



Patient-reported perspectives of therapeutic radiographers when undergoing radiotherapy: A European multi-centre study

O'Neill, A., Hughes, C., Mc Clure, P., Barbosa, M. B., Muscat, M. K., Oliveira, C., Soares, M. A. L., & McFadden, S. (2023). Patient-reported perspectives of therapeutic radiographers when undergoing radiotherapy: A European multi-centre study. *Radiography*. <https://doi.org/10.1016/j.radi.2023.01.027>

[Link to publication record in Ulster University Research Portal](#)

Published in:
Radiography

Publication Status:
Published online: 06/03/2023

DOI:
[10.1016/j.radi.2023.01.027](https://doi.org/10.1016/j.radi.2023.01.027)

Document Version
Publisher's PDF, also known as Version of record

General rights

Copyright for the publications made accessible via Ulster University's Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

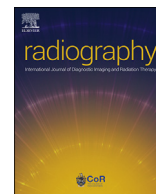
Take down policy

The Research Portal is Ulster University's institutional repository that provides access to Ulster's research outputs. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact pure-support@ulster.ac.uk.



Contents lists available at ScienceDirect

Radiography

journal homepage: www.elsevier.com/locate/radi

Patient-reported perspectives of therapeutic radiographers when undergoing radiotherapy: A European multi-centre study

A.G.M. O'Neill^{a, *}, C.M. Hughes^a, P. McClure^a, B. Barbosa^{b, c}, K. Muscat^{e, f}, C. Oliveira^b, A.L. Soares^d, S. McFadden^a

^a Institute of Nursing and Health Research, Faculty of Life and Health Sciences, Magee Campus, Northland Road, Derry/Londonderry, Northern Ireland, UK

^b Radiotherapy Department, Instituto Português de Oncologia do Porto (IPO Porto), R. Dr. António Bernardino de Almeida 865, 4200-072 Porto, Portugal

^c Medical Physics, Radiobiology and Radiation Protection Group, IPO Porto Research Center (CI-IPOP), Porto Comprehensive Cancer Center (Porto.CCC) & Rise@CI-IPOP (Health Research Network), R. Dr. António Bernardino de Almeida 865, 4200-072 Porto, Portugal

^d Medical Physics Service, Portuguese Oncology Institute of Porto, Porto, Portugal

^e Faculty of Health Sciences, Department of Radiography, University of Malta, Mater Dei Hospital, Msida, MSD 2080, Malta

^f Radiotherapy Department, Sir Anthony Mamo Oncology Centre, Tal-Qroqq, Msida, MSD 2090, Malta

ARTICLE INFO

Article history:

Received 26 July 2022

Received in revised form

24 January 2023

Accepted 31 January 2023

Available online xxx

Keywords:

Patient perspective

Patient experience

Person-centred care

Patient survey

Radiotherapy

Therapeutic radiographer

Radiation therapist

ABSTRACT

Introduction: Radiotherapy is delivered almost exclusively by therapeutic radiographers/radiation therapist (RTTs). Patient's perspectives of RTTs affect levels of trust and confidence in the profession and can have a significant impact on overall radiotherapy experience. The study reports patients' perspectives of RTTs from their experience of undergoing radiotherapy. Four partner sites collaborated in this research and included Malta, Poland, Portugal, and the UK (lead site).

Methods: A survey was developed to gather information from patients receiving radiotherapy or who had had radiotherapy within the previous 24 months. Participants ranked their responses to 23 statements relating to person-centred care on a 5-point scale of 1 (strongly disagree) to 5 (strongly agree). Mann–Whitney or Kruskal Wallis tests were applied to test differences in responses to 5 key statements for patient characteristics including gender, age group, diagnosis, country, time spent with RTTs and number of fractions remaining at survey completion.

Results: Three hundred and forty-seven surveys are included. Patients report a positive perception of RTTs (95.4% agree with 'I feel cared for'). Statistically significant differences in responses were found between gender, diagnosis, country, time spent with RTTs and fractions of radiotherapy remaining. Patients who had more time with RTTs and completed their surveys during radiotherapy had a more positive perception of RTTs.

Conclusion: This study suggests that sufficient time with RTTs is key to ensuring a positive radiotherapy patient experience. RTTs being attentive, understanding, and informative are most predictive of a positive overall patient experience. Timing of survey completion can influence responses. Implications for practice. RTT education programmes should incorporate training on person-centred care at all levels. Further research into patient experience of RTTs is warranted.

Crown Copyright © 2023 Published by Elsevier Ltd on behalf of The College of Radiographers. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Introduction & background

It is clear from numerous government and professional guidelines in the UK^{1–6} and Europe^{7–9} that person-centred care and patient engagement is advocated in the planning and provision of healthcare. Regardless of the focus of these guidance documents, all include reference to improving patient-centeredness and

engagement within their aims. Despite this, it is less clear how this should be achieved and as a result can be sporadic, tokenistic or absent.¹⁰ Cancer patients overall experience from pre diagnosis to post treatment, is assessed in the UK via the National Cancer Patient Experience Survey (CPES).¹¹ The breadth of services covered by this survey (which includes everything from GP services, diagnostic services, hospital, outpatient and follow-up care) gives an overview of patients overall cancer experience but reveals little in relation to a specific treatment or service and mentions only medical, nursing and hospital staff.

* Corresponding author.

E-mail address: angyoneill@gmail.com (A.G.M. O'Neill).

<https://doi.org/10.1016/j.radi.2023.01.027>

1078-8174/Crown Copyright © 2023 Published by Elsevier Ltd on behalf of The College of Radiographers. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Radiotherapy is a major component of cancer care with approximately 60% of cancer patients receiving radiotherapy either alone, or in combination with surgery or systemic treatment during the course of their disease management.¹² Radiotherapy is delivered almost exclusively by therapeutic radiographers/radiation therapists (RTTs). They are highly skilled and proficient in the technical and clinical aspects of radiotherapy planning and delivery. In addition, they carefully monitor and manage treatment related toxicity and co-ordinate multidisciplinary/auxiliary care during treatment which may be daily for up to six weeks. They are key in the delivery of patient-centred cancer services and are uniquely placed to involve and engage patients regarding their perceptions of the profession and the care it provides. The competencies and skills required for RTT core and advanced practice have been the subject of recent research which has identified variations in educational curricula and professional roles across Europe, resulting in varying levels of competency in clinical practice.^{13,14}

A recent systematic review aiming to map the available evidence on the patients' experience of RTT care, found that patients perspective of, and engagement with, RTTs during a course of radiotherapy affects levels of trust and confidence in the profession. This can have a significant impact on their overall radiotherapy experience and satisfaction. However, overall, the paucity of evidence demands further research by RTTs to identify patients' needs and how these are, or are not, met during their radiotherapy.³⁶

The aim of this current study is to report patients' perspectives of RTTs from their lived experiences of undergoing radiotherapy. This study is part of the wider SAFE EUROPE (www.safeurope.eu) project exploring the education and professional migration of RTTs in the EU and will inform RTT undergraduate training across Europe. Four partner sites collaborated in this research and included Malta, Poland, Portugal, and the UK (lead site).

Site specific approvals

Ethical approval was granted by the UK Office of Research Ethics Committee Northern Ireland (ORECNI Ref: FCNUR-21-019) and the relevant University Research Ethics Committee. Additional local approvals were obtained for each partner site as required. In addition, a data sharing agreement was generated to facilitate sharing of study data between EU sites and the UK as required post Brexit.

Methodology

The survey

A cross-sectional survey was developed by the study team (Supplementary file 1).

1. Part one of the survey requested information relating to participant gender, age, cancer diagnosis, country where radiotherapy was delivered, treatment intent (radical/palliative), length of daily treatment set-up daily, time spent with RTT daily and fractionation. This section of the survey was developed by the study team.
2. Part two of the survey is based on the person centred practice inventory – service user (PCPI-SU) (unpublished). This is an adaptation of the person centred practice inventory – staff (PCPI-S).¹⁵ Additional questions were included in the PCPI-SU through consultation with patient and public involvement (PPI) consisting of a group of two radiotherapy patients and two RTTs. The PPI group reviewed all patient facing documents and all

feedback was incorporated prior to distribution. In addition a small pilot study was performed with two radiotherapy patients and two practising RTTs. It consists of 23 statements relating to aspects of person-centred care. Participants ranked their response on a 5-point scale of 1 (strongly disagree) to 5 (strongly agree), their level of agreement with each statement. This scale was based on the original Likert scale.¹⁶ The survey was translated for use in each of the participating centres by the respective study teams. Validation of this tool for service users is ongoing and is as yet unpublished.

Survey dissemination, eligibility and recruitment

Participation was voluntary and open to patients >18 years, who were receiving radiotherapy or had received radiotherapy within the previous 24 months. COVID-19 pandemic restrictions in place during recruitment meant that in-person access to clinical departments and patients for the purposes of research was not possible in the UK. Hence, the survey was conducted on-line via Qualtrics© software (2020) by UK participants. A study information poster with a link to the Qualtrics© survey was disseminated via UK cancer charity social media websites. Patient information and consent were embedded within the online survey and presented to the participants when they clicked on the study link.

At the non-UK sites, hard copy surveys were available in clinical departments where a convenience sampling approach¹⁷ was used inviting everyone receiving radiotherapy to participate. Participants were provided with study information and had at least 24 h to decide if they wished to participate. Willing participants were then invited to provide written informed consent by the local study researcher. The study researcher provided the hard copy survey to the patient but did not engage with or assist them during completion and patients were informed they could take the survey home for completion if they wished. Completed surveys were returned to a drop box within the department or returned by post.

Data collection and analysis

Data was pseudo-anonymised by allocation of a unique study identifier and entered into the Statistical Package for the Social Sciences (SPSS) version 27 for analysis. Descriptive statistics were used to describe the survey population and summarise 23 Likert scale responses. Percentages of Likert responses were based on a three-level aggregation (strongly disagree/disagree, neutral and agree/strongly agree) based on respondents who answered each specific question. Further analysis was carried out on key Likert statements, representative of the main categories of care covered by the survey, (a) feeling safe, (b) shared decision making, (c) expressing feedback, (d) staff connect with me and (e) feeling cared for.¹⁵ Since Likert scale data are ordinal in nature, the non-parametric Mann–Whitney or Kruskal Wallis tests were applied to test differences in key responses for key patient characteristics (gender, age group, cancer diagnosis, country of treatment, time spent with RTTs and number of fractions remaining at time of survey completion).¹⁸ Cancer diagnoses were consolidated into 3 groups: Breast, urological and all other cancers. This was due to the fact that breast and urological cancers constituted the two largest groups. The remaining discrete diagnoses would not provide a robust basis for statistical analysis and were therefore grouped together. The significance level for all tests was 5.0%.¹⁹ The indicator for overall patient experience was generated from responses to the question “do you feel cared for”. Correlation analysis, using the non-parametric Spearman's rho test¹⁸ was undertaken to generate

Table 1
Characteristics of the Study population.

Variable	n (%)
Gender	
Male	137 (39.5)
Female	210 (60.5)
Age (years)	
18–44	45 (13)
45–54	80 (23.1)
>55	222 (63.9)
Treatment Intent	
Radical	326 (93.9)
Palliative	21 (6.1)
Diagnosis	
Breast	162 (46.7)
Urological	83 (23.9)
Other	99 (28.5)
Missing	3 (0.9)
Country treated	
UK	66 (19)
Portugal	215 (62)
Malta	51 (14.7)
Poland	15 (4.3)

correlation coefficients for each Likert statement compared to the assessment of the overall patient experience.

Results

Data from three hundred and forty-seven surveys from all four participating sites was combined and included in the final analysis. Table 1 summarises the study population. In the UK, 117 surveys were generated online over seven months. Following data cleaning 66 fully completed surveys were included in the analysis. Two hundred and eighty-one surveys were included from the three non-UK sites: 215 from Portugal, 51 from Malta and 15 from Poland. Most participants received radical radiotherapy (93.9%) with 6.1% stating their treatment was palliative. Females accounted for 60.5%

and males 39.5% of the study population. Breast cancer and urological cancers accounted for 46.7% and 23.9% of the study population, respectively.

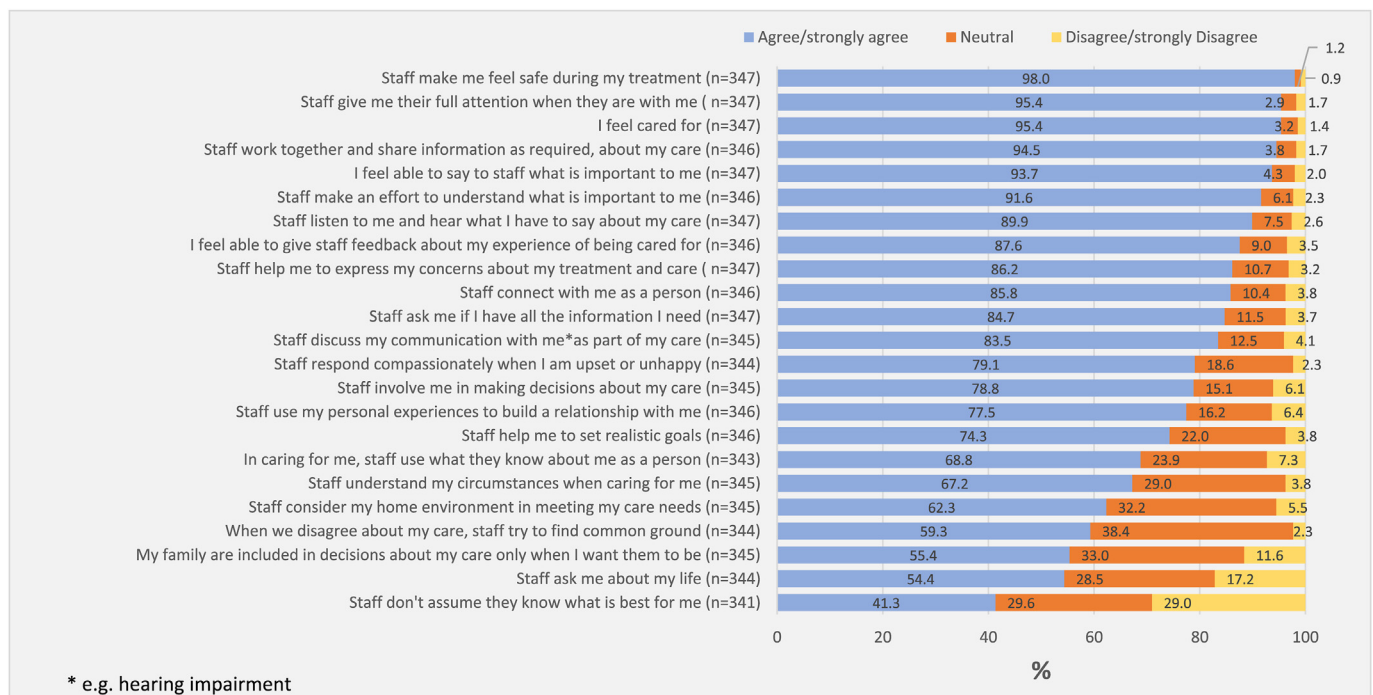
The proportion of respondents indicating agreement (strongly agree/agree), neutrality and disagreement (disagree/strongly disagree) to all 23 Likert statements is presented in Fig. 1.

The highest levels of agreement were in relation to ‘Staff make me feel safe during my treatment’ (98.0%), ‘Staff give me their full attention when they are with me’ (95.4%), ‘I feel cared for’ (95.4%), ‘Staff work together and share information as required about my care’ (94.5%) and ‘I feel able to say to staff what is important to me’ (93.7%).

The most ‘neutral’ response was recorded for the statement ‘When we disagree about my care, staff try to find common ground’ (38.4%) and reassuringly, 29% of respondents disagreed/strongly disagreed with the statement ‘RTT’s don’t assume they know what is best for me. The percentage of respondents who agreed (agree/strongly agree) with the 5 key statements ranged between 78.4% (for patients being involved in decision making) and 98.0% (staff make me feel safe during my treatment).

Differences in key Likert responses for a patient characteristic of interest were tested using Mann–Whitney and Kruskal–Wallis tests, and are reported in Table 2. Mann–Whitney tests were performed to assess if agreement with the five key Likert items differed between males and females. Statistically significant differences in responses were found with males having higher levels of agreement for the following items, ‘Staff make me feel safe during my treatment’ (p < .01), ‘Staff involve me in making decisions about my care’ (p < .01) and ‘I feel cared for’ (p < .001).

Kruskal–Wallis tests were performed, to test if agreement with the five key Likert items differed by cancer diagnoses, countries of treatment, time spent with RTTs and for the participants’ ages. Statistically significant differences in responses were found between cancer diagnosis groups with higher levels of agreement for urological and for other cancers compared to breast cancer, for ‘Staff make me feel safe during my treatment’ (p < .01), ‘Staff



* e.g. hearing impairment

Figure 1. Summary of patient responses regarding interaction with RTT's.

Table 2
Mean ranking of agreement to key statements*.

	Staff make me feel safe during my treatment		Staff involve me in making decisions about my care		I feel able to give staff feedback about my experience of being cared for		Staff connect with me as a person		I feel cared for	
	Mean rank	KW/MW p	Mean rank	KW/MW p	Mean rank	KW/MW p	Mean rank	KW/MW p	Mean rank	KW/MW p
Female	165.11	12518.0**	160.83	11717.0 ***	169.69	13480.5	179.38	12785.0	161.93	11849.5***
Male	187.63	0.002	191.47	0.003	179.38	0.331	166.38	0.072	192.51	<0.001
Breast	159.22	13.0**	152.93	12.2 **	166.82	1.120	157.37	8.0 *	155.85	12.5 **
Urological	188.44	0.001	186.25	0.002	178.93	0.571	184.65	0.018	188.64	0.002
Other	180.87		189.15		174.73		185.46		186.20	
UK	129.59	48.7***	122.14	33.2 ***	132.89	16.9***	128.47	27.2 **	115.88	50.9***
Portugal	182.86	<0.001	177.02	<0.001	181.97	<0.001	188.46	<0.001	196.52	<0.001
Malta	205.00		202.79		183.18		184.23		152.87	
Poland	137.00		242.86		198.40		121.80		178.83	
<5	159.23	7.2	137.16	12.2 **	144.50	6.1	155.51	9.0*	169.87	3.2
5–10	165.68	0.065	160.43	0.007	167.64	0.106	158.15	0.029	165.42	0.36
10–20	178.76		189.7		180.15		185.07		183.38	
>20	189.99		181.69		187.96		191.48		170.54	

*P < .05 **P < .01 ***P < .001.

involve me in making decisions about my care' (p < .01), 'Staff connect with me as a person' (p < .05) and 'I feel cared for' (p < .01).

Significant differences were found in agreement levels for key responses by country of treatment:

'Staff make me feel safe during my treatment', p < .001 (Malta highest, UK lowest)

'Staff involve me in making decisions about my care', p < .001 (Poland highest, UK lowest)

'I feel able to give staff feedback about my experience of being cared for', p < .001 (Poland highest, UK lowest), 'Staff connect with me as a person', p < .01 (Portugal highest, UK lowest) and 'I feel cared for' (p < .05), (Portugal highest, UK lowest).

Statistically significant differences in levels of agreement were found between time spent with RTTs for two of the five key statements, 'Staff involve me in making decisions about my care', p < .001 (10–20 min highest) and 'Staff connect with me as a person', p < .01 (>20 min highest).

Statistically significant differences in levels of agreement were found between patients depending on how many treatment fractions they had remaining at the time of survey completion for four of the five key statements: 'Staff make me feel safe during my treatment', p < .001; 'I feel able to give staff feedback about my experience of being cared for', p = .016; 'Staff connect with me as a person', p < .001 and 'I feel cared for', p < .001. Agreement was

lowest for patients with no fractions remaining and highest for those with >10 fractions remaining.

The proportion of patients agreeing with the five key statements by (a) cancer diagnosis and by (b) country is summarised in Fig. 2, illustrating the lowest agreement by breast cancer patients for all key statements. The mean difference between agreement of the breast cancer group and the next highest diagnosis category was 5.7% (range 2.5%–10.7%). The highest level of agreement by cancer diagnosis is the 'other' category except for 'staff involve me in making decisions about my care' for which the 'urological' cancer group recorded marginally higher agreement by 0.5%. Poland recorded the highest levels of agreement (100%) except for the statement 'staff connect with me as a person' in which they recorded least agreement at 60%. The UK had the lowest levels of agreement except for 'staff connect with me as person' in which they were second lowest (65.2%). For the remaining statements, the difference between the UK and the next highest response was 10.6%, 18.8%, 20.0% and 20.3% for 'staff make me feel safe', 'involve me in decisions', 'feel able to give feedback' and 'I feel cared for', respectively.

For each country, Fig. 3 illustrates the differences in (a) the amount of daily time spent with RTTs and (b) the number of treatment fractions remaining at the time of survey completion. The UK had the lowest proportion of participants spending between 10 and 20 min with RTTs (27.3%). Portugal reported 38.8% and Poland 40% in

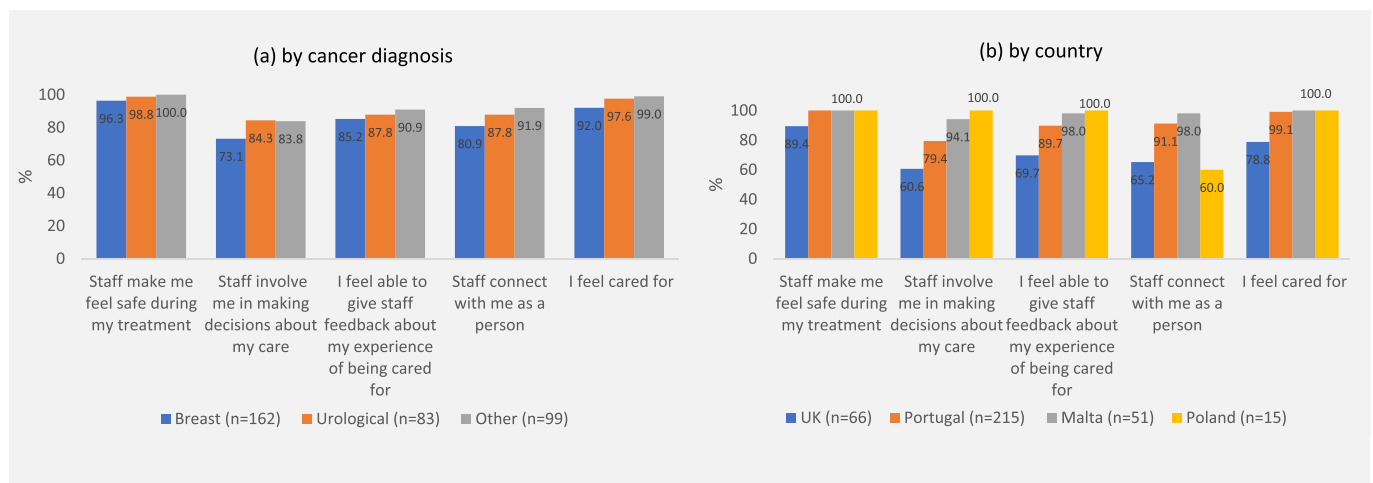


Fig. 2. (a and b) Proportion of respondents agreeing (strongly agree/agree) with key Likert statements.

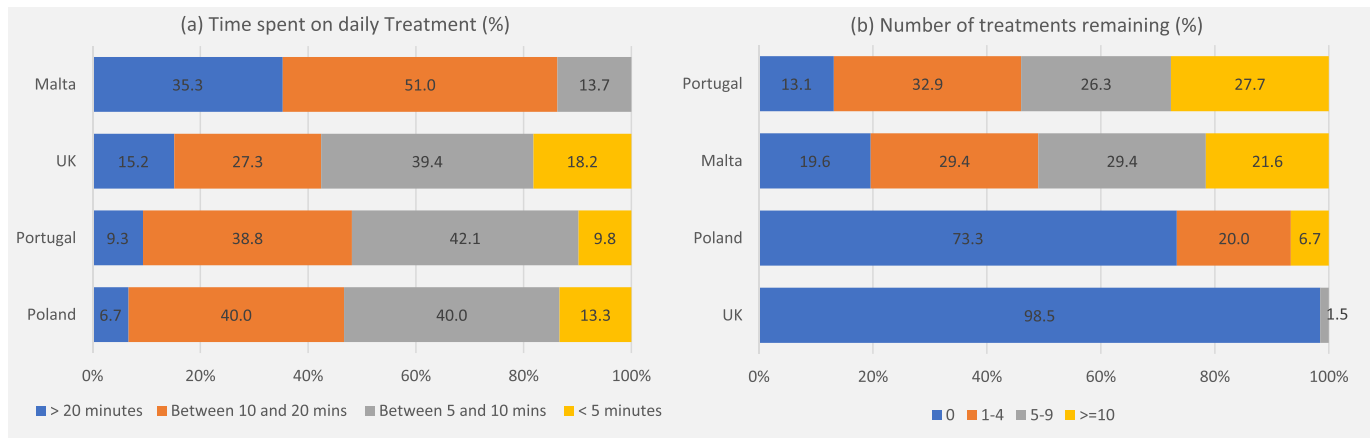


Figure 3. Time spent on (a) daily treatment (%) and (b) number of treatments remaining: by country.

this time category while over 50% of patients in Malta reported between 10 and 20 min with their RTTs daily. Our results suggest that more time with RTTs is associated with a more positive perception of RTTs and this was significant for being involved in decision making and staff connecting personally with them.

Table 3
Correlations of individual Likert questions with overall patient care assessment by strength of correlation.

	Correlation	p
Staff give me their full attention when they are with me	0.6915	<0.0001
Staff make an effort to understand what is important to me	0.6278	<0.0001
Staff ask me if I have all the information I need	0.6106	<0.0001
I feel able to say to staff what is important to me	0.5725	<0.0001
I feel able to give staff feedback about my experience of being cared for	0.5557	<0.0001
Staff listen to me and hear what I have to say about my care	0.5344	<0.0001
Staff connect with me as a person	0.5321	<0.0001
Staff make me feel safe during my treatment	0.5061	<0.0001
Staff work together and share information as required, about my care	0.4918	<0.0001
Staff help me to express my concerns about my treatment and care	0.4909	<0.0001
In caring for me, staff use what they know about me as a person	0.4897	<0.0001
Staff involve me in making decisions about my care	0.4751	<0.0001
Staff help me to set realistic goals	0.4306	<0.0001
Staff use my personal experiences to build a relationship with me	0.4228	<0.0001
Staff respond compassionately when I am upset or unhappy	0.4098	<0.0001
Staff discuss my communication with me (e.g. hearing impairment) as part of my care	0.3882	<0.0001
When we disagree about my care, staff try to find common ground	0.3625	<0.0001
Staff consider my home environment in meeting my care needs	0.3553	<0.0001
Staff ask me about my life	0.3319	<0.0001
Staff understand my circumstances when caring for me	0.2983	<0.0001
My family are included in decisions about my care only when I want them to be	0.1821	0.0007
Staff don't assume they know what is best for me	0.1244	0.0216

Our results also suggest that patients completing the survey after completion of treatment had a less positive response to four of the five key statements than those who completed the survey during treatment. 98.5% of UK participants had no remaining treatments when they completed the survey, and these were all completed on-line. In contrast the percentage of participants still receiving treatment for the European sites were Portugal 80.4%, Malta 86.9%, and Poland 26.7%.

Correlations of individual Likert statements with the overall statement of care 'I feel cared for' (Table 3) indicate that staff being attentive ($r = 0.6915$), staff making an effort to understand what is important to me ($r = 0.6278$) and 'staff ask me if I have all the information I need' ($r = 0.6106$), are the top three predictors of a positive perception of RTTs. The three lowest correlations with overall care are 'staff understand my circumstances' ($r = 0.2983$), 'My family are included in decisions about my care only when I want them to be' (0.1821) and 'Staff don't assume they know what is best for me' (0.1244).

Discussion

This multi-centre study measured patient perspectives of RTTs from four different European countries using a survey completed during or within 2 years of radiotherapy. Overall results indicate that patients had a positive perception of RTTs. Over 90.0% of participants agreed with more than half of the survey statements and over 95.0% agreed with the overall care statement of 'I feel cared for'. Previous generalised radiotherapy surveys report comparable positive outcomes in relation to overall radiotherapy experience²⁰ or experience of RTTs.²¹ However there is limited patient experience survey evidence specific to RTTs, with which to compare our results. Treeby²² and Rozanec et al.²³ reported high levels of patient satisfaction in relation to a urology clinical specialist RTT and palliative clinical specialist RTT respectively. For the former,²² no overall satisfaction statement or question was included. The latter, Rozanec et al.²³ found that 88.9% of patients rated their experience as excellent, comparable with our overall experience rating of 95.0%. However, given the differences in role and setting for RTTs delivering treatment and those practising in a specialist role, useful comparisons with our study are limited.

No significant differences were observed in responses by age group in this study. This aligns with numerous other reports.^{21,24,25} However, French et al.²⁶ report that age influences patient satisfaction in radiotherapy, observing an increase in satisfaction for patients over fifty years. In relation to diagnosis, a

less positive perception by breast cancer patients in our study aligns with Muraj et al.,²¹ who suggest lower levels of satisfaction reported by breast cancer patients in their study may be linked with how informed patients felt about available support services. Differences in our study by gender and by cancer diagnosis may be a function of the urological cancer group being all male and the breast cancer category being all female. It has been reported that breast cancer patients experience the highest levels of stress and anxiety during radiotherapy.²⁷ This may have a negative influence on their radiotherapy experience and as a result a negative impact on their perception of RTTs. Identifying the needs of specific patients groups by RTTs at the beginning of RT in relation to information and support may help to reduce patients' stress and improve their experience and perception of RTTs. Observed differences in satisfaction by gender in the present study contrasts with others reporting no difference in satisfaction levels for gender.^{21,24,26} A larger sample of other diagnoses may detect differences in diagnosis independent of gender. Heterogeneity in methodologies, and outcome measures in radiotherapy patient experience studies and, the paucity of those specific to RTTs, may explain variations in findings. This points to a need for standardised methodologies and larger, controlled studies to grow the evidence base and inform practice within the RTT profession and the wider field of radiotherapy.

Our results suggest that patients who had more daily time with RTTs, and those completing the survey during treatment, had a more positive perception of RTTs. UK participants, who generally reported the least positive responses, also recorded the least daily time with RTTs, and all except one were post radiotherapy at the time of survey completion. Our study suggests that both factors can significantly influence perceptions of RTTs. This aligns with others who have investigated patient perceptions of RTTs²⁸ and satisfaction of patients undergoing radiotherapy in terms of time spent.²⁹ However, time spent with RTTs has not been explored quantitatively in these other studies. In this study, patients who were receiving treatment on receipt of the survey may have responded more positively given that they were still in personal contact with their RTTs. Patients' perspectives may change over time and has been shown to be more negative the further it is measured from their actual experience.^{30,31} It is postulated that variations in daily time with RTTs, and the timing and mode of survey completion contributed to the differences in survey responses by country, in addition to other variations in local departments and education and training. Further exploration of this area is warranted at national and European level.

The relevance of this study is rooted in the significant impact a positive patient-RTT experience can have on a patient's overall experience. RTTs have a central role in patients developing a sense of emotional comfort found to be important in breast cancer patients.²⁸ Influencing factors included the willingness of RTTs to form a relationship, and provision of information and adequate time.²⁸ We can draw some parallels with our findings. First, our top three Likert statements correlating with overall care include staff being attentive, showing understanding and ensuring patients have adequate information. This is significant for every practising RTT in demonstrating the impact of their care to a patients overall experience. Also, being attentive, understanding and providing adequate information are elements of professional practice that every RTT can augment forthwith without the need for additional resources. Secondly, our results show that patients reporting more daily time with RTTs feel more included in decision making and perceive a greater personal connection with their RTT, supporting the idea that insufficient time with, or feeling rushed by, the RTT will negatively impact the patients' experience. It is intuitive that adequate time with patients will facilitate person-

centred care, however allocation of time in health care requires justification and robust evidence, therefore this area warrants further quantitative research to demonstrate potential benefits in terms of patient experience but also the potential to improve patient outcomes.

Patient-centred care of RTT patient education sessions has been shown to be an important predictor for overall satisfaction in radiotherapy.³² Some radiotherapy patient satisfaction surveys even suggest a positive patient-RTT experience is more predictive of overall satisfaction than the patient-physician relationship or effective pain management.^{24,33} Matorrozi et al.³⁴ suggest that effective patient-RTT communication can reduce perceived pain intensity during radiotherapy potentially by de-activating nociceptive effects. These reports emphasise how important a positive patient-RTT relationship is both for overall patient experience and treatment outcomes. For example, a reduction in perceived pain intensity may result in reduced use of analgesics and fewer interruptions to treatment.

The highest-ranking correlation with overall perception of RTTs in our study is 'Staff give me their full attention when they are with me', a seemingly obvious and easy goal for any health-care professional. However, when treating a high volume of patients with complex needs in an increasingly technical environment, while also managing ionising radiation risks within limited time and resources, being fully attentive to a given patient becomes more challenging. There is some evidence to support this idea that the unique radiotherapy environment may create feelings of fear for patients and stress for staff, which negatively affect the patient-RTT relationship,^{28,35} and consequently may be detrimental to patients' perceptions of RTTs.

The lowest level of agreement from our survey was in relation to decision making with 78.8% agreeing (agree/strongly disagree) with this key statement. This is less than that reported by Samant et al.²⁹ who for their corresponding statement 'I felt included in the decision-making process' reported 93% agreement from 199 participants. However, Samant et al.'s²⁹ study was not RTT specific, referring to health care professionals (HCPs) and/or physicians and may have reflected an overall impression of HCPs including decisions prior to commencing treatment. Participants in our study may have felt there was less opportunity to be involved in decision making during radiotherapy, hence the most disagreement (29%) and most neutral responses (29.6%) for the other statement linked to decision making, 'Staff don't assume they know what's best for me'. Being involved in decision making is fundamental to person-centred care. Major cancer management decisions may be made prior to radiotherapy planning and treatment, but RTTs can still provide individualised care and to do so demands they get to know patients as people and involve them in decisions, however small.

Limitations

A number of limitations exist within the study. Convenience sampling introduces the likelihood of motivation bias with some groups of patients more motivated to participate than others. The study population had a predominance of breast cancer and urological cancer patients and therefore results may not be generalisable to all patients. Sources of bias may also exist related to the mode and timing of survey completion. For example, those who were still receiving treatment may have been inclined to respond more positively (acquiescence bias) than those who were post treatment and completing the survey on-line. A degree of memory recall bias may have influenced the responses of those who completed treatment earlier than others. Variations in sample size between diagnosis and particularly country may be considered

limiting, however as widely recommended in this scenario, non-parametric tests were employed.

Conclusion

This is the first study to investigate patient's perceptions of radiotherapy treatment by RTTs across European countries. The majority of patients in this study report a positive perception of RTTs as a result of their radiotherapy experience. Our study shows that staff giving their full attention, making an effort to understand patients' priorities and asking them if they have all the information they need, are most predictive of their overall experience and engagement with RTTs. Significant differences were found between levels of agreement by patient gender, diagnosis and time spent with RTTs. Time spent with RTTs has a significant impact on patients' perception of their engagement with RTTs which is a significant predictor of overall experience and can have an emotional, psychological, and physical impact.

Recommendations for practice

As well as developing their clinical and technical knowledge and expertise, RTTs should ensure they develop and maintain person-centred care skills at the centre of their professional practice. Awareness of patient groups who report less positive experiences and perceptions will guide RTTs in identifying those patients most in need of additional support and information.

Further research into patients' experience of RTTs, what can improve this and the impact of this experience, is warranted with a focus on specific cancer diagnoses and time spent with RTTs. The challenge will be to demonstrate not just enhanced patient experience, but also tangible benefits in terms of improved outcome measures that will support changes in practice.

In addition, RTT education programmes should ensure they incorporate training on person-centred care at all levels. Radiotherapy providers should ensure RTTs have access to person-centred care training on a regular basis through-out their career.

Funding

This work was co-funded by the SAFE EUROPE project under the Erasmus+ Sector Skill Alliances programme [Grant Agreement number 2018–2993 600952-EPP-1-2018-1-UK-EPPKA2-SSA-N.]. The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Conflict of interest statement

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.radi.2023.01.027>.

References

1. Department of health. A policy framework for commissioning cancer services. In: *A report by the expert advisory group on cancer to the chief medical officers of England and Wales*. Department of Health; 1995.
2. House of Commons Health Committee. *Patient and public involvement in the NHS*. Department of Health; 2007.
3. NHS England. *Five year forward view*. Department of Health; 2014.
4. Jenkinson C, Coulter A, Bruster S, Richards N.C. 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>.
5. Society of Radiographers. *Patient public and practitioner partnerships within imaging and radiotherapy: guiding principles*. 2018.
6. National Cancer Action Team. National cancer peer review programme. In: *Manual for cancer services*. Department of Health; 2007.
7. European Cancer Organisation. *European code of cancer practice*. <https://www.europecancer.org/2-standard/66-european-code-of-cancer-practice>. Web site. Accessed 21/June/2022.
8. Lievens Yolande, Ricardi Umberto, Poortmans Philip, Verellen Dirk, Gasparotto Chiara, Verfaillie Christine, et al. ESTRO vision 2030. Radiation oncology. In: *Optimal health for all, together. European Society for Radiotherapy and Oncology (ESTRO)*; 2019. p. 86–97 (136).
9. European Commission. *Europe's beating cancer plan: communication from the commission to the European Parliament and the Council*. EC; 2022.
10. The Kings Fund. *From vision to action. Making patient-centred care a reality*. 2012.
11. Cancer Patient Experience Advisory Group. *Cancer patient experience survey*. 2021. <https://www.ncpes.co.uk/>.
12. INTERNATIONAL ATOMIC ENERGY AGENCY. *Radiotherapy in cancer care: facing the global challenge*. IAEA; 2017.
13. 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>.
14. Oliveira C, Barbosa B, Couto JG, Bravo I, Khine R, McNair H. Advanced practice roles of therapeutic radiographers/radiation therapists: a systematic literature review. *Radiography* 2022;28(3):605–19. <https://doi.org/10.1016/j.radi.2022.04.009>.
15. Slater P, McCance T, McCormack B. The development and testing of the person centred practice inventory - staff (PCPI-S). *Int J Qual Health Care* 2017;29(4):541–7.
16. Likert R. A technique for the measurement of attitudes. *Arch Psychol* 1932;22:140. 55.x.
17. Stratton S. Population research: convenience sampling strategies. *Prehospital Disaster Med* 2021;36(4):373–4. <https://doi.org/10.1017/S1049023X21000649>.
18. Jamieson S. Likert scales: how to (ab)use them? *Med Educ* 2004;38(12):1217–8. <https://doi.org/10.1111/j.1365-2929.2004.02012>.
19. Andrade C. The P value and statistical significance: misunderstandings, explanations, challenges, and alternatives. *Indian J Psychol Med* 2019;41(3):210–5. https://doi.org/10.4103/IJPSYM.IJPSYM_193_19.
20. Hashmi F, Gregor N, Liszewski B, Bola R, Kulczycki S, Nathoo D, 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>.
21. 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>.
22. 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>.
23. 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>.
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. Nijman JL, Sixma H, Bv Triest, 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>.
26. French J, McGahan C. Measuring patient satisfaction with radiation therapy service delivery. *Healthc Manag Forum* 2009;40–50.
27. Sehlen S, Hollenhorst H, Schymura B, Herschbach P, Aydemir U, Frischling M. Psychosocial stress in cancer patients during and after radiotherapy. *Schweizerische Monatsschrift für die gesamte innere Medizin und ihre Grenzgebiete* 2003;179(3):175–80. <https://doi.org/10.1007/s00066-003-1018-z>.
28. 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>.
29. Samant R, Cisa-Paré E, Balchin K, Renaud J, Bunch L, Wheatley-Price P, et al. Assessment of patient satisfaction among cancer patients undergoing radiotherapy. *J Cancer Educ* 2021. <https://doi.org/10.1007/s13187-020-01950-8>.
30. Bendall-Lyon D, Powers TL, Swan JE. Patients report lower satisfaction levels as time goes by *Market Health Serv* 2001;21(3):1.

31. Bjertnaes OA. The association between survey timing and patient-reported experiences with hospitals: results of a national postal survey. *BMC Med Res Methodol* 2012;**12**(1):13. <https://doi.org/10.1186/1471-2288-12-13>.
32. Dong S, Butow PN, Costa DSJ, Dhillon HM, Shields CG. The influence of patient-centred 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>.
33. Famiglietti RM, 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>.
34. 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>.
35. 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>. n/a-N.PAG.
36. O'Neill et al. (in press). Patient engagement with radiation therapists: patient perspectives, challenges, and opportunities. A systematic review. *Radiography*.