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Exploring the cancer patients' experiences during external radiotherapy: A systematic review and thematic synthesis of qualitative and quantitative evidence

Ana Monteiro Grilo [a,b,*], Bárbara Santos [c], Inês Baptista [c], Fátima Monsanto [a]

[a] *H&TRC-Health & Technology Research Center, ESTeSL- Escola Superior de Tecnologia da Saúde, Instituto Politécnico de Lisboa, Portugal*
[b] *CICPsi - Research Center for Psychological Science, Faculty of Psychology, University of Lisbon, Portugal*
[c] *Medical Imaging and RT Degree, Escola Superior de Tecnologia da Saúde, Instituto Politécnico de Lisboa, Portugal*

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ABSTRACT

Purpose: To investigate the subjective experience of adult cancer patients undergoing external radiotherapy and provide evidence for better practices in radiotherapy services.

Methods: A systematic review was performed according to the PRISMA Statement Guidelines. Qualitative and mixed studies were identified through five electronic databases (CINAHL, PsychINFO, Medline, Scopus and Web of Science), between March and April 2020, using defined criteria. Methodological quality assessment was conducted, and the data integrated into a thematic synthesis.

Results: Of the 886 studies identified, 13 met our inclusion criteria. Patients experiences were described into four main themes: (1) Time, (2) Physical Environment, (3) Treatment Concerns and (4) Radiotherapy Team. Time refers to waiting time and treatment time; Physical Environment states temperature in the treatment room and equipment; Treatment Concerns included side effects, daily activities, positioning and immobilization and treatment preparation (e.g., bladder filling); radiotherapy team comprised patients support; response to patients needs and recognized team. The generating analytical phase of thematic analysis allowed us to recognize that the effectiveness of the radiotherapy team operates as a facilitator of the patients' experience. In contrast, time in the waiting room, the treatment preparation when is required, and the positioning and immobilization, specifically for the neck and head patients, act as barriers.

Conclusion: Four distinct themes were identified to be positively and negatively associated with patients' experience during external radiotherapy. The evidence provides valuable recommendations to improved radiotherapy services organization, as well as to the delivery of more patient-centred care adjusted to the concerns and needs of patients.

1. Introduction

With more than 3.7 million new cases and 1.9 million deaths each year, cancer represents the second most important cause of death and mortality in Europe in the past years ("WHO/Europe | Cancer - Data and statistics," n. d.).

The cancer incidence is estimated to have risen to 2.7 million new cases and 1.3 million deaths in 2020 ("Cancer burden statistics and trends across Europe | ECIS," n. d.). Based on demographic changes, about 4 million new cancer cases are predicted in 2025 in Europe and 5.2 million by 2040. This increase poses a significant challenge to healthcare systems and highlights the need to ensure that all cancer patients have access to high-quality and efficient cancer care (Borras et al., 2016; Kazmierska et al., 2018).

Radiotherapy (RT) is recommended as part of the treatment for more than 50% of cancer patients. There is evidence that 40% of all cancers are eliminated by RT, either alone or combined with other types of treatment. In 2025, 2000000 patients are estimated to receive RT indication at least once during cancer treatment. If, by 2035, every cancer patient who needs RT has access to it, almost one million more lives will be saved every year (Borras et al., 2016; Kazmierska et al., 2018).

There are two types of radiotherapy: external or internal. The last

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[*] Corresponding author.

E-mail addresses: ana.grilo@estesl.ipl.pt (A.M. Grilo), barbara.v.santos@hotmail.com (B. Santos), ines-raposo@live.com.pt (I. Baptista), fatima.monsanto@estesl.ipl.pt (F. Monsanto).

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one is called brachytherapy, and the radiation is delivered inside of the patient body. External radiotherapy directs the radiation to cancer externally using different techniques and equipment. Additionally, radiation treatment can be used with a curative or palliative purpose, where curative refers to eradicating the pathology itself and palliative refers to reduce the pathology's pain and symptoms (Abshire and Lang, 2018).

Radiotherapy is a less explored treatment by the media, and therefore more unknown in society. Muniz et al. (2008), in a study on the meanings of the RT experience, states that RT is seen as a "poison medicine" due to the association people make with radioactivity and nuclear weapons. Therefore, patients and their relatives fear the effects of RT (Olausson et al., 2017).

Most patients are not aware of how RT is performed, its impact on their lives, purpose, and therapeutic foundation. Lack of knowledge increases uncertainty, anxiety, and anguish and may harm therapeutic decisions, leading to unnecessary treatment interruption (Forgione et al., 2019; Jimenez-Jimenez et al., 2018). A recent study (Probst et al., 2021) highlighted the discomfort experienced by breast patients regarding the need to remain undressed during treatment and to stay with permanent tattoos on their bodies. These issues underline deficiencies in patient radiotherapy care experiences and highlight the importance of professionals understanding how patients experience this cancer treatment throughout their stay in the RT Service (Forgione et al., 2019; Mullaney et al., 2016; Nixon et al., 2019).

The patient experience could be defined as the *broad range of interactions and situations that occur during the patient's time within the institution* (Hashmi et al., 2019). It has been associated with clinical outcomes, treatment compliance (Price et al., 2017) and high-value cancer care (Mollica et al., 2017).

Previous research described cancer patients' experience during external radiotherapy (Price et al., 2017; Nixon et al., 2019; Wagner et al., 2010). However, there is evidence of significant gaps (Mollica et al., 2017); since the literature has focused essentially on patient information needs and the experience of side effects (Probst et al., 2021). No study provides a broader perspective of radiotherapy cancer patients' experience, crucial for high-quality, patient-centred cancer care (Gleeson et al., 2016); Wagner et al. (2010). Additionally, the description of the patient's experience's main themes enables identifying facilitators and barriers that can drive quality improvement (Gleeson et al., 2016) in radiotherapy services.

Therefore, this systematic review aims to explore and synthesize qualitative and quantitative data concerning how adult patients perceive and describe their experiences undergoing external RT. We were driven to inspect the following research question: What are the most frequent themes reported by adult cancer patients undergoing external radiotherapy?

With the evidence collected and through thematic analysis, we intend to highlight the main facilitators and barriers of radiotherapy adult patient experiences and update recommendations for better RT services practices.

2. Methods

2.1. Search strategy

This thematic synthesis was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology (Moher et al., 2009). A database search was conducted from 2020 March 10 to April 24, and 886 articles were found: CINAHL (n = 69), PsycINFO (n = 0), Medline (n = 695); Scopus (n = 109) and Web of Science (n = 13).

We used a two-step, systematic search strategy (Paterson et al., 2015). In the first instance, the research was guided by the keywords *external RT* and *anxiety* and *subjective experience*. To increase the number of articles for selection, in a second phase, we added more keywords. These were selected according to the related literature, already found, on the patients' experience: (*all cancer pathologies* or *adults with cancer*) and (*external RT* or *curative RT*) and (*subjective experience* or *perceptions* or *perspective* or *concerns* or *treatment environment* or *anxiety* or *stress* or *depression* or *fears*). All terms were searched in English.

Articles published between January 2005 to March 2020 were searched. The authors considered 15 years the most appropriate period regarding the advances that have been made in radiotherapy treatment. This range time ensures that the articles' content was in line with the health services' current situation and followed other systematic reviews considering cancer's psychosocial issues (Kailemia et al., 2020; Magalhães et al., 2020; Coyne et al., 2020).

Our search was carried out to find original articles, in which the search strategy was created for the Medline database and then adapted to the others. Subsequently, an additional search (n = 10), "Snow-Balling", was made, where the reference list of the articles found in the search was analysed to detect new articles. The research was done by two researchers independently, following the inclusion and exclusion criteria.

2.2. Inclusion and exclusion criteria

Our systematic review involves mixed-method research comprising qualitative and quantitative studies (Noyes et al., 2019; Popay et al., 2006) that enables us to answer specific and complementary questions. Therefore, a broader and more significant perspective of the experience of patients who undergo RT can arise (Snilstveit et al., 2012). The articles selected met two main inclusion criteria: studies that participants receive external RT as the primary treatment for curative purposes, and research that explored patients' subjective experience and their concerns and emotional reactions regarding RT. The exclusion criteria were defined as: articles that examined side effects, development of questionnaires, need for information and decision making or technical concepts. We also excluded articles whose participants were under 18 years of age because they do not cover this revision's aim. Children and adolescents have specific development characteristics; therefore, their radiotherapy experience should be studied apart and including their caregivers. The focus of this review was the description of patient experience, specifically during external RT. Therefore, we exclude subjects such as quality of life and decision making since research in these

Table 1
PICOS inclusion and exclusion criteria.

Parameter	Inclusion Criteria	Exclusion Criteria
Population	- >18 years with cancer - All cancer pathologies	- Children with cancer
Intervention	- Radiation treatment - External RT - Curative RT	- Cancer diagnoses - Palliative RT - Metastatic RT - Brachytherapy - Surgery - Chemotherapy - Hormone therapy
Comparator	Does not apply	Does not apply
Outcomes	- Patient experience - Patient perceptions - Patient knowledge - Patient concerns - Patient perspective - Anxiety - Depression - Stress - Fears - Treatment and department environment	- Technical tasks - Side effects - Questionnaire development - Information needs - Decision making - Quality of life
Study Design	- Qualitative study - Quantitative study - Population study - Cohort study	- Literature review

areas usually covers a more extensive period (Table 1).

2.3. *Eligibility process*

At an early stage, all duplicate items were eliminated. Then, seven hundred and forty-three articles were excluded by analysing titles and abstracts according to the systematic review aim. The results are presented in sub-sections that explore and discuss the key themes.

From the search carried out based on the keywords and language chosen, sixty-two articles were collected. From the search carried out based on the keywords and language chosen, sixty-two articles were collected. By applying the selection criteria (exclusion and inclusion), the final database retained thirteen articles aimed at identifying patients' concerns and subjective experiences during treatment and the factors that influenced those dimensions. Fig. 1 represents a summary of the article's eligibility process.

2.4. *Quality appraisal*

Methodological quality evaluation was appreciated using Hawker et al. (2002) critical appraisal tool. The authors developed an instrument to evaluate the quality of heterogeneous studies. We collected both qualitative and quantitative studies, and this tool allows us to use the same qualitative criteria for all.

Studies were evaluated according to the nine dimensions: abstract and title, introduction and aim, methods and data, sampling, data analysis, ethics and bias, findings/results, transferability/generalizability, implications and usefulness. Two independent authors score each dimension as "good", "fair", "poor", and "very poor". For each study, a final score ranged from 9 (very poor) to 36 (good) was calculated. When the authors reached a different final score, a mean score for the paper was calculated.

2.5. *Data synthesis*

The selected articles were submitted to a thematic analysis, as our scope was to develop a preliminary synthesis of findings included in the systematic review (Popay et al., 2006). We follow the three steps proposed by Thomas and Harden (2008): (1): Coding text (2) Construct descriptive themes, (3) Generating analytical themes. Although this

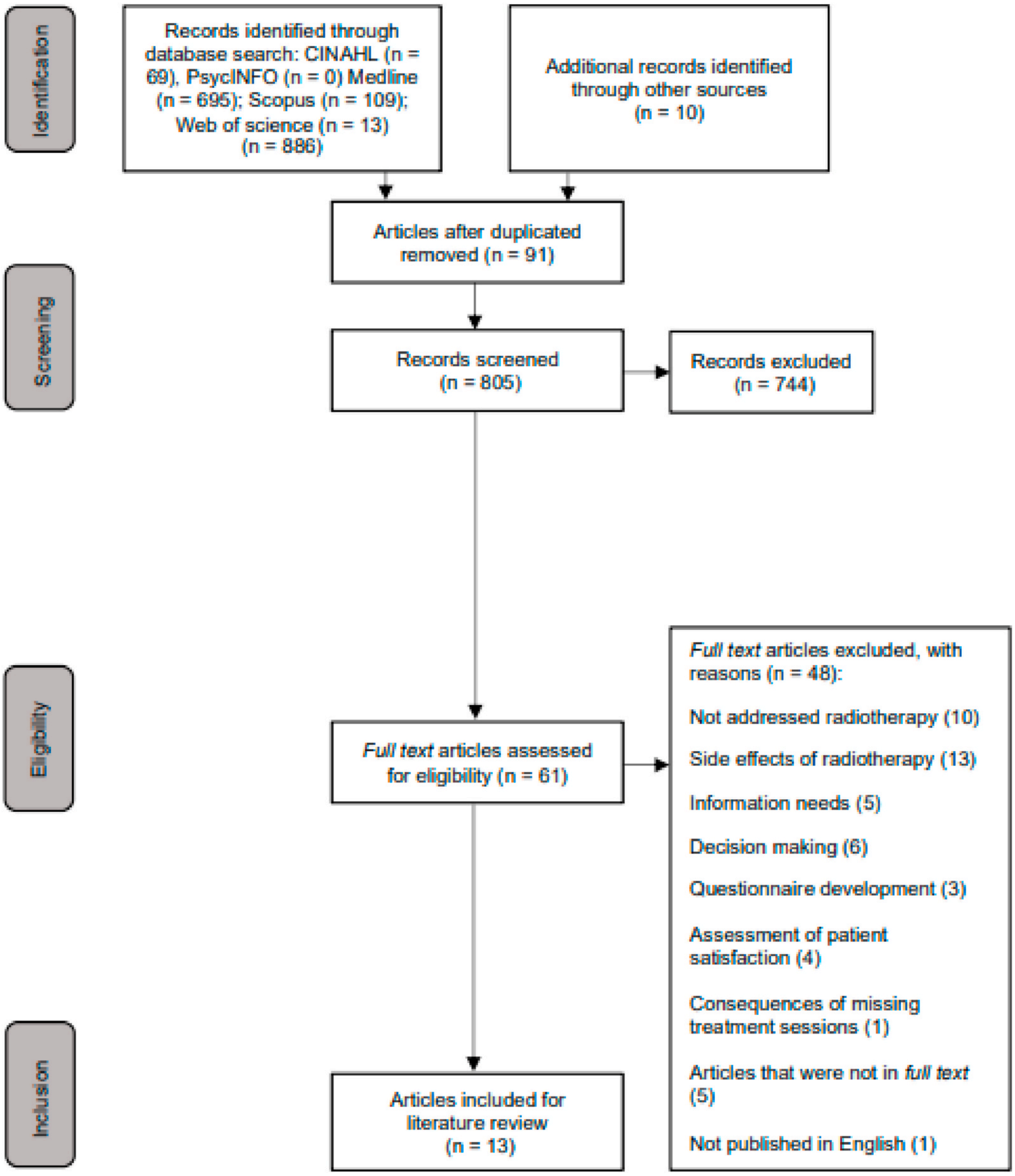

Fig. 1. PRISMA flow diagram.

methodology is usually used for qualitative studies, we use a convergent synthesis design (Noyes et al., 2019). Therefore, the results of qualitative and quantitative studies were simultaneously analysed (Thomas and Harden, 2008).

In the first phase, as proposed by Popay et al. (2006), after tabulation of the data considering extraction criteria, we transformed quantitative findings into a qualitative rubric. Then, two authors (BS & IB) independently identified the primary and/or most essential themes presented in the descriptions of the results and discussion of the included studies. Then they joined the topics, discussed all disagreements and grouped similar ones. A third author (AG) revised all proposed themes and sub-themes and performed an understandable and relevant synthesis in a second phase. Identification of facilitators and barriers was made through a debate between all authors, and a consensus was obtained.

2.6. *Data extraction*

To extract the data from the 13 eligible articles, an instrument was developed containing the following information: author, year of publication, country of publication; the purpose of the study; type of study; measurement instrument; sample (includes dimension and pathology); results and quality score. These characteristics of the studies are presented in Table 2.

3. Results

The characteristics of the thirteen studies and the quality assessment of each article are highlighted in Table 2. Table 3shows the quality appraisal process. No articles were excluded, and the final quality scores range from twenty-nine (Bristow et al., 2018) to thirty-five points (McQuestion and Fitch, 2016).

As for the general characteristics, the oldest publication was from 2008 (Halkett et al., 2008) and the most recent from 2020 (Olausson et al., 2020). Four articles were from Australia (Halkett et al., 2008; Merchant et al., 2017; Halkett and Kristjanson, 2007; Forshaw et al., 2017), two from Sweden (Mullaney et al., 2016; Olausson et al., 2020), two from Brazil (Muniz et al., 2008; Macedo et al., 2019), other three from Canada (McQuestion and Fitch, 2016; Bristow et al., 2018; Gillan et al., 2014) and the remaining two were from Norway (Egestad, 2013) and Germany (Voigtmann et al., 2010).

Of the thirteen articles analysed, eight utilised a qualitative approach and five a mixed-method research, both qualitative and quantitative. Of the eight qualitative articles, five used descriptive methods (McQuestion and Fitch, 2016; Gillan et al., 2014; Halkett et al., 2008; Halkett and Kristjanson, 2007; Forshaw et al., 2017), two contained exploratory methods (Macedo et al., 2019; Muniz et al., 2008) and one presented an ethnographic approach (Merchant et al., 2017). Of the articles with mixed-methods, four were considered as descriptive methods (Mullaney et al., 2016; Olausson et al., 2020; Bristow et al., 2018; Voigtmann et al., 2010) and one as a phenomenological hermeneutic approach (Egestad, 2013).

Samples of the articles ranged from one to eight hundred and thirty-two patients, studies in which the samples were small were included, as the sample size was not considered as an exclusion criterion. The most highlighted pathologies were breast cancer (Olausson et al., 2020; Gillan et al., 2014; Halkett et al., 2008; Merchant et al., 2017; Halkett and Kristjanson, 2007; Forshaw et al., 2017) and head and neck cancer (Mullaney et al., 2016; Macedo et al., 2019; McQuestion and Fitch, 2016; Egestad, 2013; Olausson et al., 2020).

Of the eligible articles, five address patients' experiences during RT (Muniz et al., 2008; Macedo et al., 2019; McQuestion and Fitch, 2016; Olausson et al., 2020; Forshaw et al., 2017), one study describes patients' treatment perceptions (Gillan et al., 2014), another shows the RT environment (both treatment and service) (Merchant et al., 2017), and two articles clarify patients' perspective on health professionals (Egestad, 2013; Halkett and Kristjanson, 2007). The remaining four studies refer to the psychological impact, specifically feelings of anxiety, depression, stress and fear related to the treatment (Mullaney et al., 2016; Bristow et al., 2018; Voigtmann et al., 2010; Halkett et al., 2008). The measurement instruments were based on questionnaires, interviews and observations. The psychological impact was assessed through standard scales: The State-Trait Anxiety Inventory – state-specific questions (STAI-S) and The Person-centred Climate Questionnaire (PCQ) (Mullaney et al., 2016); Distress Thermometer, Hospital Anxiety and Depression Scale and Bowel Status Bother Survey (Bristow et al., 2018); Hospital Anxiety and Depression Scale (HADS-D) and Post-Traumatic Symptom Scale (PTSS-10) (Voigtmann et al., 2010).

The thematic analysis revealed four overarching themes: time; physical environment, treatment concerns and RT team. Each theme and sub-themes are described in the following section, with explanatory statements extracted from selected studies. Fig. 2 summarized the thematic synthesis.

4. Time

Two articles addressed this theme, such as Mullaney et al. (2016) and Olausson et al. (2020). Concerning time, two subtopics should be highlighted, the treatment waiting time and the treatment time itself.

4.1. *Waiting time*

Reports about waiting time showed that it is a troublesome issue. For example, in the study by Olausson et al. (2020), one patient reported: "It is impossible to predict the waiting time and plan other appointments during the day. Today, for example, there were ten patients before me in line, yesterday there were two people at the same time. Treatment time is insignificant compared to waiting time (P4)".

4.2. *Treatment time*

According to Mullaney et al. (2016), most patients consider that treatment time is easy to tolerate, lasting about ten to 15 min, contrasting with the waiting time. The majority of the patients, precisely seven hundred and forty-eight out of eight hundred and ninety-two patients, confirm this information.

5. Physical environment

Two articles highlighted the physical environment, one by Olausson et al. (2020) and another by Merchant et al. (2017).

5.1. *Temperature*

In the study by Olausson et al. (2020), the patients reported that environmental details, particularly temperature, greatly influenced their experience, pointing out the following comment: "I experienced the temperature in the treatment room as a little cold. Nobody asked me if I froze. I am naked during the treatment (P3)". The study by Merchant et al. (2017) also goes in the same direction, highlighting the comment "The environment is a bit cold and technical (P6)".

5.2. *Equipment*

Since RT equipment is the key to treatment, it is important to consider patients' perceptions. Patients' perceptions of the equipment and all the procedures inherent to treatment are highly technical and specific to RT. Four articles represented this theme; they were Mullaney et al. (2016), Egestad (2013), Voigtmann et al. (2010) and Gillan et al. (2014).

Mullaney et al. (2016) concluded that most patients had no concerns with the equipment. In the study by Egestad (2013), the comments "I felt

Table 2
Characteristics and main findings of thirteen studies on patients' experiences, concerns, and psychological impact during RT. **STAI-S:** The State-Trait Anxiety Inventory – state-specific questions; **PCQ:** The Person-centred Climate Questionnaire; **HADS-D:** Hospital Anxiety and Depression Scale; **PTSS-10:** Post-Traumatic Symptom Scale.

Author, Year, Country	Type of study	Measurement instrument	Purpose	Sample (Pathology)	Results	Quality Score
Mullaney et al. (2016), Sweden	Qualitative and Quantitative, Descriptive	STAI-S and PCQ questionnaires	Assess whether there is a relationship between the perceptions of cancer patients and the centrality of the treatment person's experience and levels of anxiety during treatment	892 patients (Head and Neck – 191; Chest – 362; Pelvic – 239; Others – 52)	Factors that increase anxiety levels in patients undergoing RT are perceptions of safety, concerns about the equipment and feelings of isolation and claustrophobia in the treatment room	34
Macedo et al. (2019), Brazil	Qualitative, exploratory	Interviews	Understand and describe the RT experience from the perspective of a woman with head and neck cancer	1 patient (squamous cell carcinoma in the oral cavity)	Two relevant themes were considered: the path in RT and the importance of the multidisciplinary team. Although RT has a positive impact on cancer treatment, there was a fear of its side effects	33
McQuestion and Fitch (2016), Canada	Qualitative, Descriptive	Interviews	Explore the experience of patients who are undergoing RT for head and neck cancer	17 patients (Head and Neck)	The anguish of interrupted expectations has negatively affected the daily lives of patients. Another topic was the waiting time that contributed to the suffering of patients, being marked as a feeling of uncertainty	35
Egestad (2013), Norway	Qualitative and Quantitative, Phenomenological hermeneutic approach	Interviews	Clarify how head and neck cancer patients' encounters with health professionals influence the experiences of RT patients	11 patients (Head and Neck)	Three themes were highlighted: feeling safe, being understood and forming relationships with the team. All comments were very positive about these three themes, with a lot of reference to health professionals' role.	34
Olausson et al. (2020), Sweden	Qualitative and Quantitative, Descriptive	Questionnaires	Explore how patients experience RT and related procedures	825 patients (Head and Neck – 123; Chest – 297; Pelvic/Abdomen – 240; Others – 105)	The meetings with health professionals highlighted the importance of transmitting feelings of security. There was also a need to understand what RT is and what its side effects are. The waiting time for treatment was highlighted as something that negatively affects patients, as well as having to maintain routines during RT	34
Bristow et al. (2018), Canada	Qualitative and Quantitative, Descriptive	Distress Thermometer, Hospital Anxiety and Depression Scale and Bowel Status Bother Survey questionnaires	To determine levels of anxiety, depression, stress and boredom related to bowel preparation in patients with prostate cancer during RT	30 patients (prostate cancer)	Daily bowel preparation showed moderate anxiety levels, which decreased as treatment sessions progressed, normal depression levels and low-stress levels. The reasons were feelings of shame while waiting for the RT session and feelings of frustration when the preparation was performed incorrectly	29
Voigtmann et al. (2010), Germany	Qualitative and Quantitative, Descriptive	HADS-D and PTSS-10 questionnaires	Register the symptoms of anxiety, depression and post-traumatic stress of patients and their subjective experience of the disease, with different forms of RT and with different indications	232 patients (Benign – 68; Malignant - 164)	The psychological experiences that stood out were anxiety, stress, depression and post-traumatic stress. Regarding the perceptions of the treatment itself, 57% of patients saw the equipment as a source of cure, 11,8% imagined images during the treatment, and 30% had regular contact with the same health professional	31
Gillan et al. (2014), Canada	Qualitative, Descriptive	Interviews	Verify cancer patients' deeper perceptions about RT	111 patients (Breast – 28,8%; Genitourinary – 12,6%)	The most relevant topic was confidence in the quality and safety of RT, where these topics were highlighted: radiation itself, protection of healthy tissues and organs, improvement in the quality of RT, the safety of the equipment, prescription/treatment planning and competence of the RT team	29
	Qualitative, Descriptive	Interviews	Understanding the fears of breast cancer patients' in RT	34 patients (Breast cancer)	These topics were discussed: fear of the unknown, getting burned,	32

(continued on next page)

Table 2 (*continued*)

Author, Year, Country	Type of study	Measurement instrument	Purpose	Sample (Pathology)	Results	Quality Score
Halkett et al. (2008), Australia			and see how they deal with these fears		damaging internal parts, the anticipation of tiredness and trying not to worry about treatment	
Merchant et al. (2017), Australia	Qualitative, Ethnographic approach	Interviews and observations	Explore how the environment of RT departments supports or inhibits communication in general, the delivery of information and care in particular	71 patients, radiation therapists and nurses. (Breast; Prostate; Head and Neck)	The three main themes were: time and space, technology-driven culture and impact on patients	32
Halkett and Kristjanson (2007), Australia	Qualitative, Descriptive	Interviews	Study the patients' perspective on health professionals' role and develop a substantive theory on the relationships that patients form with their RT team.	34 patients (Breast Cancer)	The importance of the role of health professionals was highlighted, not only in administering the treatment but also in providing a sense of emotional comfort and continuous information	30
Muniz et al. (2008), Brazil	Qualitative, Exploratory	Interviews	Understanding patients' experiences during RT	10 patients	RT was considered a poisoned medicine: on the one hand; it meant a cure for the disease; on the other hand, the side effects of treatment caused suffering and made it impossible to carry out daily activities	33
Forshaw et al. (2017), Australia	Qualitative, Descriptive	Interviews	Explore patients' experiences and preferences for RT preparation	25 patients (Breast – 4; Prostate 12; Others – 9)	The need for individualised and appropriate RT information was highlighted and was considered inconsistent, incomprehensible, and very technical. Lack of knowledge and treatment disinformation were reported as causes of fear and anxiety during RT	32

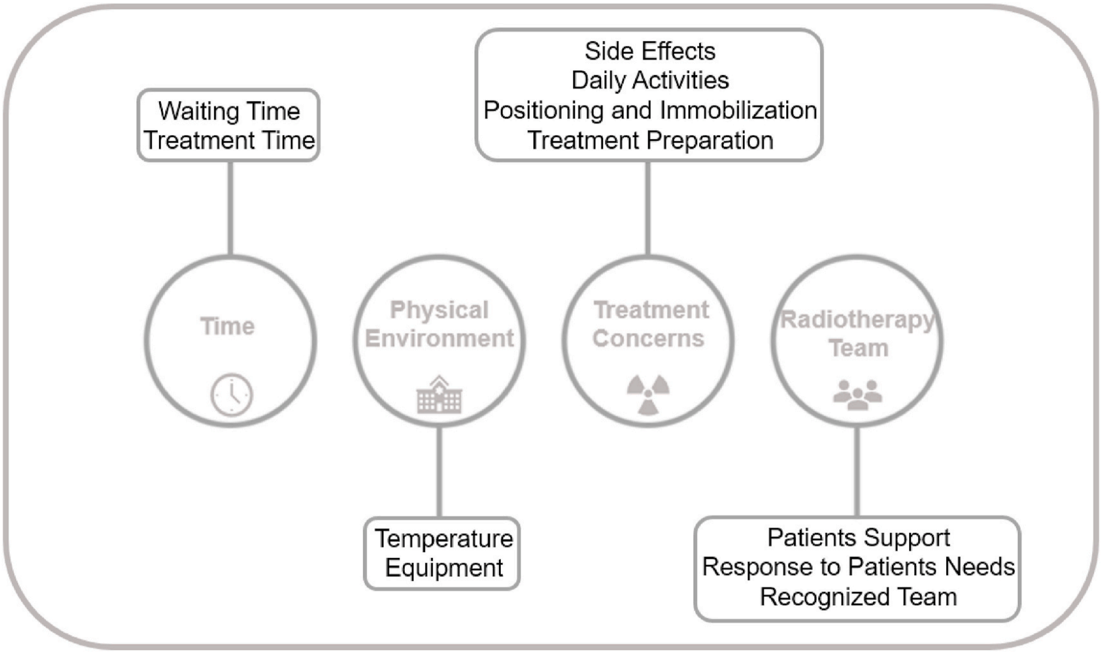

Fig. 2. The patient experience undergoing external RT.

completely safe (P5).", "You feel safe even if you are feeling sick (P5)." were highlighted. In other studies such as de Voigtmann et al. (2010), 57% of patients defined the equipment as a curing source. In the study by Gillan et al. (2014), 69.3% of patients considered the radiation to be delivered safely, and 72.5% considered the equipment to be safe.

Also, the sharp lighting or disturbing noise of the RT equipment were other environmental factors that caused discomfort in the patients (Olausson et al., 2020).

6. Treatment concerns

6.1. Side effects

Most patients fear radiation and usually make negative associations and are afraid of its side effects, leading to increased negative feelings. Three articles resumed this topic, such as Halkett et al. (2008), Gillan et al. (2014) and (Muniz et al. (2008)).

In the study by Halkett et al. (2008), some comments say: “You hear so much about radiation, it’s harmful, and so I don’t know why they use it, I think it helps the cancer; they must know what they’re doing … (P4)", “I can get burned everywhere (P4)", “I’m just worried that the skin will get so sensitive to start wearing a bra … (P4)" and “The radiation oncologist mentioned that it might slightly affect the lung so I suppose it’s a bit worrying (P5)". Gillan et al. (2014) study reported that only 46% of patients thought their healthy tissues and organs were protected from radiation. Muniz et al. (2008) investigation revealed exciting comments regarding the negative perceptions about treatment "It’s something serious, dangerous, violent and it hits hard - it’s a poison drug (P3)".

6.2. Daily activities

The visits to the RT units impact patients’ daily lives and routines. Patients described how the uncertainty in their lives caused by the treatment led to difficulties in working and other activities such as physical activities and their personal lives. Two articles explain this, one by Olausson et al. (2020) and another by McQuestion and Fitch (2016).

In the study developed by Olausson et al. (2020), this comment is highlighted *"’I’m not the only person that works during treatment, and I get stressed by not being able to plan my days better. I’m told that exercising is important, but having RT, …, and working as well, you don’t have any time left …* (P4)*”*.

In the study carried out by McQuestion and Fitch (2016), patients described feeling overwhelmed with so many changes happening all together and struggled to make sense of them and what was no longer a taken-for-granted plan. This comment shows that: *“… I’m still at it a bit, you know … thinking [about] the plans I had …* (P4)*”*

6.3. Positioning and immobilization

Four articles mentioned this subject, Mullaney et al. (2016), Egestad (2013), Merchant et al. (2017) and Muniz et al. (2008).

Mullaney et al. (2016) concluded that patients considered immobilization easy to tolerate but that head and neck patients had feelings of claustrophobia. A patient in the study by Egestad (2013) states that *“The mask was absolutely terrible, I had claustrophobia … the professionals knew how I felt, lying there was absolutely terrible* (P5)". In the study developed by Merchant et al. (2017), the comments that stood out were: *“It is a strange experience, a strange feeling* (P6)*", “You are out of your comfort zone* (P6)*",* and *“The treatment position is uncomfortable* (P6)*".*

Muniz et al. (2008) highlighted the following comments regarding the problem of markings and tattoos on the skin: *“Apparently we are no different from other people, but when we look in the mirror and see all the ink … then we understand: I’m different from the others!* (P4)*"* and *“I’d come home and I was looking forward to a bath to get all the red ink out. It was like … every time I changed my clothes, I’d look at it, and it’d all come back to me: I have cancer* (P4)*!"* (after last treatment session).

6.4. Treatment preparation

Treatment preparation can cause a negative impact in many cancer patients, especially gynaecological patients, which are routinely asked to follow a bladder filling and bowel evacuation protocol for the duration of their radiation treatment. Deviation from protocol leads to delays in treatment which can cause anxiety and distress but also can cause feelings of concern, shame and guilt. This is showed in one study by Bristow et al. (2018).

The following comments were highlighted in Bristow et al. (2018): *“I’m not sure how to anticipate the treatment and if I will be facing the same problems each day (rescan due to excess gas). I hope everything will be okay for the rest of the treatment. I have increased anxiety from this experience.* (P3)’’ and *“I have concerns about having a bowel movement at the right time …* (P3)*”*.

7. Radiotherapy team

7.1. Patients’ support

The team is responsible for reducing unpleasant experiences and feelings. When patients realise that the team is competent and takes the time to make the whole treatment a better experience, they adopt a much more positive attitude. Three studies demonstrate this topic, they are Olausson et al. (2020), Forshaw et al. (2017) and Halkett and Kristjanson (2007).

In the study performed by Olausson et al. (2020), the comments were highlighted: *“I feel that the professionals are fantastic, I feel calm and secure during the treatments. They inform me well* (P4)*"*. Patients of the Forshaw et al. (2017) study said, *“We know that their total concern is us. They simply smile at us and call us by our first name* (P6)*."*

However, patient communication with RT professionals does not always take place, as can be seen in the study performed by Olausson et al. (2020) *“I feel that professionals are stressed and don’t have time to answer questions* (P3)" and also in the study by Halkett and Kristjanson (2007) “*I had an experience where I was lying on the table … and suddenly this man appeared, his head was at my height and he just started to position me, neither hello nor anything* (P4)".

7.2. Response to patients’ needs

Patients must create a relationship with health professionals to make the whole treatment process more manageable. Two studies approached that idea, Olausson et al. (2020) and Merchant et al. (2017).

The following comment can be observed in the study by Olausson et al. (2020) *“If more information was needed during the treatment process, as was my case, I would ask and receive a clear and good answer* (P3)".

However, patients’ needs are not always put into consideration first; as demonstrated by Olausson et al. (2020)*: “I would have appreciated it if the team had told me what would happen and explained why treatment procedures sometimes deviate from the normal procedure. That would have made me less concerned. It’s important to announce when you leave the treatment room and when you return.* (P3)" The following comments from the study by Merchant et al. (2017) also support this idea: *“Sometimes the efficiency … makes health professionals move people very quickly, doesn’t it?* (P5)" and “*There are workflow and personnel problems that do not always allow time for the professionals to give justice to the problems that patients may have* (P5)".

7.3. Team

Patients give high importance to the fact that they are always in contact with the same health professionals and are always treated on the same equipment. These aspects give patients a greater sense of safety and comfort. Two studies addressed this concept, Egestad (2013) and Halkett and Kristjanson (2007).

This is observed in the comments of the study by Egestad (2013) *“It is safe when professionals are the same, because I know their personality and I know how to relate to them* (P6)" and *“They were the same, very good, a team that I recognized. I felt comfortable* (P6)". As in the comments of Halkett and Kristjanson (2007): *“It was a small group so there was a connection, sometimes I had to go to another machine and it was a totally different team on that machine and they were very nice, but I didn’t know* *them … I almost felt a little bit cheated* (P4)" and "*We got a little attached to them* (P4)".

8. Facilitators *and* barriers

The thematic interpretation phase allowed us to identify the factors that facilitate the patient's experience and what constitutes a barrier, contributing to a more negative experience in the RT service (Fig. 3).

The role of the RT team should be highlighted as a facilitator. First, patients value the fact that it is always the same team that treats them because they manage to establish a relationship during treatments. A familiar face gives them a greater sense of security. Regarding the response to patients' needs, they highlight professionals' ability to answer their doubts/questions as something that facilitates the whole treatment process. This open communication between patients and professionals improves the RT experience. Concerning patient support, patients feel that if professionals dedicate part of their time to addressing their concerns to feel some help, treatment will be easier to tolerate. However, we consider these three themes as a paradox, because if on the one hand, it facilitates treatment, on the other, it can also present itself as a barrier. When the topics mentioned before are put aside, for example, patients remain doubtful about treatment radiation; RT can be considered a negative and traumatic experience.

Barriers must be kept in mind throughout the treatment as they can make it an unpleasant experience. Waiting time is seen as quite difficult to tolerate because it is unpredictable and affects patients' daily routines. The cold feeling is aggravated by having to undress during treatment sessions. Speaking of positioning and immobilization, it is especially problematic in head and neck pathologies due to the development of claustrophobia feelings resulting from the use of thermoplastic masks. Treatment preparation, the last barrier, relates to the need for bladder filling and bowel evacuation protocols in gynaecological pathologies. When patients did not perform it correctly, they feel ashamed and guilty for not corresponding to what was required.

9. Discussion

9.1. Findings interpretation

This study aimed to generate insights into how cancer patients perceive and describe their experiences during external RT treatment and provide evidence that can be used to guide clinical practice.

Although the published literature on the patients' experience that undergoes RT treatment is scarce, this systematic review included thirteen studies that allowed us to identify four main themes that influence patients' experiences (time, physical environment, treatment concerns and RT team). In addition to these central themes, we considered some sub-themes. Regarding time, we identify two sub-themes, the waiting time and treatment time. The physical environment comprises two main parameters: temperature and equipment, whereas the treatment concerns include the side effects, daily activities, positioning/immobilization, and treatment preparation. Finally, considering the RT team, we distinguish patient support, respond to the patient's needs, and recognize the team. Based on qualitative and quantitative studies, our synthesis highlighted the unmet needs and concerns of adult patients during RT treatment that are not usually considered.

The systematic review clarifies that time is strongly linked to the RT experience and the equipment itself. (Egestad, 2013; Gillan et al., 2014; Mullaney et al., 2016; Voigtmann et al., 2010). According to the reviewed studies, patients seem to associate the equipment with curing cancer and consider it safe. This belief is supported by Moleri et al. (2011), who found that 91% of patients were not afraid of the equipment.

The physical environment is considered impersonal and unfamiliar, with the temperature being the most discussed theme. On the other hand, positioning and immobilization, results in negative and even traumatic experiences for patients (Sharp et al., 2005). The use of music, self-taught strategies, visualisation, and religion has been described to minimize anxiety due to the immobilization devices (Lundberg and Rattanasuwan, 2007; Ben-Arye et al., 2015; O'Callaghan et al., 2012) and should be seriously considered in the daily practice of radiotherapy services.

A surprising topic was related to patients with gynaecological pathologies that need to do treatment preparation. These patients expressed anguish feelings associated with the bladder filling and bowel evacuation protocol for RT treatments, which led to a less positive experience (Bristow et al., 2018; Mann, 2011).

The present review highlights the RT team as a powerful influence on the patients' experience. The professionals' conduct and behaviour are fundamental since they are associated with the patient's healing process and deal with them directly every day (Smith et al., 2017; Halkett and Kristjanson, 2007). Health professionals have a crucial role in supporting patients and developing the skills and confidence necessary to overcome their difficulties (Appleton et al., 2018; Forshaw et al., 2017; Llewellyn et al., 2019; Wagner et al., 2010).

Finally, our findings underline that positive patient experience is related to regular contact with the same health professional. That allows patients to establish a more trusting relationship and develop a sense of belonging to a place. Talking to professionals and familiarising themselves with the procedures and the treatment room positively reduce patient anxiety and treatment success (Stiegelis et al., 2004).

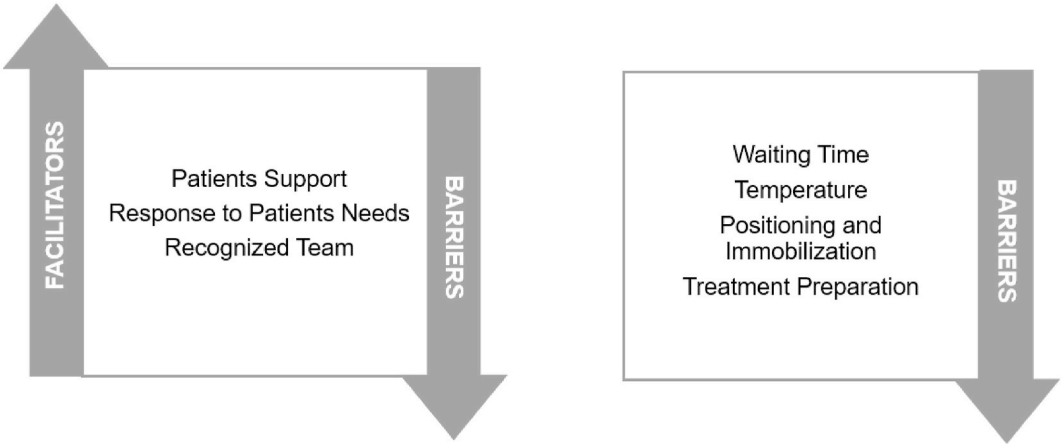

Fig. 3. Facilitators and barriers of patient experience.

9.2. Practical implications and future research

The thematic synthesis highlights the need to rethink and pay greater attention to patient experiences within healthcare. Although it is not always possible to change the course and outcome of treatment, it may be possible to change patients' perceptions and experiences during RT. Allow patients to feel that they are in control of some of their problems, protect them from negative emotions, and help them cope better with the cancer disease. Therefore, interventions that enhance the facilitators of the patient experience and attempt to minimize barriers may strengthen the patient's well-being and improve their quality of life.

Understanding the factors that contribute to a successful patient experience leads us to propose recommendations guiding best practices in RT services. We suggest three main recommendations regarding RT services and professionals care delivered.

9.3. Radiotherapy service

Radiotherapy services should plan treatment schedules so that the patient spends as little time as possible in the waiting room and that the same team of professionals follows the patient in all treatments. It is also essential to avoid overlap of different patients' treatment schedules and the treatment session considering each patient's daily routine.

The waiting time has even more importance among cancer patients because they are overwhelmed with medical appointments, testing, imaging, and procedures. On top of that, they struggle with scheduling challenges. A solution to improve the treatments booking process, according to Petrovic et al. (2006), is to use algorithms to do so. In the RT services' daily routine often appears the need to rebook for several reasons, such as forgetfulness, being on holiday, and last-minute cancellations. Using algorithms defines the best time to start treatment with little disruptions as possible, and it allows the decrease of waiting times because the schedule is optimized. Lamba et al. (2020) state that innovations can be made in the RT services to minimize the waiting time. Some examples are art or music therapy, knitting posts and educational readings while patients wait. Also, electronic messaging systems can alert about delays and let patients be near the treatment facilities instead of being closed inside.

9.4. Before the beginning of treatment

Professionals are required to invest in preparing for treatment. They may consider holding a structured education session using audio-visual or virtual means that includes explaining the treatment, what patients are supposed to do, treatment side effects and how to mitigate them and treatment preparation, when necessary. Adding a section with the discussion of myths and beliefs associated with radiation is also significant.

Patient education through educational sessions has shown positive effects on RT patients' literacy (Jahraus et al., 2002; Jimenez-Jimenez et al., 2018; Williams et al., 2017) and anxiety reduction (Jimenez-Jimenez et al., 2018; Williams et al., 2017).

9.5. During treatment

On the first day of treatment, fundamentally, professionals have to establish a relationship with the patients. During treatment, they should be aware of the information, concerns, and needs that patients may have when assessing changes in routines and their impact on their quality of life. Furthermore, professionals could develop a conversation during positioning and immobilization, allowing patients to feel supported all the time.

Providing adequate information and support, especially to patients who experience anxiety, is one of the significant duties of health professionals in a RT service (Halkett et al., 2010). To respond appropriately to these responsibilities, authors (Halkett et al., 2010; Gibon et al., 2013) emphasise the importance of communication skills training. In a recent systematic review, Van Beusekom et al. (2019) demonstrate that the RT team's communication training skills improve patients' emotional support. On the other hand, RT services that actively employed a patient-centred model had responded effectively to patients' usually unmet needs (Rose and Yates, 2015) and decreased their anxiety levels (Mullaney et al., 2016).

Future research needs to focus on the impact of these recommendations and evaluate them through randomized studies. We believe that implementing recommendations like educational sessions and ensuring that the patient is always accompanied by the same professional, who provides personalized information according to patients' needs, will strengthen patients' experiences and promote their quality of life. More precisely, we suggest evaluating the impact of an educational video relating to preparation protocols on gynaecological cancer experience.

Besides, collecting information on the patients' experience through quantitative studies with larger samples may contribute to exciting achievements in this area, allowing high-quality patient-centred cancer care. There are already questionnaires that assess radiotherapy patient experience (Hashmi et al., 2019; Olausson et al., 2017). These surveys can be used for future studies conducted with cancer patients with different pathologies and treated in various geographical locations. The surveys could be applied initially in the middle and at the end of radiation treatment to assess all patients' experiences throughout their radiotherapy service. Considering the unique experience of the patients who perform radiation treatments that require preparation, we propose setting these patients' experience. At regular intervals, patients could fill out questionnaires that include the physical and psychological impact of preparing for their daily routine protocols.

10. Limitations

There are some limitations to this thematic synthesis. Many patients, included in the various studies, had already received another treatment, such as chemotherapy and surgery, before starting RT.

Additionally, some of the studies included in this review presented a small sample size, making it impossible for the authors to reach a definitive conclusion.

11. Conclusion

To our knowledge, this is the first qualitative synthesis published on this specific topic, identifying the aspects that hinder, facilitate, or support the experience of the patient subjected to external RT.

The four themes presented from the synthesis offer valuable insights into the care of adults who undergo RT. Besides the factors directly related to the treatment (preparation, equipment, adverse effects), the themes found underline the requirement of a patient-centred approach to enabled optimal patient's cancer care experiences.

Declaration of competing interest

All the authors declare they have no conflict of interest that could inappropriately influence this study.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.ejon.2021.101965.

References

Abshire, D., Lang, M.K., 2018. The evolution of radiation therapy in treating cancer. Semin. Oncol. Nurs. 34, 151–157. https://doi.org/10.1016/j.soncn.2018.03.006.

Appleton, L., Poole, H., Wall, C., 2018. Being in safe hands: patients' perceptions of how cancer services may support psychological well-being. J. Adv. Nurs. 74, 1531–1543. https://doi.org/10.1111/jan.13553.

Ben-Arye, E., Ben-Arye, Y., Barak, Y., 2015. Eva between anxiety and hope: integrating anthroposophic music therapy in supportive oncology care. Heal. Psychol. Res. 3, 2199. https://doi.org/10.4081/hpr.2015.2199.

Borras, J.M., Lievens, Y., Barton, M., Corral, J., Ferlay, J., Bray, F., Grau, C., 2016. How many new cancer patients in Europe will require RT by 2025? An ESTRO-HERO analysis. Radiother. Oncol. 119, 5–11. https://doi.org/10.1016/j.radonc.2016.02.016.

Bristow, B.J., Mrt, T., Mcguffin, M., Mrt, T., Szumacher, E., Fitch, M., Prospero, L. Di, Mrt, T., Alimonte, L.D., Mrt, T., 2018. Assessing the psychological impact of daily bowel preparation on prostate patients who receive radiation therapy. J. Med. Imag. Radiat. Sci. 49, 70–75. https://doi.org/10.1016/j.jmir.2017.07.004.

Cancer burden statistics and trends across Europe. Ecis [WWW Document], n.d. URL. https://ecis.jrc.ec.europa.eu/. accessed 10.7.20.

Coyne, E., Heynsbergh, N., Dieperink, K.B., 2020. Acknowledging cancer as a family disease: a systematic review of family care in the cancer setting. Eur. J. Oncol. Nurs. 49, 101841. https://doi.org/10.1016/j.ejon.2020.101841.

Egestad, H., 2013. How does the radiation therapist affect the cancer patients' experience of the radiation treatment? Eur. J. Cancer Care (Engl.) 22 (5), 580–588.

Forgione, M., Sara, S., Vincent, A.D., Borg, M., Moretti, K., O'Callaghan, M.E., 2019. Satisfaction with care in men with prostate cancer. Eur. J. Canc. Care 28, 1–8. https://doi.org/10.1111/ecc.13028.

Forshaw, K., Path, B., Hall, A.E., Boyes, A.W., Carey, M.L., Martin, J., 2017. Patients' experiences of preparation for radiation therapy. A Qualitative Study 44, 1–9. https://doi.org/10.1188/17.ONF.E1-E9.

Gibon, A.S., Merckaert, I., Liénard, A., Libert, Y., Delvaux, N., Marchal, S., Etienne, A.M., Reynaert, C., Slachmuylder, J.L., Scalliet, P., Van Houtte, P., Coucke, P., Salamon, E., Razavi, D., 2013. Is it possible to improve RT team members' communication skills? A study assessing the efficacy of a 38-h communication skills training program. Radiother. Oncol. 109, 170–177. https://doi.org/10.1016/j.radonc.2013.08.019.

Gillan, C., Abrams, D., Harnett, N., Wiljer, D., Catton, P., 2014. Fears and misperceptions of radiation therapy: sources and impact on decision-making and anxiety. J. Cancer Educ. 29 (2), 289–295.

Gleeson, H., Calderon, A., Swami, V., Deighton, J., Wolpert, M., Edbrooke-Childs, J., 2016. Systematic review of approaches to using patient experience data for quality improvement in healthcare settings. BMJ Open 6, e011907. https://doi.org/10.1136/bmjopen-2016-011907.

Halkett, GK., Kristjanson, LJ., 2007. Patients' perspectives on the role of radiation therapists. Patient Educ Couns. 69 (1-3), 76–83.

Halkett, G.K.B., Kristjanson, L.J., Lobb, E.A., 2008. ' if we get too close to your bones they ' ll go brittle ' : women ' s initial fears about RT for early breast cancer 884. https://doi.org/10.1002/pon, 877-884.

Halkett, G.K.B., Merchant, S., Jiwa, M., Short, M., Arnet, H., Richardson, S., Kearvell, R., Carson, S., Spry, N., Taylor, M., Kristjanson, L., 2010. Effective communication and information provision in radiotherapy-the role of radiation therapists. J. Radiother. Pract. 9, 3–16. https://doi.org/10.1017/S1460396909990173.

Hashmi, F., Gregor, N., Liszewski, B., Bola, R., Kulczyski, S., Nathoo, D., Su, H., Tirona, R., Russell, S., Turner, A., Di Prospero, L., D'Alimonte, L., McGuffin, M., 2019. It only takes a minute: the development and implementation of a patient experience survey in radiation therapy. J. Med. Imag. Radiat. Sci. 50, 5–11. https://doi.org/10.1016/j.jmir.2018.07.006.

Hawker, S., Payne, S., Kerr, C., Hardey, M., Powell, J., 2002. Appraising the evidence: reviewing disparate data systematically. Qual. Health Res. 12, 1284–1299. https://doi.org/10.1177/1049732302238251.

Jahraus, D., Sokolosky, S., Thurston, N., Guo, D., 2002. Evaluation of an education program for patients with breast cancer receiving radiation therapy. Canc. Nurs. 25, 266–275. https://doi.org/10.1097/00002820-200208000-00002.

Jimenez-Jimenez, E., Mateos, P., Ortiz, I., Aymar, N., Vidal, M., Roncero, R., Pardo, J., Soto, C., Fuentes, C., Sabater, S., 2018. Do patients feel well informed in a radiation oncology service? J. Canc. Educ. 33, 346–351. https://doi.org/10.1007/s13187-016-1117-z.

Kailemia, P.N., Lee, E.C., Taylor, C., Renfrew, M.J., 2020. Exploring determinants of, and interventions for, delayed presentation of women with breast symptoms: a systematic review. Eur. J. Oncol. Nurs. 44, 101677. https://doi.org/10.1016/j.ejon.2019.101677.

Kazmierska, J., Jornet Sala, N., Leech, M., Jereczek-Fossa, B.A., Lievens, Y., Yarnold, J., 2018. Seizing the Opportunity in Cancer Care RADIOTHERAPY: Foreword.

Lamba, N., Niemierko, A., Martinez, R., Leland, P., Shih, H.A., 2020. The interaction of waiting time and patient experience during radiation therapy: a survey of patients from a tertiary cancer center. J. Med. Imag. Radiat. Sci. 51, 40–46. https://doi.org/10.1016/j.jmir.2019.08.008.

Llewellyn, A., Howard, C., McCabe, C., 2019. An exploration of the experiences of women treated with RT for breast cancer: learning from recent and historical cohorts to identify enduring needs. Eur. J. Oncol. Nurs. 39, 47–54. https://doi.org/10.1016/j.ejon.2019.01.002.

Lundberg, P.C., Rattanasuwan, O., 2007. Experiences of fatigue and self-management of Thai Buddhist cancer patients undergoing radiation therapy. Canc. Nurs. 30, 146–155. https://doi.org/10.1097/01.NCC.0000265005.02559.43.

Macedo, D.R., Anjos, A.C.Y., 2019. Experience of radiotherapy in head and neck. RGO - Rev. Gaúcha Odontol. 67, 1–9. https://doi.org/10.1590/1981-86372019000263529.

Magalhães, B., Carla, F., Lima, L., Martinez-Galiano, J.M., Célia, S., 2020. Cancer patients' experiences on self-management of chemotherapy treatment-related symptoms: a systematic review and thematic synthesis. Eur. J. Oncol. Nurs. 49, 101837. https://doi.org/10.1016/j.ejon.2020.101837.

Mann, K.S., 2011. Education and health promotion for new patients with cancer: a quality improvement model. Clin. J. Oncol. Nurs. 15, 55–61. https://doi.org/10.1188/11.CJON.55-61.

McQuestion, M., Fitch, M.I., 2016. Patients' experience of receiving radiation treatment for head and neck cancer: before, during and after treatment. Can. Oncol. Nurs. J. 26, 325–335. https://doi.org/10.5737/23688076264325335.

Merchant, S., O'Connor, M., Halkett, G., 2017. Time, space and technology in radiotherapy departments: how do these factors impact on patients' experiences of radiotherapy? Eur. J. Cancer Care (Engl.). 26 (2) https://doi.org/10.1111/ecc.12354.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., Altman, D., Antes, G., Atkins, D., Barbour, V., Barrowman, N., Berlin, J.A., Clark, J., Clarke, M., Cook, D., D'Amico, R., Deeks, J.J., Devereaux, P.J., Dickersin, K., Egger, M., Ernst, E., Gøtzsche, P.C., Grimshaw, J., Guyatt, G., Higgins, J., Ioannidis, J.P.A., Kleijnen, J., Lang, T., Magrini, N., McNamee, D., Moja, L., Mulrow, C., Napoli, M., Oxman, A., Pham, B., Rennie, D., Sampson, M., Schulz, K.F., Shekelle, P.G., Tovey, D., Tugwell, P., 2009. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med. 6 https://doi.org/10.1371/journal.pmed.1000097.

Moleri, C., Cabiddu, M., Tresoldi, V., Sarti, E., Bonetti, M.L., Petrelli, F., Bruscheri, L., De Stefani, A., Barni, S., 2011. 2021 POSTER "the machine fear"- cancer patients undergoing RT treatment, an observational study. Eur. J. Canc. 47, S194–S195. https://doi.org/10.1016/s0959-8049(11)70979-0.

Mollica, M.A., Lines, L.M., Halpern, M.T., Ramirez, E., Schussler, N., Urato, M., Wilder Smith, A., Kent, E.E., 2017. Patient experiences of cancer care: scoping review, future directions, and introduction of a new data resource: surveillance Epidemiology and End Results-Consumer Assessment of Healthcare Providers and Systems (SEER-CAHPS). Patient Exp. J. 4, 103–121. https://doi.org/10.35680/2372-0247.1167.

Mullaney, T., Olausson, K., Sharp, L., Zackrisson, B., Edvardsson, D., Nyholm, T., 2016. The influence of a department's psychosocial climate and treatment environment on cancer patients' anxiety during radiotherapy. Eur. J. Oncol. Nurs. 20, 113–118.

Muniz, M, et al., 2008. The oncologic RT experience for patients: a poison-drug. Revista Latino-americana de Enfermagem 16 (6), 998–1004. In press. https://doi.org/10.1590/S0104-11692008000600010.

Nixon, J.L., Brown, B., Pigott, A.E., Turner, J., Brown, E., Bernard, A., Wall, L.R., Ward, E.C., Porceddu, S.V., 2019. A prospective examination of mask anxiety during RT for head and neck cancer and patient perceptions of management strategies. J. Med. Radiat. Sci. 66, 184–190. https://doi.org/10.1002/jmrs.346.

Noyes, J., Booth, A., Moore, G., Flemming, K., Tunçalp, Ö., Shakibazadeh, E., 2019. Synthesising quantitative and qualitative evidence to inform guidelines on complex interventions: clarifying the purposes, designs and outlining some methods. BMJ Glob. Heal. 4, e000893 https://doi.org/10.1136/bmjgh-2018-000893.

O'Callaghan, C., Sproston, M., Wilkinson, K., Willis, D., Milner, A., Grocke, D., Wheeler, G., 2012. Effect of self-selected music on adults' anxiety and subjective experiences during initial RT treatment: a randomised controlled trial and qualitative research. J. Med. Imaging Radiat. Oncol. 56, 473–477. https://doi.org/10.1111/j.1754-9485.2012.02395.x.

Olausson, K., Holst Hansson, A., Zackrisson, B., Edvardsson, D., Östlund, U., Nyholm, T., 2017. Development and psychometric testing of an instrument to measure the patient's experience of external RT: the RT Experience Questionnaire (RTEQ). Tech. Innov. Patient Support Radiat. Oncol. 3– 4, 7–12. https://doi.org/10.1016/j.tipsro.2017.06.003.

Olausson, K., Sharp, L., Fransson, P., Nyholm, T., Zackrisson, B., Östlund, U., 2020. What matters to you? – free-text comments in a questionnaire from patients undergoing RT. Tech. Innov. Patient Support Radiat. Oncol. 13, 11–16. https://doi.org/10.1016/j.tipsro.2019.11.009.

Paterson, C., Robertson, A., Smith, A., Nabi, G., 2015. Identifying the unmet supportive care needs of men living with and beyond prostate cancer: a systematic review. Eur. J. Oncol. Nurs. 19, 405–418. https://doi.org/10.1016/j.ejon.2014.12.007.

Petrovic, S., Leung, W., Song, X., Sundar, S., 2006. Algorithms for RT treatment booking. Proc. 25th Work. UK Plan. Sched. Spec. Interes. Gr. 105–112.

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., 2006. Narrative synthesis in systematic reviews: a product from the esrc methods programme. ESRC Methods Program 93. https://doi.org/10.13140/2.1.1018.4643.

Price, R.A., Elliott, M.N., Zaslavsky, A.M., Hays, R.D., Lehrman, W.G., Rybowski, L., Edgman-Levitan, S., 2017. Examining the role of patient experience surveys in measuring health care quality. Physiol. Behav. 176, 139–148. https://doi.org/10.1177/1077558714541480.

Probst, H., Rosbottom, K., Crank, H., Stanton, A., Reed, H., 2021. The patient experience of radiotherapy for breast cancer: a qualitative investigation as part of the SuPPORT 4 All study. Radiography 27, 352–359. https://doi.org/10.1016/j.radi.2020.09.011.

Rose, P., Yates, P., 2015. Patients' outcomes related to person-centred nursing care in radiation oncology: a case study. Eur. J. Oncol. Nurs. 19, 731–739. https://doi.org/10.1016/j.ejon.2015.05.008.

Sharp, L., Lewin, F., Johansson, H., Payne, D., Gerhardsson, A., Rutqvist, L.E., 2005. Randomized trial on two types of thermoplastic masks for patient immobilization during radiation therapy for head-and-neck cancer. Int. J. Radiat. Oncol. Biol. Phys. 61, 250–256. https://doi.org/10.1016/j.ijrobp.2004.04.047.

Smith, S.K., Nathan, D., Taylor, J., Van Gelder, E., Dixon, A., Halkett, G.K.B., Milross, C., Dhillon, H.M., 2017. Patients' experience of decision-making and receiving information during radiation therapy: a qualitative study. Eur. J. Oncol. Nurs. 30, 97–106. https://doi.org/10.1016/j.ejon.2017.08.007.

Snilstveit, B., Oliver, S., Vojtkova, M., 2012. Narrative approaches to systematic review and synthesis of evidence for international development policy and practice. J. Dev. Effect. 4, 409–429. https://doi.org/10.1080/19439342.2012.710641.

Stiegelis, H.E., Ranchor, A.V., Sanderman, R., 2004. Psychological functioning in cancer patients treated with RT. Patient Educ. Counsel. 52, 131–141. https://doi.org/10.1016/S0738-3991(03)00021-1.

Thomas, J., Harden, A., 2008. Methods for the thematic synthesis of qualitative research in systematic reviews. BMC Med. Res. Methodol. 8, 1–10. https://doi.org/10.1186/1471-2288-8-45.

Van Beusekom, M.M., Cameron, J., Bedi, C., Banks, E., Humphris, G., 2019. Communication skills training for the RT team to manage cancer patients' emotional concerns: a systematic review. BMJ Open 9, 1–11. https://doi.org/10.1136/bmjopen-2018-025420.

Voigtmann, K., Köllner, V., Einsle, F., Alheit, H., Joraschky, P., Herrmann, T., 2010. Emotional state of patients in radiotherapy and how they deal with their disorder. Strahlenther Onkol. 186 (4), 229–235. https://doi.org/10.1007/s00066-010-2109-2.

Wagner, E.H., Bowles, E.J.A., Greene, S.M., Tuzzio, L., Wiese, C.J., Kirlin, B., Clauser, S.B., 2010. The quality of cancer patient experience: perspectives of patients, family members, providers and experts. Qual. Saf. Health Care 19, 484–489. https://doi.org/10.1136/qshc.2010.042374.

WHO/Europe. Cancer - data and statistics [WWW Document], n.d. URL. https://www.euro.who.int/en/health-topics/noncommunicable-diseases/cancer/data-and-statistics. accessed 10.7.20.

Williams, K., Blencowe, J., Ind, M., Willis, D., 2017. Meeting radiation therapy patients informational needs through educational videos augmented by 3D visualisation software. J. Med. Radiat. Sci. 64, 35–40. https://doi.org/10.1002/jmrs.220.