



Patient engagement with radiation therapists: Patient perspectives, challenges, and opportunities. A Systematic review

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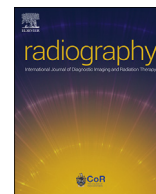
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Patient engagement with radiation therapists: Patient perspectives, challenges, and opportunities. A systematic review

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ABSTRACT

Introduction: Radiotherapy is a major component of cancer care and treatment is delivered almost exclusively by therapeutic radiographers/radiation therapists (RTTs). Numerous government and professional guidance publications have recommended a person-centred approach to healthcare through communication and collaboration between professionals, agencies, and users. With approximately half of patients undergoing radical radiotherapy experiencing some degree of anxiety and distress, RTTs are uniquely placed as frontline cancer professionals to engage with patients regarding their experience. This review seeks to map the available evidence of patient reported views of their experience of being treated by RTTs and any impact, this treatment had on the patient's frame of mind or perception of treatment. **Methods:** In line with the principles of the Preferred Reporting Items for Systematic and Meta-Analyses (PRISMA) systematic review methodology, a review of relevant literature was conducted. Electronic databases MEDLINE, PROQUEST, EMBASE and CINAHL were searched.

Results: Nine hundred and eighty-eight articles were identified. Twelve papers were included in the final review.

Conclusion: Increased time with, and continuity of RTTs during treatment has a positive influence on patients' perspectives of RTTs. A positive patient perspective of their engagement with RTTs can be a strong predictor of overall satisfaction in radiotherapy.

Implications for practice: RTTs should not underestimate the impact of their supportive role in guiding patients through treatment. A standardised method for integrating patients' experience and engagement with RTTs is lacking. Further RTT led research is required in this area.

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Introduction

Radiotherapy (RT) is a major component of cancer care.¹ Patients are referred for radiotherapy by a clinical oncologist and treatment is delivered almost exclusively by therapeutic radiographers/radiation therapists (RTTs). RTTs have a highly technical role and outdated opinions suggested that their sole purpose was to operate machinery.² However, the role is a highly specialised allied health profession requiring third level education and evidence of significant clinical practice. In some countries, for example the UK, they are unique in cancer care as the only profession to exclusively study radiotherapy and oncology at undergraduate level, although educational variations do exist across Europe.^{3,4} Radiotherapy patients are supported by a multi-professional team from diagnosis,

through radiotherapy planning, treatment and post treatment. However, RTTs will see patients on a daily basis throughout their treatment and therefore are uniquely placed frontline cancer professionals to provide ongoing patient care and support.

Professional guidance has been developed for RTTs in relation to person-centred care. This outlines good practice based on core professional principles and real patient testimony⁴ and the 'patient voice' is a central feature of the Strategy of the Society and College of Radiographers.⁵ Numerous government and professional guidelines from the UK^{4,6–9} and Europe^{10,11} advocate person-centred care and patient engagement in the provision of cancer care. Despite this, the assessment of quality in RT remains heavily weighted to patient throughput, reporting of errors and accreditation by external agencies. Measuring safety, accuracy, and efficiency of radiotherapy is critical, but previous failings within healthcare illustrate the importance of the patient's perspective. One famous public inquiry into serious failings in healthcare found that one of the reasons for poor care was 'the concerns of patients

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and staff had been repeatedly ignored and instead management were target driven and financially focused'.¹²

Some mechanisms exist within RT departments to gather patient feedback. Examples might include tools such as patient feedback cards given at or towards the end of treatment, standard complaints procedures and national surveys e.g. Cancer Patient experience survey (CPES). With the exception of the CPES, results are rarely publicly available and even fewer are focussed specifically on patients' experience of RTTs.

This review seeks to map the available evidence of patient reported views of their experience of being treated by therapeutic radiographers and what impact, if any, this had on them.

Methodology

Research strategy

In line with the principles of the Preferred Reporting Items for Systematic and Meta-Analyses (PRISMA)¹³ systematic review methodology, a review of relevant literature was conducted. Electronic databases MEDLINE, PROQUEST, EMBASE and CINAHL were searched based on the search strategy outlined in Table 1. The search strategy was based on the Population, Exposure, Outcome (PEO) framework,¹⁴ developed with the assistance of a subject specialist librarian and refined through discussion with the research team. The population in this review were radiotherapy patients, the exposure was to the RTT profession and the outcome was the patients' perception of that exposure.

Inclusion and exclusion criteria

Studies from 1995 to November 2021 were included to coincide with a milestone cancer strategy publication, the Calman-Hine report.⁶ Full inclusion and exclusion criteria are listed in Table 2.

Evaluation of studies

Results of searches were manually reviewed by two authors by screening titles and abstracts initially to establish relevance. Duplicates were removed. Additional hand searching was carried out by reviewing reference lists. Full copies of potentially relevant studies were obtained and reviewed independently by two members of the research team. Any discrepancies in those for inclusion in the final review were resolved through discussion with the wider team.

Table 1

PEO search strategy.

		Subject heading/mesh term (if applicable)	Search terms	Additional search criteria
Population	Radiotherapy patients	Patient satisfaction	Patient* OR user* OR client* OR person* OR service user* OR survivor* combined with AND	
Exposure	Therapeutic radiographers	na	Therapeutic radiographer* OR Therapy radiographer* or Radiation therapist* OR Radiotherapist* OR Radiation technologist* OR RTT combined with AND	Appearing within the title/abstract
Outcome	Experience	na	Experience* OR Perspective* OR Perception* OR Impression* OR Satisfaction OR Viewpoint* OR Insight* OR Observation* OR Encounter OR Engagement OR Involvement OR Opinion* OR Attitude* OR Story OR stories OR Account*	Adjacency search (Appearing within 3 words of population search terms)

Data extraction

Data were extracted according to; study type, study focus i.e., specific to RTTs or more general, study methodology, number of participants, if the study was cancer specific, aims and main findings.

Quality appraisal

The Critical Appraisal Skill Programme (CASP) qualitative checklist tool was used to assess the quality of each of the papers included (CASP, 2017).¹⁵ Two authors assessed and scored each paper independently. Discussion of individual assessment allowed for any discrepancies to be resolved. The CASP score was not used to exclude papers.

Results

Study characteristics

The search identified 988 papers of which 976 were excluded following removal of duplicates and screening for relevance and eligibility against inclusion and exclusion criteria (Fig. 1) based on PRISMA Guidelines.¹³ Twelve journal papers were included in the final review. The year of publication ranged from 2007 to 2018. The total number of participants from all studies combined was 13,425 (range 11–8069). The RTT focussed studies consisted of four survey papers^{16–19} and two interview based papers,^{20,21} together accounting for 259 participants. The general papers consisted of five surveys^{22–26} and one interview-based/focus group study²⁷ with a total of 13,166 participants. A summary of the evidence is presented in Table 3.

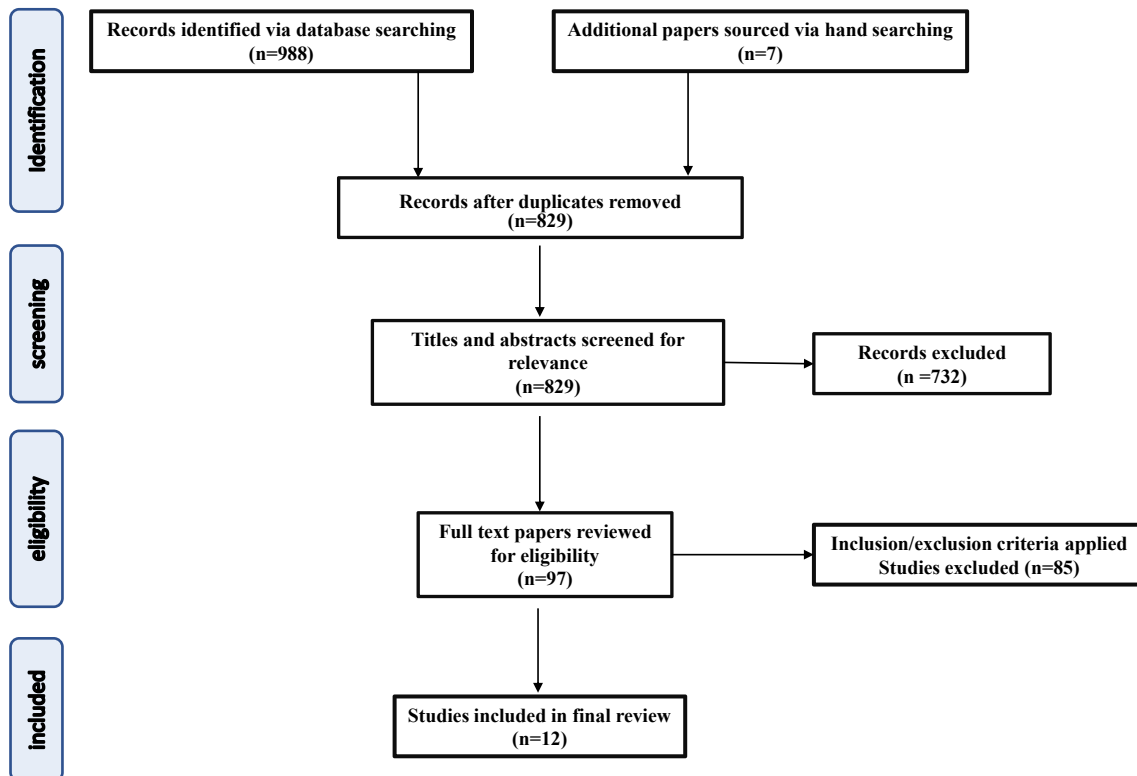
Quality appraisal

Quality was scored out of 9, as detailed in Table 4. The quality of the papers was good, with a mean score of 7.8 out of 9. Two papers scored 9^{23,24} and the lowest score was 5, attributed to two papers.^{19,20} Many papers indicated that ethical permission was gained, however only four papers gave any indication of any additional ethical considerations, such as the potential of the research 'triggering' anxiety, the implications of the study process and consideration of the impact of the researcher on the participant.^{17,21,24,26} The methods of collection and analysis of the resultant data differed between each study, although the methodology was deemed appropriate in all papers assessed.

Included studies used a range of recruitment strategies dependent on the type of study conducted. Adequate rationale for

Table 2
Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Studies reporting patient-reported lived experience of RTTs	Lay/consumer reports on desirable qualities for RTTs
Studies which include feedback on RTTs within a broader study	Studies exclusively investigating medical and/or nursing personnel
All study design methodologies & presentation formats	Studies reporting perceptions of professionals
English language studies	Reviews/editorials and commentaries

**Figure 1.** Flow diagram¹³ outlining literature identification and selection process.

recruitment was missing in some cases.^{19–21} Inclusion and exclusion criteria were described in all 12 studies.

The role of the researcher was poorly described in most cases, with the exception of the study by Famiglietti et al.²³ who describe postal delivery of a survey, although a low response rate was noted, which perhaps can be attributed to this type of methodology. All studies explained and justified how data analysis was conducted and ranged from basic qualitative thematic analysis to inferential statistics used to detect patterns in ordinal data gathered. All studies presented findings clearly relating them to other literature on the subject, future recommendations and limitation of the research were also addressed.

Main findings

There were three interview-based studies; two are focussed on RTTs and one explores various aspects of radiation care. Egestad et al.²¹ report that RTTs' level of professional competence and willingness to develop supportive relationships influence Head & Neck (H&N) cancer patients' experience by positively or negatively affecting feelings of anxiety, uncertainty, and loneliness. Similar findings are reported by Halkett et al.²⁰ regarding the central role played by RTTs in helping patients achieve a sense of emotional comfort. Sufficient time with RTTs was an

underlying factor in allowing patients to feel comfortable, both emotionally and physically. When patients felt rushed, communication with RTTs suffered and they felt more negative about treatment and even started to doubt the competency of those delivering treatment which led to increased anxiety. As well as the effect of insufficient time, the impact of constantly changing therapists on patients' experience is a common theme in both studies and also by Nijman et al.²⁷ A lack of RTT continuity could contribute to a degree of mistrust and increase in anxiety in some patients.

Mattarozzi et al. and Dong et al.^{17,18} investigated various aspects of RTT-patient interaction and communication. Each employed a different published survey tool which they adapted for use in radiotherapy. Dong et al.¹⁸ report that a more person-centred approach (as perceived by patients) during treatment education sessions with RTTs, predicted outcomes such as trust in the RTT and patient satisfaction. Factors that influenced their perceptions included the level of experience and gender of RTTs (females scoring higher). The RTT session with patients ranged from 3.36 min to 16.17 min but no correlation between patients' perception of person-centred care and length of time is reported. They conclude that the RT education session is viewed by the patient as more person-centred when the RTT does more than merely impart information. Addressing patients' concerns and

Table 3
Summary of evidence.

Author	Year of publication	Source	Title	Methodology	No. of participants	RTT specific?	Cancer specific	Main finding
Halkett and Kristjanson	2007	Journal Patient Education and Counselling 69 (2007) 76–83	Patients' perspectives on the role of radiation therapists	Semi-structured interviews	34	YES	Breast cancer	RTTs played a central role in enabling patients to achieve a sense of emotional comfort.
Treeby	2008	Journal of Radiotherapy in Practice (2008)	Prospective cohort survey of patient satisfaction with on-treatment review by advanced practice urology radiographer	Survey	34	YES	UROLOGICAL CANCERS	High level of patient satisfaction with review and level of support provided by RTT
French & McGahan	2009	Healthcare Management Forum	Measuring patient satisfaction with radiation therapy service delivery	Survey	3188	NO	NO	97% respondents were mostly/ completely satisfied with the radiation therapy team. Improvements needed in supporting palliative patients
Nijman et al.	2012	Radiotherapy and Oncology 102 (2012) 154–160	The quality of radiation care: The results of focus group interviews and concept mapping to explore the patient's perspective	Focus group interviews	35	NO	NO	Patients trusted in the skills of RTTs during the technical execution of radiotherapy but disliked continuous change of RTTs
Mattarozzi et al.	2013	Patient Preference and Adherence 2013:13 1861–1865	The Role of Effective Radiation Therapist–Patient Communication In Alleviating Treatment-Related Pain And Procedural Discomfort During Radiotherapy	Survey	91	YES	NO	Patients who were more satisfied with RTT interaction reported more positive attitudes toward RT and lower pain intensity during treatment
Egestad et al.	2013	European Journal of Cancer Care 22, 580–588	How does the radiation therapist affect the cancer patients' experience of the radiation treatment?	Qualitative interviews	11	YES	H&N	Encounters with RTTs can lead to less/ more loneliness, uncertainty, and existential anxiety RTT competence & continuity contribute to feeling secure RTTs relationship with patients was most significant contributor to overall patient satisfaction
Famiglietti et al.	2013	Int J Radiation Oncol. Biol. Phys. Vol. 87, No. 1, pp. 148e152, 2013	Determinants of Patient Satisfaction During Receipt of Radiation Therapy	Survey	8069	NO	NO	RTTs relationship with patients was most significant contributor to overall patient satisfaction
Dong et al.	2014	Patient Education and Counselling 95 (2014) 305–312	The influence of patient-centred communication during radiotherapy education sessions on post-consultation patient outcomes	Survey	56	YES	NO	Patient-centred care of RTT influences proximal patient outcomes. RTTs have technical and supportive roles.
Muraj et al.	2015	Journal of Medical Imaging and Radiation Sciences 46 (2015) 182-188	Assessing Patient Satisfaction in a Radiation Therapy Department Using a Survey Tool	Survey	78	No	NO	Majority of patients satisfied with the care they are receiving. No obvious areas for improvement
Becker-Schiebe et al.	2015	Patient Preference and Adherence 2015:9 1381–1388	Predictors of overall satisfaction of cancer patients undergoing radiation therapy	Survey	1710	NO	NO	Courteous behaviour by RTTs and physicians & protection of privacy were the strongest predictors of the overall satisfaction
Rozanec et al.	2017	Journal of Radiotherapy in Practice (2017) 16, 226-231	Patient satisfaction with the role of a Clinical specialist radiation therapist in palliative care	Survey	33	YES	YES	CSRT facilitates dedicated time to addressing concerns resulting in improved patient understanding and excellent patient satisfaction
Hashmi et al.	2018	Journal of Medical Imaging and Radiation Sciences 50 (2019) 5-11 Journal	It Only Takes a Minute: The Development and Implementation of a Patient Experience Survey in Radiation Therapy	Survey	86	NO	NO	Main areas for improvement in environmental, organisational and staff communication areas.

Table 4
Critical appraisal.

	Study 1 <i>Halkett and Kristjanson, 2007</i> ²⁰	2 <i>Treeby, 2008</i> ¹⁶	3 <i>French and McGahon, 2009</i> ²²	4 <i>Nijman et al., 2012</i> ²⁷	5 <i>Egestad, 2013</i> ²¹	6 <i>Famiglietti et al., 2013</i> ²³	7 <i>Dong et al, 2014</i> ¹⁸	8 <i>Becker-Schiebe et al., 2015</i> ²⁵	9 <i>Muraj et al., 2015</i> ²⁴	10 <i>Rozanec et al., 2017</i> ¹⁹	11 <i>Mattarozzi et al., 2019</i> ¹⁷	12 <i>Hashimi et al., 2019</i> ²⁶
1. Was there a clear statement of the aims of the research?	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓
2. Is a qualitative methodology appropriate?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3. Was the research design appropriate to address the aims of the research?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?
4. Was the recruitment strategy appropriate to the aims of the research?	?	✓	✓	✓	?	✓	✓	✓	✓	?	✓	✓
5. Was the data collected in a way that addressed the research issue?	×	✓	×	✓	✓	✓	✓	✓	✓	✓	?	?
6. Has the relationship between researcher and participants been adequately considered?	?	✓	×	✓	×	✓	✓	?	×	✓	×	✓
7. Have ethical issues been taken into consideration?	?	?	×	×	✓	×	?	×	✓	×	✓	✓
8. Was the data analysis sufficiently rigorous?	✓	?	✓	✓	?	✓	✓	✓	✓	✓	✓	✓
9. Is there a clear statement of findings?	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓

✓	Yes (1 point)
?	Can't tell (0 points)
×	No (0 points)

encouraging patients to ask questions and express feelings, increased patient satisfaction and trust in the RTT.

Mattarozzi et al.¹⁷ found a significant correlation between patient satisfaction with the RTT-patient relationship and patients' perception of RT induced pain intensity and attitudes to RT in general. Patients viewed their RTT relationship as positive, reported

lower pain intensity and also had a more positive attitude to RT. Two RTT specific survey studies reported patient satisfaction with aspects of a specialist radiographer led service. Using an in-house audit questionnaire, a urology specialist RTT performing on-treatment review, reported over 90% of patients were happy with the level of support and did not feel their questions could have been

answered better by a doctor. A comparison with the service provided by a doctor would have been appropriate but that was not possible. This audit therefore could only demonstrate an adequate level patient satisfaction and perception of RTT competence.¹⁶ Rozanec et al.¹⁹ compared patient satisfaction between palliative radiotherapy patients who spent between 30 and 45 min with the palliative RTT specialist at the start of treatment with palliative patients who did not. The most significant finding was that those who did reported a better understanding of treatment.

Five papers report the results of patient satisfaction or experience surveys in relation to their general radiotherapy experience. The second largest, by French et al.,²² reported patient satisfaction from 3188 survey respondents over five years, the findings of which claim to inform quality improvement initiatives.²² The survey included items on environmental aspects, accessibility/convenience, and hotel services as well as interpersonal relationships with, and perception of competence of, health care providers. General terms like *'healthcare provider,'* are used, and these encompassed *'doctors, nurses, radiation therapists and clerks,'* therefore profession specific issues could not be clearly identified. However, they reported satisfaction for each of the ten treatment units. While not explicit, it is reasonable to assume that patients' interactions with therapy radiographers will have contributed to patient satisfaction on individual treatment units. The unit treating mainly palliative patients had the lowest levels of satisfaction.

Albeit professionally generic, French et al.²² reported that being treated with courtesy and respect by staff, was the strongest determinant of overall patient satisfaction. This aligns with Becker-Scheibe et al.²⁵ and Famiglietti et al.²³ who aimed to establish the main predictors of overall satisfaction for patients during radiotherapy. Both groups sought feedback on specific professional groups including radiation therapists. Famiglietti et al.²³ represents the largest survey study included in this review with responses from 8069 patients. They concluded, care given by RTTs had the greatest influence on overall satisfaction, even more predictive than adequate pain management. Similarly, Becker-Scheibe²⁵ found courteous behaviour by RTTs and physicians and the protection of privacy, followed by the care and skills of physicians and RTTs as the strongest predictors for overall satisfaction from the analysis of 1710 patient surveys. Although neither study was specific to a cancer diagnosis, Becker-Scheibe²⁵ found that H&N cancer patients reported the lowest levels of overall satisfaction. No other disease or patient characteristics demonstrated significant correlation with satisfaction, however a slight trend towards more positive feedback with increasing age was noted. French et al., Muraj et al. and Hashmi et al.^{22,24,26} all report high levels of overall satisfaction with the radiotherapy team. Comments in relation to staff encounters were positive, but some individual comments or survey responses suggested areas for improvement, for example, one patient commented *'when there is a delaytalk to the people waiting, it makes them feel better'*²⁶ but this was not borne out in overall results.

Discussion of main findings

This review aimed to map the available evidence in relation to patients' perspectives on their engagement with RTTs and what impact, if any, this had. Twelve papers reporting the views of patients over an 11-year period were found. Six focussed on RTTs specifically and provided in-depth analysis of patients' experience of RTTs'. However, they are limited by small sample size and heterogeneity in terms of study population and methodologies and therefore results may not be generalisable. The six general radiotherapy surveys have the advantage of much larger sample sizes but may not have been sensitive enough to elicit specific aspects

that influence patient experience as other research suggests.⁹ Nevertheless, this review reveals aspects of RTT care important to patients. This in turn exposes aspects of patient care by RTTs requiring improvement and some of the established working practices not fully enabling the vision of patient-centred care.

Sufficient time with RTTs has been shown to be important for patients in developing trust and reducing anxiety and stress. Appointment duration for a single radiotherapy treatment may be theoretically sufficient for the set-up, verification, and delivery of treatment, assuming there are no set-up difficulties or additional support required by the patient. Few RT departments have the resources to allocate regular dedicated time to facilitate more in-depth discussion between RTTs and their patients. RTTs have been known to facilitate this on the way to or from the treatment room, anecdotally referred to as the *'walk and talk'* and is designed to preserve treatment room time. However, due to a lack of privacy patients may feel unable to discuss concerns, particularly of a more subtle or sensitive nature. This aspect of communication is evident in statements expressed by breast cancer patients interviewed in Halkett's study.²⁰ For example, there were *'few opportunities to have detailed conversations'* and *'you couldn't really chat muchthey were measuring you up'* and patients were conscious that *'radiation therapists were too busyand had technical work to do'.*

When it happens, dedicated time and space for patients to discuss concerns during a course of treatment, is often away from the treatment unit and with a health professional not directly involved in their radiotherapy. This task-based model underestimates the significance of positive RTT engagement for patients on their overall radiotherapy experience. In contrast to the limited time available on a linac, an initial consultation of 30–45 min with a palliative care specialist RTT provides the exact opportunity to chat and ask questions that are reported by patients as lacking. 20 Advanced practitioner RTTs have an opportunity to work in close partnership with RTTs planning and delivering treatment to integrate specialist care into the radiotherapy delivery model and enhance person-centred care.

In addition to insufficient time, inadequate space and a technology driven culture have also been shown to negatively affect the quality of interaction between RTTs and their patients by Merchant et al.²⁸ They recommend redesign of the radiotherapy environment *'to reflect a patient centred culture which enhances opportunities for RTTs to provide supportive care.'* However, Mullaney et al.²⁹ report not just the radiotherapy environment, but also the psychosocial climate, can significantly impact patients' anxiety levels. The professional competence and interpersonal skills of RTTs will invariably influence the psycho-social aspect of the RT department as shown in this review.^{20,21} In this way RTTs should strive to demonstrate a harmonious environment and be mindful that a negative psychosocial atmosphere can negatively affect patients. Demonstration of both competence and interpersonal skills requires adequate time with patients, a lack of which can increase patient anxiety and create doubt in the professional competence of RTTs. Since RTTs themselves have identified insufficient time as one of the main barriers to effective communication with patients,³⁰ environmental changes alone will not achieve person centred care but could be improved to facilitate RTTs in providing a more holistic person-centred approach.

This review reveals that a lack of RTT continuity throughout treatment can also hinder the development of a positive patient-RTT relationship.^{20,21,27} The need to maintain adequate clinical skill mix and supervision must be maintained and may necessitate movement of staff between linacs and other areas of the department. However, patients who have developed a relationship with an individual or team of RTTs report feeling anxious when there are sudden or regular changes in personnel despite mitigations by staff.

This can also be a source of stress for RTT staff which may negatively affect patient care.

Patients' desire for staff continuity extends beyond the end of treatment.²⁷ In the acute post treatment phase when side effects can persist, the RTT team are arguably best placed to advise and support patients. Continuity of care during treatment would facilitate trust and ensure patients felt comfortable contacting the team post treatment for advice. In a similar way to adapting the radiotherapy environment to enhance the RTT-patient relationship, traditionally established working models in radiotherapy perhaps require innovative approaches to respond to patients needs in terms of the support they would like from RTTs during and post radiotherapy.

Dong et al.¹⁸ report RTT-patient communication during radiotherapy education sessions as lacking in relation to encouraging a two-way discussion, favouring a one-way information provision approach. Patients scored RTTs lowest in aspects of communication relating to patients' fears and anxieties. The main aim of the education session is to provide information about the treatment procedure, expected side effects and to make the patient aware of safety aspects when in the treatment room. This is an opportunity for the RTT to connect with the patient, away from the distractions of the treatment room and provide much needed support and reassurance at a time when many patients feel particularly anxious. Challenges mentioned previously, such as time and space, can limit the person-centredness of this first meeting but may also have a negative impact on the perceived manner of the RTT with an associated detrimental effect on communication. In reality this encounter may be short, rushed or even omitted completely, with patients being 'informed' while in the treatment room. Dedicated patient time, ideally away from clinical/technical areas, has previously been suggested as important for establishing rapport, facilitating reciprocal communication, and engaging the patient in the treatment process.^{30,33} Beyond the effect on the patient emotionally and mentally, it has been suggested that positive RTT-patient engagement may enhance patient co-operation and empowerment which contributes to overall treatment safety.³¹ This is a subtle but important point for RTTs, and managers, given that safety is arguably the top shared priority for patients and professionals alike and reinforces the case for dedicated patient communication time.

The process of patient-professional communication is complex and detailed analysis is beyond the scope of this review. However, one conceptual framework developed by Feldman-Stewart et al.³² for the analysis of one-to-one communication between a patient and a healthcare professional identifies four key areas; communication goals, the participants as individuals, the communication process and the environment in which the communication occurs.³² Even a crude application of such a framework can elicit conflicting goals of the RTT and their patient and how this may contribute to less than optimum communication. RTTs need to impart specific information in a limited time against a backdrop of appointment time delays, machine faults and staffing issues. Whereas patients have an array of concerns to do with treatment, diagnosis, life expectancy and psycho-social issues. Linked to conflicting goals may be disparity in information needs as perceived by the patient and RTTs³³ and suggests that while there are key aspects which should be mandatory e.g., treatment side effects, communication should be reciprocal. RTTs should strive to tailor information to the individual patient's needs and wishes.

Mattarozzi et al.¹⁷ represent the only investigation into the physical impact of the patient's interaction with RTTs. The reduction in pain intensity associated with a positive RTT-patient relationship

reported is significant in terms of the potential benefits for patients and in highlighting the potential impact of positive RTT-patient engagement. Previously published studies have demonstrated a relationship between anxiety and hyperalgesia and have shown how patient-health professional interactions can modulate pain.³⁴ The evidence sourced by this review albeit limited, suggests RTTs may directly influence a patient's experience not only in a psychological or emotional context but in doing so positively, may also reduce the intensity of pain perceived during treatment. Consequently, there may be an associated reduction in the need for analgesics and a reduced chance of detrimental interruptions during treatment.³⁵ Compensating for such gaps requires additional resources including radiation oncologist, radiotherapy planner, RTT and linac time. This is particularly significant for patients with specific cancer diagnoses associated with increased anxiety and pain and those coping with very restrictive immobilisation including H&N cancer patients. The study by Mattarozzi et al.¹⁷ is limited in terms of sample size and heterogeneity, and the use of an unvalidated tool to measure patient attitudes. However, it is hypothesis generating and further research to corroborate these outcomes would be invaluable for patients, for informing person-centred RTT practice and for generating new knowledge in relation to the management of radiotherapy related toxicity.

Two of the studies on patients' perspectives of RTTs were in relation to advanced practitioners.^{20,21} A distinction must be made between RTTs practising daily on a linear accelerator and the advanced or specialist RTT. There are significant role differences in terms of patient caseload, level of autonomy and management responsibility, among others. Additional factors may influence the patient's perspective in the treatment room compared to a clinical/consultation room e.g., equipment, number of staff, undressing and immobilisation to name a few, in comparison to the distraction free and enclosed clinic room environment. Another difference in these roles is the amount and quality of time available to spend with a patient, which as we have seen influences the RTT-patient relationship.²⁰ These differences mirror those discussed previously, namely the radiotherapy environment and restricted time with RTTs on a treatment unit, which when perceived by patients as lacking, may hinder the development of the patient-RTT relationship. An interesting study would be to compare patients' perspectives on engagement with specialist radiographers and treatment unit/simulator radiographers during their course of treatment.

Lower levels of satisfaction have been reported by palliative patients.²² Several additional factors may influence the palliative experience; shorter treatment courses may hinder the development of the patient-professional relationship; symptoms of added disease burden and existential distress associated with a palliative outlook may demand enhanced psychological support, interpersonal engagement, and communication with RTTs. These additional needs and the heavy emotional burden can create added pressure and stress for patients. RTTs may feel ill-equipped to provide this in the fast-paced treatment environment.³⁶ Dedicated, and focussed time would encourage reciprocal communication to address additional needs such as emotional distress and onward referrals. Inevitably, this would impact the standard working day and is an unlikely solution within existing levels of capacity and resources in most RT clinics. This points again to the need for innovative solutions regarding alternate working models and designs for radiotherapy departments which enhance the patient experience. Additional training and support for RTTs in specific groups of patients such as palliative patients and indeed other disease specific groups is also warranted to enable them to support patients effectively.

Limitations of review

In general, one of the main limitations in the body of evidence found in this review was the heterogeneity in study design and methodology. This was evident in the variety of survey tools employed and specific adaptations to these for individual studies and severely limits any meaningful comparison. The strengths of some studies are in their sample size; however, the relative response rates were low. For example, in Becker-Schiebe et al.'s study, the response rate was 45% (n = 1710)²⁵ and Famiglietti et al.²³ had a 28% response (n = 8069) to their patient satisfaction surveys. As a result, even in studies with relatively large sample sizes, results may not be generalisable or representative of the target population. Due to the generality of terms used in the field of patient satisfaction and patient involvement in healthcare and the range of titles used for the role of therapy radiographers, some papers may have been missed by our search strategy. To gain specific data on RTTs based on patient reported outcomes, our search criteria were stringent and may have excluded some broader studies.

Global differences in education and training, varying levels of autonomy and local culture may influence RTT practice between counties and result in differences in patient reported perceptions which may not be fully represented in this review.

Conclusions

The heterogeneity in methods used indicates the need for the development of a validated survey tool to assess patients' experience of RT which includes detailed assessment of patients' views of RTTs. This would enable multi-centre collaboration, comparison of outcomes, knowledge exchange and inform the evidence base for radiotherapy education curricula and professional development.

RTTs should not underestimate the impact of their supportive role in guiding patients through treatment. The need for sufficient time to establish and build the RTT-patient relationship and a preference for continuity of RTT care are recurring themes throughout this review. Alternative department design and new models of working that facilitate and encourage a more person-centred patient experience. In addition to competence, professionalism, and management skills, RTTs need to be mindful of attaining and maintaining highly developed communication skills while ensuring technical safety and accuracy in treatment delivery.

Additional training and support for RTTs is warranted which might include advanced communication/interpersonal skills, patient psychology and emotional intelligence. Research is needed to identify the particular needs of cancer specific groups and into alternative radiotherapy department design and models of working to explore how the unique expertise of RTTs can be fully utilised for the benefit of patients.

Conflict of interest

There are no conflicts of interest to declare.

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References

1. International Atomic Energy Agency. *Radiotherapy in cancer care: facing the global challenge*. 2017.
2. Mitchell GW, Glicksmanand AS. Cancer patients: knowledge and attitudes. *Cancer* 1977;**40**:61–6.
3. Couto JG, McFadden S, McClure P, Bezzina P, Hughes C. Competencies of therapeutic radiographers working in the linear accelerator across Europe: a systematic search of the literature and thematic analysis. *Radiography* 2020;**26**(1):82–91. <https://doi.org/10.1016/j.radi.2019.06.004>.
4. Society of Radiographers. *Patient public and practitioner partnerships within imaging and radiotherapy: guiding principles*. 2018.
5. Society of Radiographers, College of Radiographers. *The 2018–20 strategy of the society and college of radiographers*. 2018.
6. Department of Health and Welsh Office. *Department of Health: a policy framework for commissioning cancer services a report by the expert advisory group on cancer to the chief*. Medical Officers of England and Wales; 1995.
7. House of Commons Health Committee. *Patient and public involvement in the NHS*. 2007.
8. NHS England. *Five year forward view*. 2014.
9. Jenkinson C, Coulter A, Bruster S, Richards NC. Patients' experiences and satisfaction with health care: results of a questionnaire study of specific aspects of care. *Qual Saf Health Care* 2002;**11**(4):335. <https://doi.org/10.1136/qhc.11.4.335>.
10. European Cancer Organisation. *European code of cancer practice*. <https://www.europecancer.org/2-standard/66-european-code-of-cancer-practice>. Accessed 21/06/2022.
11. Lievens Yolande, Ricardi Umberto, Poortmans Philip, Verellen Dirk, Gasparotto Chiara, Verfaillie Christine, et al. ESTRO vision 2030. radiation oncology. Optimal health for all, together. *Eur Soc Radiother Oncol* 2019;**136**: 86–97.
12. Francis R. *Report of the Mid- Staffordshire NHS foundation trust public inquiry*. 2013.
13. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Br Med J* 2021;372.
14. Moola Sandeep, Munn Zachary, Sears Kim, Sftcu Raluac, Currie Marian, Lisy Karolina, Tufanaru Catalin, Qureshi Rubab, et al. Conducting systematic reviews of association (etiology): the Joanna Briggs Institute's approach. *Int J Evid Base Healthc* 2015;**13**(3):163–9. <https://doi.org/10.1097/XEB.0000000000000064>.
15. Treeby J. Prospective cohort survey of patient satisfaction with on-treatment review by advanced practice urology radiographer. *J Radiother Pract* 2008;**7**(4):205–12. <https://doi.org/10.1017/S1460396908006456>.
16. Mattarozzi K, Fino E, Panni V, Agostini A, Morganti AG, Russo PM. The role of effective radiation therapist-patient communication in alleviating treatment-related pain and procedural discomfort during radiotherapy. *Patient Prefer Adherence* 2019;**13**:1861–5. <https://doi.org/10.2147/PPA.S214375>.
17. Dong S, Butow PN, Costa DSJ, Dhillon HM, Shields CG. The influence of patient-centered communication during radiotherapy education sessions on post-consultation patient outcomes. *Patient Educ Counsel* 2014;**95**(3):305–12. <https://doi.org/10.1016/j.pec.2014.02.008>.
18. Rozanec N, Smith S, Wells W, Moyo E, Zychla L, Harnett N. Patient satisfaction with the role of a clinical specialist radiation therapist in palliative care. *J Radiother Pract* 2017;**16**(3):226–31. <https://doi.org/10.1017/S1460396917000267>.
19. Halkett GKB, Kristjanson LJ. Patients' perspectives on the role of radiation therapists. *Patient Educ Counsel* 2007;**69**(1):76–83. <https://doi.org/10.1016/j.pec.2007.07.004>.
20. Egestad H. How does the radiation therapist affect the cancer patients' experience of the radiation treatment? *Eur J Cancer Care* 2013;**22**(5):580–8. <https://doi.org/10.1111/ecc.12062>.
21. French J, McGahan C. Measuring patient satisfaction with radiation therapy service delivery. *Healthc Manag Forum* 2009;40–50.
22. Famiglietti Robin M, Neal EC, Edwards TJ, Allen PK, Buchholz TA. Determinants of patient satisfaction during receipt of radiation therapy. *Int J Radiat Oncol Biol Phys* 2013;**87**(1):148–52. <https://doi.org/10.1016/j.ijrobp.2013.05.020>.
23. Muraj Zaynab, Kwan Maisie, Wake Michele, Tse Karen, Swanson Lue-Ann. Assessing patient satisfaction in a radiation therapy department using a survey tool. *J Med Imag Radiat Sci* 2015;**46**(2):182–8. <https://doi.org/10.1016/j.jmir.2015.01.105>.
24. Becker-Schiebe M, Pinkert U, Ahmad T, Schäfer C, Hoffmann W, Franz H. Predictors of overall satisfaction of cancer patients undergoing radiation therapy. *Patient Prefer Adherence* 2015;**9**:1381–8. <https://doi.org/10.2147/PPA.S93248>.
25. Hashmi F, Gregor N, Liszewski B, et al. It only takes a minute: the development and implementation of a patient experience survey in radiation therapy. *J Med Imag Radiat Sci* 2019;**50**(1):5–11. <https://doi.org/10.1016/j.jmir.2018.07.006>.
26. Nijman JL, Sixma H, Triest Bv, Keus RB, Hendriks M. The quality of radiation care: the results of focus group interviews and concept mapping to explore the patient's perspective. *Radiother Oncol* 2011;**102**(1):154–60. <https://doi.org/10.1016/j.radonc.2011.08.005>.
27. Merchant S, O'Connor M, Halkett G. Time, space, and technology in radiotherapy departments: how do these factors impact on patients' experiences of radiotherapy? *Eur J Cancer Care* 2017;**26**(2). <https://doi.org/10.1111/ecc.12354>.

28. Mullaney T, Olausson K, Sharp L, Zackrisson B, Edvardsson D, Nyholm T. The influence of a department's psychosocial climate and treatment environment on cancer patients' anxiety during radiotherapy. *Eur J Oncol Nurs* 2016;**20**:113–8.
29. Halkett GKB, Merchant S, Jiwa M, et al. Effective communication, and information provision in radiotherapy—the role of radiation therapists. *J Radiother Pract* 2010;**9**(1):3–16. <https://doi.org/10.1017/S1460396909990173>.
30. Pernet A, Mollo V, Bibault J, Giraud P. Evaluation of patients' engagement in radiation therapy safety. *Cancer Radiother* 2016;**20**(8):765–7. <https://doi.org/10.1016/j.canrad.2016.02.010>.
31. Feldman-Stewart D, Brundage MD, Tishelman C. A conceptual framework for patient-professional communication: an application to the cancer context. *Psycho-oncology* 2005;**14**(10):801–9. <https://doi.org/10.1002/pon.950>.
32. Bolderston A. Mixed messages? A comparison between the perceptions of radiation therapy patients and radiation therapists regarding patients' educational needs. *Radiography* 2008;**14**(2):111–9. <https://doi.org/10.1016/j.radi.2006.09.001>.
33. Blasini M, Corsi N, Clinger R, Colloca L. Nocebo and pain: an overview of the psychoneurobiological mechanisms.
34. Royal College of Radiologists. The timely delivery of radical radiotherapy: guidelines for the management of unscheduled treatment interruptions.
35. Koo K, Zeng L, Zhang L, et al. Comparison and literature review of occupational stress in a palliative radiotherapy clinic's interprofessional team, the radiation therapists, and the nurses at an academic cancer centre. *J Med Imag Radiat Sci* 2013;**44**(1):14–22. <https://doi.org/10.1016/j.jmir.2012.08.001>.
36. Sarra A, Feuz C. Examining the prevalence of compassion fatigue and burnout in radiation therapists caring for palliative cancer patients. *J Med Imag Radiat Sci* 2018;**49**(1):49–55. <https://doi.org/10.1016/j.jmir.2017.10.008>.