

Research Article

Prehabilitation in Oesophageal Cancer Care: A Qualitative Study of What Moves Patients

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Background: Personalised interventions are recommended to optimise participation in prehabilitation programmes, but this requires insight into what motivates patients to participate in, and complete, such programmes. We investigated the experiences of patients with oesophageal cancer who had participated in a prehabilitation programme, with a view to identifying factors that contribute to programme participation.

Methods: This multicentre, qualitative study included patients who had completed a curative trajectory of neoadjuvant chemoradiotherapy and surgery for oesophageal cancer and who had been offered a multimodal prehabilitation programme in the period between chemoradiotherapy and surgery. Prehabilitation consisted of nutritional support and a supervised physical training programme. Data were collected after surgery using semi-structured interviews. Data were analysed using an inductive thematic analysis.

Results: Twelve patients were interviewed. Main themes contributing to programme participation were ‘development of internal motivation’, ‘external motivation through relational support’ and ‘programme feasibility and perceived benefits’. Factors related to internal motivation were ‘a clear purpose (to get through surgery)’, ‘patients’ sense of responsibility for treatment success’ and ‘a positive change of mind during the programme’. Factors related to external motivation included ‘support and supervision from healthcare providers’ and ‘support from family members’. The programme was feasible, but patients differed in their preferred level of dietary support and training supervision. Overall, the patients were positive about the programme, feeling that it prepared them for surgery.

Conclusions: This study shows that patients with oesophageal cancer are motivated by internal and external factors to participate in a multimodal prehabilitation programme. Clear information on the purpose of the programme, tailored supervision by healthcare providers and active involvement of family members support this feasible form of prehabilitation care.

Keywords: cancer; exercise; nutrition; prehabilitation

1. Introduction

Oesophagectomy is the standard curative treatment for patients with oesophageal cancer. This invasive surgery is carried out after neoadjuvant chemoradiotherapy and is frequently associated with serious postoperative complications, such as pulmonary complications, anastomotic leakage and cardiac events [1, 2]. In this context, many patients experience prolonged hospital stays, functional decline and a reduction in health-related quality of life [3–5].

Prehabilitation refers to the preoperative optimisation of physical fitness before major surgery and may be unimodal (e.g. exercise only) or multimodal (exercise, nutrition and/or psychological support) [6, 7]. Increasing evidence indicates that prehabilitation programmes improve postoperative recovery after major abdominal or thoracic surgery [8–10]. A prehabilitation programme consisting of exercise and nutritional support was found to reduce morbidity and the duration of hospitalisation, and to improve postoperative physical fitness in patients with oesophageal cancer [11–13]. Indeed, such programmes are increasingly being incorporated in usual care pathways to optimise physical fitness during the preoperative period and to improve postoperative recovery [14, 15].

Given the relatively short time period of approximately 6–8 weeks between neoadjuvant therapy and surgery, it is important to optimise participation in prehabilitation programmes. Previous studies have shown that personalised interventions are important in optimising programme participation [16–23]. This requires knowledge of what motivates patients to participate and adhere to these programmes. To date, knowledge of patients' motivation has been acquired from various patient groups with cancer, including colorectal cancer, lung cancer or breast cancer [23, 24]. These studies highlight the importance of patients' understanding of the benefits of prehabilitation, perceived self-efficacy, social support and clear communication from healthcare professionals as key motivational factors. Given the distinct clinical characteristics of oesophageal cancer—such as poor prognosis, neoadjuvant chemoradiotherapy, eating difficulties and malnutrition—it is uncertain to what extent findings from other cancer populations are transferable [25, 26]. Literature on patients with oesophageal cancer is limited to one previous study investigating the feasibility of a home-based prehabilitation programme [27]. Currently, no studies have explored motivational factors influencing participation in supervised prehabilitation in this patient group. Therefore, the objective of this study was to investigate the experiences of patients with oesophageal cancer after participation in a prehabilitation programme, in order to identify factors that contribute to programme participation.

2. Materials and Methods

2.1. Study Details. In this qualitative study, a subsample of participants was recruited from the PREoperative intervention to Improve outcomes in Oesophageal cancer patients after Resection (PRIOR) study (METC protocol

numbers 17-533/C and 20-211/C). The PRIOR study is a multi-centre, observational cohort study evaluating physical fitness and nutritional status of patients with oesophageal cancer after the implementation of a multimodal prehabilitation programme [28]. The prehabilitation programme was offered to all patients who followed a curative trajectory, as part of the usual care pathway. Curative treatment started with a 5-week schedule of chemoradiotherapy (Figure 1). Thereafter, patients followed a 6- to 8-week training programme supervised by a physiotherapist in primary care practice to improve muscle function and aerobic capacity. In addition, patients were advised to perform moderately intensive physical activity for at least half an hour, on at least 5 days a week, during the period of chemoradiotherapy and the training programme [29]. Furthermore, patients received nutritional support provided by a dietician to maintain body weight and achieve an adequate protein intake, during chemoradiotherapy and the training programme. Patients underwent oesophagectomy after completion of the prehabilitation programme. Physical fitness and nutritional status were monitored by a physiotherapist and dietician in the hospital at five timepoints, before and after chemoradiotherapy, after the training period, before discharge from hospital and 3 months after surgery. This study is reported according to the Standards for Reporting Qualitative Research [30].

2.2. Participants. Patients were recruited from the University Medical Center Utrecht, University Medical Center Groningen, Hospital Group Twente (location Almelo), Gelre hospital Apeldoorn and Isala hospital Zwolle, between April 2020 and April 2021. Patients were eligible if they had undergone surgery for oesophageal cancer with curative intent in the past year, there was no evidence of metastatic disease 3 months after surgery and patients had participated in the PRIOR study. Patients were purposively sampled by the physiotherapist during the last hospital consultation, 3–5 months after surgery. At least one patient was included from each participating hospital. Since a small proportion (6%) of patients in the total study population clearly preferred to train without supervision, both patients who had trained with and without supervision were asked to participate in the study. Interested patients were informed about the study and gave informed consent before the start of the interview.

2.3. Data Collection. Data were collected through semi-structured interviews held 4–13 months after surgery, using a loosely structured topic list based on the literature on prehabilitation and input from the research team (Appendix S1). The topic list contained open-ended questions on participants' opinions and experiences with participation in the prehabilitation programme, consisting of nutritional support and a physical training programme. Programme participation was defined as starting and adhering to the prehabilitation programme. Themes and topics were added if they emerged during interviews. Participants were interviewed using an online conference tool (Microsoft

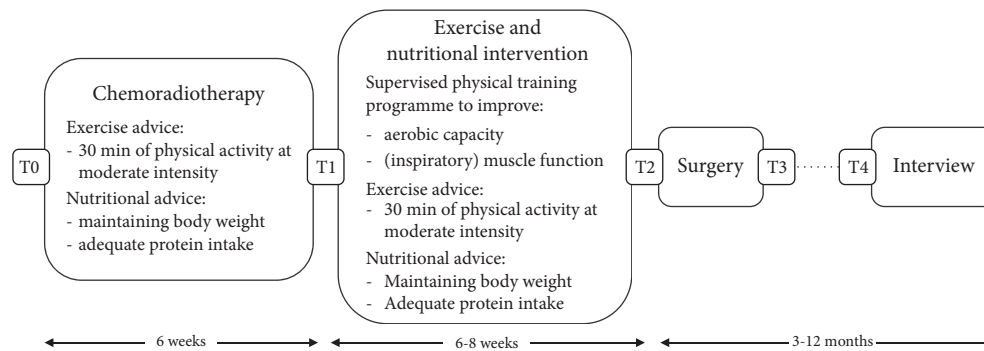


FIGURE 1: Curative treatment pathway of patients in the PRIOR study. Patients were monitored by a physiotherapist and dietician at T0, T1, T2, T3 and T4.

Teams) or by telephone, depending on the patient's preference. Interviews were carried out by one researcher (EAER) who had not been involved in the preoperative care of the patients. Prior to data collection, a bracketing exercise was conducted to identify and suspend preconceptions regarding patient experiences with prehabilitation. To ensure the quality of the interviews, a second researcher took part as an observer during three interviews. Patients were informed in advance and consented to the presence of an observer. The observer took notes during the interview without actively engaging in the conversation. At the end of the interview, and in agreement with the patient, the observer was given the opportunity to ask one or two follow-up questions. After the interview ended, the observer provided EAER with feedback. Data collection ended when sufficient variation within the sample was achieved (from different hospitals, and prehabilitation with/without supervision) and no new perspectives emerged related to the research question. During data collection, observations and reflections were documented after each interview, with particular attention to the researcher interpretations and interactions with participants. All interviews were recorded using the Free Cam application. Demographic characteristics (sex, age, tumour type, surgery, postoperative complications, length of hospital stay and time since surgery) were collected from the database of the PRIOR study.

2.4. Data Analysis. Interviews were transcribed verbatim by EAER. An inductive thematic analysis was carried out to analyse the data [31]. Three interviews were independently coded by two researchers (EAER and CDS), after which the coding strategy was discussed and refined. For practical reasons, all subsequent interviews were coded by the researcher who performed the interview. Open coding was performed using Atlas.ti software, version 22, and groups of codes were clustered to form themes, using axial coding. The themes were checked in relation to the coded extracts by two researchers (EAER and JJD). During data analysis, reflexive memoing and peer debriefing were used to critically examine emerging themes and ensure that interpretations were grounded in the data rather than influenced by researcher bias. Preliminary findings were discussed with the research team, after which the final themes were defined.

3. Results

Seventeen eligible patients were invited to participate in the study: Four patients declined to participate without giving a reason and one patient did not participate because of disease progression. In total, 12 patients participated in interviews. The last two interviews provided no new perspectives related to the research question, indicating that data collection was sufficient. Patient characteristics are presented in Table 1. The interview lasted 41 min (median, range 32–68 min). All participants were monitored by the hospital dietician and physiotherapist during the preoperative period. Three participants did not participate in the supervised training programme and performed the exercises without supervision.

All interviewed patients recognised the importance of a good physical condition before surgery. Some patients indicated to have a clear internal motivation to participate in the programme, while others needed more external support. These findings resulted in the themes (1) 'development of internal motivation' and (2) 'external motivation through relational support'. In addition, patients mentioned how the feasibility and perceived effectiveness of the programme contributed to their participation. Findings related to the feasibility and acceptability of the separate elements of the programme are presented under the last theme, (3) 'programme feasibility and perceived benefits'. The themes and codes related to participation in prehabilitation are presented in Figure 2.

3.1. Theme 1: Development of Internal Motivation. Three factors emerged as supporting internal motivation, namely, 'a clear purpose', 'patient commitment and personal responsibility' and positive experiences during the programme, resulting in a 'change of mind'.

3.1.1. A Clear Purpose ('To Get Through Surgery'). Patients reported that they received clear and understandable information about the purpose of the programme, namely, that a good physical condition would help them to recover from surgery. This information contributed to patients' internal motivation to participate in the programme. Patients mentioned that the information was consistently communicated by different healthcare providers (surgeon, nursing

TABLE 1: Characteristics of participants ($n = 12$).

Sex, n	
Male	11
Female	1
Age in years, mean (SD)	68.9 (7.0)
Living situation	
Alone	0
With partner	12
Level of education	
Primary or middle school	7
High school	5
College/University	0
Tumour type, n	
Adenocarcinoma	10
Squamous cell carcinoma	2
Surgery, n	
Transthoracic oesophagectomy	12
Postoperative complications, n	
Yes	8
No	4
Length of hospital stay in days, median (range)	8 (6–28)
Participation in supervised training programme	
Yes	9
No	3

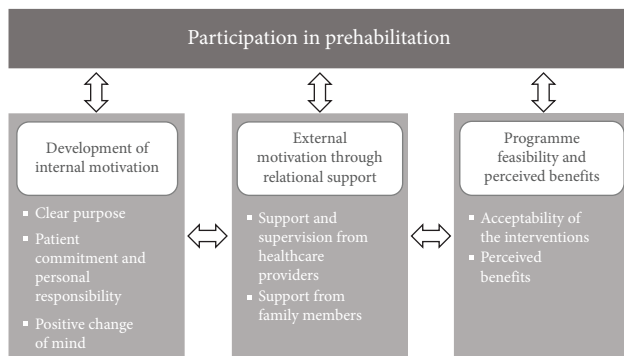


FIGURE 2: Factors contributing to participation in prehabilitation.

specialist, physiotherapist and dietician), all of whom emphasised the importance of the programme. Several patients mentioned that their motivation to exercise was greater in the preoperative period than in the postoperative period.

Pt 1: 'The better your condition, the faster you recover. I focused on that'.

Pt 9: 'A good physical condition was necessary to fight'.

Pt 7: 'At that moment, I had a clear motivation to go to the physiotherapist. My condition had to be good before surgery. Now (postoperatively), I no longer have this motivation'.

3.1.2. Patient Commitment and Personal Responsibility. Patients reported that their own efforts and a positive approach were important elements contributing to programme participation. The opportunity to undergo cancer treatment with curative intent motivated patients to do everything to

make that treatment successful—patients felt a personal responsibility to contribute to the success of their treatment by adequately preparing for surgery. Patients valued the support and advice from healthcare providers—who did everything within their capacity to support a successful treatment outcome—but indicated that the discipline and commitment to participate in the programme had to come from themselves.

Pt 6: 'You have the chance to start a curative trajectory, and then you must participate in this trajectory. You do everything that is possible'.

Pt 11: 'If you were asked: you have to be in good shape, and I wouldn't have done anything, then you could blame yourself for not doing anything for it. But I did everything I could'.

Pt 3: 'You receive tips and tricks, but the discipline must also come from yourself. That's crucial'

3.1.3. A Positive Change of Mind During the Programme. Initially, some patients indicated that they were not internally motivated to engage in the preoperative training programme, because they did not like exercise or because they felt sick. However, these patients reported that they ultimately participated in the programme, largely because of the efforts and support provided by healthcare providers. After surgery, these patients said that they considered the preoperative training programme to be very important and that their motivation had changed in a positive sense.

Pt 3: 'But afterwards, when I had had surgery and I was shuffling in the hallway, I understood, I thought, yes, that's how it works, so this is what you do it for. Yes, it is very important that you are as trained and as good as possible when you undergo the surgery. I did find out.'

Pt 6: 'At that moment, I felt sick and I thought: leave me alone. But now, I can really say it was necessary to train'.

3.2. Theme 2: External Motivation Through Relational Support. Two main factors contributed to the external motivation of patients to participate in the programme, namely, 'support and supervision from healthcare providers' and 'support from family members'.

3.2.1. Support and Supervision From Healthcare Providers. Patients reported that physiotherapists and dieticians as well as nurse specialists and surgeons encouraged them to be in a good physical condition before surgery. Patients who were initially not motivated to participate in the programme reported afterwards that they appreciated this encouragement provided by healthcare professionals, noting that this support played an important role in their decision to engage with the programme.

Pt 6: 'Fortunately, there was encouragement to start training. It really is necessary—you need to be stimulated. Otherwise, you feel like, just let it go'

Several patients mentioned that the surgeon emphasised that if their physical condition was not sufficient, the surgery might not proceed. For patients, this served as a strong motivator.

Pt 9: 'I wanted to be as fit as possible before surgery, because if the surgeon thinks that your condition is not good enough, he may postpone surgery. I thought, this won't happen to me.'

The need for a structured and supervised training programme differed among patients. Most patients preferred to train under the supervision of a physiotherapist, who supported the patient by providing positive feedback, tips and advice. Patients found that having a fixed appointment was helpful—they found it inconvenient to cancel their appointment. Moreover, they appreciated the supervision of a physiotherapist specialised in oncology. Other patients chose to perform the training programme without supervision, because they already trained in a gym, or because they did not like gyms and preferred to walk and cycle outdoors.

Pt 7: 'Just going to the physiotherapist makes you more motivated, I think. Then, you do something for it, you go for it and that works better'

Pt 4: 'I don't like gyms. I prefer to do it myself. That's what I said, and that's what I did. Especially with walking, so to speak'.

3.2.2. Support From Family Members. Most patients said that support from family members contributed to their adherence to the prehabilitation programme. Family members motivated patients to go to the physiotherapist or exercised (walking or cycling) with them. This gave patients the feeling that they were supported by their family and helped them to follow and adhere to the advice given by the healthcare providers. In addition to this mental support, family members helped patients to achieve an adequate nutritional intake, paying close attention to their nutritional and protein intake. This instrumental support enabled patients to follow the nutritional advice.

Pt 12: 'My daughter always said: make sure that you stay in good shape. When you get involved with illness, it is important that you have the feeling: I am supported by my family'.

Pt 4: 'My wife paid specific attention to proteins, but I just eat what's there, for convenience'.

3.3. Theme 3: Programme Feasibility and Perceived Benefits. Overall, patients found the prehabilitation programme to be feasible, expressed in terms of the 'acceptability of the physical training programme', 'acceptability of the nutrition intervention' and 'perceived benefits of the prehabilitation programme'.

3.3.1. Acceptability of the Training Programme. Patients reported very few barriers to participation in the training programme. They received sufficient guidance from the physiotherapist and considered that the content and intensity of the programme were adapted to their specific situation. Patients experienced an improved physical fitness, which contributed to their motivation to follow the programme.

Pt 2: 'I liked the training programme, because my condition improved by leaps and bounds'.

Pt 8: 'You notice that it got better and better over time. So that's positive, (...) it contributes to your motivation. Then you know what you're doing it for.'

Patients who chose to follow the training programme without supervision appreciated the flexibility to complete the programme in their own way. They reported that this approach contributed to the acceptability of the programme, and that they were able to improve their physical condition independently.

3.3.2. Acceptability of the Nutrition Intervention. Patients had different views about the nutritional guidance. While patients recognised the importance of maintaining their bodyweight and having a sufficient protein intake, some indicated that they had few nutritional problems preoperatively and were less concerned about eating a protein-rich diet or maintaining their body weight. These patients did not feel a strong need to change their diet.

Pt 5: 'Before surgery, I was not so concerned with nutrition, because I had no problems'.

Other patients reported that they had great difficulty with swallowing and could hardly eat or had great difficulty maintaining their weight. These patients found it very difficult to follow the advice about a protein-rich diet and additional oral supplements. This difficulty in achieving an adequate diet made some patients less motivated to follow the advice given by the dietician.

Pt 7: 'And then I had to eat 95 grams of protein a day, I kept track of that, I said, but that won't work, I won't'.

Pt 2: 'I was advised to start using very protein-rich products. But they are very heavy and not easy to eat'.

Pt 9: 'Well, in the beginning during the radiation, nothing tasted. And then I found the oral nutritional supplements so disgusting that it was a struggle to get that stuff in three times a day'.

3.3.3. Perceived Benefits of the Prehabilitation Programme. Patients felt well informed and supported by healthcare providers during the preoperative period. Regular monitoring of physical fitness and nutritional status was helpful,

so that patients knew whether their physical condition was adequate. This was reassuring and made them feel more confident about undergoing surgery. Patients not only improved their physical fitness but also had more energy. They felt that their good condition before surgery helped them to recover from surgery.

Pt 12: 'I was more relaxed before surgery. Because I was in good shape, and I got a bit of confidence out of that'.

Pt 8: 'You just have a better condition before surgery. And that also means—yes, you just would take a hit due to the surgery. But, the fitter you go into surgery, the better you come out of it'.

4. Discussion

In this study, we investigated the opinions of patients with oesophageal cancer about a multimodal prehabilitation programme to optimise their physical condition before surgery. We found that internal and external factors, and programme feasibility were important motivators to participation in the programme. Clear information on the purpose of the programme, patients' sense of personal responsibility to contribute to the success of their treatment and support from healthcare providers and family members were key elements that contributed to programme participation. The acceptability and feasibility of the programme were high and patients experienced beneficial effects of participation, which made them feel better prepared for surgery.

All patients in our study indicated that they were motivated to participate in prehabilitation. They had been told about the importance of a good physical condition before surgery. This information was consistently communicated by different healthcare providers and seems to be a major contributor to the internal motivation of patients to participate in the prehabilitation programme. Several patients indicated that, in particular, the encouragement from surgeons, who emphasised the importance of a good physical condition, had a positive influence on their motivation to participate, which is in line with previous research [16, 21, 27]. Accordingly, the provision of clear information on the purpose and importance of prehabilitation by different healthcare providers seems to be an important first step to motivate patients to follow a prehabilitation programme. Even so, some patients initially lacked internal motivation to perform the preoperative training programme, in spite of being aware of the benefits of the programme. After programme completion, these patients reported a shift in motivation—from externally driven to internally motivated—and emphasised that support from healthcare professionals had played a crucial role in encouraging their participation. Family support also helped motivate patients to adhere to the programme, as has been found earlier [19, 22, 32].

The motivational factors identified in this study align closely with the principles of the self-determination theory (SDT), which posits that behaviour is driven by the

fulfilment of three basic psychological needs: autonomy, competence, and relatedness [33]. Patients in our study demonstrated autonomous motivation through their internal drive to improve their physical condition before surgery, particularly when they understood the purpose of prehabilitation and felt responsible to contribute to the success of their own treatment. The need for competence was reflected in a clearly defined and manageable timeframe of the prehabilitation programme, which supported patients' sense of capability. Furthermore, patients described a sense of empowerment as they noticed improvements in their physical condition. The shift from external to internal motivation observed in some participants illustrates the internalisation process described in SDT. In addition, the role of healthcare providers and family members in encouraging participation highlights the importance of relatedness—patients felt supported and connected, which enhanced their engagement.

In our study, a small number of patients expressed a clear preference for training independently. These individuals were internally motivated, in relatively good physical condition, had a history of exercising in the past and were well able to perform regular exercise without intensive supervision. For this subgroup, a programme without close supervision may represent a suitable alternative. However, the majority of patients in our study valued the offered supervision and considered it highly beneficial, consistent with previous findings for patients with oesophageal, colorectal or bladder cancer [16, 27, 32]. These findings suggest that while supervised programmes are generally preferred, the necessity of intensive supervision for an individual patient is debatable, particularly in light of the need for efficient healthcare resource utilisation. A tailored approach may therefore be more appropriate in clinical practice. Accordingly, shared decision-making on the level of physiotherapeutic supervision before initiating the programme is recommended, enabling more personalised and potentially cost-effective interventions.

In spite of the positive overall experience of patients with the programme, not all patients were motivated to follow the nutritional advice. Some patients reported that they did not experience any nutritional problems and therefore felt that the advice was not relevant to them. Other patients with swallowing and eating problems in the preoperative phase found it challenging to achieve an adequate nutritional intake and were not comfortable with the strong focus on their diet. The less positive experience about nutritional intervention might be because nutritional support was less intensive than physiotherapy support. Therefore, patients with nutritional problems might require more intensive and individually tailored dietary support in order to motivate them to adhere to nutritional advice.

Our results suggest that knowledge of being scheduled for surgery was a good incentive for patients to participate in this prehabilitation programme. Previous studies have found the diagnosis of cancer and the preoperative period before surgery to be 'teachable moments' in which patients might be more likely to consider long-term behaviour changes, such as doing regular physical exercise and eating a healthy

diet [34]. However, in our study and another study in patients prior to surgery, the behavioural modification seemed to focus on the immediate and short-term perioperative period (to recover from surgery), with there being less evidence of long-term behavioural change [35]. Patients in our study indicated that they were highly motivated to temporarily modify their behaviour during the preoperative period. Nevertheless, some also reported difficulties in maintaining these behavioural changes in the postoperative period, as the incentive of being physically prepared for surgery was no longer present. Therefore, integrating postoperative monitoring and support may be essential to maintain behavioural changes beyond surgery.

This is the first study to evaluate the opinions of patients with oesophageal cancer about a multimodal prehabilitation programme. Unlike earlier studies in patients with cancer [16, 21, 32], in our study, patients reported very few barriers to programme participation. This may be explained by several factors related to programme design and study population. First, in our study, the prehabilitation programme was offered to patients as part of the usual care pathway, which may have contributed to participation. Second, training programmes were adapted to the abilities of individual patients, which made it acceptable in spite of patients having physical symptoms and nutritional problems. Moreover, the training programme was offered locally, so that patients did not have to travel far to exercise facilities. Lastly, the relatively good physical condition of the patients in our study, and the relatively long prehabilitation period between chemoradiotherapy and surgery, which may have contributed to the high level of participation, were positive factors not necessarily seen in other patient groups, such as colorectal cancer.

A strength of this study is that the interviewed patients were recruited from a representative group of patients who had followed a personalised prehabilitation programme as part of the usual care pathway. Interviewing patients who followed the supervised training programme and patients who trained independently resulted in a good understanding and broad picture of the opinions and needs of patients. However, a number of study limitations should be mentioned. First, we were unable to include patients who declined participation in the PRIOR programme altogether. Although this group was very small (2%), their perspectives could have provided additional insights into motivational barriers. Second, in some cases, the period between surgery and the interview was almost a year, which may have caused some recall bias in the answers of these patients. Nevertheless, the preoperative period usually made a great impression on patients, and they could often remember this period very well. Therefore, we consider the impact of this period on the results of our study as minimal. Third, there is a risk that patients who were less interested in physical exercise and a healthy diet may have been less willing to participate in the interviews, generating bias to more positive findings. However, a survey with a larger group of patients from the PRIOR study also showed that patients had a positive experience with the programme, suggesting that

there were few patients with a less positive opinion about prehabilitation.

In conclusion, patients with oesophageal cancer were motivated to participate in a prehabilitation programme consisting of physical exercise and nutritional support. Both internal and external motivational factors, as well as the programme feasibility and perceived benefits, contributed to patient participation. It is essential to provide clear information about the purpose of prehabilitation, and this information should be emphasised by different healthcare disciplines. Furthermore, family members must be actively involved in prehabilitation care. Depending on the internal motivation and preferences of patients, the intensity of dietary support and physiotherapeutic supervision can be adjusted to provide feasible and personalised interventions.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Conflicts of Interest

The authors declare no conflicts of interest.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. (*Supporting Information*)

Appendix S1: Topic list semistructured interviews.

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