sequencing of systemic treatments.

Breast surgery has evolved from the Halsted radical mastectomy, involving excision of the entire mammary gland, the pectoral muscles, and the axillary contents, towards techniques that reduce morbidity while simultaneously aiming to achieve oncological control, preserve function, and improve aesthetic outcomes. Modified radical mastectomy, skin-sparing and nipple-sparing techniques, breast-conserving surgery, and oncoplastic surgery reflect this evolution. Axillary evaluation has also changed, with sentinel lymph node biopsy reducing the need for complete lymphadenectomy in selected patients.

Breast-conserving treatment associated with radiotherapy can provide oncological outcomes comparable to mastectomy in early stages. Oncoplastic surgery allows adequate oncological resections to be performed simultaneously with breast remodelling. The choice of technique must first and foremost respect oncological safety.

The surgical decision must be made together with the patient. The options, benefits, risks, functional impact, and aesthetic consequences must be clearly explained. This aspect is all the more important as the disease is also diagnosed in young women, for whom aesthetic appearance, quality of life, and individual preferences carry considerable importance.

4. Impact of the COVID-19 Pandemic on Breast Cancer Management

The pandemic disrupted screening, diagnosis, monitoring, and oncological treatment globally. Professional organisations rapidly developed recommendations for patient prioritisation and efficient use of resources. ESMO, ABS, NICE, CSBI, and CAR proposed stratification models according to clinical urgency and the risk that postponement could influence prognosis.

In the ESMO recommendations, cases with a high suspicion of malignancy, postoperative complications, symptoms of progression, invasive tumours requiring immediate treatment, and situations with high oncological risk were prioritised. Routine screening, monitoring of certain stable patients, reconstructive procedures, and other low-priority procedures could be

postponed. For some luminal tumours, neoadjuvant hormone therapy could be used temporarily to allow postponement of surgery. Hypofractionation of radiotherapy and reducing the number of hospital visits were other adaptation strategies.

Telemedicine expanded rapidly during the pandemic and enabled triage, monitoring, discussion of results, and assessment of adverse reactions, while reducing exposure to the hospital environment. It cannot replace clinical examination or necessary procedures, but the experience of the pandemic demonstrated its usefulness as a complementary tool.

Screening was one of the most affected components. International data synthesised in the thesis show substantial decreases in mammography examinations, the number of new diagnoses, and cases detected at early stages. In Northern Italy, the temporary suspension of screening was associated with a reduction in the number of cases of carcinoma in situ and an increase in cases with positive lymph nodes and advanced stages, even though the time from histopathological confirmation to treatment did not deteriorate significantly. Data from England showed thousands fewer cases diagnosed through screening and a slight shift towards more advanced stages.

These observations are essential for interpreting the personal research: a health crisis may affect initial access to screening and diagnosis more severely than the pathway of patients who have already managed to enter a specialised oncology centre. Consequently, the absence of major therapeutic delays within a centre does not equate to the absence of an impact of the pandemic at the level of the entire population.

5. Personal Contribution

5.1. Aim and Objectives

The study aimed to evaluate the impact of the COVID-19 pandemic on breast cancer management at the Bucharest Oncology Institute.

The objectives included the comparison of age, laterality, tumour location, stage, histological grade, hormone receptor and HER2 status, and molecular subtypes; the analysis of the administration of neoadjuvant, surgical, and adjuvant treatment; as well as the quantification of the intervals between referral and presentation, imaging and biopsy, biopsy and neoadjuvant treatment, completion of neoadjuvant treatment and surgery, surgery and adjuvant chemotherapy, imaging and surgery, and between successive chemotherapy cycles.

5.2. Material and Method

The study had a retrospective, observational, and comparative design and analysed two distinct cohorts of patients with breast cancer treated at IOB. The pandemic cohort included 73 patients, and the post-pandemic cohort included 99 patients. Adult female patients who were newly diagnosed, had histopathological confirmation, and were eligible for surgical treatment were included. Recurrent cases, underage patients, male patients, and cases with advanced inoperable disease were not included in the study.

The initial identification of cases was followed by the individual verification of the medical documentation. Discharge summaries, imaging investigations, histopathological and immunohistochemical reports, and treatment-related data were analysed. A database was constructed that integrated demographic, clinical, imaging, pathological, immunohistochemical, and therapeutic information.

Age, date and mode of presentation, laterality and tumour location, stage, histological grade, hormone receptors, HER2, molecular subtype, and administered treatments were recorded. Reconstruction of the patient pathway

allowed the calculation of time intervals between the diagnostic and therapeutic stages. When certain investigations or treatments had been performed in other centres, the available data were used only if they could be documented with sufficient accuracy.

Missing data were handled by analysing the available data for each variable, without artificial imputation of non-existent information. For the time intervals, patients without sufficient data for calculation were excluded only from the analysis of the respective interval. Continuous variables with a non-normal distribution were presented as median and interquartile range, and categorical variables as number and percentage. The threshold for statistical significance was set at $p < 0.05$.

5.3. Results

The general characteristics of the cohorts were relatively similar. The median age was 56 [47–67] years in the pandemic cohort and 59 [50–68] years in the post-pandemic cohort, with no statistically significant difference ($p = 0.399$). No significant differences were identified regarding tumour laterality or location.

The distribution of stages revealed an important descriptive difference. In the pandemic cohort, 79.5% of patients had early-stage disease and 20.5% had advanced disease. In the post-pandemic cohort, the proportion of early-stage cases was 68.7%, while that of advanced disease was 31.3%. The difference did not reach the threshold for statistical significance ($p = 0.11$), but the direction of the change became a central element in the interpretation of the results.

Histological grade had a similar distribution. G2 tumours predominated in both cohorts: 68.5% during the pandemic period and 61.6% post-pandemic. G3 tumours represented 23.3% and 24.2%, respectively, while G1 tumours represented 8.2% and 14.1%, respectively. The overall profile does not suggest a major change in tumour grade between the two periods.

Immunohistochemical data were available for 40 of the 73 pandemic patients and for 77 of the 99 post-pandemic patients. Among the evaluable cases, ER was positive in 85.0% versus 75.3%, PR in 82.5% versus 70.1%, and HER2 in 30.0% versus 22.1%.

Luminal subtypes predominated in both cohorts. During the pandemic period, Luminal A represented 42.5%, Luminal B 45.0%, HER2-enriched 5.0%, and triple-negative 7.5%. Post-pandemic, the values were 37.7%, 44.2%, 6.5%, and 11.7%, respectively. The descriptive increase in triple-negative and HER2-enriched tumours was not separately tested for statistical significance and does not allow the conclusion that a real change in tumour biology occurred.

Neoadjuvant chemotherapy was administered to 43 of the 73 pandemic patients (58.9%) and to 49 of the 99 post-pandemic patients (49.5%), with no significant difference ($p = 0.285$). Among the patients treated with neoadjuvant therapy, treatment had been initiated in other institutions in 23.3% during the pandemic period and 30.6% post-pandemic ($p = 0.578$).

A comparable proportion of patients underwent surgery without preoperative biopsy, with confirmation being obtained intraoperatively: 21.9% in the pandemic cohort and 24.2% in the post-pandemic cohort ($p = 0.862$). Adjuvant chemotherapy was administered in 35.6% versus 33.3% ($p = 0.881$), and postoperative radiotherapy in 27.4% versus 22.2% ($p = 0.548$). These data support the absence of major changes in access to the main therapeutic components.

5.4. Analysis of Time Intervals

The interval between the issuance of the referral and the first presentation at IOB had a median of 6 [2–10] days in the pandemic cohort and 3 [1–8] days post-pandemic. The difference was close to the significance threshold but did not reach it ($p = 0.053$). The result indicates a descriptive trend towards faster access to the oncology centre after the pandemic.

The interval between imaging diagnosis and biopsy was 14 [4–33] days during the pandemic period, for 26 patients with available data, and 7 [3–22] days post-pandemic, for 43 patients. This descriptive reduction of the median by half also remained statistically non-significant ($p = 0.058$).

The interval between biopsy and initiation of neoadjuvant treatment was comparable between the cohorts ($p = 0.651$), while the interval between surgery and initiation of adjuvant chemotherapy showed no significant differences ($p = 0.942$). These results suggest the maintenance of continuity of essential therapeutic stages even during the pandemic period.

For patients who received neoadjuvant treatment, the time between its completion and surgery was 33 [28–44] days during the pandemic period and 38 [27–49] days post-pandemic. The five-day difference was descriptive and non-significant ($p = 0.437$).

The interval between imaging diagnosis and surgery was 28 [20–41] days in the pandemic cohort and 59 [27–80] days post-pandemic. Although the difference between the medians was numerically important, it was not statistically significant ($p = 0.220$) and must be interpreted in the context of the limited number of evaluable cases and the heterogeneity of individual pathways.

The only statistically significant difference among the analysed intervals was that between successive chemotherapy cycles. The median was 21 [21–22] days in the pandemic cohort and 18 [17–19] days in the post-pandemic cohort ($p < 0.001$). The result indicates administration at shorter intervals after the pandemic and may reflect the normalisation or optimisation of the functioning of oncology services, without being directly equated with a prognostic benefit.

6. Discussion and Interpretation of the Results

Despite the reorganisation imposed by the pandemic, most therapeutic intervals were not significantly longer than during the post-pandemic period. This supports the role of prioritising oncology cases, adapting protocols, and institutional reorganisation.

However, the interpretation must be separated from the impact of the pandemic on initial access to the healthcare system. International literature reported major reductions in screening and new diagnoses. In the United States, the studies cited in the thesis described decreases of approximately 50% in newly identified breast cancer cases during the first months and a reduction of almost 90% in screening in April 2020. Italian and British studies also showed fewer early diagnoses and an increase in the proportion of advanced disease.

The fact that the intervals measured after entry into the oncology institute remained relatively stable does not exclude previous delays. A patient could delay presentation after the onset of symptoms or could have reduced access to screening, but, once she reached a specialised centre, she could rapidly go through the subsequent stages.

The increase in advanced disease from 20.5% to 31.3% was not statistically significant and does not demonstrate stage migration. Nevertheless, the observation is consistent in direction with international data suggesting delayed effects of the suspension of screening and late presentation. Data from Italy, Turkey, and Ireland discussed in the thesis support the possibility that some consequences of the pandemic may become visible after the initial phase of restrictions.

Similarly, the descriptively higher proportion of triple-negative and HER2-enriched tumours in the post-pandemic cohort cannot be attributed to the pandemic. The exclusive selection of patients eligible for surgery and the incomplete availability of the immunohistochemical profile limit interpretation. The result represents an observation that justifies further research, not a demonstration of a change in tumour biology.

Access to surgical treatment after neoadjuvant therapy was maintained, and the surgery–adjuvant chemotherapy interval was comparable. The literature shows that surgical delays may influence mortality, which emphasises the

importance of protecting surgical capacity for oncology cases during periods of crisis.

The significant reduction in the interval between chemotherapy cycles during the post-pandemic period is the most robust statistical result of the interval analysis. It may reflect the recovery of service capacity, but it may also be influenced by treatment regimens, toxicities, dose reductions, comorbidities, or infections. During the pandemic, SARS-CoV-2 infection represented an additional factor capable of causing postponements. The study did not evaluate relative dose intensity or the individual reasons for delays; therefore, the exact mechanism cannot be established.

The results suggest two distinct levels of oncological resilience. The first concerns the capacity of the specialised centre to continue the treatment of patients already within the system; the second concerns the capacity of the entire system to maintain screening, early diagnosis, and rapid referral. Maintaining the first level cannot fully compensate for disruption of the second.

7. Clinical and Organisational Implications

The experience of the pandemic shows that protecting oncological treatment alone is not sufficient. A resilient system must keep all stages functional: screening, evaluation of symptoms suggestive of malignancy, imaging, biopsy, staging, surgery, systemic treatment, and radiotherapy. An early disruption in the pathway may produce effects that become visible only later.

Prioritisation according to oncological risk, fast-track pathways, multidisciplinary collaboration, and adaptation of protocols are useful mechanisms both during a crisis and in routine practice. Some of the solutions developed during the pandemic, including the selective use of telemedicine and

the reduction of non-essential hospital visits, may remain useful if they are implemented without compromising clinical evaluation.

Monitoring the time intervals between the different stages of the pathway may be used as a quality indicator. The time between suspicion and biopsy, between biopsy and systemic treatment, between neoadjuvant therapy and surgery, or between surgery and adjuvant treatment may provide an early indication of the emergence of bottlenecks. Such monitoring allows organisational interventions before delays affect a large number of patients.

8. Strengths and Limitations

The present study has a number of strengths, but also certain methodological limitations that must be taken into consideration when interpreting the results.

The study provides an overview of the management of patients with breast cancer in a major oncology centre in Romania, both under the particular conditions imposed by the COVID-19 pandemic and during the subsequent period. The analysis of data derived from routine medical practice allows an evaluation of how a specialised oncology centre managed to maintain the continuity of diagnostic and therapeutic stages during a period characterised by significant constraints on the healthcare system.

The main limitations are the retrospective and single-centre design, the relatively small size of the cohorts, and the dependence on the quality of the medical documentation. Some investigations and treatments were performed in other institutions, which resulted in missing data and reduced the number of patients who could be evaluated for certain intervals.

The exclusion of patients with very advanced or inoperable disease limits generalisability. These patients may have been among those most affected by delays. Furthermore, the transitional period between the two cohorts was not analysed; therefore, the pace of recovery of healthcare services cannot be described continuously.

The study did not evaluate overall survival, disease-free survival, recurrence, or quality of life. Information regarding socioeconomic status, psychological distress, access to the general practitioner, transportation, or the use of telemedicine was not systematically collected. In addition, the interval between the onset of symptoms and the first request for medical care could not be fully quantified, although this represents an essential stage for understanding late presentation.

9. Future Research Directions

Future research should be extended to larger cohorts and multiple oncology centres in order to increase statistical power and allow the results to be generalised. A multicentre design would allow the comparison of organisational strategies and the identification of models associated with maintaining the most efficient oncological pathways.

Longitudinal follow-up is required to evaluate overall survival, disease-free survival, recurrence, and quality of life. Correlating these outcomes with diagnostic and therapeutic delays could establish the clinical relevance of each interval.

The transitional period between the pandemic and post-pandemic phases deserves to be analysed separately in order to describe the pace at which screening resumed, biopsies returned to normal activity, surgical activity recovered, and systemic treatment stabilised.

Future studies should investigate the stages preceding presentation at an oncology centre: onset of symptoms, access to the general practitioner, time to referral, and participation in screening. The integration of socioeconomic, psychological, and geographical factors may identify groups at increased risk of late presentation.

Regarding chemotherapy, data are needed on the regimen used, relative dose intensity, toxicities, dose reductions, the number and duration of postponements, and the reasons for these postponements. This information

could clarify why the interval between cycles was significantly shorter post-pandemic.

Future studies should also include patients with inoperable locally advanced and metastatic disease. Evaluation of the entire spectrum of the disease is necessary in order to estimate the true impact of a health crisis on the population of patients with breast cancer.

10. General Conclusions

The study shows that, for patients with breast cancer eligible for surgical treatment who entered the care pathway of the Bucharest Oncology Institute, the main components of treatment could be maintained during the pandemic period. Most therapeutic intervals were comparable with those observed post-pandemic, suggesting the centre's ability to adapt protocols and prioritise oncological care.

11. Personal Contributions

The main personal contribution consists of carrying out an original, retrospective, comparative analysis of the experience of a Romanian oncology centre during the pandemic and post-pandemic periods, in a field for which national data are limited.

A complex database was constructed and analysed, allowing the reconstruction of the patients' pathways and the integration of demographic, clinical, imaging, histopathological, immunohistochemical, and therapeutic characteristics.

An original element is the systematic quantification of the time intervals between successive stages of the diagnostic and therapeutic pathway. This approach made it possible to demonstrate the stability of most therapeutic stages and to identify the significant shortening of the interval between chemotherapy cycles in the post-pandemic period.

The research descriptively identified a higher proportion of advanced disease post-pandemic and integrated this observation with data regarding the functioning of the oncological pathway. Thus, the thesis proposes a conceptual

distinction between the patient's access to the healthcare system and the functioning of the therapeutic pathway after entry into a specialised centre.

The thesis proposes the use of systematic monitoring of diagnostic and therapeutic intervals as indicators of the functioning of oncology services and outlines directions for the development of resilience models capable of simultaneously protecting screening, diagnosis, surgery, and systemic treatment.

By including the post-pandemic period, the research goes beyond the evaluation of the immediate effects of COVID-19 and raises the possibility of delayed consequences. Overall, the contribution of the thesis consists of documenting the experience of IOB and transforming it into an interpretative model focused on the continuity of the entire oncological pathway and preparedness for future health crises.

Summary of the Main Results Obtained

Indicator	Pandemic	Post-pandemic	p
Age, median [IQR], years	56 [47–67]	59 [50–68]	0.399
Advanced disease	20.5%	31.3%	0.11
Neoadjuvant chemotherapy	58.9%	49.5%	0.285
Adjuvant chemotherapy	35.6%	33.3%	0.881
Postoperative radiotherapy	27.4%	22.2%	0.548
Referral → first presentation	6 [2–10]	3 [1–8]	0.053
Imaging → biopsy, days	14 [4–33]	7 [3–22]	0.058
End of NACT → surgery	33 [28–44]	38 [27–49]	0.437
Imaging → surgery, days	28 [20–41]	59 [27–80]	0.220

Indicator	Pandemic	Post-pandemic	p
Interval between chemotherapy cycles, days	21 [21–22]	18 [17–19]	<0.001