

Breast cancer treatment during the COVID-19 pandemic — a patient's perspective

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Introduction. The COVID-19 pandemic has had an impact on healthcare. The aim of the study was to assess how factors related to the COVID-19 pandemic were perceived by breast cancer patients during their anticancer treatment.

Material and methods. The study was carried out on 154 breast cancer patients. A questionnaire prepared specifically for this analysis was used.

Results. The duration of the cancer diagnosis was the same both before and during the COVID-19 pandemic. However, 42.9% of the respondents stated that they waited longer for a visit/examination than before the pandemic. Some patients were proposed a teleconsultation and over half of them were not satisfied with this; most patients claimed that this could have been a good alternative only when they began to feel better.

Conclusions. Breast cancer patients treated during the COVID-19 pandemic experienced some inconveniences and were afraid that the pandemic would have a negative impact on their treatment's outcome.

Keywords: breast cancer, COVID-19, anticancer treatment, vaccination, teleconsultations

Introduction

Breast cancer is one of the most frequently diagnosed cancers in the world [1]. The International Agency for Research on Cancer estimates that there were about 2.3 million new breast cancer cases around the world in 2020. Breast cancer is the most common cause of death from cancer in women [1].

Diagnosis and effective treatment of breast cancer is affected by multiple factors, dependent both on the healthcare system and on the patients themselves. Recently, the healthcare system has been severely affected by the COVID-19 pandemic. Restrictions began to be implemented in Poland

in March 2020, and a pandemic state was ultimately declared [2, 3]. The healthcare system had to face the challenge of a large number of COVID-19 patients, which — on the one hand — forced the decision-makers to introduce organisational changes and to move resources to fight the pandemic and, on the other hand, caused problems with ensuring continuing healthcare to patients with other diseases. During the first period of the pandemic, prevention and screening tests were discontinued, and emergency cases became the priority [4, 5]. Changes in the functioning of the healthcare system forced by the pandemic also affected the diagnostics

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and treatment of cancers. It is known that a longer waiting time for diagnosis and treatment initiation has an adverse impact on the survival rate in cancer patients, including those with breast cancer [6, 7]. Extending the time before the start of breast cancer treatment by three months results in decreasing the 5-year overall survival rate by 5–7% [7]. A number of analyses were conducted based on predictive models, e.g. it is projected that the discontinuation of screening tests for breast cancer for three months because of the COVID-19 pandemic in Canada resulted in a decrease in the number of diagnosed cancer cases by 7% and an increase in the number of advanced cancers [8]. It is estimated in the United Kingdom (UK) that a delay in diagnosing breast cancer will result in a decrease in the 5-year overall survival rate by 9.6% [9]. Patients who were in the middle of anticancer treatment or whose cancer was diagnosed during the pandemic should have been given treatment in accordance with the standard of care. However, it turned out that this was not the case. For example, the number of patients on radiotherapy in various countries decreased during the first year of the COVID-19 pandemic by 6–36% [10–12]. The concerns among healthcare professionals and patients themselves about the spread of the infection and its consequences have led various oncology scientific associations to recommend appropriate actions to reduce the risk of morbidity and death from SARS-CoV-2 infection among cancer patients, which in turn has led to changes in existing procedures [13–16].

The aim of the study was to assess how factors related to the COVID-19 pandemic were perceived by patients with breast cancer during their anticancer treatment.

Material and methods

The study was carried out on 154 breast cancer patients diagnosed between 2019 and 2021. The questionnaire in a Google form was shared on Facebook. A link to the form was provided on the websites of Klub Amazonek, patient associations and oncology-related non-profit organisations. The link to the online survey was active from 1.04.2022 to 4.03.2023. Participation in the study was voluntary and anonymous; filling out the questionnaire was equal to giving consent to participate in the study.

An original questionnaire prepared for this analysis was used. The questionnaire contained demography-related questions (age, place of residence, educational status) and 21 survey questions: twenty close-ended questions (with three multiple-choice questions among them) and one open-ended question. The questionnaire is presented as Supplementary Materials.

The survey was anonymous, and none of the participants' personal data were processed. Therefore, in accordance with the rules of the Bioethics Committee at the University of Warmia and Mazury in Olsztyn, ethics approval for the study was not required.

Statistical analysis

Descriptive statistics were used to characterise the patients' group. The chi-square test was used to compare the proportions between subgroups. A *p* value of < 0.05 was considered to be significant. The data analysis was conducted using Statistica (data analysis software), version 13 — <http://statistica.io> TIBCO Software Inc., Krakow, Poland (2017).

Results

The study included 154 women diagnosed with breast cancer, aged 25–73 years (mean age 47.3 years). 55.2% of the patients had high education, 44.2% had secondary education, and only one woman had primary education. The patients were from all parts of Poland — the smallest number from the Podlaskie and the Świętokrzyskie Voivodships (3 respondents from each), the largest number from the Mazowieckie Voivodship (18 respondents). A quarter of the respondents lived in villages (26.6%), a third lived in cities with a population exceeding 100 thousand residents (33.8%), and the other third lived in smaller towns (39.6%). Breast cancer had been diagnosed before December 2019 (over three months before the outbreak of the COVID-19 pandemic) in 32 patients (20.8%), 14 women (9.1%) had been diagnosed between December 2019 and March 2020 (immediately before the COVID-19 pandemic outbreak), 41 patients (26.6%) had been diagnosed between April and December 2020 (during the first nine months of the COVID-19 pandemic), and 66 patients (42.9%) had been diagnosed between January 2021 and December 2021 (during the second year of the COVID-19 pandemic).

The time between reporting the first symptoms to the physician or observing worrying results of screening tests and obtaining a result of a histopathological examination was shorter than one month in over half of the patients (65.6%), and it was 2–3 months in a quarter of the patients (24.7%). Only 11 patients (7.1%) waited over three months for the diagnosis after the first symptoms. A majority of the patients had completed chemotherapy and/or radiotherapy at the time of the study (80%). Half of the patients had received three COVID-19 vaccination doses at the time of the study (54.5%), 27.9% had received two doses, and 3.3% of them had received one dose. Eleven women (14.3%) were not vaccinated against COVID-19 at the time of completing the survey (Tab. I).

Demographic factors as age, education and place of residence did not have statistically significant impact on time from reporting the first symptoms to the physician or obtaining a worrying mammography result to the histopathological result (Tab. II). There was no significant relationship between the period during which the patients were diagnosed (over three months before the COVID-19 pandemic, three months immediately before the pandemic, the first nine months of the pandemic, and nine months after the start of the pandemic) and the time between a patient's visit to the physician with cancer symptoms or a worrying results

Table I. Characteristics of the study group (n = 154)

Group	n	[%]
Age (range 25–73 years; mean 47.3 ± 10.1):		
< 50 years	93	60.4
≥ 50 years	61	39.6
Education		
Primary	1	0.6
Secondary	68	44.2
High	85	55.2
Place of residence — voivodship		
Dolnośląskie	8	5.2
Kujawsko-Pomorskie	9	5.8
Lubelskie	7	4.5
Lubuskie	5	3.2
Łódzkie	14	9.1
Małopolskie	12	7.8
Mazowieckie	18	11.7
Opolskie	9	5.8
Podkarpackie	7	4.5
Podlaskie	3	1.9
Pomorskie	15	9.7
Śląskie	12	7.8
Świętokrzyskie	3	1.9
Warmińsko-Mazurskie	14	9.1
Wielkopolskie	14	9.1
Zachodniopomorskie	4	2.6
Place of residence		
Village	41	26.6
City < 20 thousand residents	23	14.9
City 20–100 thousand residents	38	24.7
City > 100 thousand residents	52	33.8

of screening mammography and the moment when the breast cancer was confirmed by histopathology (Tab. III).

A majority of respondents (85.7%) were vaccinated against COVID-19 (with at least one dose) at the moment of the study. Significantly more women aged ≥ 50 years were vaccinated compared to those aged < 50 years (95% vs. 79%, respectively; $p = 0.006$). The educational level and place of residence did not have any impact on whether they were vaccinated or not (Tab. IV). 60.4% of the women stated that they feared vaccination against COVID-19 (Tab. V). Women

Group	n	[%]
Time between reporting the first symptoms to the physician or observing worrying results of screen tests and obtaining a result of the histopathological examination		
< 1 month	101	65.6
1–3 months	38	24.7
> 3 months	11	7.1
No data	4	2.6
Phase of treatment		
During chemotherapy or radiotherapy	21	13.6
During hormonotherapy	123	79.9
During treatment of disease progression	10	6.5
Period of cancer diagnosis		
01.2019–11.2019	32	20.8
12.2019–03.2020	14	9.1
04.2020–12.2020	41	26.6
01.2021–12.2021	66	42.9
No data	1	0.6
Vaccination against COVID-19:		
1 dose	5	3.3
2 doses	43	27.9
3 doses	84	54.5
Not vaccinated	22	14.3

± Standard deviation

living in cities with a population of over 100,000 the least fear vaccination against COVID-19 ($p = 0.005$). Neither age nor educational status was shown to affect the fear of vaccination (Tab. SI). The women could not state whether they had become more susceptible to COVID-19 or its severe course after being diagnosed with cancer (Tab. V). Women with breast cancer living in large cities believed more often that they were at a higher risk of infection/severe course of COVID-19 ($p = 0.04$). Other demographic factors, such as age or educational level, did not affect the feelings of insecurity (Tab. SI). Only half of the patients (47.4%) said they felt/feel less at risk of severe COVID-19 after receiving the vaccination (Tab. V). There was no significant differences in feeling less threatened with a severe bout of COVID-19 after being vaccinated according to demographic factors (Tab. SI).

In total, 43.5% of the respondents felt safe in a hospital/clinic environment in terms of risk of SARS-CoV-2 infection, although in most of them (86.4%) an epidemiological history was taken and their body temperature was measured before

Table II. The relationship between demographic factors and the time between reporting the first symptoms to the physician or observing worrying results of screen tests and obtaining a result of histopathological examination

Group	The time between reporting the first symptoms to the physician or observing worrying results of screen tests and obtaining a result of histopathological examination						p value
	< 1 month		1–3 months		> 3 months		
	n	[%]	n	[%]	n	[%]	
Age							
< 50 years	60	67.4	22	24.7	7	7.9	0.94
≥ 50 years	41	67.2	16	26.2	4	6.6	
Education							
Secondary	44	65.7	18	26.9	5	7.4	0.94
High	56	68.0	20	25.0	6	7.0	
Place of residence							
Village	23	57.0	14	35.0	3	8.0	0.19
City < 20 thousand residents	19	86.4	1	4.5	2	9.1	
City 20–100 thousand residents	24	64.9	9	24.3	4	10.8	
City > 100 thousand residents	35	68.6	14	27.5	2	3.9	

Table III. The relationship between the period of cancer diagnosis (based on the pandemic period) and the time between reporting the first symptoms to the physician or observing worrying results of screen tests and obtaining a result of the histopathological examination

Period of cancer diagnosis	The time between reporting the first symptoms to the physician or observing worrying results of screen tests and obtaining a result of the histopathological examination								p value*
	< 1 month		1–3 months		> 3 months		no data		
	n	[%]	n	[%]	n	[%]	n	[%]	
01.2019–11.2019	21	65.6	6	18.8	3	9.4	2	6.2	0.85
12.2019–03.2020	9	64.3	3	21.4	2	14.3	0	0.0	
04.2020–12.2020	26	63.4	10	24.4	3	7.3	2	4.9	
01.2021–12.2021	44	66.7	19	28.8	3	4.5	0	0.0	
No data	1								

*No data was excluded from analysis

the visit. 37% of the women said it was impossible to maintain appropriate social distancing while waiting for the visit to the clinic or hospital admission. Nearly half of the respondents (48.7%) knew that they could use free tests to detect SARS-CoV-2 (in case of symptoms or contact with an infected person) (Tab. V).

During COVID-19 pandemic-related restrictions, the breast cancer study participants noticed changes in the functioning of healthcare that had an impact on their contacts with oncology centres. 42.9% of the respondents claimed that they waited for the visit or an examination longer than they would have before the pandemic. Difficulty in contacting the attending physicians was declared by 16.2% of the patients, while 8.4% had their planned visit cancelled with no information on when and where the visit would be rescheduled. According to 10 patients, the visits at the clinic were discontinued and/or the ward where they were treated

had been closed. 15.6% of the respondents had problems with having imaging examinations performed, and 9.1% had problems collecting results of already performed tests. For some patients (38.9%), a visit to the clinic was replaced with a teleconsultation and over half of the patients were not satisfied with the change (Fig. 1A).

Only 21% of patients expressed the view that the health-care system during the COVID-19 pandemic made them feel safe. 10.4% of the respondents needed more frequent meetings with the physician, and 21% mentioned the need to meet with a psychologist. Most of the patients received great support from their families and/or friends (72.1%) and their husband/partner (71.4%) (Fig. 1B).

Half of the respondents (53.2%) thought that the COVID-19 pandemic had an adverse impact on diagnosis and treatment of cancer (Tab. V). There were no significant correlations between demographic factors, such as age,

Table IV. The relationship between demographic factors and being vaccinated

Group	Vaccination		p value
	n	[%]	
Age			
< 50 years	73	79.3	0.006
≥ 50 years	59	95.2	
Education			
Secondary	61	89.7	0.20
High	70	82.4	
Place of residence			
Village	35	85.4	0.99
City < 20 thousand residents	20	87.0	
City 20–100 thousand residents	33	86.8	
City > 100 thousand residents	44	84.6	

educational status, or place of residence and this opinion (Tab. SII). A majority of the respondents (72.8%) expressed

Table V. Patients' opinion on factors related to the COVID-19 pandemic

Patients' opinion	n	[%]
Do/Did you fear vaccination against COVID-19?		
Yes	93	60.4
No	61	39.6
In your opinion, do you have a higher risk of COVID-19 infection/severe course of COVID-19?		
Yes	55	35.7
No	49	31.8
I have no opinion	50	32.5
Did you feel/Would you have felt a lower risk of severe COVID-19 after being vaccinated?		
Yes	73	47.4
No	42	27.3
I have no opinion	39	25.3
In your opinion, what is the impact of the COVID-19 pandemic on diagnosis and treatment of cancer in Poland?		
It is worse than before the pandemic	82	53.2
It is better than before the pandemic	6	3.9
It is the same as before the pandemic	66	42.9
Are/Were you afraid that isolation/quarantine may reduce the effectiveness of your treatment?		
Yes	112	72.8
No	27	17.5
I have no opinion	15	9.7

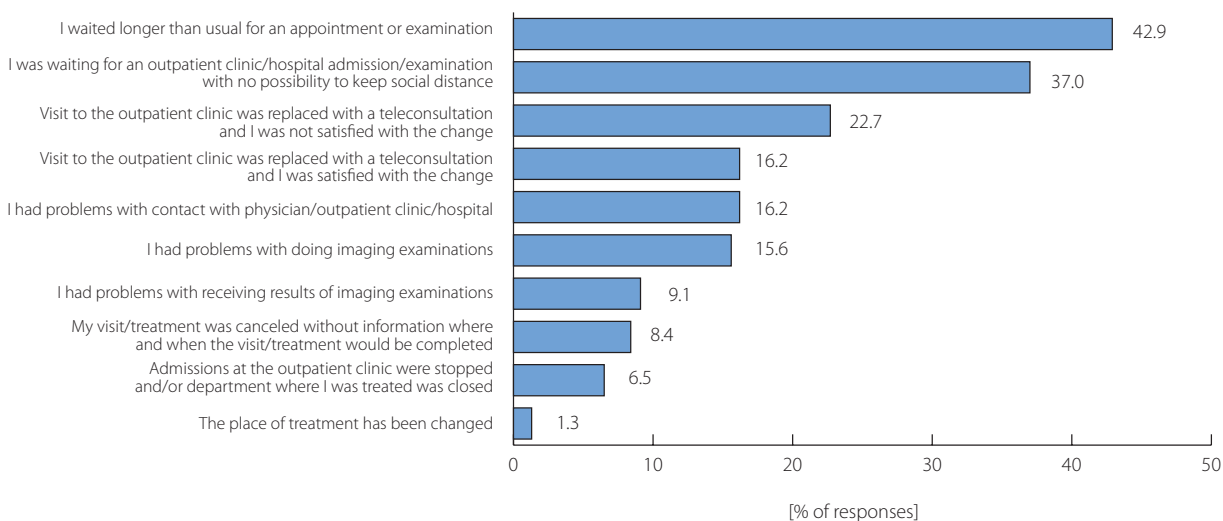
concern that isolation/quarantine could have decreased the effectiveness of their treatment (Tab. V). This concern was reported significantly more often by patients living in villages and in small towns compared to those living in large cities ($p = 0.004$) (Tab. SII).

A teleconsultation as an alternative to an in-person clinic visit was regarded as a good option by 46.1% of the patients, but only when they felt well. According to 31.8% of the respondents, the physician may have incomplete insight into overall health status during a teleconsultation. According to 51.7% of the patients who used teleconsultation, it did not meet their expectations, and 71.7% of the patients who had teleconsultations claimed that they strongly preferred in-person visits to the clinic. Only 20% of the women who had teleconsultations definitely liked them. Some patients thought that with teleconsultation they had avoided contact with those suffering from COVID-19, and saved time and money (53.5%, 63.3% and 41.7% of the respondents who had such consultations, respectively) (Tab. VI). No differences were demonstrated regarding opinion on teleconsultations based on such demographic factors as age, educational status, or place of residence.

Patients' opinion	n	[%]
Did you feel safe in a hospital/clinic with respect to the threat of being infected with SARS-CoV-2?		
Yes	67	43.5
No	58	37.7
I have no opinion	28	18.2
No data	1	0.6
In your opinion, were treatment and diagnostic centers well prepared to treat and diagnose patients during the COVID-19 pandemic?		
Yes	48	31.2
No	53	34.4
I have no opinion	53	34.4
Was your visit to the hospital preceded by an analysis of your health condition and an epidemiological interview (temperature measurement, interview or questionnaire on previous exposure to sick people or symptoms of infection)?		
Yes	133	86.4
Seldom/occasionally	10	6.5
No	11	7.1
Did you have the option to use tests to detect SARS-CoV-2 virus (in case of symptoms or exposure to an infected person)?		
Yes	75	48.7
No	11	7.1
I have no opinion	68	44.2

A

Did any of the following situations happen to you during your treatment during the pandemic? (multiple choice answer question)



B

How do you cope as a patient during a pandemic? (multiple choice answer question)

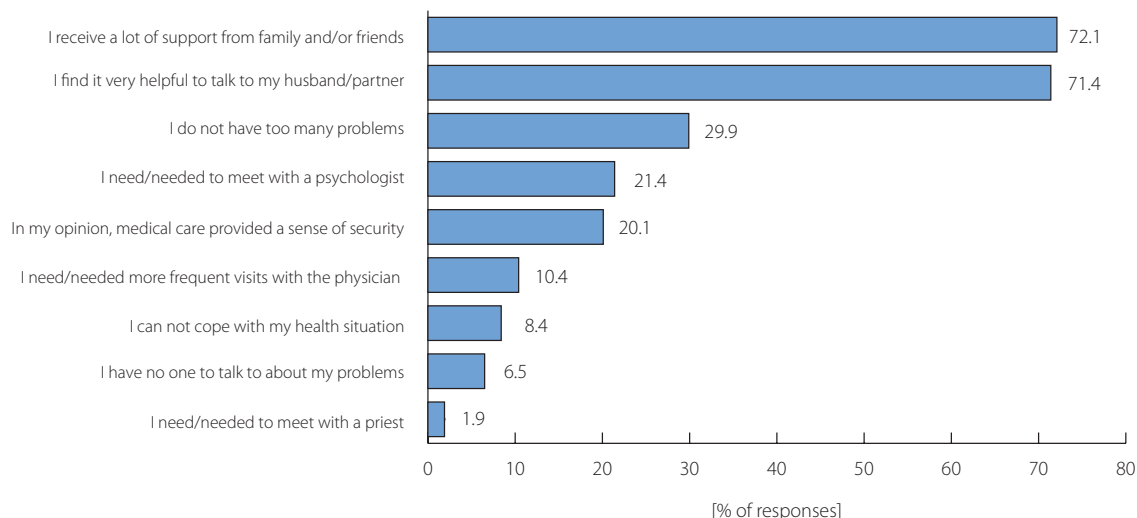


Figure 1. Patients' problems (A) and needs (B) related to treatment during the COVID-19 pandemic

Discussion

Analyses performed in various countries have shown that the COVID-19 pandemic, particularly in its initial stage, had an impact on cancer diagnostics and treatment [17–19]. Some societies (e.g. the American Society for Clinical Oncology) recommended that screening tests like mammography should be postponed [20]. It was found that the number of new cancers detected decreased by 40–50% compared to the same months in previous years [21, 22]. Afterwards, the number of detected cancers in more advanced stages increased, which also applies to breast cancer [23, 24]. It seems that this may have been affected by an extension of the diagnosis time. In a very large United States (U.S.) population study (over 6 mil-

lion insured), a decrease in the number of breast biopsies performed was shown by 71% in April 2020 and by 31% in July 2020 compared with the same months of the previous year [25]. The period in the current study during which patients were diagnosed (over three months before the COVID-19 pandemic, three months immediately before the pandemic, the first nine months of the pandemic, and nine months after the start of the pandemic) did not have a significant impact on the duration of the cancer diagnosis. 65.6% of all the analysed patients got a histopathological diagnosis within one month of reporting the first symptoms to the physician or obtaining a worrying mammography result. In fact, this study did not analyse the time between the histopathologi-

Table VI. Patients' opinion on teleconsultations

Patients' opinion	n	[%] (n = 154)*	[%] (n = 60)**
Do you think teleconsultations are a good alternative to an in-person visit? (multiple choice answer question)			
Yes, teleconsultations met my expectations	28	18.2	46.7
No, teleconsultations did not meet my expectations	31	20.1	51.7
Yes, teleconsultations saved my time	38	24.7	63.3
Yes, teleconsultations saved my money	25	16.2	41.7
Yes, owing to teleconsultations it is possible to avoid being exposed to contact with those with COVID-19	32	20.8	53.3
No, in my opinion, the physician may not have full insight into my health status during a teleconsultation	49	31.8	–
No, I don't think I can convey all my problems and concerns to the physician during the teleconsultation	0	0.0	0.0
Yes, I definitely like the teleconsultations	12	7.8	20.0
No, I definitely prefer in-person visits	43	27.9	71.7
No, teleconsultation is regarded as a good option only when I feel well	71	46.1	–
I have no opinion	4	2.6	6.7

*All patients; **Patients, who have had teleconsultation

cal result and the start of treatment. The Netherlands Cancer Registry reported that the number of women who started breast cancer treatment within three months of the cancer diagnosis decreased in the first months of the COVID-19 pandemic compared to the previous year [26]. A considerable decrease in the number of visits to oncology clinics — both for first and subsequent visits — was recorded in the U.S. at the beginning of the pandemic (March–July 2020) compared to the previous year [25]. The decline was greatest in April 2020 (by 74%). The number of hospitalised cancer patients decreased by more than 30% [25]. Similar observations on the difficulty of accessing oncology consultations were also shown by other authors [27, 28]. 42.9% of the respondents in this study stated that they waited for a visit or an imaging examination longer than usual during the COVID-19 pandemic. The appointments of 13 patients were cancelled without any information about when or where the visit would be rescheduled, and ten patients reported that the admission to the clinic, outpatient clinic and/or department where they were treated was discontinued. This was probably a result of organisational changes in healthcare, a reallocation of resources to fight the pandemic, and a desire to reduce the risk of SARS-CoV-2 infection in cancer patients.

A new form of healthcare — a teleconsultation — was introduced to reduce social contact to limit the spread of the pandemic. Teleconsultations were liked by only 20% of the respondents in the current study, and this was not influenced by their age, educational and place of residence. 32% of all patients thought that the physician could not provide a full view of the patient's situation during the teleconsultation, and 46% of the respondents stated that a teleconsultation was a good option only if the patient was

feeling well. Half of the patients for whom the in-person clinic visit was replaced by a teleconsultation were dissatisfied with the change. In a study by Wehrle et al. [29], 68% of cancer patients preferred personal visits. However, other authors reported a higher satisfaction rate with teleconsultations among cancer patients [30–32]. Bizot et al. [31] examined 1,300 breast cancer patients and noted that those who used teleconsultations showed concerns about the fact that their breasts were not physically examined by a physician. After the teleconsultations were discontinued, 63% of the respondents, as shown in the study by Wehrle et al. [29], were satisfied with the return to the in-person visits to the clinic, mainly because of the physical examinations being carried out. The patients who had a teleconsultation in the current study believed that this form of contact with the physician, saved time and money, and they were not exposed to contact with those suffering from COVID-19. Similarly, patients examined by Wehrle et al. [29] also mentioned the benefits of teleconsultations, such as convenience and time saving (52% of those using teleconsultations) and reducing the risk of COVID-19 infection (48%). Nearly all the patients with breast and gynecological cancers in the U.S (92%) in the Zimmerman et al. study [32] were satisfied with teleconsultations during the COVID-19 pandemic, and they mentioned time-saving as the main benefit of such visits. Less than half of the respondents in the current study declared that they felt safe during the pandemic in a hospital/clinic with regard to potential SARS-CoV-2 infection, although most patients claimed that their hospitalisation was preceded by an analysis of their health and epidemiological history. In general, the patients did not know whether, in their case — a cancer patient — there might be an increased risk of infection and/or

a severe course of COVID-19. In a study by Erdoğan et al. [33] in Türkiye, 66.8% of cancer patients were scared of COVID-19 infection and the associated risk of death.

A Danish study found that 80% of cancer patients were afraid of SARS-CoV-2 infection, and 9% of them avoided visits to the clinic or to the hospital because of it [34]. According to an analysis of more than one million COVID-19 patients in the U.S., those diagnosed with cancer had a 14% higher risk of pulmonary complications and a 21% higher risk of hospital death compared to the general population [35]. Nearly half of the patients in this study declared that they would be less afraid of a severe course of the disease after being vaccinated against COVID-19. Karataş et al. [36] showed that a fear of negative consequences of a COVID-19 infection was relatively low in vaccinated cancer patients. However, 60.4% of the women in this study were afraid of vaccination against COVID-19. Vaccines against COVID-19 were not available during the first months of the pandemic. After the introduction of vaccines, there were no clear guidelines concerning the vaccination of cancer patients. Media reports have been inconsistent and may have caused fear and even panic. This particularly concerned the quick introduction of new vaccines and uncertainty regarding their side effects [37, 38]. However, most patients under the current study had themselves vaccinated against COVID-19. This study showed that significantly more women aged ≥ 50 years were vaccinated compared to those aged < 50 years. Karataş et al. [36] showed that fears related to the COVID-19 virus in cancer patients (breast cancer, lung cancer, colorectal cancer) were associated with age — individuals over 45 years were more afraid. In a study conducted in England in 2020, 72% of the general population were ready to be vaccinated against COVID-19, and there were no differences regarding the respondents' ages [37]. An analysis by Cochran Library from 2022 [38] showed that the acceptance of vaccination fluctuated across various countries. For example, it was close to 100% in Malaysia and Indonesia, nearly 60% in France and only 30% in the U.S. 53.2% of breast cancer patients in this study believed that the COVID-19 pandemic had a negative impact on cancer diagnosis and treatment in Poland. As many as 72.8% of the respondents thought that the pandemic restrictions could affect the effectiveness of their treatment.

There are some limitations to the study: the online questionnaire was made available via social media and patient organization websites, which may have contributed to patients' selection; sample size was relatively small; the questionnaire was prepared only for this study and had not been validated; the study refers only to patients' subjective impression and has not been verified based on medical records.

Conclusions

Breast cancer patients treated during the COVID-19 pandemic experienced inconveniences and fears related to the pandemic; they had doubts about whether the pandemic would

negatively affect the effectiveness of their treatment. It is necessary to monitor the objective impact of the COVID-19 pandemic on breast cancer treatment outcomes.

Article information and declarations

Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics statement

The survey was anonymous, and no participants' personal data were processed. Therefore, in accordance with the rules of the Bioethics Committee at the University of Warmia and Mazury in Olsztyn, ethic approval for the study was not required.

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None.

Conflict of interest

None declared.

Supplementary material

1. Questionnaire.
2. Table SI. The relationship between demographic factors and patients' opinion on factors related to COVID-19 pandemic.
3. Table SII. The relationship between demographic factors and patients' opinion on treatment during COVID-19 pandemic.

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SUPPLEMENTARY MATERIAL

Questionnaire

Age: ... years

Education

- Primary
- Secondary
- High

Place of residence — voivodship

- Dolnośląskie
- Kujawsko-Pomorskie
- Lubelskie
- Lubuskie
- Łódzkie
- Małopolskie
- Mazowieckie
- Opolskie
- Podkarpackie
- Podlaskie
- Pomorskie
- Śląskie
- Świętokrzyskie
- Warmińsko-Mazurskie
- Wielkopolskie
- Zachodniopomorskie

Place of residence

- Village
- City < 20 thousand residents
- City 20–100 thousand residents
- City > 100 thousand residents

Year of breast cancer diagnosis

- 2019
- 2020
- 2021

Month of breast cancer diagnosis

- January
- February
- March
- April
- May
- June
- July
- August
- September

- October
- November
- December

How long did it take from the time you reported the first symptoms to the physician or observing worrying results of screen tests and obtaining a result of histopathological examination?

- < 1 month
- 1–3 months
- > 3 months
- I do not know

What phase of treatment are you in?

- During chemotherapy or radiotherapy
- During hormonotherapy
- During treatment of disease progression

Are you vaccinated against COVID-19?

- Yes — 1 dose
- Yes — 2 doses
- Yes — 3 doses
- No

Do/Did you fear vaccination against COVID-19?

- Yes
- No

Did you feel/would have felt less threatened with a severe course of COVID-19 after being vaccinated?

- Yes
- No
- I have no opinion

Have you or your household members been infected with COVID-19?

- Yes, only I have been infected
- Yes, someone in the household has been infected
- No, no one in my household has been infected

In your opinion, do you have a higher risk of COVID-19 infection/severe course of COVID-19?

- Yes
- No
- I have no opinion

In your opinion, what is the impact of the COVID-19 pandemic on diagnosis and treatment of cancer in Poland?

- It is worse than before the pandemic
- It is better than before the pandemic
- It is the same as before the pandemic

Has your treatment or diagnosis been postponed or canceled due to the COVID-19 pandemic?

- Yes
- No

If the answer in the previous question was yes, please indicate how often

- Once
- Twice
- Several times
- Many Times
- It is difficult to establish

Did any of the following situations happen to you during your treatment during the pandemic? (multiple choice answer question)

- I waited longer than usual for an appointment or examination
- I had problems with contact with physician/outpatient clinic/hospital
- Visit to the outpatient clinic was replaced with a teleconsultation and I was satisfied with the change
- Visit to the outpatient clinic was replaced with a teleconsultation and I was not satisfied with the change
- My visit/treatment was canceled without information where and when the visit/treatment would be completed
- I had problems with doing imaging examinations
- I had problems with receiving results of imaging examinations
- Admissions at the outpatient clinic were stopped and/or department where I was treated was closed
- The place of treatment has been changed
- I was waiting for an outpatient clinic/hospital admission/examination with no possibility to keep social distance

Did you feel safe in a hospital/clinic with respect to the threat of being infected with SARS-CoV-2?

- Yes
- No
- I have no opinion

In your opinion, are treatment and diagnostic centers well prepared to treat and diagnose patients during the COVID-19 pandemic?

- Yes
- No
- I have no opinion

Was your visit to the hospital preceded by an analysis of your health condition and an epidemiological interview (temperature measurement, interview or questionnaire on previous exposure to sick people or symptoms of infection)?

- Yes
- Seldom/occasionally
- No

Did you have possibility to use tests to detect SARS-CoV-2 virus (in case of symptoms or exposure to an infected person)?

- Yes
- No
- I have no opinion

Are/Were you afraid that isolation/quarantine may reduce the effectiveness of your treatment?

- Yes
- No
- I have no opinion

Do you think teleconsultations are a good alternative to an in-person visit? (multiple choice answer question)

- Yes, teleconsultations met my expectations
- No, teleconsultations did not meet my expectations
- Yes, teleconsultations saved my time
- Yes, teleconsultations saved my money
- Yes, owing to teleconsultations it is possible to avoid being exposed to contact with those ill with COVID-19
- No, in my opinion, the physician may not have full insight into my health status during a teleconsultation
- No, I don't think I can convey all my problems and concerns to the physician during the teleconsultation
- Yes, I definitely like the teleconsultations
- No, I definitely prefer in-person visits
- No, teleconsultation is regarded as a good option only when I feel well
- I have no opinion

How do you cope as a patient during a pandemic? (multiple choice answer question)

- I receive a lot of support from family and/or friends
- I find it very helpful to talk to my husband/partner
- I have no one to talk to about my problems
- In my opinion, medical care provided a sense of security
- I do not have too many problems
- I can not deal with what's going on in my life
- I need/needed more frequent visits with the doctor
- I need/needed to meet with a psychologist
- I need/needed to meet with a priest

What are your feelings about anticancer treatment in Poland during the pandemic?

Table S1. The relationship between demographic factors and patients' opinion on factors related to COVID-19 pandemic

Group	Do/Did you fear vaccination against COVID-19?				In your opinion, do you have a higher risk of COVID-19 infection/severe course of COVID-19?				Did you feel/would have felt less threatened with a severe course of COVID-19 after being vaccinated?								
	No		Yes		No		Yes		No		Yes		I have no opinion				
	n	[%]	n	[%]	n	[%]	n	[%]	n	[%]	n	[%]	n	[%]			
Age																	
< 50 years	36	39.1	56	60.9	33	35.9	34	37.0	25	27.1	30	32.6	37	40.2	25	27.2	0.07
≥ 50 years	25	40.3	37	59.7	16	25.8	21	33.9	25	40.3	12	19.4	36	58.0	14	22.6	
Education																	
Secondary	25	36.8	43	63.2	20	29.4	21	30.9	27	39.7	19	27.9	34	50.0	15	22.1	0.67
High	36	42.4	49	57.6	29	34.1	33	38.8	23	27.1	23	27.1	38	44.7	24	28.2	
Place of residence																	
Village	14	34.1	27	65.9	9	22.0	14	34.1	18	43.9	14	34.1	13	31.8	14	34.1	0.35
City < 20 thousand residents	4	17.4	19	82.6	5	21.7	8	34.8	10	43.5	5	21.7	11	47.8	7	30.5	
City 20–100 thousand residents	13	34.2	25	65.8	14	36.8	10	26.4	14	36.8	10	26.3	20	52.6	8	21.1	
City > 100 thousand residents	30	57.7	22	42.3	21	40.4	23	44.2	8	15.4	13	25.0	29	55.8	10	19.2	

Table SII. The relationship between demographic factors and patients' opinion on treatment during COVID-19 pandemic

Group	In your opinion, what is the impact of the COVID-19 pandemic on diagnosis and treatment of cancer in Poland?				Are/Were you afraid that isolation/quarantine may reduce the effectiveness of your treatment?				p value				
	It is worse than before the pandemic	It is better than before the pandemic	It is the same as before the pandemic		Yes	No	I have no opinion						
	n	[%]	n	[%]	n	[%]	n	[%]	n	[%]			
Age													
< 50 years	50	54.4	4	4.3	38	41.3	68	73.9	15	16.3	9	9.8	0.89
≥ 50 years	32	51.6	2	3.2	28	45.2	44	71.0	12	19.3	6	9.7	
Education													
Secondary	34	50.0	1	1.5	33	48.5	47	69.1	14	20.6	7	10.3	0.66
High	47	55.3	5	5.9	33	38.8	64	75.3	13	15.3	8	9.4	
Place of residence													
Village	21	51.2	2	4.9	18	43.9	34	82.9	4	9.8	3	7.3	0.004
City < 20 thousand residents	12	52.2	0	0.0	11	47.8	21	91.3	2	8.7	0	0.0	
City 20–100 thousand residents	23	60.5	1	2.6	14	36.9	27	71.1	4	10.5	7	18.4	
City > 100 thousand residents	26	50.0	3	5.8	23	44.2	30	57.7	17	32.7	5	9.6	