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PREHABILITATION: NEW OPPORTUNITIES AND CHALLENGES AFTER THE COVID-19 PANDEMIC. A NARRATIVE REVIEW

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A – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

ABSTRACT

Background: Prehabilitation is a comprehensive process of preparing a patient for oncological or surgical treatment. It is based on four basic pillars: nutritional care, improvement of physical condition, psychological support and giving up addictions. The COVID-19 pandemic has significantly impacted the functioning of health care systems, forcing extensive social isolation and changes in the organization of medical facilities, including outpatient counseling.

Aim of the study: The main aim of the article is to examine the impact of the COVID-19 pandemic on the possibility of using prehabilitation in patients undergoing surgical treatment. Secondary aims include identifying challenges related to the concept of prehabilitation in the pandemic era and opportunities for adaptation to local health care protocols in the post-pandemic period.

Material and methods: A targeted literature review was conducted in five databases using the "prehabilitation AND COVID-19" formula, of articles published between January 2020 and April 2024. Inclusion criteria included randomized clinical trials, systematic reviews and meta-analyses on prehabilitation of patients qualified for surgical treatment.

Results: As a result of the search criteria used, 13 works were selected for analysis: 2 randomized clinical trials, 1 systematic review combined with meta-analysis and 10 review articles. According to the content of the papers included in the analysis, the COVID-19 pandemic significantly influenced the form of prehabilitation and the need for use of telemedicine solutions. Thanks to these solutions, prehabilitation proved to be highly effective.

Conclusions: Prehabilitation, as an important preoperative procedure, plays a key role in reducing the risk of complications and improving treatment results. These goals can be achieved through outpatient consultations and remote training programs. It is important to standardize prehabilitation care to ensure optimal effectiveness.

KEYWORDS: prehabilitation, pandemic, COVID-19, perioperative care, surgery

Background

Prehabilitation is a comprehensive process preparing the patient for elective oncological or surgical treatment. Its main goal is to improve the patient's physical and mental condition, which contributes to reducing the risk of complications related to the therapy [1]. Currently, prehabilitation is based on four key pillars, which include improving nutritional status, increasing physical activity and body performance, reducing stress and maintaining mental health, as well as giving up addictions [2]. The benefits

of prehabilitation have been observed in a wide group of patients. Among oncological patients treated for, among others, cancers of the colon [3], liver, pancreas and upper gastrointestinal tract [4], lungs [5], urinary system [6] or reproductive organs [7], prehabilitation leads to improved tolerance treatment, reducing the number of complications and increasing physical fitness. Additionally, prehabilitation brings positive effects in patients qualified for surgical treatment for other reasons, including obesity [8] or joint degeneration [9, 10]. Comprehensive preparation of the patient is possible thanks to cooperation between the patient and a team of specialists, including a physician, a dietitian, a physiotherapist and a psychologist.

Preoperative preparation of patients plays a key role in the context of population aging. With age, changes occur in the body's physiology, physical and mental performance decreases, which negatively affects the ability to adapt to stressful situations. Older patients often struggle with multi-morbidities and require polypharmacy, which is important for optimizing the results of planned therapy [11]. This emphasizes the need to adapt prehabilitation to the individual needs of the patient. These activities are also beneficial for medical staff because they enable early identification of the patient's health needs and additional medical problems that may significantly increase the risk of complications. Quick identification of the patient's general condition allows for personalized pre-operative care, which ensures that the action undertaken is more effective. Moreover, cooperation and dialogue with the patient promote his/her involvement in the implementation of recommendations, which positively affects the results of treatment [12].

The COVID-19 pandemic, involving an infectious disease caused by the SARS-CoV-2 virus, has had a significant impact on the everyday functioning of communities around the world. The epidemiological effects and health consequences of this disease have necessitated the restructuring of health care systems. Preventive measures and actions aimed at limiting the spread of the virus forced extensive social isolation and changes in the functioning of medical facilities, including specialist clinics and hospitals. This, in turn, led to limited access of patients to specialist medical care and extended the waiting time for planned diagnostics and treatment [13], including scheduled surgical procedures in oncology patients. COVID-19 also significantly affected the possibility of conducting prehabilitation in the form of personal consultations, forcing the adaptation of counseling to applicable safety rules.

Additionally, the COVID-19 pandemic has significantly impacted the lifestyle and health of the population. Prolonged social isolation and limited access to recreational areas and facilities have negatively impacted individuals' physical activity. A deterioration in eating habits was also observed, with an increase in alcohol consumption and cigarette smoking [14]. The result of dietary neglect was weight gain in obese people, while the condition of those malnourished deteriorated as well. Moreover, an increase in depression and anxiety rate was observed, which was associated with isolation and limited social support [15,16]. These changes will have a significant impact on prehabilitation activities in the post-pandemic period [17].

Aim of the study

The main aim of this article was to understand the impact of the COVID-19 pandemic on the possibility of using prehabilitation in patients qualified for surgical treatment and the methods of providing this care. The secondary goal was to identify the challenges facing the concept of prehabilitation due to the pandemic and the possibilities of adapting them to local health care protocols in the post-pandemic period.

Material and methods

During work on this article, the authors initially undertook a systematic review of the literature to identify studies determining the impact of the COVID-19 pandemic on prehabilitation. The literature research was conducted using five databases: PubMed, Scopus, Web of Science, Cochrane Library and ProQuest. The search was based on the following formula: "prehabilitation AND COVID-19". We only included articles published between January 2020 and April 2024.

A narrowing criterion was then used to select studies concerning only patients qualified for surgical treatment. The data collection period lasted seven months from November 2023 to May 2024.

This study had no prior protocol describing the rationale, hypothesis, or methodology and it is not registered with the Prospective International Registry of Systematic Reviews (PROSPERO). During the review, the authors followed the recommendations of the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) [18].

Due to the insufficient volume of primary literature necessary to conduct a systematic review, the authors decided to prepare the results in the form of a narrative review. For this purpose, a targeted literature review was performed based on the criteria indicated above. Randomized clinical trials, systematic reviews and meta-analyses were selected for analysis.

Results

The primary review of the literature available in the PubMed, Scopus, Web of Science, Cochrane Li-

brary and ProQuest databases resulted in identification of 1,311 records matching the search formula "prehabilitation AND COVID-19". Ultimately, randomized clinical trials presented in English or German that concerned the impact of the COVID-19 pandemic on the prehabilitation of patients qualified for surgical treatment were selected for analysis. As a result of the search criteria used, only two studies were selected, although the study by López-Rodríguez-Arias F et al. [19] was part of the study by Triguero-Cánovas D et al. [20]. The results of this research are presented in the form of a narrative synthesis of data.

The period of the COVID-19 pandemic forced a change in the current model of patient preparation for surgical treatment. As a result of consensus, prehabilitation was transferred from the outpatient setting to the patient's home environment. López-Rodríguez-Arias et al. [19] assessed the effectiveness of home prehabilitation in patients with colorectal cancer qualified for minimally invasive surgical treatment. They conducted a prospective, randomized clinical trial involving 20 patients, 65% of whom were men, and the average age of the patients was 66.5 years. The study included patients without metastases, without nutritional intervention and without neoadjuvant treatment. The participants were divided into two groups: receiving prehabilitation and receiving standard care, 10 patients in each group. The prehabilitation program included recommendations on physical exercise, nutrition and stress reduction. Exercise videos were 30-45 minutes long, nutritional recommendations were based on a high-protein diet, and relaxation techniques included breathing exercises twice a week. Patient preparation lasted 30 days before surgery and 30 days after surgery. Body mass composition was analyzed using electrical bioimpedance at the time of diagnosis, the day before surgery and 6 and 12 weeks after surgery. In the prehabilitation group, there was a significantly lower loss of lean body mass before (1.7% vs 7.1%) and after the procedure (20% vs 80%). The average hospitalization time was shorter in the prehabilitation group (4.8 days vs 7.2 days), and complications occurred less frequently (20% vs 50%).

The presented results are an integral part of the study published by Triguero-Cánovas et al. [20], which also concerned patients operated on for colorectal cancer.

The study included 60 people treated in two periods: from October 2018 to February 2019 and from September 2019 to September 2020. The patients were divided into two groups: the study group (N=30) subjected to home prehabilitation and the control group, given standard care. Intervention outcomes were assessed based on the following parameters: change in physical status as measured by cardiopulmonary exercise testing (CPET) and 6-minute walk test (6MWT) at three time points: at diagnosis, the day before surgery, and 6–8 weeks after surgery. Patients undergoing prehabilitation followed a program involving physical activity, proper nutrition and relaxation exercises. The physical program included daily aerobic exercise and three weekly endurance sessions, individually tailored to the patient's condition. Dietary recommendations included meals with appropriate calories with a protein supply of 1.2-1.5 g/kg body weight/day and supplementation with vitamin D3 and calcium β-hydroxy-β-methylbutyrate. Patients were advised not to drink alcohol or smoke cigarettes. Relaxation exercises included breathing techniques performed at least twice a week.

The results indicated a reduced risk of postoperative complications (17.4% vs. 33.3%) and shorter hospitalization time (5.74 vs. 6.67 days). The prehabilitated group had better 6MWT test results before surgery (+78.9 m) and 6 weeks after surgery (+68.9 m vs –27.2 m, p=0.01). Body performance measured with an ergospirometer was significantly better in the prehabilitated patients 6 weeks after surgery (average 11.15 MET [SD=3.27]) compared to patients receiving standard care (average 9.65 MET [SD=3.53]). The study also highlights the usefulness of the 6MWT test as a tool for assessing patient performance, which may be useful when individualizing prehabilitation care schemes. The limitation of the presented studies was the small size of the patient groups, but the randomization used by Triguero-Cánovas et al. enhances the reliability of the results. To justify the effectiveness of the home prehabilitation model, further research on a larger group of patients is necessary.

The complexity of the prehabilitation process and the impact of the COVID-19 pandemic on the overall preoperative preparation is an important problem from a clinical point of view. The discussion becomes particularly useful due to the scarce research material and the clinical usefulness of prehabilitation. The most important targeted literature was selected for further analysis. A summary of the articles included in the analysis is presented in Table. 1.

Discussion

Preoperative preparation of patients and the role of prehabilitation are currently the subject of intensive analysis. Numerous articles document the beneficial effects of patient preparation before surgical treatment. For example, the number of publications matching the search formula "prehabilitation AND surgery" only in the PubMed database increased from 111 articles in 2020 to 568 in April 2024, which is a more than fivefold increase. Although prehabilitation is not yet a mandatory stage of treatment, it is becoming an increasingly common element of therapy.

Table 1. Summary of the articles included in the analysis

Title	Author	Year	Type of article	Effect of COVID-19 on health	Effect of COVID-19 on rehabilitation	Conclusions
Home-based prehabilitation improves physical conditions measured by ergospirometry and 6MWT in colorectal cancer patients: a randomized controlled pilot study.	Triguero-Cánovas D et al. [20]	2023	Randomised Controlled Trial		+	Home prehabilitation helps improve the patient's physical capacity, which correlates with improved results in the 6-minute walk test. Moreover, preparing the patient at home reduces the risk of complications and shortens the hospitalization time.
Effect of home-based prehabilitation in an enhanced recovery after surgery program for patients undergoing colorectal cancer surgery during the COVID-19 pandemic.	López-Rodríguez-Arias F et al. [19]	2022	Randomised Controlled Trial		+	Home prehabilitation helps effectively prepare patients for surgical treatment, reduces the loss of lean body mass in the early postoperative period, decreases the risk of potential postoperative complications.
Opportunities and Challenges for the Next Phase of Enhanced Recovery After Surgery: A Review	Ljungqvist O et al. [23]	2021	Review		+	Preoperative preparation programs combined with the ERAS protocol offer multiple benefits for the patient.
The Role of Surgical Prehabilitation During the COVID-19 Pandemic and Beyond	Hunter TL et al. [14]	2023	Review	+		The COVID-19 pandemic has aggravated the dysfunctionality of patients with frailty syndrome. Therefore, prehabilitation plays a crucial role in equalizing inequalities and reducing the risk of postoperative complications.
COVID-19-induced sarcopenia and physical deconditioning may require reassessment of surgical risk for patients with cancer	Casey P et al. [46]	2021	Review	+		COVID-19 exacerbates muscle loss, which is particularly a challenge in the group of oncological and elderly patients. Sarcopenia is a challenge for prehabilitation in the post-pandemic period.
Physical and Psychological Health Behavior Changes During the COVID-19 Pandemic that May Inform Surgical Prehabilitation: a Narrative Review	Silver JK et al. [16]	2022	Review	+		In the post-pandemic period, prehabilitation plays a key role in restoring the health of patients whose condition may have significantly worsened due to restrictions resulting from the COVID-19 pandemic and infection itself.
Fit4Surgery for cancer patients during covid-19 lockdown - A systematic review and meta-analysis	van Gestel T et al. [32]	2022	Review and meta-analysis		+	Prehabilitation conducted at home may be effective in the case of oncological patients and may also help widen its availability.
Adaptation of the PERCEPT myeloma prehabilitation trial to virtual delivery: changes in response to the COVID-19 pandemic	McCourt O et al. [33]	2022	Review		+	The development of remote prehabilitation methods is beneficial for patients requiring isolation due to the underlying disease.
Multidisciplinary paper on patient blood management in cardiothoracic surgery in the UK: perspectives on practice during COVID-19	Al-Attar N et al. [50]	2023	Review		+	Preparing a patient for surgical treatment should include the diagnosis of anaemia and coagulation disorders, which is of great importance in the case of surgical treatment. This stage should be included in the prehabilitation process.
Advantages of, and Adaptations to, Enhanced Recovery Protocols for Perioperative Care during the COVID-19 Pandemic	Stone R et al. [40]	2021	Meta-analysis		+	Presurgical preparation is particularly significant for people leading a sedentary lifestyle. The characteristics of life during the COVID-19 pandemic forces prehabilitation to focus on physical activation.
Outpatient care through cross-sector prehabilitation and rehabilitation concepts in outpatient hip and knee arthroplasty	Paloncy R et al. [49]	2022	Review		+	The use of prehabilitation as a standard element of preoperative care shortens hospitalization time, decreases the risk of complications and reduces the cost of treatment, which is important after the COVID-19 pandemic.
The Feasibility of Exercise Interventions Delivered via Telehealth for People Affected by Cancer: A Rapid Review of the Literature	Morrison KS et al. [24]	2020	Review		+	Telemedicine used in preparation for surgical treatment is a necessary alternative to outpatient visits, although it cannot be used as the only prehabilitation method.
The role of telemedicine in joint replacement surgery? An updated review	Li KY et al. [31]	2023	Review		+	Telemedicine has developed rapidly since the COVID-19 pandemic. It can be used as an addition or alternative to the current prehabilitation model.

Thanks to its versatility, it covers many important aspects of the patient's health. By using the period between the diagnosis of the disease, qualification for treatment and the initiation of therapy, it improves the patient's overall condition. This is possible by taking care of physical activity, proper nutrition, reducing stress and giving up addictions [21]. The basic areas of preparation determine the composition of the prehabilitation team, which should consist of at least a physiotherapist, a dietitian and a psychologist. It is also important to consider the role of other specialists, such as doctors, nurses and pharmacists. The physician, although not always directly involved in the preparation process, identifies risk factors that may harm the course of the planned treatment. It can determine priorities for actions in areas requiring immediate correction, predict threats and estimate the risk of complications. Additionally, the doctor may escalate nutritional therapy to include enteral or parenteral nutrition. The prehabilitation nurse acts as a coordinator, accompanying the patient at every stage of preparation, providing continuous patient education, which helps the patient understand the need to prepare for treatment and familiarize oneself with what is the treatment going to involve. The pharmacist also plays a key role in prehabilitation, supporting the process of giving up addictions in cooperation with a psychologist [22]. Pharmaceutical care is of particular importance in patients taking multiple medications – the pharmacist assesses the drugs used, the interactions between them and the impact of pharmacotherapy on future treatment. A summary of the specialist prehabilitation team is presented in Fig. 1.

The cooperation of many specialists and the focus on preparing the patient for treatment make prehabilitation a separate field [23], different from lifestyle medicine, although sometimes using its recommendations. The versatility of prehabilitation requires an individual approach, tailored to the needs of each patient.

The COVID-19 pandemic has reorganized healthcare, changed priorities and limited the functioning of hospitals. Medical facilities were ready to provide assistance in urgent situations requiring immediate intervention while maintaining the highest epidemiological standards. Elective surgical procedures have been postponed to further dates due to the efforts to treat patients infected with the SARS-CoV-2 virus. This was also related to the need to protect uninfected patients treated for other reasons. Thus, these restrictions also affected oncology patients qualified for surgical treatment. The changes also covered outpatient counseling, including prehabilitation. During the pandemic, preparing patients has become particularly difficult due to restrictions and limitations on personal contact with specialists.

Fig. 1. Extended prehabilitation team

In such circumstances, the prehabilitation format required urgent adaptation. Patient communication and preparation for procedures have become possible thanks to the use of telemedicine [24]. Remote forms of consultation have replaced traditional, personal visits to the clinic. Telephone calls and video calls enabled ongoing cooperation between specialists and patients. Published guides and video materials helped patients properly perform exercises and understand the elements of the planned treatment. These actions changed the current form of preoperative preparation, giving rise to teleprehabilitation. A prehabilitation model based on telemedicine solutions during the pandemic was presented by Gonell F. et al. [25]. Within this model, patients were consulted in person only during their first visit to a dietitian, psychologist and physiotherapist. The next stages of preparation were carried out through individual or group online meetings. However, when determining the possibility of using teleprehabilitation, social differences in access to the Internet and the ability to use online materials cannot be ignored [26]. This depends on the degree of digitization of a given country and local availability of online services. However, the benefits of preparation based on remote programs [27,28] require further confirmation in studies involving a larger group of patients.

Tay S.S. presented observations on the adaptation of telemedicine solutions in the prehabilitation process, based on the experience of Changi General Hospital in Singapore [29]. A total number of 188 patients were qualified for preoperative preparation and divided into four groups depending on the type of cancer: colorectal cancer, liver and biliary tract cancer, upper gastrointestinal cancer and urinary tract cancer.

This process was fully completed by 73% of patients, and the adherence rate was 65.9%. The cooperation rate of patients with the prehabilitation team is satisfactory. However, home preparation conditions may have a negative impact on the quality of prehabilitation due to the lack of direct supervision by a specialist. The reviewing progress can be run effectively through real-time online sessions or by combining remote care with periodic in-person visits. Undoubtedly, the lack of need to travel to a clinic or hospital and the time saved by patients contribute to a better attitude towards preparation [30].

Home prehabilitation is an interesting alternative to the standard outpatient care model. Van Gestel T et al. [31] assessed the effectiveness of home preparation of patients for treatment, adherence to recommendations, and postoperative outcomes in a published meta-analysis. Ultimately, five randomized controlled trials were included in the analysis, including a total of 351 patients with a variety of cancers, such as colorectal cancer, esophageal and gastric cancer, bladder cancer, and non-small cell lung cancer. Of these patients, 177 underwent prehabilitation and 174 were treated according to the standard care algorithm. The adherence rate, assessed by telephone conversations with a consultant or analysis of patient diaries, ranged from 63% to 83%. Although the results suggest an improvement in general condition and physical capacity in patients prehabilitated at home, accurate estimates are difficult due to the variety of patient preparation programs and different methods of assessing compliance. Additionally, the patient groups were heterogeneous and the number of participants in individual studies was often small. The complexity of prehabilitation interventions poses a challenge to the methodology of assessing their effectiveness, especially when conducted remotely.

It can be concluded that the benefits offered by the home preparation of patients also have a socioeconomic dimension. Home prehabilitation is particularly beneficial for people with financial or logistical problems that make regular outpatient visits difficult or impossible. This may mark a step towards a more individualized and flexible approach to the patient. Prehabilitation conducted at home is particularly useful for immunocompromised patients, such as hematooncological patients [32]. The COVID-19 pandemic, forcing the isolation of these patients, significantly limited the availability of consultations, which may have made prehabilitation difficult to implement. Thanks to the use of telemedicine techniques, it is possible to continuously support the physical activity of these patients, which allows them to continue prehabilitation despite the restrictions related to the pandemic. However, there is a risk of lack of proper supervision of the preparation process. It is therefore worth considering combining home prehabilitation with outpatient supervision, creating hybrid prehabilitation programs [30].

Prehabilitation focuses on improving the patient's condition before planned surgical treatment. It is also worth considering how the COVID-19 pandemic affected the health of patients in the preoperative period. This is an important point of consideration because it shows the indirect impact of the pandemic itself on the organization and adjustment of prehabilitation. Silver J.K. et al. [16] attempted to provide some answers. They indicated three main negative effects of the pandemic on oncology patients, i.e. extended waiting time for planned surgeries, limited access to specialist consultations and deterioration of health due to isolation. This, in turn, translates into an increased risk of postoperative complications [33]. The COVID-19 pandemic has also changed eating habits, widening disparities in nutritional status [34]. The increase in the consumption of highly processed products and snacking between main meals resulted in an increase in body weight in overweight and obese people. Malnourished patients, by disregarding the quality of their meals, exacerbated the loss of lean body mass [35]. An increase in adipose tissue and visceral fat as well as sarcopenia negatively affect the results of surgical treatment [36]. Isolation forced by epidemiological restrictions resulting from the pandemic has had a negative impact on patients' mental health – an increase in depression and anxiety has been reported [37,38]. Changes in mood and attempts to control it with diet combined to affect body weight. Mental health disorders also resulted in an increase in cigarette smoking and alcohol consumption [14].

The general deterioration of health habits determines the need to increase health education in the post-pandemic period. Among oncological patients, the role of prehabilitation is particularly increasing in the light of the changes described. The consequences of infection with the SARS-CoV-2 virus in terms of the efficiency of the respiratory and circulatory systems are also important, especially in patients who have undergone the severe course of infection. An additional period of limited movement and the need to rest in a lying position negatively affected muscle mass and function [31]. This requires focusing attention on solving additional health problems, including expanding diagnostics at the stage of preparing for oncological or surgical treatment.

The duration of the COVID-19 pandemic has changed the current operating model of health care systems [39], particularly limiting the possibilities of planned surgical treatment due to the need to care for a huge number of people infected with the SARS-CoV-2 virus. The potential of preventive programs and outpatient care has been significantly strained. Even though some time has passed since the end of the pandemic, the effects of health inequalities – due to isolation, lim-

ited access to specialists and the course of the infection – remain tangible. These factors directly influence the preoperative condition of patients and modulate the risks associated with surgical treatment. Observations of increased perioperative risk in patients with symptomatic COVID-19 infection [40,41,42] prompt consideration of the potential challenges of prehabilitation in the post-pandemic period. One of the first studies on this topic was a retrospective cohort study published in spring 2020 that included 1,128 patients, where the authors found a significantly higher risk of mortality and pulmonary complications in patients infected with SARS-CoV-2 [43]. Infection with this virus also reduces exercise tolerance and increases sarcopenia [44,45], which reveals an additional aspect that should be considered during preoperative preparation. Anorexia and anosmia occurring during COVID-19 infection increase the severity of malnutrition in cancer patients, resulting in further muscle loss. Sarcopenia increases mortality in this group of patients [46]. Their weakening and decrease in quantity are also the result of the action of pro-inflammatory cytokines on myofibrils, especially CXCL-10, IFN-ϒ, IL-1β, IL-6, IL-17 and TNFα [47]. This process is not specific only to SARS-CoV-2 virus infection; it may also occur during influenza infection. However, the COVID-19 pandemic has meant that more attention is now paid to the importance of muscle mass loss in the context of perioperative risk assessment and risk reduction techniques. Patient cooperation with a physiotherapist and rehabilitation of muscle mass are becoming particularly important considerations for the geriatric population in the post-pandemic period [48].

The impact of the pandemic on patient health highlights the need to create a permanent package of mandatory functional and laboratory tests [49]. Combining these studies with a clinical examination could significantly determine a patient's potential surgical and metabolic risk. This topic requires further clinical research, which will help assess the sense of additional diagnostics and enable rationalization of preparation costs. Prehabilitation, the aim of which is to reduce the risk of complications and related treatment costs, cannot, however, be excessively expensive. It is necessary to find a balance to make it both effective and economically viable.

Preoperative preparation is particularly beneficial for patients suffering from multi-morbidities, including respiratory and circulatory system diseases. Dysfunctions of these systems may have been further exacerbated by COVID-19 infection. A higher risk of surgical complications is also associated with frailty syndrome [50,51,52,53], which is a multidimensional problem resulting from reduced physiological reserves of the body, impaired immunity and multi-organ dysfunction. Frailty syndrome, typical of geriatric patients, leads to reduced mental and physical fitness, deterioration of nutritional status and a greater risk of falls. In the context of hospitalization, frailty is associated with a longer treatment period and a higher risk of complications and death [54,55]. The development of medicine results in an extension of life expectancy, which leads to a global aging of society, bringing new challenges for medicine, including surgery. Older patients are undergoing surgery more and more often, which emphasizes the importance of proper preoperative preparation. Prehabilitation makes it possible to get to know the patient and identify his/her medical problems, which promotes better results of surgical treatment, shorter hospitalizations and lower treatment costs, including the treatment of possible complications, by reducing their percentage [56].

Conclusions

Prehabilitation, as an important preoperative procedure, plays a key role in reducing the risk of complications and improving treatment results. In the face of diverse concepts regarding the implementation of prehabilitation, there is a need to structure this care by developing local guidelines and standards that guarantee a high level of medical services. Although prehabilitation is currently not a mandatory component of therapy, it is becoming an increasingly important part of treatment, especially in surgery and oncology. It is likely that in the future it will become an integral part of preoperative care.

The COVID-19 pandemic has accelerated the development and implementation of telemedicine in patient care. The use of modern technologies in the post-pandemic period will serve to expand the group of patients covered by prehabilitation, while increasing the efficiency of this process without the need to significantly increase the workload of medical staff. It is predicted that an increase in the number of patients using prehabilitation will require their classification in terms of the urgency and intensity of preoperative preparation. Classification based on clearly established criteria will enable patients to receive appropriate care – this area deserves further research.

List of abbreviations

6MWT - 6-minute walk test
COVID-19 – coronavirus disease 2019
CPET - cardiopulmonary exercise testing
ERAS - enhanced recovery after surgery
PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO – international prospective register of systematic reviews
SARS-CoV-2 – coronavirus 2

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