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Enhancing inclusion in cancer prehabilitation: a case study using ethnographic methods to explore access, acceptance, and adherence

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Abstract

Background Prehabilitation for patients awaiting cancer surgery and/or treatment comprises support for exercise, nutrition, and emotional well-being. Prehabilitation is associated with faster recovery and improved outcomes. Practical action to improve inclusion in prehabilitation is needed to reduce inequities in cancer care and outcomes. This study explored cancer prehabilitation practices to understand how, when, and why people engage (or otherwise) with prehabilitation.

Methods Ethnographic case study of cancer prehabilitation within seven National Health Service (NHS) Wales organisations (United Kingdom) that offered prehabilitation to adults with upper gastrointestinal, colorectal, lung, prostate, and/or breast cancer. Data were collected from observations of prehabilitation consultations and semi-structured interviews, using a sampling frame for a socioeconomically diverse patient sample. A focus group with cancer care workers took place at each NHS organisation. Qualitative data were analysed using a thematic framework approach.

Results We observed prehabilitation consultations with 120 patients, 45 (37.5%) from the most socioeconomically deprived communities, and conducted 168 brief interviews with 32 cancer care workers and 36 in-depth patient interviews. Seven focus groups involved 44 cancer care workers. Patterns of modifiable factors for inclusive access to, acceptance of, and adherence to cancer prehabilitation are described within six themes: personal capacity for prehabilitation; closer alignment of patient, family, and health professional expectations; interpersonal connection and support; potholes and forks in the prehabilitation pathway; diversity of prehabilitation delivery; and person-centred prehabilitation.

Conclusions For prehabilitation to be inclusive, each patient needs to understand how prehabilitation can help them as an individual (motivation and self-efficacy) through surgery and/or treatment for cancer. Health professionals and other cancer care workers should prioritise aligning expectations for prehabilitation. To achieve this, communication and delivery of prehabilitation education and services must be person-centred and involve interpersonal support.

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Introduction

Addressing health inequity is a key element of the United Kingdom (UK) and devolved governments' cancer strategies (NHS Wales (NHS [n.d](#)). While survival rates are improving, cancer outcomes are poor in the UK compared to European countries with similar healthcare systems (Arnold et al. [1995](#)). Furthermore, health inequity persists, with avoidable differences in cancer treatment outcomes across socioeconomic and demographic groups (Rachet et al. [2010](#); Syriopoulou et al. [2017](#)). Reducing inequity is a priority for clinical practice and health policy, in the UK and internationally (UK Government [2025](#); Lin et al. [1990](#)).

People who are physically fit and psychologically resilient experience faster recovery from surgery and cancer treatment, and live longer (Boujibar et al. [2018](#); Treanor et al. [2018](#); Heil et al. [2023](#); Bausys et al. [2023](#)). Prehabilitation ('prehab') is a complex intervention that prepares people for cancer surgery and treatment. Services range from universal prehabilitation for anyone with cancer – advice and behaviour change for exercise, nutrition, and psychological well-being – to more targeted and specialist prehabilitation interventions assessed and prescribed by registered healthcare professionals ([2025](#)) based on the complexity of an individual's symptoms and comorbidities. However, service availability affects whether patients are offered appropriate prehabilitation (Pufulete et al. [2024](#)).

Multimodal prehabilitation comprises education and/or interventions for exercise, nutrition, and psychological support (Macmillan Cancer Support [2025](#)). Alternatively, unimodal prehabilitation includes just one of these three components. Multimodal prehabilitation can lead to faster recovery times (Treanor et al. [2018](#); Halliday et al. [2021](#); Zhao et al. [2023](#); Waterland et al. [2021](#)) and reduce cancer morbidity (Bausys et al. [2023](#)) and mortality (Boujibar et al. [2018](#); Heil et al. [2023](#)), with associated cost and bed savings. However, prehabilitation requires significant behaviour change at a time when change and uncertainty are increased by the process and outcome of cancer diagnosis (Macmillan Cancer Support [2025](#)).

People from some minority ethnic groups and socioeconomically disadvantaged communities experience disparities in prehabilitation (Macmillan Cancer Support [2019](#)). To enhance inclusion, adjustments are required to enable access, facilitate acceptance, and support adherence. A systematic review by our group reported individual, structural, and interpersonal barriers and facilitators to cancer prehabilitation (Watts et al. [2025](#)). However, this review found limited research on equity of access and adherence. As such, a better understanding of inclusivity in cancer prehabilitation services is required to identify reasons for differences in access to, acceptance of, and adherence to prehabilitation, along with solutions to address inequity.

Responding to this need, our case study explored current practice in cancer prehabilitation across Wales to identify modifiable factors affecting access to, acceptance of, and adherence to prehabilitation with particular consideration to people from communities at higher risk of poor outcomes following cancer treatment. This case study research was part of the wider Inclusive Prehabilitation ('I-Prehab') project aiming to improve the inclusivity of prehabilitation for people with cancer (<https://fundingawards.nihr.ac.uk/award/NIHR151668>).

Research aim

To explore access to, acceptance of, and adherence to cancer prehabilitation, to understand how, when, and why patients engage (or otherwise) with prehabilitation.

Methods

Study design

A case study using ethnographic methods was chosen for its strength in exploring complex situations through multiple data sources. It enabled the tracing of events, decisions, and changes, and supported learning from specific contexts to develop transferable insights that inform practical action (Yin 2009). National Health Service (NHS) Wales was the overarching case, and individual NHS organisations implementing prehabilitation were nested cases (study sites). Multiple data sources included field notes from observations of prehabilitation consultations, interviews with prehabilitation staff, patients, and carers/family members, patient questionnaires, medical records, and focus groups with staff working in cancer services.

Data were collected between November 2023 and September 2024 across seven of the eight regional NHS Wales organisations commissioned to deliver cancer services. These sites reflect the diverse geography and population density of Wales, including a mix of urban, rural, remote, and inner-city settings in which cancer prehabilitation was delivered. Sites were eligible for inclusion if they offered prehabilitation to patients with colorectal, upper gastrointestinal (GI), lung, prostate, or breast cancer; i.e., one or more of the most common cancer types (2025).

Inclusion and exclusion criteria

Adults (18 years or older) with a diagnosis of lung, colorectal, upper GI, prostate, or breast cancer and experience of prehabilitation, scheduled to receive active or palliative cancer surgery/treatment, and not approaching the very end of life, were eligible to participate. Family members/carers who attended an observed prehabilitation consultation were invited to take part if they and the patient agreed. Cancer workers were eligible if their job role involved contact with adults with a diagnosis of lung, colorectal, upper GI, prostate, or breast cancer.

Sampling strategy

All eligible patients referred to selected clinics attended by a researcher were invited to participate until the recruitment target of 20 prehabilitation observations per site was met. Following observations of prehabilitation consultations, we used a sampling frame, based on self-reported postcode and ethnicity, to purposively sample six patients from each site to interview: two people from socioeconomically deprived communities (quintiles 1 and 2), two people from affluent communities (quintiles 4 and 5), and two people from ethnic minority groups. Quintile of socioeconomic deprivation was generated using the Welsh Index of Multiple Deprivation (Welsh Government 2019), derived from postcode data.

Data collection

We planned to collate data from eight NHS healthcare organisations providing cancer services in Wales (seven health boards and one hospital trust). However, one NHS Wales organisation did not offer cancer prehabilitation and was therefore excluded. In addition, one health board offered signposting to prehabilitation resources but not targeted or specialist prehab advice; therefore, observations and interviews were not conducted at this site. All participants who provided informed consent were included in the study. Patients were asked to self-report demographics (age, sex, ethnicity, postcode) following the consent process.

Research team members (AM, MP, SL, AR) observed prehabilitation consultations ($n = 120$) and made detailed handwritten fieldnotes using a bespoke observation chart [see Appendix I]. Observations were conducted with a particular emphasis on the initiation of prehabilitation conversations, communication about health risks, and how interactions motivated and supported people's self-efficacy to engage with prehabilitation. Following each

observation, on the same day, where possible, during or after the clinic, brief face-to-face interviews were conducted with staff from the prehabilitation consultation. A topic guide [see Appendix II] was used to clarify reasons for decisions made and actions taken.

Purposively selected patient participants were then invited to a face-to-face, semi-structured interview at a time and place convenient to them. With the consent of all parties, a carer/family member also participated in some interviews. The interview schedule [see Appendix III] was designed to explore participants' pathways to prehabilitation, perceptions of prehabilitation, and intent to adhere to the prehabilitation advice received. At the end of the interview, patient participants were asked to complete four validated outcome measures: General Self-Efficacy (Schwarzer 1993; Chen et al. 2001); Nutrition Self-Efficacy and Exercise Self-Efficacy (Schwartz R 2026); and the Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith 1983; Snaith 2003).

Seven focus groups (one per site) with cancer care workers ($n=44$) explored perceptions of who accesses and adheres to prehabilitation, along with contextual issues, e.g., position of prehabilitation within cancer services. All focus groups and research interviews with staff, patients, and carers/family members were audio-recorded and transcribed. Transcription was carried out by an external company under a confidentiality agreement.

In addition, an anonymised medical record review was conducted at each site; results are fully reported elsewhere (Palmer et al., in print). Data were extracted for all new patients to the included services during the month prior to case study recruitment.

Data analysis

Quantitative data were analysed using descriptive statistics in IBM SPSS Statistics (Version 29). Characteristics of the recruited patient samples for observation and interview are presented alongside the medical record review sample (Palmer et al., in print) to assess representativeness.

Qualitative data from observations, interviews, and focus groups were coded by the research team using NVivo (Version 14). A conceptual framework of access, acceptance, and adherence to prehabilitation, based on the World Health Organisation (WHO) adherence framework (World Health Organization 2003) and systematic review findings (Watts et al. 2025), provided the architecture for coding of qualitative data: socioeconomic, patient, patient-provider system, relational, health condition, and therapy. Our model assumes adherence to prehabilitation is a process with access as the starting point, variability in uptake and persistence over time, and an end point of disengagement from prehabilitation or transition to rehabilitation post-treatment.

Coded data were analysed to derive cross-cutting themes between sites and data sources. Thematic analysis of observational and interview data was conducted by seven research team members (AM, MP, SL, AR, TW, SW, GM) and independently by the lead researcher (JH), using a framework approach (Ritchie J 2013). Cross-case comparison was informed by Wolcott's (1994) framework for qualitative data analysis (Wolcott 1994). Our analysis focused on modifiable factors that influence access to, acceptance of, and adherence to cancer prehabilitation. Of particular interest was any finding that may enable a greater number of people from lower socioeconomic and ethnic minority groups to access and engage in prehabilitation before cancer treatment.

Methodological Rigour

Independent coding and thematic analysis of qualitative data, firstly by the research team and secondly by an experienced qualitative researcher (JH), were conducted and compared to ensure completeness. The research team was culturally and professionally diverse, comprising a mix of clinical and non-clinical academics with expertise in qualitative methods and oncology research [Further details of research team specialisms and qualifications can be found in the Authors' information statement included in the declarations at the end of this article].

The analytic process and developing themes were discussed at various time points during data collection and analysis, within the core research team, amongst the wider I-Prehab research team, including three public contributor co-applicants, and with our five public advisors. Core team discussions centred on consideration of

researcher bias. Meetings and workshops with the wider research team and public advisory group provided an opportunity for example cases and data extracts to be shared and discussed in relation to the research questions. Focused small group discussions offered diverse perspectives, facilitating reflexivity and informing analysis and synthesis of findings by sense-checking data interpretation and adding depth of understanding.

Ethics and standards

All participants involved in observations, interviews, or focus groups provided informed consent, either written, electronic, or audio-recorded. Standards for Reporting Qualitative Research Studies (SRQR) (O'Brien et al. 2014) were used to report this study [see Appendix IV].

Results

Participants

Twenty prehabilitation consultations were observed at each of six of the seven included NHS Wales organisations ($n=120$ patients). Five of these NHS organisations ran specialist prehabilitation services, and one offered prehabilitation advice within a multidisciplinary team clinic. Figure 1 shows the participants included from each data source [see Appendix V for breakdown by site].

Of the 32 cancer care workers interviewed following a prehabilitation consultation, 10 were physiotherapists, 8 occupational therapists, 6 dietitians, 6 therapy assistant practitioners, 1 exercise physiologist, and 1 specialist nurse. Patient characteristics for the whole sample ($n=120$) and the subset of interviewed patients ($n=36$) are presented in Table 1.

Of the 120 patient participants, 72% had diagnosed or suspected GI cancer (upper GI, 35%; colorectal, 37%), 22.5% lung cancer, and 5% prostate cancer. None had breast cancer. A majority were diagnosed with stage 3 or 4 cancer (59.2%, $n=71$), and most were planned for treatment with curative intent (87.5%, $n=105$).

All 120 patients were over 30 years of age, with the majority being over 60 years (83.4%) and male (62.5%). Similarly, in the medical record review, patients ranged from 36 to 89 years old (mean $\pm$ SD, 68 ± 10 years). Patients from all levels of socioeconomic status (SES) were well represented in our recruited sample, including 45/120 (37.5%) from the most deprived areas in Wales (IMD quintile 1 or 2, lower SES) and 51/120 (42.5%) from the least deprived areas (IMD quintile 4 or 5, higher SES). Comparatively, in the retrospective review sample, 56/134 patients (41.8%) were from the two quintiles of highest socioeconomic deprivation and 51/134 (38.0%) from the lowest two quintiles. Of the patients observed in a prehabilitation consultation, four patients (3.3%) were from an ethnic minority background.

Of the 36 interviewed patients, 35 completed the HADS questionnaire. Four (11.4%) scored above normal range for anxiety and depression, four for anxiety only, and four for depression only. Median scores for complete self-efficacy scales: general self-efficacy ($n=30$), 35/40 (IQR, 31.75–38.00); nutrition self-efficacy ($n=29$), 17/20 (IQR, 15–19.5); physical exercise self-efficacy ($n=29$), 18/20 (IQR, 12–19.5).

Factors affecting access to, acceptance of, and adherence to cancer prehabilitation

Modifiable factors for access to, acceptance of, and adherence to cancer prehabilitation, and non-modifiable factors that underpin them, are presented in Fig. 2. Factors identified as having potential for change by cancer services and/or prehabilitation services (modifiable factors) are listed by category in Table 2. Due to the extensive qualitative data set and findings, specific illustrative examples are not included within this manuscript. However, data (quotes from interviews and focus groups and extracts from observational notes) supporting each category of factors in Table 2 are presented in supplementary material [see Additional file 1].

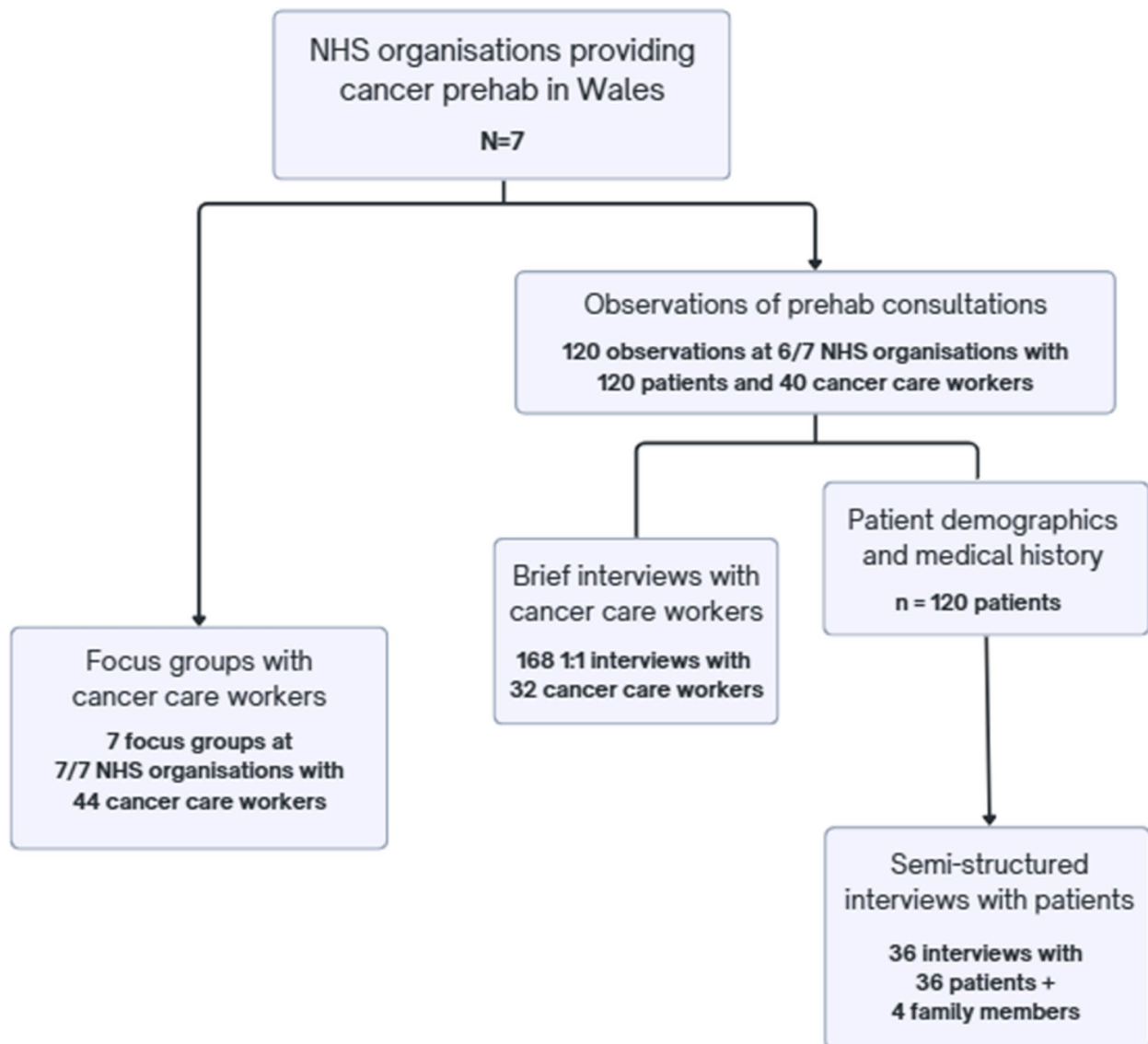


Fig. 1 Flow diagram of recruitment and data collection

Factors at the individual level relate to the cognitive and physical characteristics of the patient (internal patient factors) and to the physical and social characteristics of the patient's environment (external patient factors). Inter-personal level factors concern interactions between the patient and others involved in prehabilitation, i.e., health-care professionals, family members, and peers (relational factors). Structural level factors relate to the system in which cancer prehabilitation is delivered (patient-provider system).

Factors considered to be modifiable by prehabilitation or cancer services, and with apparent importance and/or novelty in the research literature, were conceptualised within six cross-cutting themes to explain access to, acceptance of, and adherence to cancer prehabilitation.

- Theme 1: Personal capacity for prehabilitation
- Theme 2: Closer alignment of expectations for prehabilitation
- Theme 3: Interpersonal connection and support
- Theme 4: Potholes and forks in the prehabilitation pathway
- Theme 5: Diversity of prehabilitation delivery

Table 1 Patient Characteristics

	Observed patients (<i>n</i> = 120)		Interviewed patients (<i>n</i> = 36)		Patients included in retrospective record review (<i>n</i> = 134)	
	Frequency (n)	Percent %	Frequency (n)	Percent %	Frequency (n)	Percent %
Cancer type (diagnosed or high suspicion)						
Upper Gastrointestinal	42	35.0	10	27.8	29	21.6
Colorectal	45	37.0	14	38.9	85	63.4
Lung	27	22.5	10	27.8	16	11.9
Prostate	6	5.0	2	5.6	3	2.2
Breast	0	0	0	0	1	0.7
Gender						
Male	75	62.5	18	50	75	56.0
Female	45	37.5	18	50	59	44.0
Quintile for Index of Multiple Deprivation						
1 – highest deprivation	18	15.0	5	13.9	24	17.9
2	27	22.5	6	16.7	32	23.9
3	24	20.0	9	25.0	27	20.1
4	33	27.5	11	30.6	20	14.9
5 – lowest deprivation	18	15.0	5	13.9	31	23.1
Ethnicity						
White British or Irish	116	96.7	33	91.7	87	64.9
Black or Black British	1	0.8	0	0	0	0.0
Asian or Asian British	1	0.8	1	2.8	0	0.0
Mixed/multiple ethnicities	2	1.7	2	5.6	0	0.0
Not recorded	0	0	0	0	47	35.1
Age (years)						
30–39	1	0.8	1	2.8	1	0.7
40–49	5	4.2	3	8.3	5	3.7
50–59	14	11.7	4	11.1	15	11.2
60–69	28	23.3	10	27.8	48	35.8
70–79	49	40.8	15	41.7	51	38.1
≥ 80	23	19.2	3	8.3	14	10.4
Hospital Anxiety and Depression Scale – Anxiety						
Normal (0–7)			27	77.1		
Borderline (8–10)			4	11.4		
Abnormal (11–21)			4	11.4		
Hospital Anxiety and Depression Scale – Depression						
Normal (0–7)			27	77.1		
Borderline (8–10)			6	17.1		
Abnormal (11–21)			2	5.7		

Theme 6: Person-centred prehabilitation

Theme 1: Personal capacity for prehabilitation

The emotional and practical burden associated with the process and consequences of cancer diagnosis and treatment can be overwhelming. For many patients, their daily activities were limited by the anxiety of having an accident, such as a fall or incontinence, or exacerbation of their symptoms. Stigma around a cancer diagnosis was a key concern for some patients, affecting their acceptance of prehabilitation interventions. However, while most patients experienced stress and worry, some felt more optimistic.

Prior commitments, such as hospital appointments, caring responsibilities, employment, and social or religious activities, affected a patient's capacity to engage in and commit to prehabilitation activities. Where patients were carers in some capacity, these responsibilities were prioritised, leaving them with less time available for

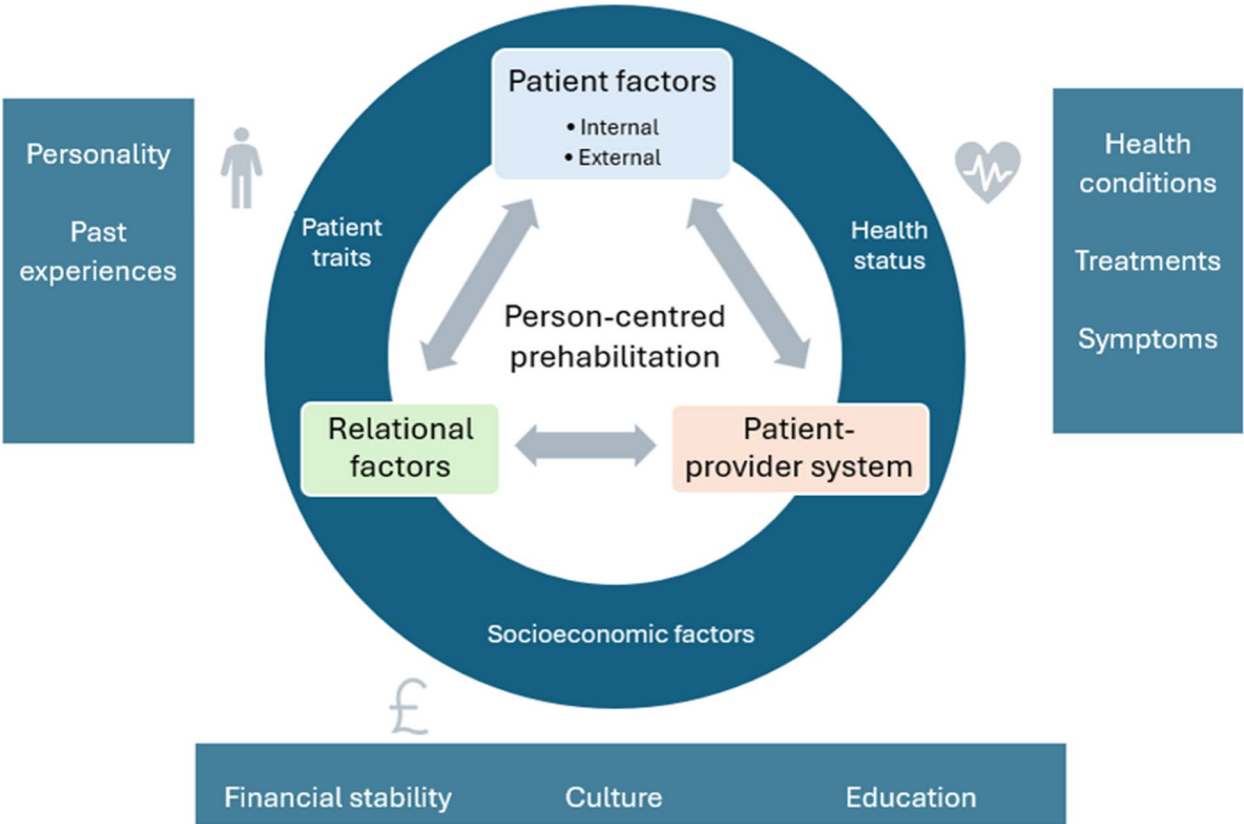


Fig. 2 Factors affecting access to, acceptance of, and adherence to cancer prehabilitation. Patient factors, relational factors, and patient-provider system include factors with potential for modification within cancer services and prehabilitation services. These modifiable factors are underpinned by patient traits, health status at diagnosis, and socioeconomic factors (non-modifiable factors)

Table 2 Modifiable factors affecting access to, acceptance of, and adherence to cancer prehabilitation

Individual	Interpersonal	Structural
Patient factors—Internal	Relational factors	Patient-provider system
• Trust in healthcare professionals	• Alignment of expectations	• Prehabilitation pathway
• Knowledge, beliefs, and preferences	• Communication	• Mode of prehabilitation delivery
• Emotional and physical capacity	• Reciprocity and connection	• Resources
• Motivation		• Staff knowledge, beliefs, and preferences
• Self-efficacy		
Patient factors—External		
• Physical environment		
• Social environment		
• Transport		
• Technology		
	Person-centred prehabilitation	
	• Individualisation and holistic approach	
	• Shared decision-making	

prehabilitation. Similarly, patients who were self-employed or had an unsupportive workplace needed to prioritise work over attending prehabilitation sessions, which were mostly delivered during usual working hours.

Patients and their loved ones who expressed a sense of personal responsibility and empowerment to manage their health were more likely to be receptive to prehabilitation advice and behaviour change, and keep track of appointments and plans, so long as they believed that prehabilitation could benefit them.

Self-efficacy for prehabilitation was influenced by prior experience with prehabilitation and/or the gym setting; comfort with exercise and/or a group environment, and ‘performing’ in front of others; and familiarity with equipment. Confidence to participate in prehabilitation-related activities could be affected by symptoms or body image, perceived presence or absence of safe and suitable space for exercise, and social and/or physical isolation.

Theme 2: Closer alignment of expectations for prehabilitation

Patients’ expectations were influenced by their prior knowledge and experience of prehabilitation. Often, there was insufficient explanation of prehabilitation at the point of referral, and patients and their family members/carers came to the prehabilitation consultation with inaccurate expectations, for example, that they might be advised not to eat their favourite foods, or would be ‘*told off*’.

Our data suggest that adherence to prehabilitation requires alignment of expectations between cancer care workers, patients, and their family/friends/carers. Such expectations include 1. Desired and anticipated benefits of prehabilitation for the individual, 2. What the individual and their family members, friends, or carers will need to do to achieve these benefits, 3. The individual’s ability to make the lifestyle changes required for prehabilitation. For some, a misalignment of expectations for prehabilitation was explicitly communicated, while for others, misalignment was apparent but not mutually acknowledged.

To change behaviour and participate in prehabilitation, patients needed to believe this would confer benefit in ways that were important to them. Knowledge and understanding of what prehabilitation would involve and its purpose were key to this. Awareness of the benefits of prehabilitation came either through their own prior experience or learning from others such as family, peers, or other cancer care workers. Patients’ beliefs about their own physical fitness and diet, combined with their understanding of prehabilitation, determined their belief in whether prehabilitation would benefit them, thereby influencing adherence.

Behaviours and activities that helped align patients’ and prehabilitation professionals’ expectations included clear, tailored communication about the role of prehabilitation and the purpose of any onward referrals, to gain patient and family/carer ‘*buy-in*’. Explanation of the link between assessments and advice or exercises facilitated understanding of the purpose of each element of prehabilitation. Some staff expressed the importance of reinforcing key messages, for example, ‘*more protein*’. Clear and consistent two-way communication between cancer care workers and patients supported acceptance and adherence.

If patients’ priorities and concerns were not acknowledged and/or addressed by cancer care workers, patients struggled to understand how prehabilitation was relevant and important for them or how they could follow prehabilitation advice and carry out prehabilitation activities (low self-efficacy). Engagement was facilitated when prehabilitation activities aligned with patient preferences for social situations and activities, physical activity, and diet. Providing an opportunity to see the prehabilitation gym ‘*and get a bit of a feel for it*’ before attending an exercise class offered a positive experience and built familiarity with the environment, increasing patient understanding and self-efficacy.

Prehabilitation staff held a strong preference for group exercise sessions over home exercise programmes based on their belief in greater adherence and effectiveness for group exercise. The evidence base for effective prehabilitation was referenced as the source of this belief. Researchers observed that aligning patients and their family, friends, or carers with this belief and preference was not straightforward and required positive experience, which could often only be gained by attending sessions. Staff at one prehabilitation service described a positive feedback loop for patients attending group sessions; progress was monitored, visible, and celebrated, increasing motivation to continue and leading to further progress. Examples provided included the patient’s inspiratory

muscle training (IMT) device being linked to a laptop to record and display their data, and the measurement of body composition at initial assessment and follow-up. Prehabilitation physiotherapists and therapy assistant practitioners would progress patients' exercise prescriptions, i.e., intensity and/or duration, as the patient's fitness improved, providing another source of positive feedback and facilitation of progress.

Theme 3: Interpersonal connection and support

Interpersonal connection enabled positive alliances within prehabilitation. Rapport was developed by showing interest in a personal disclosure or talking about a shared interest or experience. Humour was both a facilitator and a consequence of rapport between patient and prehabilitation professional. Patients often sought reassurance and, when provided, this was a source of connection. Support with navigating uncertainty facilitated engagement.

Where prehabilitation tapped into or helped build community around the patient to support them through their cancer journey, this facilitated engagement. There were examples of how, when a patient lacked motivation, a peer/partner (co-prehabber) offered support and extrinsic motivation, encouraging adherence. This helped when a patient was struggling with symptoms such as fatigue or low mood. Group prehabilitation offered role models and social support, encouraging peers to participate and show vulnerability; for example, men sharing their feelings.

Theme 4: Potholes and forks in the prehabilitation pathway

Specialist nurses were commonly the source of referrals to prehabilitation clinics, but they often lacked the knowledge or time to have a positive conversation with patients about prehabilitation. Prehabilitation staff expressed a need for surgeons and specialist nurses (pre-op and cancer specialists) to explain to patients the benefits and importance of prehabilitation.

Communication between prehabilitation and other teams within the cancer service varied between sites. Commonly, prehabilitation teams spoke of receiving referrals with minimal information about the patient. However, one prehabilitation service reported '*constant channels of communication*' between teams, for example, with specialist nurses.

In some cases, difficulty finding the prehabilitation clinic was an additional source of stress for patients and/or made them late for their appointment. In at least one instance, this meant that staff did not have time to include everything they had intended.

Prehabilitation assessment consultations were used to build rapport, provide education, and complete baseline assessments. Prehabilitation services used multiple standard assessments (questionnaires and physical tests) to assess nutritional status, physical function, mood, and self-efficacy for screening and/or monitoring purposes. Often, patients were required to complete and return the questionnaires before being offered or attending a prehabilitation appointment. Sometimes, questionnaires were completed in the clinic with staff offering to help complete assessments. One staff member explained how she decided to help a patient complete the fatigue questionnaire during the appointment, as she perceived that the patient would find it a burden to do it at home. In addition to baseline assessments, the standard assessments were also offered post-programme (before cancer treatment) and after treatment, for example, at 6 weeks post-op; however, these follow-up assessments were completed only by the most engaged patients. One focus group identified the 6-week post-operative assessment as a potential opportunity for peer support of pre-operative patients.

Allied health professionals working as prehabilitation specialists were trained/experienced in the basics of all components of prehabilitation and were able to provide first-line advice when a certain profession was not present in the clinic. Timely follow-up by healthcare professionals was required to sustain adherence. This involved reaching out to monitor progress and support needs, and/or promoting in-reach, i.e., encouraging patients to contact them if further advice or support was needed. Opportunities to ask questions were consistently offered during prehabilitation consultations. After this, patients were usually provided with a contact number. Where

prehabilitation team members were available ad hoc to answer queries or discuss concerns at group sessions, this provided a valuable opportunity for patients to seek support.

Patients with upper GI cancer were usually under the care of a specialist dietitian outside of the prehabilitation service. This ensured they received the specialist dietetic support they required from both a condition-specific and prehabilitation perspective. However, the separation of services meant more appointments for the patient and a lack of clarity about who they should contact or speak to if an issue or concern arose. Some patients, while they appreciated receiving input from different specialists, felt frustrated by a lack of joined-up care, for example, having to answer the same questions for different healthcare professionals and receiving different or even conflicting information.

NHS prehabilitation services referred or signposted patients to other NHS services and/or third sector providers in cases where the prehabilitation service was unable to meet a specific need, such as counselling, financial advice, or cancer support groups. However, services available varied considerably by geographical location, and gaps were common. No prehabilitation service had a clinical psychologist within the team, and patients requiring treatment for mental health issues were directed to their general practitioner or emergency care in severe cases.

Theme 5: Diversity of prehabilitation delivery

Visual resources such as posters, leaflets, and physical demonstrations were commonly used to support verbal advice. In-person supervision of practice with equipment was perceived as beneficial by staff and patients. One service offered virtual prehabilitation and provision of monitoring equipment as an alternative, when attending in person was not possible; however, uptake was very low.

Suitable space for group exercise sessions in desired locations and at an affordable price was a challenge for services. There was often a lack of privacy during prehabilitation assessments because the prehabilitation team had to use shared spaces. Background noise was a problem for patients with hearing difficulties. Where prehabilitation services had their own gym, patients gained access to more equipment, and less time was spent setting up and clearing away for sessions.

Group prehabilitation sessions offered opportunities for informal peer support. At one prehabilitation service, a café space with a free drinks machine was available for patients, family members, and carers to sit and talk before or after sessions. Where group sessions were online, it was more difficult to provide opportunities for informal peer support. However, there were examples of participants choosing to share phone numbers after an online session.

Theme 6: Person-centred prehabilitation

Prehabilitation was more acceptable when its purpose and value were explained in a way that conveyed specific relevance to the patient as an individual. This was supported by negotiation of a shared agenda with explicit consideration for the patient's concerns and priorities.

When, on occasion, a patient attended a prehabilitation consultation with a conflicting agenda, healthcare professionals attempted to briefly explain the purpose of prehabilitation and intentions for the consultation. If the patient expressed that they did not intend to engage in prehabilitation, then they were offered the option to continue or terminate the consultation.

Delivery of information for prehabilitation required adaptation to the individual; for example, breaking down information into small chunks and emphasising key words to make it more accessible for an overwhelmed patient. One prehabilitation team member spoke of informally assessing and reinforcing knowledge at each session and then adding a bit more.

Patient choice and adaptability of the prehabilitation service were key to engagement. This involved the assessment and monitoring of symptoms to tailor prehabilitation to the individual and identify where/if more specialist advice was needed. Staff knowledge of other services (NHS and third sector) and health conditions contributed

to their ability to provide tailored prehabilitation. One patient's experience highlighted the risk of insufficient tailoring of advice to the individual and their overall health status. In this case, a person with high motivation for exercise became seriously ill after the sudden commencement of intense exercise while on steroids for a flare of an inflammatory bowel condition.

Often, patients were supported to make collaborative, informed choices about referrals to other healthcare professionals or prehabilitation activities. However, at times, prehabilitation professionals made assumptions about patients that restricted patient choice, for example, assuming that a patient would not be willing to travel over half an hour to attend exercise classes twice a week and therefore not offering this option.

Influence of socioeconomic background on factors affecting access to, acceptability of, and adherence to cancer prehabilitation

Socioeconomic factors and health status influenced physical and emotional capacity for prehabilitation. For example, those experiencing financial insecurity, mental health struggles, or chronic pain had reduced capacity for the behaviour change required for prehabilitation. Socioeconomic factors also indirectly affected physical and emotional capacity through the physical and social environment, for example, a lack of safe and suitable space for exercise, or social and/or physical isolation.

People from areas of higher deprivation and those with financial concerns or who were socially isolated displayed lower confidence in following prehabilitation advice. Pre-existing knowledge and familiarity with components of prehabilitation, e.g., structured exercise, increased confidence amongst people from more affluent communities. However, they often expressed the belief that their current diet and physical activity levels were healthy and sufficient to optimise cancer outcomes.

Individualisation of dietary advice based on understanding the patient's usual diet and tailoring the advice to their personal context and preferences supported the patient's understanding of how to apply the advice provided. This was particularly important for those with culturally diverse diets.

One prehabilitation service included financial issues in their assessment and had local services available to which they could signpost or refer patients and their families, where a need was identified and referral mutually agreed. In addition to financial support, a counselling service for people affected by cancer was also available in one region. Addressing financial and mental health issues appeared to increase patients' capacity to engage in the nutrition and physical activity components of prehabilitation; however, in most locations, these supporting services were unavailable or difficult to access.

Discussion

The purpose of this study was to discover the 'what, when, where, and with whom' of practices that enable access to and participation in cancer prehabilitation. A multidisciplinary research team gathered extensive and diverse qualitative data from seven nested case studies of cancer prehabilitation across Wales. Factors that facilitated or impeded access to, acceptance of, and adherence to cancer prehabilitation were identified at three levels: Individual – patient factors (internal and external); Interpersonal – relational factors; Structural – patient-provider system. Six themes described patterns of modifiable factors with apparent importance and/or novelty: 1) Personal capacity for prehabilitation, 2) Closer alignment of expectations for prehabilitation, 3) Interpersonal connection and support, 4) Potholes and forks in the prehabilitation pathway, 5) Diversity of prehabilitation delivery, 6) Person-centred prehabilitation. These interlinking factors influence patients' understanding of and confidence in the process and outcome of prehabilitation, specifically for them. Our findings demonstrate how this is an essential condition for engagement in cancer prehabilitation.

This study suggests that prehabilitation is disproportionately offered to people with GI or lung cancer in Wales, with fewer services for those with breast or prostate cancer. This may be due to increased risk of malnutrition and physical or functional decline, particularly for people with upper GI cancer (Zhang et al. 2025).

Our findings build on those of our mixed-methods systematic review (Watts et al. 2025) that included 56 studies, heterogeneous in methodological design and quality. Individual factors influencing access, acceptance, and adherence to cancer prehabilitation included perceived need and benefits, motivations, health status, and everyday practicalities. Structural barriers and facilitators similar to those identified in our case study analysis were described in the review in relation to the prehabilitation environment and mode of delivery. The review highlighted the importance of interpersonal factors. Embedding family and peer support within prehabilitation interventions, along with supportive dialogue with healthcare professionals, was found to be essential for enhancing acceptability and sustaining adherence (Watts et al. 2025). These were also key factors within the theme of interpersonal connection and support in the current ethnographic case study research.

The significance of aligned expectations for prehabilitation between patients and cancer care workers was a novel theme in our case study, expanding understanding of the nature and importance of interpersonal factors. Until professionals working within cancer care can reach consensus on the definition of prehabilitation, misalignment of expectations between healthcare professionals and patients cannot be fully addressed (Pufulete et al. 2024). However, greater knowledge and understanding within cancer care, alongside prioritisation and tailoring of communication about prehabilitation, could improve alignment of expectations between patients and cancer care workers and increase patient engagement. These findings support and build on previous literature suggesting that variation in awareness of prehabilitation and knowledge of the evidence base across professional groups needs to be addressed (Provan et al. 2022).

In another systematic review, focusing on participation and adherence to prehabilitation for colorectal cancer, again, the importance of effective communication and social support was emphasised, alongside a need for flexible, patient-centred approaches to overcome logistical barriers and patient concerns (Sier et al. 2025). In our case study, many prehabilitation services required patients to complete multiple screening questionnaires before an initial prehabilitation appointment. This could present a barrier to people with certain disabilities, low literacy, and/or social isolation (Macmillan Cancer Support 2025).

Another study explored perspectives from interviews with healthcare professionals to identify facilitators and barriers to prehabilitation in older patients with early lung cancer (Zhang et al. 2025). Barriers included a lack of aging-friendly prehabilitation programs and emergency safeguards. Recommendations included that prehabilitation programmes for older patients should consider the patient's physical condition as well as exercise preferences, inform patients of potential risks and how to manage them, and provide monitoring by specialist professionals.

In our case study research, prehabilitation specialists often adapted their advice due to comorbidities; for example, by recommending exercise in a supervised environment, particularly for those with a coexisting heart or lung condition. However, comorbidities with lesser-known risks of exercise can be overlooked, particularly in younger, fitter patients.

Strengths and limitations

An inclusive approach to site selection allowed for maximum variation in population and structural factors known to affect access and adherence; for example, surgical and non-surgical cancer treatments and groups with varying indices of socioeconomic deprivation and ethnicity. We captured data from all NHS cancer service providers delivering prehabilitation in Wales, thus providing an in-depth case study of cancer prehabilitation across an entire nation. This new knowledge can be used by cancer service providers in Wales, the UK, and internationally to improve the quality of care and potentially reduce inequalities in cancer outcomes.

A strength of the case study ethnography methodology is the diversity and depth of data collected within the studied case, cancer prehabilitation within NHS Wales. The combination of observational qualitative data and

descriptive quantitative data alongside in-depth qualitative interview data from the perspectives of people with cancer, their family members, and staff working within prehabilitation as well as wider cancer services increases the validity and depth of the study's findings. Another strength of this study was the wealth of professional and lived experience amongst the research team and patient contributors who provided diverse insights into recruitment, data collection, and data interpretation.

Constraints of the case study approach are inherent in the choice of case. As such, caution is needed in generalising our findings from data collected within NHS Wales to other countries or other healthcare providers. However, since our findings support and build on previous knowledge acquired from settings outside of our case (Watts et al. 2025) and many similarities exist between NHS services and cancer populations throughout the UK, with careful consideration and evaluation, much of the learning from this study may be transferable.

At one site, we were only able to recruit four patients to interview, thus not reaching our recruitment target of six interviews per site. This deficit was made up by over-recruitment at other sites; however, it likely reflects differences in treatment type, cancer stage, and symptoms in the patient population of this one service compared to other participating services. Chemotherapy and radiotherapy present a greater burden than waiting for surgery, thus reducing capacity for participation in prehabilitation and research.

In this study, which focused on five cancer types, a majority of the patients observed in a prehabilitation consultation had diagnosed or suspected GI cancer (72.0%). Comparison to the reported incidence in 2022 for the same five cancer types in Wales shows that GI cancer is over-represented within prehabilitation (Upper GI 35.0% vs 17.5%; Colorectal 37.0% vs 20.0%) while breast and prostate cancer are under-represented (Breast 0.0% vs 22.7%; Prostate 5.0% vs 21.2%). Lung cancer representation was more closely aligned with the reported Wales incidence (22.5% vs 18.7%) (Public Health Wales 2025).

Despite being eligible for inclusion, no breast cancer patients were recruited. This was due to prehabilitation not commonly being offered to people with breast cancer by the participating services at the time of data collection. As such, the qualitative findings reported, in the main, reflect the experiences and perspectives of people with GI and lung cancer in prehabilitation, and further research is required to establish their generalisability to people with other cancer types.

In our sample of 120 patients observed in a prehabilitation consultation, 37.5% were female, compared to 47% of patients included in the reported incidence for the 5 included cancer types in Wales for 2022 (Public Health Wales 2025); However, 50% of the subset of 36 interviewed patients were female. Out of 120 observed patients, 96.7% identified as White British or Irish, which is consistent with reported cancer incidence in Wales (96.4% White, 2011–2020) (Public Health Wales 2025).

That our case study was conducted in Wales is a limitation to the transferability of learning related to ethnic minority groups. This is due to lower ethnic variation in Wales compared to other areas of the UK. For patient interviews, we made efforts to sample for maximum variation in socioeconomic background and ethnicity. While this was achieved for socioeconomic background, only 3/36 (8.3%) of the patients interviewed were non-White. These three patients all lived in areas of lower deprivation, two in professional employment and one retired, which could explain the similarity in factors affecting access, acceptance, and adherence when compared to patients of White ethnicity.

Further research

Findings from this study are most relevant to the early stages of the adherence process (access, acceptance, and engagement) due to the cross-sectional design. Longitudinal research is needed to explore persistence in prehabilitation behaviours across time, and disengagement or transition to rehabilitation.

As part of the wider I-Prehab Project, case study findings were used within a coproduction process to develop an online education package to support inclusive prehabilitation for cancer care workers [Available at https://xerte.cardiff.ac.uk/play_24238]. Feasibility of this education has been evaluated and reported separately (Gale et al., manuscript under review). Further research is required to monitor its impact.

Conclusions

This study identified themes describing interlinked factors that may be modified by cancer services and cancer care workers to increase uptake of prehabilitation amongst people from diverse socioeconomic and cultural backgrounds.

For cancer prehabilitation to be inclusive, patients need to understand how it can support them, as individuals, through their cancer surgery and/or treatment and recovery. Cancer services and those working in cancer care need to consider differences in patients' personal capacity for prehabilitation and provide consistent, tailored messaging to align expectations for the process and outcomes of prehabilitation. Interpersonal support through reciprocity and connection is key to developing positive alliances that facilitate initiation of and adherence to behaviour change for prehabilitation. Pathways for cancer prehabilitation should be interrogated for gaps where certain patient groups may be lost. Diverse modes of prehabilitation delivery should be offered to support the diverse needs of individuals and communities. Inclusive prehabilitation is underpinned by person-centred care, which prioritises individualisation, shared decision-making, and a holistic approach. Together, these factors contribute to patients' understanding of and confidence in the process and outcome of prehabilitation specifically for them.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1186/s13741-026-00737-7>.

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Authors' contributions All authors contributed to the study conception and design. Material preparation and data collection were performed by AM, MP, SL, AR, and JH, and analysis was conducted by JH, AM, MP, SL, AR, TW, SW, and GM. The first draft of the manuscript was written by AM, and all authors commented on previous versions of the manuscript. AM and MP prepared Fig. 1. AM prepared Fig. 2. All authors read and approved the final manuscript.

Authors' information The research team had professional, and in some cases clinical, backgrounds in nursing (JH, TW), dietetics (AM), physiotherapy (MP, SP, NG), health psychology (SW, SL, GM), and sports science (AR), and various personal and professional experiences of cancer. Seven had PhDs (JH, AM, TW, SW, GM, NG, SP), and experience within the team included extensive expertise in qualitative data analysis and cancer care research.

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Data availability The dataset supporting the results and conclusions of this article is included in Additional file 1. Raw datasets generated during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate Ethical approval was granted by London—Surrey Borders NHS Research Ethics Committee (Reference 23/PR/0868). Local research governance approvals were also secured from each participating service provider. All participants provided informed consent to participate in the study.

Consent for publication As part of the process for informed consent, participants interviewed for this research agreed to the following statement: *I agree to the use of direct quotes in any publications or presentations that arise from the findings of this study. I understand that these quotes will be anonymised.*

Competing interests The authors have no relevant financial or non-financial interests to disclose.

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