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### Authors' Affiliation:

<sup>1</sup>Ludwik Rydygier Specialist Hospital, Os. Złotej Jesieni 1, 31-820 Kraków, Poland

<sup>2</sup>Hospital of the Ministry of Internal Affairs and Administration, Kronikarza Galla 25, 30-053 Kraków, Poland

<sup>3</sup>V Military Hospital with Polyclinic, Wrocławska 1-3, 30-901 Kraków, Poland

<sup>4</sup>Chrzanów District Hospital, Topolowa 16, 32-500 Chrzanów, Poland

<sup>5</sup>Karol Marcinkowski University Hospital, Zyty 26, 65-046 Zielona Góra, Poland

### \*Corresponding author:

Roksana Hrapkowicz; Ludwik Rydygier Specialist Hospital, Os. Złotej Jesieni 1, 31-820 Kraków, Poland; Email: [roksanah99@gmail.com](mailto:roksanah99@gmail.com)

### Contact List:

Roksana Hrapkowicz	<a href="mailto:roksanah99@gmail.com">roksanah99@gmail.com</a>
Agnieszka Czernecka	<a href="mailto:aga.czernecka98@gmail.com">aga.czernecka98@gmail.com</a>
Kinga Światała	<a href="mailto:kingazaczyki1@gmail.com">kingazaczyki1@gmail.com</a>
Maria Mroczka	<a href="mailto:maria.w.mroczka@gmail.com">maria.w.mroczka@gmail.com</a>
Dominik Tomczak	<a href="mailto:dominiktomczak2@wp.pl">dominiktomczak2@wp.pl</a>
Kinga Erazmus	<a href="mailto:kingaers@interia.pl">kingaers@interia.pl</a>
Justyna Kuciel	<a href="mailto:j.a.kuciel@gmail.com">j.a.kuciel@gmail.com</a>
Karolina Jałocha	<a href="mailto:karolinajalocha007@gmail.com">karolinajalocha007@gmail.com</a>
Marek Borecki	<a href="mailto:marek.borecki.vip@gmail.com">marek.borecki.vip@gmail.com</a>
Patrycja Pysz	<a href="mailto:pyszu.pat@gmail.com">pyszu.pat@gmail.com</a>

### ORCID List:

Roksana Hrapkowicz	0009-0005-3470-4588
Agnieszka Czernecka	0009-0002-5075-3433
Kinga Światała	0009-0003-1021-4221
Maria Mroczka	0009-0005-8326-6991
Dominik Tomczak	0000-0003-4891-9318
Kinga Erazmus	0009-0009-0215-5472
Justyna Kuciel	0000-0001-6788-4451
Karolina Jałocha	0009-0006-0718-7295
Marek Borecki	0009-0009-4678-5986
Patrycja Pysz	0009-0007-6866-7900

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# Supplements in Breast Cancer Care: Managing Side Effects and Navigating Drug–Supplement Interactions: A Narrative Review

Roksana Hrapkowicz<sup>1\*</sup>, Agnieszka Czernecka<sup>2</sup>, Kinga Światała<sup>3</sup>, Maria Mroczka<sup>3</sup>, Dominik Tomczak<sup>4</sup>, Kinga Erazmus<sup>1</sup>, Justyna Kuciel<sup>4</sup>, Karolina Jałocha<sup>5</sup>, Marek Borecki<sup>5</sup>, Patrycja Pysz<sup>3</sup>

## ABSTRACT

**Background:** Women diagnosed with breast cancer are more likely than other cancer patients to use supplements. Despite potential benefits, there is still a lack of clear data regarding their safety. It is also concerning that physicians are often insufficiently informed about this, and that awareness of potential interactions with treatment remains low. **Aim:** This narrative review aims to (1) evaluate the role of dietary supplements in managing breast cancer treatment-related side effects and (2) critically assess the risks associated with supplement use. **Methods:** We searched the literature on PubMed, Embase, the Cochrane Library, and Google Scholar for publications up to May 1, 2025. The research focused on the use of dietary supplements by adult breast cancer patients during or after their cancer therapy. We included 22 trials in the review after screening. **Results:** Certain supplements, such as ginger and glutamine, might help reduce nausea and gastrointestinal toxicity caused by chemotherapy. Conversely, numerous supplements—particularly antioxidants and herbal compounds—have shown worrisome interactions with treatment, possibly undermining treatment effectiveness. Although there may be benefits, numerous patients do not receive advice on the safe use of supplements, and awareness of their risks is often limited. **Conclusion:** Dietary supplements may help alleviate some side effects of breast cancer treatment, but there is a risk of interactions with ongoing therapy. Physicians should always actively ask patients about supplement intake. There is a need to develop clear safety guidelines.

**Keywords:** breast cancer, dietary supplements, side effect management, drug–supplement interactions

## 1. INTRODUCTION

Oncology patients are more inclined to use dietary supplements than the general population, often at higher rates and doses. Moreover, many exceed the

recommended daily intakes (Mandecka et al., 2018). Usage rates can range from 30 to 90%, depending on the specific type of malignancy and the individual's sex (Gröber et al., 2016). Certain groups are more likely to take supplements than others. Research indicates that women and individuals under the age of 65 are more likely to utilize dietary supplements in comparison to their male counterparts and older patients. Furthermore, non-smokers and those with a college degree or higher tend to use supplements more frequently.

Studies suggest cancer patients use supplements mainly to support the immune system, manage malnutrition and treatment side effects. Additionally, supplements are widely perceived by the public as health-promoting and non-toxic (Tank et al., 2021).

A large number of studies indicate that many patients receiving cancer therapy frequently neglect to tell their healthcare providers about their use of dietary supplements. Insufficient physician questioning during medical appointments is one factor that contributes to this, as it may lead patients to think that such information is unimportant or unrelated to their care (Pouchieu et al., 2015). Inadequate communication between patients and physicians can lead to dangerous interactions between supplements and prescribed medications, as well as reduce their effectiveness.

This narrative review focuses on two main topics: the role of supplements in alleviating side effects of breast cancer therapy and potential drug-supplement interactions. Numerous patients look for complementary methods to reduce symptoms like fatigue and gastrointestinal problems, and supplements might provide supportive advantages when used correctly. Many patients are unaware that their daily vitamin regimen or herbal tea may unintentionally undermine their therapy by either reducing the effectiveness of medications or unexpectedly enhancing adverse effects. To provide clinicians with the concrete data they need to steer patients safely, we have sorted through the study to distinguish actual risks from hypothetical issues.

## 2. REVIEW METHOD

We conducted a thorough literature search across multiple databases, such as PubMed, Embase, the Cochrane Library, and Google Scholar. The search included studies released between January 1, 2015, and May 1, 2025, applying a mix of keywords and Medical Subject Headings (MeSH) terms. Search terms included: ("dietary supplements" OR "nutritional supplements" OR "antioxidant" OR "herbal supplement" OR "vitamin" OR "omega-3" OR "probiotics") AND ("breast cancer" OR "breast carcinoma" OR "breast tumor") AND ("chemotherapy" OR "endocrine therapy" OR "radiotherapy" OR "hormone therapy") AND ("side effects" OR "adverse effects" OR "drug interactions"). Boolean operators AND and OR were applied to refine the search according to each database's structure.

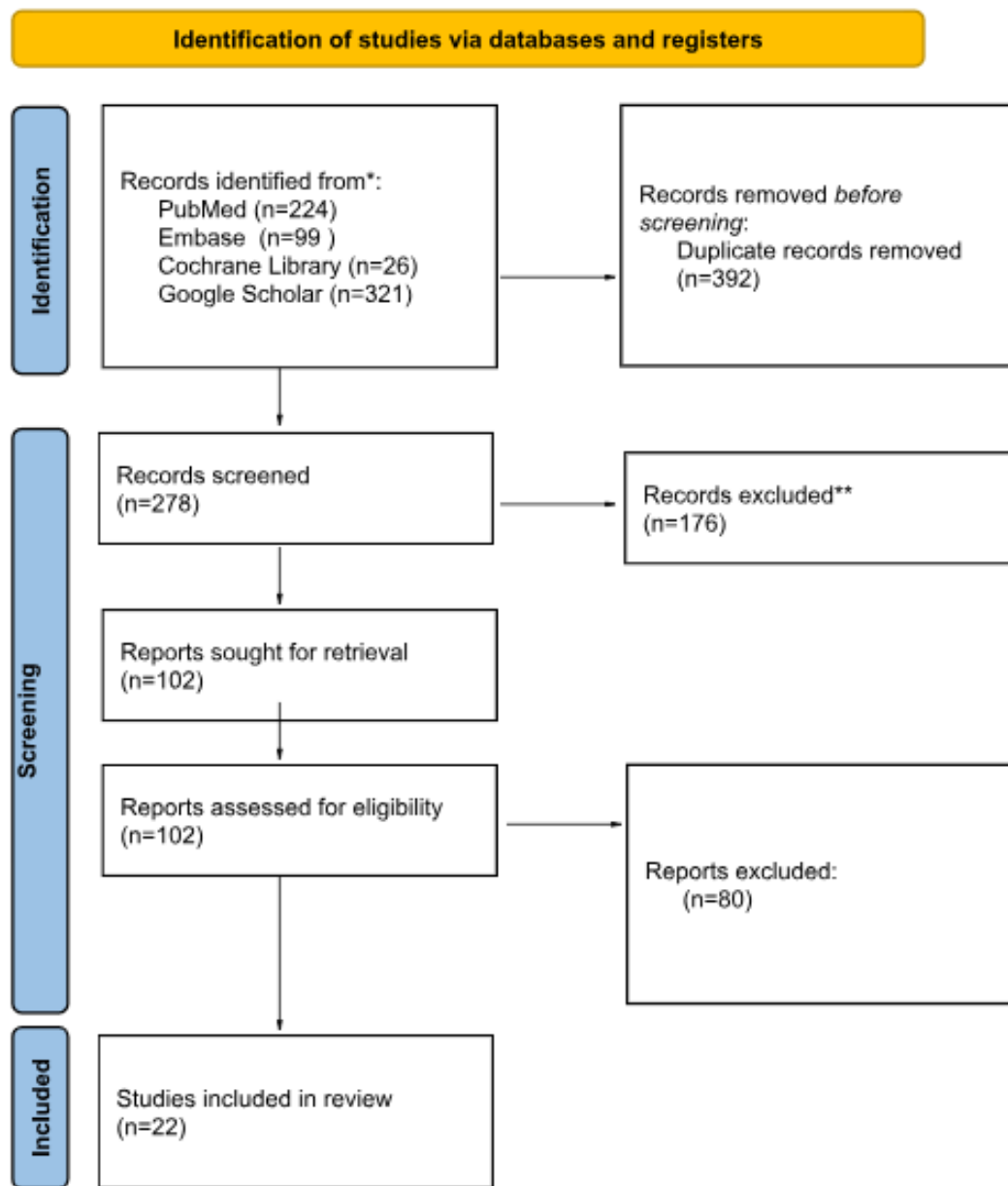
The inclusion criteria were: (1) studies involving adult breast cancer patients, (2) studies reporting on the use of dietary supplements for managing treatment-related side effects or describing potential interactions with cancer therapies, and (3) original research articles, systematic reviews, meta-analyses or narrative reviews published in English before May 1, 2025. We prioritized articles published after 2015 to ensure clinical relevance. We excluded studies if they (a) did not provide full-text access, (b) focused solely on supplements for cancer prevention, (c) involved non-breast cancer populations, or (d) were animal or in vitro studies.

After removing duplicates and screening titles, abstracts, and full texts, we incorporated 22 studies into this narrative review. The study selection process is outlined in the PRISMA flow diagram (Figure 1).

## 3. RESULTS AND DISCUSSION

### 3.1. Supplement Use Overview

Breast cancer survivors constitute a significant percentage of supplement users among oncology patients, frequently using multiple products concurrently. The products reported with the highest prevalence include vitamin D, calcium, multivitamins, vitamin C, vitamin B12, glucosamine, probiotics, turmeric, fish oil, omega-3 fatty acids, biotin, coenzyme Q10, melatonin, and cannabis (Hauer et al., 2023). In addition, the consumption of vitamins and minerals varies based on the current treatment and is notably less common among those actively receiving chemotherapy or radiotherapy; conversely, it is more prevalent among individuals currently undergoing endocrine therapy. According to Lee et al., (2021) study, around 84% of participants said they used at least one supplement during the research. Interestingly, during chemotherapy, the percentage of people using supplements remains relatively stable at around 50%, but begins to rise sharply after the treatment ends. This suggests an attempt to manage persistent symptoms and improve overall health in the post-treatment phase. Women with a history of breast cancer have significantly increased their use of dietary supplements in recent years. However, integrating these alternative techniques into cancer therapy can cause issues because they may pose health risks, particularly by interfering with the effectiveness of conventional cancer treatments (Lopes et al., 2017).



**Figure 1.** PRISMA flow diagram of study selection

### 3.2. Supplements for Side Effect Management

#### 3.2.1. Musculoskeletal Health

Endocrine therapies like aromatase inhibitors and tamoxifen are standard treatments for HR+ breast cancer, but patients often struggle to adhere long-term due to side effects such as bone loss. To mitigate bone loss associated with endocrine therapies, clinicians widely recommend vitamin D and calcium supplementation. Certain foods, such as honey and dried plums, have also been suggested to support bone density, particularly for overweight patients (Haid et al., 2021). Studies indicate that these products may help by reducing bone loss, supporting bone formation, and improving bone mineral density. A study by Chen et al., (2023) showed that Chinese medicinal herbs combined with complementary therapy improved bone mineral density. In one study, the authors assessed the role of n-3 polyunsaturated fatty acids (PUFAs) in mitigating side effects associated with breast cancer therapy. They found that it can lower bone resorption (Vityala et al., 2023).

The majority of breast cancer treatments, especially chemotherapy, result in a loss of muscle mass and strength, which raises the likelihood of disability and a lower quality of life. To assess the effect of seven days of creatine supplementation (20 g/day) in female

breast cancer survivors, researchers performed a placebo-controlled, randomized, double-blind trial. They used 10-repetition maximum (10RM) strength tests, isometric/isokinetic torque, and sit-to-stand power to evaluate muscle performance. The study's findings, which may be due to the brief duration, showed no significant differences when compared to the placebo (Parsowith et al., 2024).

### 3.2.2. Metabolic function

Studies suggest that cancer treatment, especially chemotherapy, can negatively impact patients' metabolic profiles. It can increase insulin resistance and lipid abnormalities. Additionally, it affects body composition, typically reducing fat-free mass while increasing fat percentage, even if weight or BMI remains unchanged. Although some research indicated that the use of oral nutritional supplements may serve a protective function in maintaining consistent body weight, preventing muscle loss, avoiding sarcopenic obesity, sustaining plasma albumin levels, and stabilizing lipid profiles, which helps prevent chemotherapy-induced dyslipidemia (low HDL, high triglycerides) (Grupińska et al., 2021), other studies found no significant variations.

The research conducted by Arsic et al., (2023) revealed that supplementation with fish oil (high in EPA and DHA) and evening primrose oil (rich in GLA) did not avert reductions in hematological parameters or induce significant changes in body composition.

### 3.2.3. Chemotherapy-Related Fatigue (CRF)

A frequent and crippling adverse effect of fatigue is a noticeable decline in quality of life. These supplements could work by boosting mitochondrial function and affecting energy production. According to research, some breast cancer patients may find relief from weariness from particular supplements, such as guarana, babassu oil, coenzyme Q10, l-carnitine, and omega-3 fatty acids. In contrast, the evidence for melatonin and guarana is mixed, with some trials showing no significant advantage over a placebo.

Based on research, guarana extract, combined with a healthy diet rich in plant-based foods and omega-3 fatty acids, could aid in reducing fatigue symptoms (Pereira et al., 2018). Further research indicates that incorporating babassu oil into the dietary regimen led to notable clinical enhancements in fatigue alleviation and quality of life metrics (Pereira et al., 2020). The therapeutic effects of babassu oil likely result from its ability to modulate immune function. Specifically, it lowers pro-inflammatory markers such as TNF- $\alpha$  and IL-6 and enhances mucosal immunity, as reflected in elevated salivary IgA levels.

Iwase et al., (2016) found that individuals who took the dietary supplement containing coenzyme Q10 and L-carnitine experienced a reduction in the peak level of fatigue, as assessed by the Brief Fatigue Inventory (BFI), suggesting that this supplement may help manage moderate to severe cancer-related fatigue in breast cancer patients undergoing chemotherapy in Japan, without causing any serious side effects.

Nimee et al., (2024) conducted a placebo-controlled, randomized trial to investigate the effects of melatonin supplementation (1 mg/day) on cancer-related fatigue in breast cancer patients receiving chemotherapy. The results from the melatonin group showed a significant improvement in CRF when contrasted with their baseline, implying its possible function in controlling fatigue during chemotherapy. In contrast, Mukhopadhyay et al., (2024) found that melatonin did not significantly reduce or prevent fatigue in women with early-stage breast cancer who were getting radiation therapy.

### 3.2.4. Gastrointestinal problems

Chemotherapy frequently causes severe side effects in cancer patients, primarily due to oxidative stress and damage to rapidly dividing cells, especially in the gastrointestinal system. Certain dietary supplements, such as glutamine and ginger, have been proven in studies to help reduce these side effects in breast cancer patients undergoing chemotherapy. Glutamine is particularly effective in managing gastrointestinal side effects, including diarrhea and mucositis, whereas ginger has shown strong efficacy in reducing nausea and vomiting. Ginger, which is widely recognized for its historical use in treating nausea, has only lately been investigated as a supportive therapy in oncology. A meta-analysis by Kim et al., (2022) examined data from 337 breast cancer patients in randomized controlled trials and found that ginger significantly reduced the severity of both acute and delayed chemotherapy-related nausea and vomiting, with no notable side effects reported. Glutamine supplementation has become a promising supportive strategy for mitigating chemotherapy-induced toxicities, according to Muranaka et al., (2024). The incidence, severity, and duration of grade 2 and 3 mucositis and stomatitis may be significantly reduced by glutamine, as shown by the evidence. Both oral and parenteral forms of glutamine have demonstrated efficacy in alleviating mouth pain and mucosal inflammation. Although its role in preventing chemotherapy-induced diarrhea, such as that caused by doxifluridine, is still unknown, glutamine can maintain intestinal integrity and reduce permeability during treatment.

In a randomized clinical trial, Khazaei et al., (2023) found that synbiotic supplementation significantly improved bowel movement quality in breast cancer patients undergoing chemotherapy. In that study, most participants in the synbiotics group experienced relief from diarrhea or constipation.

### 3.3. Interaction with therapy

Dietary supplements can significantly interact with breast cancer therapies, potentially reducing treatment effectiveness or increasing side effects. Antioxidants may neutralize free radicals—an essential mechanism of action for certain chemotherapies (e.g., cisplatin, doxorubicin) and radiotherapy, potentially reducing treatment effectiveness. While some studies suggest these compounds may protect healthy cells (Griñán-Lisón et al., 2021), their overall impact remains controversial. Ambrosone et al. (2020) reported that antioxidant use before and during chemotherapy was associated with a higher hazard of recurrence and mortality. Similarly, Jung et al., (2019) reported that postmenopausal women who used antioxidants during chemotherapy or radiotherapy experienced poorer outcomes.

Moreover, certain supplements can modulate cytochrome P450 enzymes by either inhibiting or inducing these enzymes, affecting the metabolism of drugs such as tamoxifen or irinotecan, which could lead to subtherapeutic drug levels or increased toxicity. Analysis of 108 self-reported dietary supplements among breast cancer survivors revealed 36 unique ingredients with potential interactions with aromatase inhibitors. Most supplement interactions were moderate. Grapefruit extract posed the most significant risk. Herbal products accounted for 89% of the interactions, with patients most frequently using vitamin D. These interactions varied by endocrine therapy and involved mechanisms such as CYP450 modulation, estrogenic activity, and altered drug absorption or clearance (Harrigan et al., 2021).

The use of herbal and dietary supplements without prior medical guidance can present perioperative risks, particularly due to their possible impact on hemostasis. A retrospective analysis involving breast cancer patients revealed that 15.5% had taken supplements that may have been inappropriate or contraindicated during the surgical period (Andersen et al., 2015). We summarized key findings on supplement efficacy for side effect management and potential interactions with therapies in Table 1.

**Table 1.** Key Summary Points of the Study

Musculoskeletal Health	<ul style="list-style-type: none"> <li>• Vitamin D + calcium help prevent bone loss during endocrine therapy.</li> <li>• n-3 PUFAs reduce bone resorption.</li> <li>• Creatine showed no short-term benefit for muscle strength.</li> </ul>
Metabolic Effects	<ul style="list-style-type: none"> <li>• Some evidence supports oral supplements in maintaining weight, muscle, and lipid levels.</li> <li>• Fish oil + evening primrose oil had no significant metabolic effect.</li> </ul>
Chemotherapy-Related Fatigue	<ul style="list-style-type: none"> <li>• Guarana, babassu oil, CoQ10 + L-carnitine may reduce fatigue.</li> <li>• Melatonin shows mixed results across studies.</li> </ul>
Gastrointestinal Side Effects	<ul style="list-style-type: none"> <li>• Glutamine reduces mucositis and diarrhea.</li> <li>• Ginger effectively reduces nausea and vomiting.</li> <li>• Synbiotics improve bowel regularity.</li> </ul>
Therapy Interactions	<ul style="list-style-type: none"> <li>• Antioxidants may interfere with chemo/radiotherapy by reducing oxidative stress.</li> <li>• Some herbal supplements (e.g., grapefruit extract) alter drug metabolism via CYP450, affecting endocrine therapy.</li> <li>• 15.5% of patients took contraindicated supplements before surgery.</li> </ul>

### 3.4. Clinical Implications

#### *Routine Screening:*

The high prevalence of dietary supplement use among breast cancer patients underscores the need for routine, proactive screening by healthcare providers. Oncologists and oncology teams should incorporate standardized supplement use assessments into clinical workflows to identify potential pharmacokinetic and pharmacodynamic interactions, particularly those involving endocrine agents and cytotoxic treatments.

*Effective Clinician–Patient Communication:*

Open discussion between patients and healthcare practitioners is essential to ensure the safe use of supplements. Clinicians should create a supportive and nonjudgmental atmosphere in which patients feel comfortable sharing their supplement use. Effective communication fosters trust, supports shared decision-making in survivorship care, and helps prevent negative patient experiences.

*Treating Symptoms:*

Before recommending supplementation, clinicians should always ask themselves whether there are any valid indications. Although selected supplements may help relieve specific symptoms, routine use is not recommended. That's why healthcare practitioners should stay informed about recent discoveries on safe, potentially beneficial supplements.

*Development and Integration of Evidence-Based Guidelines:*

There is a clear need to develop and put evidence-based clinical practice recommendations into practice in light of the potential hazards and the presently unknown benefits of supplement use throughout and after breast cancer treatment. Considering the particular stage and kind of cancer therapy, these guidelines should specify which supplements might be hazardous or not recommended. Including such advice in conventional oncology treatment practices would improve the quality, safety, and consistency of care, help standardize practices, reduce unnecessary variation, and support better patient outcomes.

## 4. CONCLUSION

Breast cancer patients frequently use dietary supplements. They are often motivated by the desire to support the immune system, improve general health, and prevent cancer recurrence. Although some supplements may help with symptoms like weariness, gastrointestinal distress, or neuropathy, new data suggests that some, especially antioxidants and specific herbal remedies, may interact with conventional treatments through pharmacokinetic or pharmacodynamic interactions. These possible dangers highlight the importance of regularly screening for supplement use throughout oncology care and of providing evidence-based, personalized guidance to each patient. The use of supplements can be addressed in routine clinical practice, supported by interaction tools unique to HS, to help improve treatment outcomes and ensure patient safety. Additional high-quality studies are needed to develop explicit recommendations for the safe usage of supplements in treating breast cancer.

**Author's Contributions**

Roksana Hrapkowicz - Conceptualization, review and editing, investigation, methodology

Agnieszka Czernecka - Methodology, review and editing, visualization, supervision

Kinga Świtała - Conceptualization, visualization, investigation

Maria Mroczka - Resources, review, data curation, investigation

Dominik Tomczak - Review, draft writing, data curation

Kinga Erazmus - Supervision, investigation, formal analysis

Justyna Kuciel - Review, visualization, data curation,

Karolina Jałocha - Visualization, writing- rough preparation, data curation

Marek Borecki - Resources, formal analysis, supervision

Patrycja Pysz - Resources, initial drafting, formal analysis

Project administration - Roksana Hrapkowicz

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**Conflict of interest**

The authors declare that there is no conflict of interest.

**Data and materials availability**

All data associated with this study will be available based on the reasonable request to corresponding author.

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