



Original research article

Disability in the context of prehabilitation in oncogynecological patients: a pilot study

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Abstract

Introduction: Surgical interventions for malignant oncogynecological diseases represent a significant disruption to patients' functional status and commonly result in disability. Prehabilitation serves as a preparatory process enhancing patients' resilience prior to major surgery.

Goal: To compare disability-related changes before and after a three-week intensive multimodal prehabilitation, assessed through selected functional evaluation tools.

Methods: This prospective pilot study was conducted over 15 months and involved patients diagnosed with malignant oncogynecological disease. Participants underwent intensive multimodal prehabilitation, aimed at improving psychosensory potential before demanding surgical intervention. Disability was assessed using the following tools: the International Classification of Functioning, Disability and Health (ICF), WHODAS 2.0, Perceived Stress Scale (PSS-10), Frailty Index, and Borg Rating of Perceived Exertion.

Results: Twenty patients participated in the study, with a mean age of 65 years. Statistically significant improvement was observed in three out of five selected functional assessment tools: ICF categories for body functions ($p = 0.003$), activities and participation – performance ($p = 0.003$) and capacity ($p = 0.002$), Perceived Stress Scale ($p = 0.008$), and Frailty Index ($p = 0.018$).

Conclusion: Prehabilitation led to improved disability outcomes and quality of life, demonstrating its clinical value and relevance in the context of oncogynecology.

Keywords: Disability; Functional assessment; Oncogynecology; Prehabilitation; Quality of life

Introduction

The global incidence of gynecologic oncology diseases is steadily rising. In 2022 alone, 1,473,427 new cases of gynecologic cancers were diagnosed, accounting for 15.25% of all newly reported malignant tumors in women. Mortality from these cancers represents approximately 15.77% of all female cancer-related deaths (Zhu et al., 2024). According to the International Agency for Research on Cancer (IARC), there were 324,603 new cases of ovarian cancer worldwide in 2022 (IARC, 2022). In the Czech Republic, an estimated 3,945 women are newly diagnosed with gynecologic malignancies each year, with approximately 1,292 deaths annually (Krejčí et al., 2024).

The prognosis of gynecologic cancers – including cervical, endometrial, ovarian, vulvar, and vaginal tumors – varies depending on tumor type, stage at diagnosis, and availability

of treatment. Surgical intervention remains the cornerstone of therapy, aiming both at cytoreduction and precise disease staging (Ndukwe et al., 2024).

In recent years, the concept of *prehabilitation* has been introduced into oncologic care, including gynecologic oncology. It refers to a set of targeted interventions designed to enhance the patient's physical and psychological resilience prior to major stressors, such as surgery (Lednický et al., 2020; Malecová et al., 2024). Evidence suggests that prehabilitation may help optimize therapeutic outcomes, particularly when preceded by a thorough functional assessment of health-related quality of life and disability (Diaz-Feijoo et al., 2022; Laza-Cagigas et al., 2024).

Disability, as defined by the World Health Organization (WHO) and framed by the International Classification of Functioning, Disability and Health (ICF), is understood as a reduction in an individual's functional ability due to the inter-

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action between a health condition and environmental barriers (Leonardi et al., 2006). The Czech Statistical Office (CSO) reported that in 2024, more than 1,313,000 people aged 15 and over in the Czech Republic were living with a disability that limited their daily activities – representing approximately 15% of the population aged 15 and over (Czech Statistical Office, 2025).

Assessment of disability in oncology requires a *biopsychosocial approach*, as the impact of disease extends beyond physical impairment. It encompasses the patient's ability to function within their social environment, psychological adaptation, and broader life context (Leonardi et al., 2022; WHO, 2001). Oncologic disability typically results from a combination of disease-related symptoms, treatment side effects, and psychosocial influences (Neo et al., 2017).

From a psychological perspective, disability is seen not only as a clinical or functional condition but also as a complex psychosocial phenomenon. Emphasis is increasingly placed on *psychosocial adaptation*, intersectionality, and the recognition of disability as influenced by multiple identities such as gender, race, or socioeconomic status (Brinkman et al., 2023; Wright, 1983).

In social work and public health, disability is viewed as a natural component of human diversity. This perspective emphasizes the removal of systemic barriers and the promotion of inclusive practices (Clarke and Westmore, 2022). The WHO recommends the ICF framework for standardized, objective assessment, and the WHODAS 2.0 tool for subjective self-reported measurement of disability (Institute of Health Information and Statistics of the Czech Republic, 2020; WHO, 2001).

This study focuses on the implementation of a prehabilitation model in patients with gynecologic malignancies. It aims to evaluate changes in disability and quality of life, and to promote a comprehensive understanding of cancer care that integrates physical, psychological, and social dimensions.

Material and methods

This prospective pilot study was conducted from November 2023 to January 2025 and included a total of 20 female patients diagnosed with gynecologic malignancies. The clinical protocol was designed to implement a short-term, intensive prehabilitation program prior to planned surgical intervention.

Patients were hospitalized on a 4/7 schedule, receiving care from Monday to Thursday each week, over a three-week program period. During hospitalization, they underwent an intensive multimodal prehabilitation regimen, consisting of individual physiotherapy and occupational therapy sessions conducted twice daily, each lasting 20–30 minutes. From Friday to Sunday, patients were discharged home with respiratory training devices and received instructions to continue the prescribed therapeutic activities independently.

A multidisciplinary team was engaged in delivering the prehabilitation program. The team included an oncologist, a gynecologic oncologist, a rehabilitation physician, physiotherapists, a clinical psychologist, a nutrition specialist, and occupational therapists.

The prehabilitation model was structured into three fundamental pillars, reflecting a biopsychosocial framework:

1. Promotion of motor functions (1P) – This component included exercises targeting cardiovascular and respiratory function, fine motor coordination, muscle strength, postural stability, and general physical fitness.

2. Nutritional support (2P) – Patients received individualized counseling and interventions aimed at optimizing nutritional status and addressing weight loss or malnutrition risk.
3. Psychosocial support (3P) – This included psychological interventions to enhance coping strategies, reduce anxiety and depressive symptoms, and strengthen cognitive functions.

To assess the baseline level of disability and to evaluate the effectiveness of the prehabilitation program prior to surgery, five functional assessment tools were employed. Two instruments were used for objective assessment:

- International Classification of Functioning, Disability and Health (ICF) – for structured clinical evaluation.
- Frailty Index – to identify physical vulnerability and frailty risk.

Three self-assessment tools were utilized to capture the patients' subjective experience:

- WHO Disability Assessment Schedule 2.0 (WHODAS 2.0) – for global assessment of disability across 6 domains.
- Perceived Stress Scale (PSS-10) – to measure perceived stress intensity.
- Borg Rating of Perceived Exertion Scale – for subjective evaluation of physical effort during activity.

All data were collected at two time points: prior to initiation of the prehabilitation program and immediately before the surgical procedure. The study was approved by the institutional ethics committee, and all participants provided written informed consent.

International Classification of Functioning, Disability and Health (ICF)

This pilot study focuses on evaluating body functions and domains of activity and participation. Body functions are assessed using a single qualifier that expresses the severity of impairment on a five-point scale ranging from 0 to 4 (WHO, 2001).

Activity and participation are assessed using two qualifiers: performance and capacity. Performance describes how the individual performs an activity in their usual environment, including the use of assistive devices and environmental adaptations. In contrast, capacity reflects the individual's ability to perform the activity independently, without external support or environmental modifications. Both qualifiers are rated on a scale from 0 to 4 (Sládková, 2022).

The prehabilitation team developed a “List of selected categories for oncogynecology”, consisting of 10 selected categories from component b (Body Functions) and 10 from component d (Activities and Participation), see Table 1.

World Health Organization Disability Assessment Schedule (WHODAS 2.0)

WHODAS 2.0 is a tool used for the subjective assessment of disability. The most commonly used version contains 36 items that focus on areas crucial to the patient's quality of life. The assessment covers six major domains:

- D1: Cognition (understanding and communicating)
- D2: Mobility
- D3: Self-care
- D4: Getting along with people
- D5: Life activities — domestic responsibilities, leisure, work & school
- D6: Participation

Table 1. Selected ICF categories of body functions (b) and activities and participation (d) relevant to oncogynecology

ICF code	ICF category title
b130	Energy and drive functions
b134	Sleep functions
b144	Memory functions
b152	Emotional functions
b180	Experience of self and time functions
b280	Sensation of pain
b620	Urination functions
b640	Sexual functions
b710	Mobility of joint functions
b730	Muscle power functions
d230	Carrying out daily routine
d240	Handling stress and other psychological demands
d410	Changing basic body position
d450	Walking
d520	Caring for body parts
d530	Toileting
d570	Looking after one's health
d760	Family relationships
d770	Intimate relationships
d870	Economic self-sufficiency

Note: The rating scale ranges from 0 to 4, with the corresponding percentage values indicated in parentheses: 0 – no difficulty (0–4%), 1 – mild difficulty (5–24%), 2 – moderate difficulty (25–49%), 3 – severe difficulty (50–95%), 4 – complete difficulty (96–100%) (Sládková et al., 2025)

The scale used is analogous to that of the ICF, with five levels (0–4): 0 indicates no difficulty, and 4 indicates the activity cannot be performed at all. Results are interpreted using a specific scoring form that converts raw scores into a percentage range (0–100%). A lower percentage indicates that the patient perceives their disability as less limiting (Sládková et al., 2024; Topinková et al., 2021).

Borg Rating of Perceived Exertion (RPE)

The Borg RPE scale is a subjective measure used to estimate the perceived intensity of physical activity. The commonly used scale ranges from 6 to 20, where 6 indicates very light effort and 20 indicates maximal exertion. The numerical values approximately correspond to heart rate; for example, a score of 13 reflects an estimated heart rate of around 130 beats per minute (Arney et al., 2019; Williams, 2017).

Perceived Stress Scale – PSS-10

The PSS-10 is a self-assessment questionnaire that evaluates the degree to which individuals perceive their lives as unpredictable, uncontrollable, and overwhelming. It consists of 10 items rated on a five-point Likert scale (never – almost never – sometimes – fairly often – very often). The total score ranges from 0 to 40, with higher scores indicating a greater level of perceived stress. Scores above 27 suggest a high level of stress (Figalová and Charvát, 2021).

Frailty Index (FI)

The Frailty Index is a tool used to quantify frailty in older adults. Frailty is defined as an increased vulnerability to stressors (e.g., surgery or illness) due to diminished physiological reserve and adaptability. In oncogynecology, the FI can be applied to assess the frailty of elderly patients, helping to predict treatment tolerance, the risk of complications, and overall prognosis. The FI is calculated as the ratio of the number of health deficits present to the total number of assessed variables. The resulting value ranges from 0 (no deficits) to 1 (all assessed deficits present) (Rockwood et al., 2005).

Results

A total of 20 female patients with malignant oncogynecological diseases participated in the study. Twelve patients were diagnosed with ovarian cancer, six with endometrial cancer, and two with cervical cancer. The mean age was 65 years, ranging from 61 to 75 years. The mean body mass index (BMI) was 28.

Performance status (PS) describes patients' functional capacity and reflects their level of physical activity and self-sufficiency. It is useful for determining treatment eligibility (surgery, chemotherapy) as well as prognosis (Rockwood et al., 2005). The performance status in the study ranged from 1 to 2 (1 – restricted physical activity but able to carry out light work; 2 – capable of self-care but unable to work, spending more time in bed).

The ASA physical status classification (American Society of Anesthesiologists) is a globally used preoperative risk assessment tool based on overall health status. The ASA score ranges from I to VI; score II reflects mild systemic disease (e.g., well-controlled hypertension, diabetes, obesity), and score III denotes severe systemic disease with functional limitations (e.g., COPD, heart failure) (Daabiss, 2011). The mean ASA score in this sample was 2.4. The most common comorbidities were well-controlled arterial hypertension ($n = 10$) and dyslipidemia under pharmacological treatment ($n = 4$).

For paired comparisons of five selected tests (ICF, WHODAS 2.0, Borg Rating of Perceived Exertion, PSS-10, Frailty Index), the non-parametric Mann–Whitney U test was applied due to the asymmetric distribution of most variables (Table 2).

A detailed analysis of individual items was carried out for the ICF classification and the WHODAS 2.0 questionnaire. The Wilcoxon signed-rank test was used to evaluate the significance of pre- and post-intervention differences.

ICF classification

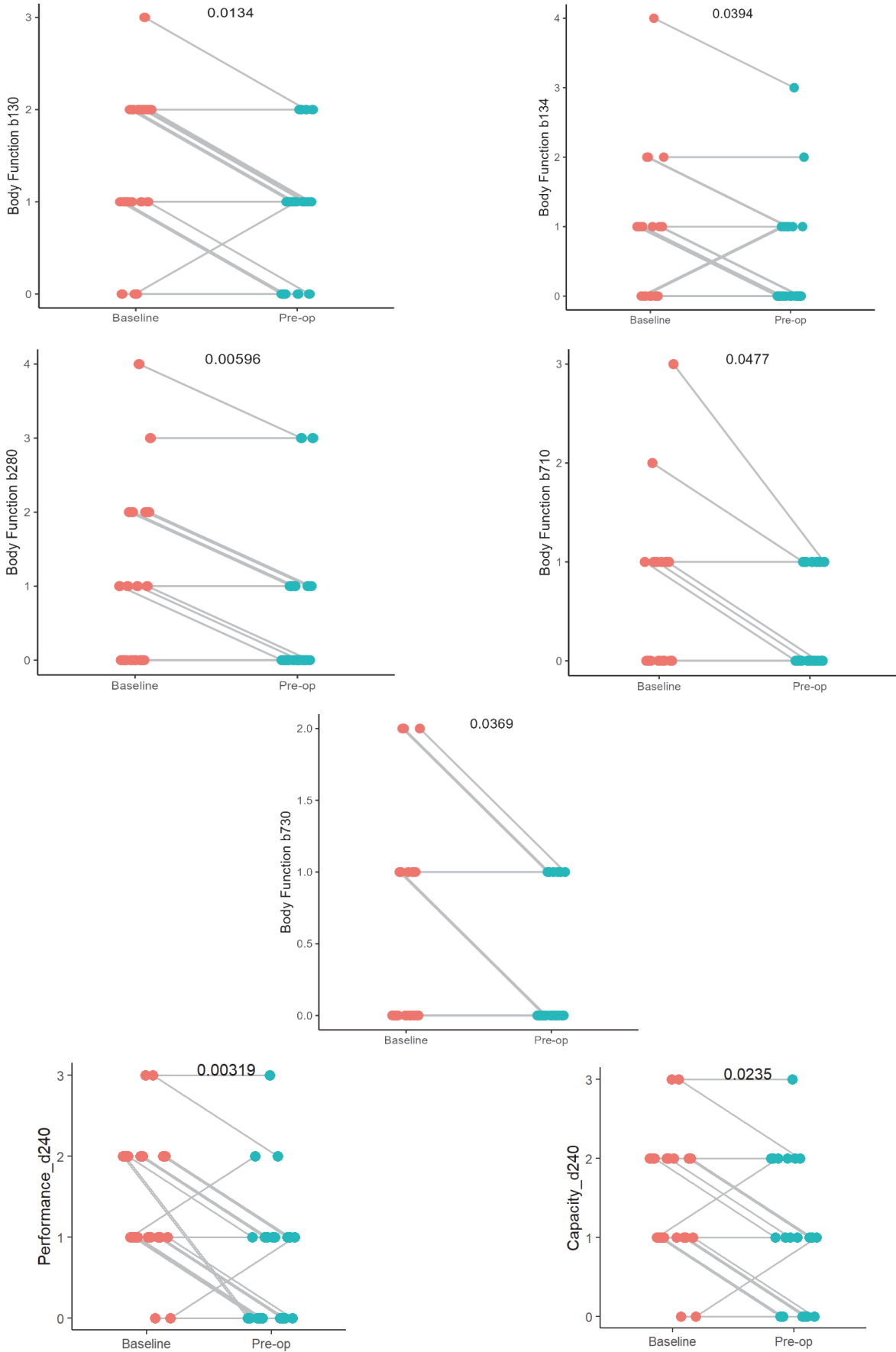
Data from the clinical application of the ICF classification are summarized in Table 2. Statistically significant improvements were observed in the domain of Body Functions (b) ($p = 0.003$), and in the domain of Activities and Participation (d), both in performance ($p = 0.003$) and capacity qualifiers ($p = 0.002$).

The oncology-specific clinical ICF form includes 10 categories from the Body Functions component and 10 from the Activities and Participation component. Statistically significant improvements were observed in five categories of Body Functions (b):

- b130 – Energy and drive functions ($p = 0.013$), b134 – Sleep ($p = 0.039$), b280 – Pain ($p = 0.006$), b710 – Mobility of joint ($p = 0.048$), b730 – Muscle power ($p = 0.037$).

In the Activities and Participation domain, significant improvement was found in:

- d240 – Handling stress and other psychological demands, in both the performance qualifier ($p = 0.003$) and capacity qualifier ($p = 0.0024$) (Charts 1–7).



Charts 1-7. Statistically significant input-output changes in selected ICF items

underline the necessity of comprehensive assessment, encompassing not only motor but also psychosocial functions. Such a multidimensional approach enables a better understanding of the complex consequences of oncogynecological disease and its treatment on patients' functional status and overall quality of life. Although the most prominent improvements were observed in motor functions, meaningful progress in psychosocial domains – such as reduced anxiety and depression – was essential for a holistic impact within the biopsychosocial model of disability. Future research should focus on extending patient monitoring into the postoperative phase and replicating this study in other specialized oncogynecology centers across the Czech Republic to validate and generalize the results.

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Ethical aspects and conflict of interest

The authors have no conflict of interest to declare.

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