

# An Evidence-Based Medical Review on Preoperative Exercise Prehabilitation in Lung Cancer Patients

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**Objective:** Preoperative exercise prehabilitation in lung cancer patients can improve preoperative functional reserve, reduce postoperative complications, accelerate postoperative recovery compared with postoperative rehabilitation. To integrate and evaluate the evidence related to preoperative exercise prehabilitation in patients with lung cancer.

**Methods:** Conducted utilizing the “6S” model of evidence resources, according to the search strategy searching for relevant guidelines, evidence summaries, best practices, systematic reviews, and expert consensuses on preoperative exercise prehabilitation for lung cancer patients. Based on the evidence inclusion and exclusion criteria, filter out relevant literature published between the beginning of each database and December 2024. Evaluated the quality of the selected literature, and then synthesis the evidence from the literature and made the recommendation level formulation.

**Results:** There were 16 pieces of literature in total, including two guidelines, three evidence summaries, one expert consensus, and ten systematic reviews. Twenty-two pieces of evidence were summarized from seven aspects: patient selection and assessment, exercise implementation and supervision, type of the exercise program, exercise prescription, safety of the exercise program, adherence to exercise program and exercise outcome evaluation.

**Conclusion:** The evidence presented in this study is scientific, comprehensive and of good clinical applicability, which can provide an evidence-based basis for medical staff to carry out preoperative exercise prehabilitation of lung cancer patients.

**Keywords:** lung neoplasms, prehabilitation, preoperative exercise, evidence summary, evidence-based nursing

## Introduction

Lung cancer is an intricate illness with a variety of clinicopathological characteristics,<sup>1-3</sup> which is high on the list in overall morbidity and mortality among all malignant tumors.<sup>4</sup> Surgical resection is the only effective treatment for most patients with early lung cancer.<sup>5</sup> Current research on exercise interventions for perioperative lung cancer patients focuses mostly on the postoperative rehabilitation phase of the perioperative period, and studies have shown that short-term postoperative rehabilitation in an inpatient setting is not clinically beneficial, so it is particularly important to be able to fully utilize the time prior to surgery, especially prior to admission, for purposeful exercise.<sup>6-8</sup> The guidelines for enhanced recovery after surgery emphasize that improving preoperative functional reserve and surgical tolerance by prehabilitation prior to surgery can assist lower perioperative morbidity and postoperative problems.<sup>9,10</sup> Therefore, preoperative exercise is an important basis for prehabilitation.

Preoperative exercise prehabilitation continues to be more and more researched, and pertinent clinical trial results have demonstrated its safety and efficacy.<sup>11</sup> Previous research has demonstrated the benefits of preoperative exercise, but it has not provided a clear description of the precise nature of the exercise.<sup>12,13</sup> It is still unclear to clinical medical personnel how to create the best preoperative exercise prehabilitation program. The content of preoperative exercise prehabilitation for lung cancer patients includes a series of measures recommended to implement and improve the perioperative functional status, but there is still a lack of unified mode. How to select acceptable and suitable interventions among a complex series of recommendations is a challenge for the further implementation and promotion of preoperative exercise prehabilitation for lung cancer patients. In order for clinical medical staff to fully comprehend the specifics and encourage the integration of pertinent evidence into clinical practice, it is necessary to summarize the evidence regarding preoperative exercise prehabilitation for lung cancer patients based on the evidence that is currently available. The present research used an evidence-based methodology to methodically acquire, analyze, and integrate evidence in order to create a reference for preoperative exercise prehabilitation for lung cancer patients.

## Materials and Methods

### Question Identification

Using the Evidence-based Nursing Center of Fudan University's Problem Development Tool, we identified questions according to the clinical question "How to do preoperative exercise prehabilitation in lung cancer patients", adhering to the PICO principle.<sup>14</sup> The following was the detailed content of the question identification. Population (P): the patients to be operated on for lung cancer. Intervention (I): the measures related to exercise prehabilitation related to the ERAS concept. Professional (P): the medical professionals and lung cancer patients could benefit from the evidence. Outcome (O): the indicators of improvement in the perioperative condition of patients with lung cancer. Setting (S): the evidence could be used in hospitals, homes, and communities. Type of evidence (T): the forms of evidence included guidelines, expert consensus, systematic reviews, evidence summaries, and clinical practice.

### Retrieval Strategy

A top-down searching using the "6S" model of evidence resources was carried out.<sup>15</sup> The search included relevant databases as well as guidelines net. The databases included Cochrane Library, PubMed, CNKI, Wanfang database, China Biomedical Literature Database (CBM), Web of Science, Embase, CINAHL. Guidelines net including UpToDate, National Institute for Health and Care (NICE), Registered Nurses' Association of Ontario (RNAO), Scottish Intercollegiate Guidelines Network (SIGN), National Guideline Clearinghouse (NGC), Guidelines International Network (GIN), BMJ Best Practice, DynaMed, Joanna Briggs Institute Evidence-Based Health Care Center Library (JBI), National Comprehensive Cancer Network (NCCN), British Thoracic Society (BTS), European Society of Thoracic Surgeons (ESTS), Scottish Intercollegiate Guidelines Network (SIGN), New Zealand Guidelines Group (NZGG).

The search strategy was "lung cancer/lung neoplasms[mesh]/lung tumor/pulmonary\*" AND "preoperative exercise-[mesh]/exercise/prehabilitation/rehabilitation" AND "guideline/consensus/statement/evidence summary/systematic review/meta/practice". The search encompassed all available literature from the inception of each database to December 2024.

### Literature Inclusion and Exclusion Criteria

Inclusion criteria: (1) the study population of the literature is lung cancer patients treated with surgery, (2) the intervention of the literature is preoperative exercise measures related to prehabilitation under the concept of ERAS, (3) the population to which the evidence of the literature can be applied is clinical professionals and lung cancer patients, (4) the outcome indicator of the literature is the improvement of patients' perioperative conditions, (5) the place to which the evidence of the literature can be applied is hospitals, homes and community or rehabilitation centers, (6) the type of the literature is guidelines, clinical practice, expert consensus, systematic evaluation, evidence summary, printed in Chinese or English language, published from the inception of each database to December 2024. Exclusion criteria: (1)

full text was not available, (2) plans in the research stage or systematic evaluations or evidence summaries included in the guidelines, (3) literature for which updated versions were available.

## Literature Quality Evaluation Instrument

(1) Clinical guideline quality evaluation tool: the AGREE-II evaluation tool was used to evaluate the quality of the included guidelines.<sup>16</sup> (2) Expert consensus quality evaluation tool: the JBI authenticity evaluation tool was used to evaluate expert consensus articles.<sup>17</sup> (3) Clinical decision-making and evidence summarization quality evaluation tool: tracing the source of evidence and selecting the appropriate evaluation tool according to the type of literature. (4) Quality evaluation tool for systematic evaluation: evaluated according to the quality evaluation tool of JBI systematic evaluation.<sup>18</sup> Three researchers evaluated the quality of the literature separately, and if the evaluators' opinions were not unanimous, a fourth senior researcher was invited to confer and finally reach a unified opinion.

## Evidence Synthesis and Recommendation Level Formulation

Two researchers extracted the resulting evidence, and a third was invited to discuss and come to a consensus if there was a disagreement. If there was a conflict in the extracted evidence, the principle of prioritizing evidence based on evidence, high-quality evidence, recently published evidence, and evidence from national guidelines was followed for integration. The level of evidence for inclusion was categorized as 1~5 according to the JBI evidence pre-grading, where the highest level was 1 and the lowest level was 5.<sup>19</sup> All authors of this article have clinical experience and have received systematic training in evidence-based curricula.

## Result

### General Characteristics of the Included Literature

This study initially searched for 2156 relevant papers. After excluded duplicates, translated versions, paraphrased versions, papers that did not fit the topic, were of lower quality, and did not fit the type of paper or the time of publication, sixteen relevant articles were finally included. Which includes two guidelines, one expert consensus, three evidence summaries, and ten systematic evaluations. The flowchart of literature screening is shown in [Figure 1](#). Basic characteristics of the included literature are shown in [Table 1](#).

### Quality Evaluation Results of Literature

#### Results of the Quality Evaluation of Guidelines

The two guidelines that were included were assessed with grade A and grade B, then they were approved for inclusion. [Table 2](#) displays the quality assessment's specifics.

#### Results of the Quality Evaluation of Expert Consensus

One expert consensus was included with "yes" for all entries except entry 1, which was "no". The expert consensus was of high quality and was allowed to be included. [Table 3](#) summarizes the findings.

#### Results of the Quality Evaluation of Systematic Reviews

Eight systematic evaluations were included, which were of high overall quality and were also granted inclusion. The results are summarized in [Table 4](#).

#### Results of the Quality Evaluation of Evidence Summaries

There were two JBI evidence summaries that traced the evidence back to the original literature, and all four were systematic reviews. The systematic reviews' quality was evaluated, and they all met standard. As a result, two evidence summaries were permitted to be included. The results are summarized in [Table 5](#).

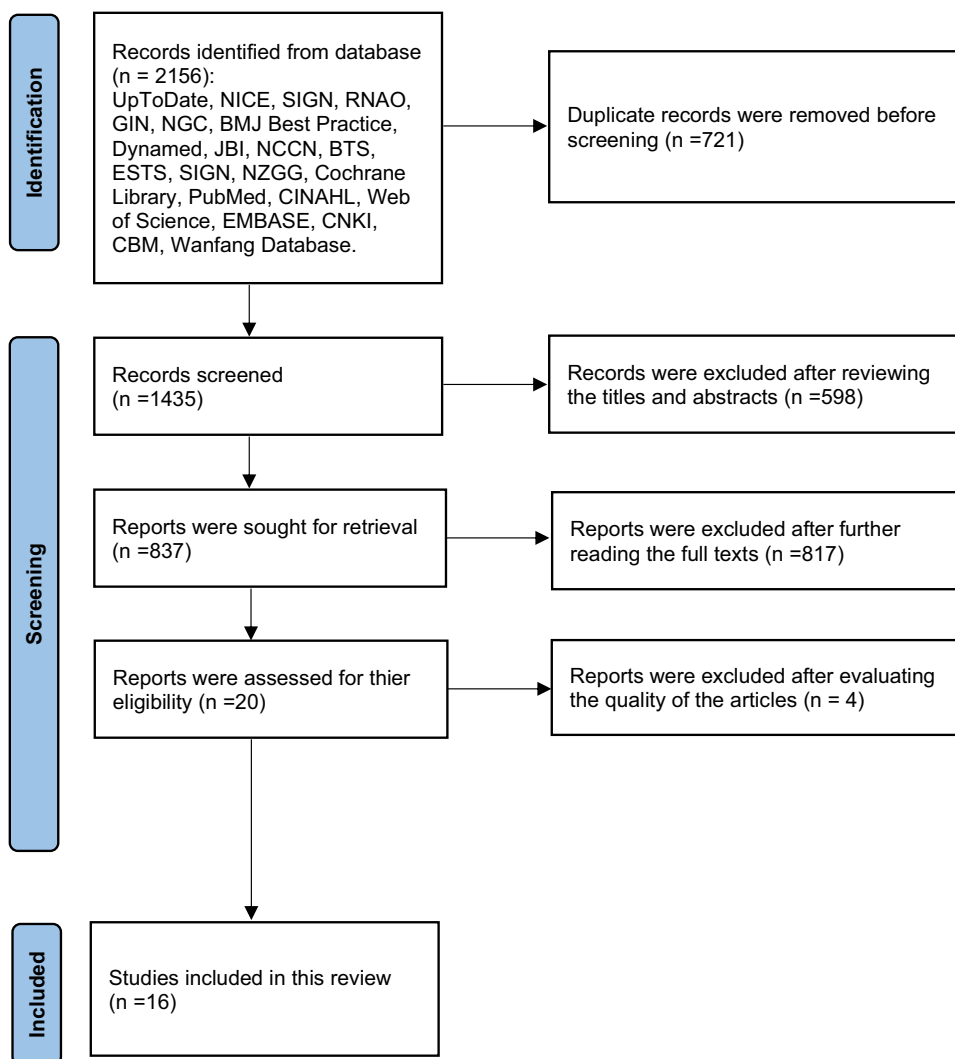


Figure 1 Flow chart of literature screening.

## Evidence Summary and Description

After the evidence was summarized by three researchers in a focused discussion and verified by one researcher, a total of 20 pieces of evidence in seven areas were finally arrived at, and the evidence was classified from 1 to 5 according to the JBI evidence pre-grading system, as Table 6.

Table 1 The Characteristics of the Included Studies (n=16)

Number	Included Studies	Source	Topic	Type of Article	Year
1	NICE <sup>20</sup>	NICE	Diagnosis and management of lung cancer	Guidelines	2024
2	Tew et al <sup>21</sup>	Web of Science	Pre-operative exercise training	Guidelines	2018
3	Liu ZJ et al <sup>22</sup>	CNKI	Prehabilitation for patients undergoing thoracic surgery	Expert consensuses	2022
4	Wu et al <sup>23</sup>	PubMed	Prehabilitation management of patients with non-small cell lung cancer	Evidence summaries	2024

(Continued)

**Table 1** (Continued).

Number	Included Studies	Source	Topic	Type of Article	Year
5	JBI <sup>24</sup>	JBI	Prehabilitation for Cancer patients	Evidence summaries	2023
6	JBI <sup>25</sup>	JBI	Preoperative strategies of postoperative pulmonary complications	Evidence summaries	2022
7	Del Bianco et al <sup>26</sup>	Embase	Physical exercise prehabilitation of cancer	Systematic reviews	2024
8	Xu et al <sup>7</sup>	PubMed	The effectiveness of pre- and post-operative rehabilitation for lung cancer	Systematic reviews	2022
9	Liu Si et al <sup>27</sup>	CNKI	The effect of cancer prehabilitation on patients with lung cancer surgery	Systematic reviews	2021
10	Voorn et al <sup>28</sup>	PubMed	Effectiveness of exercise prehabilitation	Systematic reviews	2023
11	Gravier et al <sup>29</sup>	PubMed	Effects of exercise training in people with non-small cell lung cancer before lung resection	Systematic reviews	2021
12	Granger et al <sup>11</sup>	Cochrane Library	Preoperative exercise training for people with non-small cell lung cancer	Systematic reviews	2022
13	Li et al <sup>30</sup>	PubMed	Impact of preoperative exercise therapy on surgical outcomes in lung cancer patients with or without COPD	Systematic reviews	2019
14	Rosero et al <sup>31</sup>	PubMed	Preoperative physical exercise interventions in patients with non-small-cell lung cancer	Systematic reviews	2019
15	Ni et al <sup>32</sup>	Embase	Exercise Training for Patients Pre- and Postsurgical Treated for Non-Small Cell Lung Cancer	Systematic reviews	2017
16	Sebio Garcia et al <sup>33</sup>	Embase	Preoperative exercise training in patients with lung cancer	Systematic reviews	2016

**Table 2** Quality Evaluation results of Included Guidelines (n=2)

Included Guidelines	Percentage of Field Standardization (%)						≥60% Domain Number	≥30% Domain Number	Recommendation Level
	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5	Domain 6			
NICE <sup>20</sup>	96.3	83.3	70.1	85.2	65.3	100.0	6	6	A
Tew et al <sup>21</sup>	90.7	77.8	63.9	70.4	51.4	97.2	5	6	B

**Notes:** Domain 1, scope and purpose; domain 2, stakeholder involvement; domain 3, rigor of development; domain 4, clarity of presentation; domain 5, applicability; domain 6, editorial independence.

**Table 3** Quality Evaluation Results of Included Expert Consensus (n=1)

Included Expert Consensus	Liu ZJ et al <sup>22</sup>
1. Is the source of the opinion clearly identified?	No
2. Does the source of opinion have standing in the field of expertise?	Yes
3. Are the interests of the relevant population the central focus of the opinion?	Yes
4. Is the stated position the result of an analytical process, and is there logic in the opinion expressed?	Yes
5. Is there reference to the extant literature?	Yes
6. Is any incongruence with the literature/sources logically defended?	Yes

**Table 4** Quality Evaluation Results of Included Systematic Reviews (n=10)

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Del Bianco et al <sup>26</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U
Xu et al <sup>7</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Liu Si et al <sup>27</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U
Voorn et al <sup>28</sup>	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	Y
Gravier et al <sup>29</sup>	Y	Y	Y	Y	Y	Y	U	Y	U	Y	Y
Granger et al <sup>11</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Li et al <sup>30</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U
Rosero et al <sup>31</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ni et al <sup>32</sup>	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	U
Sebio Garcia et al <sup>33</sup>	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	Y

**Table 5** Quality Evaluation Results of Systematic Reviews From Included Evidence Summaries (n=5)

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Piriaux et al <sup>34</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U
Treanor et al <sup>35</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U
Assouline et al <sup>36</sup>	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	Y
Katsura et al <sup>37</sup>	Y	Y	Y	Y	Y	Y	Y	Y	U	Y	U
Mainini et al <sup>38</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U

**Notes:** Q1. Is the review question clearly and explicitly stated? Q2. Were the inclusion criteria appropriate for the review question? Q3. Was the search strategy appropriate? Q4. Were the sources and resources used to search for studies adequate? Q5. Were the criteria for appraising studies appropriate? Q6. Was critical appraisal conducted by two or more reviewers independently? Q7. Were there methods to minimize errors in data extraction? Q8. Were the methods used to combine studies appropriate? Q9. Was the likelihood of publication bias assessed? Q10. Were recommendations for policy and/or practice supported by the reported data? Q11. Were the specific directives for new research appropriate? Y, yes; U, unclear.

**Table 6** Summary of the Best Evidence of Preoperative Exercise Prehabilitation in Lung Cancer Patients

Evidence Item	Evidence Content	Evidence Level
Patient selection and assessment	(1) Patients with VO <sub>2</sub> peak in the lower range of 10mL/kg/min to 15mL/kg/min should receive preoperative exercise training. <sup>11</sup>	I
	(2) General assessment: contraindications to exercise, health status, current treatment and investigations, physical mobility. <sup>21</sup>	5
	(3) Assessment of functional capacity: 6MWD, CPET, MIP, MEP, grip strength, quadriceps muscle strength, etc. <sup>22</sup>	5
	(4) Quality of life assessment: WHODAS 2.0 and SF-36 are available for measurement. <sup>22</sup>	5
Exercise implementation and supervision	(5) Timing of exercise: exercise training is beneficial 7 days to 4 weeks before lung cancer surgery. <sup>7</sup>	I
	(6) Place of exercise: exercise training takes place primarily in hospitals, and/or at home, in rehabilitation centers. <sup>25</sup>	I
	(7) It is recommended to refine the preoperative exercise prehabilitation program based on the International Consensus on Therapeutic Exercise and Training tool (i-CONTENT tool). <sup>28</sup>	5
	(8) Staffing: ensure that patients and their families have access to a clinical nurse specialist with expertise in lung cancer at every step of care. <sup>20</sup>	5
Type of the exercise program	(9) Main types of exercise: aerobic training, resistance training and respiratory muscle training. <sup>21,23</sup>	I
	(10) Cardiorespiratory Physical Therapist-guided High Intensity Interval Training (HIIT) can achieve the same exercise results as endurance training in a short period of time. <sup>7,22</sup>	I
	(11) The training program may also include flexibility, stretching and balance exercises during the warm-up and cool-down phases. <sup>30</sup>	I

(Continued)

Table 6 (Continued).

Evidence Item	Evidence Content	Evidence Level
Exercise prescription	(12) Exercise frequency: Aerobic training was performed for 30 minutes per session, 3–7 times per week; resistance training was performed for 10–12 repetitions in two sets or 8–15 repetitions in a single set at a frequency of 2–4 times per week; and respiratory muscle training was performed for 15–30 minutes 5–7 times per week. <sup>21,25</sup>	I
	(13) Exercise intensity: Aerobic training maintains exercise intensity at 60–80% of peak oxygen uptake for more than 5 minutes; resistance training is performed with 12–15 repetitions at loaded maximal strength; and respiratory muscle training can be performed with the aid of respiratory muscle exercise equipment from light to moderate intensity at 10%–60% of MIP. <sup>21,31</sup>	I
	(14) Exercise type: Aerobic training can be done using a recumbent cross trainer or treadmill. Resistance training requires a combination of upper- and lower-body exercises, including functional exercises for chair sitting and standing and exercises using elastic resistance bands, dumbbells, or resistance machines. The main form of respiratory muscle training is inspiratory muscle training, such as lung expansion maneuvers, voluntary deep breathing, or exercises using a respiratory physical therapy device. <sup>7,21</sup>	I
	(15) Exercise time: A short-term program of between 20–60 minutes of training per session, at least five days per week for approximately two weeks. <sup>29,31</sup>	I
	(16) Exercise volume and exercise progression: Exercise is done at a level that is sufficient to regularly benefit the patient while preventing the patient's illness burden from increasing. Base the heart rate and RPE to guide the progression of exercise, maintaining a certain level of intensity at each stage before moving on to the next. <sup>21</sup>	I
Safety of the exercise program	(17) Aerobic training should be referred to a cardiopulmonary physiotherapist when necessary for patients who are not suitable for a universal aerobic exercise program. <sup>22</sup>	5
	(18) Regular breathing should be maintained during resistance training to avoid elevation of blood pressure, and elderly patients should be seated or recumbent when practicing to avoid falling. <sup>22</sup>	5
	(19) Respiratory muscle training should priority activating the diaphragm, and intervals should be reasonably arranged to avoid dizziness and fatigue of the inspiratory muscles. <sup>22</sup>	5
Adherence to exercise program	(20) Instruction booklets, telecommunication service-based in-home training, and follow-up visits were used to increase adherence. <sup>7,27</sup> Adherence is evaluated according to a standardized management diary, and completion of more than 80% of the training plan is considered good. <sup>27,28</sup>	I
Exercise outcome evaluation	(21) Postoperatively, patients were evaluated on the basis of their functional capacity (6MWD, VO <sub>2</sub> peak, degree of dyspnea) and medical care outcomes (length of hospitalization and postoperative complications). <sup>29,31,33</sup>	I
	(22) The effects of preoperative exercise prehabilitation on lung cancer patients in terms of lung function, quality of life, economic benefits, and depression, as well as in terms of the role of multimorbid co-morbidities, need to be evaluated over a longer follow-up period. <sup>24,26,30,32</sup>	I

**Abbreviations:** VO<sub>2</sub> peak, peak oxygen uptake; CPET, cardiopulmonary exercise testing; 6MWD, 6-minute walking distance; MEP, maximal expiratory pressure; RMT, respiratory muscle training; MIP, maximum inspiratory pressure; IMT, inspiratory muscle training; RPE, rating of perceived exertion; HIIT, high-intensity interval training.

## Discussion

Based on the framework of i-CONTENT tool,<sup>39</sup> this study developed a localized summary of the evidence for preoperative exercise prehabilitation based on the seven dimensions of patient selection and assessment, exercise implementation and supervision, type of the exercise program, exercise prescription, safety of the exercise program, adherence to exercise program and exercise outcome evaluation, which is aimed at providing a reference for high-quality, evidence-based exercise therapy programs. This study summarizes the evidence and concludes that patients who are appropriate for preoperative exercise prehabilitation are those with peak oxygen uptake (VO<sub>2</sub> peak) in the lower range.<sup>11</sup> Ideally, it would be desirable for all patients undergoing elective surgery to undergo preoperative exercise prehabilitation to improve physiological and functional reserve.<sup>40</sup> However, patients with lower cardiorespiratory fitness and a higher risk of perioperative complications should be given greater priority for preoperative exercise prehabilitation.<sup>41</sup> The main types of exercises are aerobic training, resistance training and respiratory muscle training. High-intensity interval training (HIIT) is also a good option in the preoperative phase when lung cancer patients have limited preparation time. However, it needs to be done under the guidance of a physical therapist, and the patient's exercise heart rate, blood pressure, and oxygen saturation need to be closely monitored to ensure the patient's safety, and cannot be done at home.<sup>7,22</sup> Furthermore, NICE guidelines recommend that patients and their caregivers receive enhanced assistance by guaranteeing that a clinical nurse specialist with expertise in lung cancer is accessible throughout the entire care process.<sup>20</sup> Patient education, adherence assessment, and follow-up necessitate the use of specialist professionals in the form of online supportive training, management diary guidance, and phone communication.<sup>42</sup> For it turns out, institutions and

departments may want to consider increasing manpower to ensure that preoperative exercise prehabilitation programs are implemented effectively.

With the advancement of the concept of enhanced recovery after surgery, prehabilitation was described as “a range of treatments provided between the diagnosis and surgical treatment of cancer”, has been gradually recognized.<sup>43</sup> Current guidelines on rapid rehabilitation for lung cancer patients strongly recommend multimodal prehabilitation in the preoperative phase, including improving exercise capacity.<sup>10</sup> Preoperative exercise is the foundation of prehabilitation for lung cancer patients and can reduce healthcare costs by qualifying patients with borderline physical function for surgical treatment and improving perioperative outcomes.<sup>13</sup> JBI best practice recommendations entail determining the best program for exercise prehabilitation, including exercise patterns, exercise duration, and exercise intensity.<sup>24</sup> Most of the current descriptions of preoperative exercise intervention programs are vague, and the certainty of evidence for all outcomes is suboptimal.<sup>28</sup> In this study, we followed the FITT-VP principle and summarized the exercise prescriptions of aerobic training,<sup>44</sup> resistance training, and respiratory muscle training, which are easier to be implemented preoperatively in lung cancer patients, based on six factors: exercise frequency, exercise intensity, exercise time, exercise type, exercise volume, and exercise progress. Flexibility exercises, stretching, or balance exercises during the warm-up and cool-down phases can also be used to increase comfort and reduce the risk of exercise injury. We hope that the evidence will further standardize exercise prescription, improve the quality of interventions, and improve patient outcomes after surgery through more precise preoperative exercise prehabilitation.

The process of evidence-based practice is the process of creating and implementing strategies for change in a given clinical situation based on the best available evidence and clinical professional judgment, encouraging evidence translation and scientific decision-making.<sup>45</sup> In the process of clinical translation of the evidence related to preoperative exercise prehabilitation, a sound implementation intervention strategy needs to be developed after adequate assessment of potential adopters and practice settings. A plan of action must be constructed for hospital, patient, and specific clinical scenarios during implementation in order to facilitate evidence translation.<sup>46</sup> In this study, most of the literature comes from studies in other countries and regions, and in the process of localized clinical practice, it is necessary to fully consider the awareness, attitude, skills, concerns, and practice status of clinical health care workers, and to make adjustments at any time during the application process. In addition, the best evidence needs to be constantly updated and improved as new evidence emerges.<sup>47</sup>

## Conclusion

This study summarized the 22 best evidence which related to preoperative exercise prehabilitation for lung cancer patients, including patient selection and assessment, exercise implementation and supervision, type of the exercise program, exercise prescription, safety of the exercise program, adherence to exercise program and exercise outcome evaluation. To provide an evidence-based basis for preoperative exercise prehabilitation for healthcare professionals, lung cancer patients and family members, and other stakeholder groups. Applicators should apply the evidence according to the feasibility and applicability of the evidence, so as to better provide preoperative exercise prehabilitation programs for lung cancer patients to achieve the best therapeutic outcomes. Currently, the number of relevant high-quality literature is still insufficient. In the future, additional large-sample RCTs and high-quality systematic reviews are needed to provide further evidence for clinical selection. In addition, evidence users need to use the evidence selectively according to the feasibility and suitability of the evidence, so as to formulate appropriate preoperative exercise prehabilitation programs for lung cancer patients.

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## Disclosure

The authors report no conflicts of interest in this work.

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