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Original Article

Barriers to Referral for Palliative Radiotherapy by Physicians: A Systematic Review

J. Livergant *†, M. Howard ‡, J. Klein *§

* Department of Radiation Therapy, BC Cancer Agency – Vancouver Island Centre, British Columbia, Canada
† Division of Radiation Oncology and Developmental Radiotherapeutics, Department of Surgery, University of British Columbia, Vancouver, British Columbia, Canada
‡ Department of Family Medicine, McMaster University, Hamilton, Ontario, Canada
§ Department of Radiation Oncology, Albert Einstein College of Medicine and Montefiore Medical Center, Bronx, New York, USA

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Abstract

Aims: Palliative radiotherapy (PRT) can relieve symptoms and improve quality of life, but remains underutilised, possibly due to lack of referrals. We conducted a systematic review to study barriers impeding referral for PRT.

Materials and methods: We searched EMBASE and MEDLINE to identify published studies of physician barriers to PRT referral. Data were synthesised using the percentage of respondents to the surveys in these studies who identified a given factor as a significant barrier to PRT referral. Barriers were categorised using a conceptual framework for radiotherapy access described by Sundaresan *et al.* (Aust Health Rev 40 (1), 2016, 11–18.)

Results: EMBASE and MEDLINE searches returned 364 distinct papers. Of these, 11 papers (reporting on 12 cohorts of survey respondents) met the study inclusion criteria. All used a cross-sectional survey design. Seven cohorts included mainly family physicians, one surveyed mostly radiation oncologists, one surveyed hospice professionals and one surveyed members of the American Society of Clinical Oncology, the American Society of Radiation Oncology and the American Academy of Hospice Palliative Medicine. Many factors were identified as strongly influencing referral decisions. Only two cohorts of respondents were asked whether patient wishes influence referrals, but most (78–82%) respondents in these cohorts agreed that it was an important influence. Other important barriers included functional status (five cohorts asked, cited as a strong influence by 53–78% of respondents), short life expectancy (three, 44–59%), treatment length (five, 51–58%), inconvenience (six, 24–65%), cancer type (three, 55–80%), uncertainty of benefits (seven, 18–54%) and toxicity concerns (11, 18–43%). Hospice professionals most frequently cited factors related to expense of treatment.

Conclusions: Published high-quality data on barriers to PRT referral are limited to survey studies. Barriers to PRT referral include referrers' unfamiliarity regarding risks and benefits, cumbersome referral processes and perceived inconvenience of treatment. Interventions to increase referrals should be tailored to different professional groups and may include increased expert participation in multidisciplinary palliative care, shortening treatment courses and in-person interprofessional education.

Key words: Pain; palliative care; radiation oncology; radiotherapy; systematic review

Introduction

Palliative radiotherapy (PRT) can alleviate symptoms from primary or metastatic tumours and improve quality of life [1,2]. Most patients (60–80%) experience relief from a wide variety of symptoms, including pain, bleeding, neurological deficits and dyspnoea after receiving PRT [3].

Despite good results, PRT remains underutilised across the world [4]. However, the optimal utilisation rate is difficult to estimate, with estimates of optimal lifetime utilisation rates ranging from 34% to over 50% [4,5] compared with actual utilisation of less than 30% [4–8]. The gap between population and benchmark utilisation represents an unmet need for PRT that may be attributable to inequities in access [9,10].

Barriers to access act at different levels of the referral process. Sundaresan *et al.* [10] proposed a multidimensional framework describing access to radiotherapy as

Author for correspondence: J. Klein, Center for Radiation Therapy, Suite 201, 1625 Poplar Street, Bronx, NY, 10128, USA. Tel: +1-718-405-8550.
E-mail address: joklein@montefiore.org (J. Klein).

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opportunity translated into actual utilisation. Four factors contribute to opportunity: availability, adequacy, affordability and acceptability of radiotherapy services. Utilisation is affected at different levels: the patient and caregiver level (grouped together as 'consumer-level factors'), referrer level and service level. Difficulty travelling to and from treatment due to distance or socioeconomic stress is a patient-level factor. A patient's primary physician being unfamiliar with benefits of PRT represents a referrer-level factor, whereas long waiting times for radiotherapy machine availability would be a service-level barrier. Fitting barriers into this framework may help identify patterns affecting access and suggest areas for improvement.

Although it has been hypothesised that cancer patients declining referral or treatment contributes to the PRT usage gap, it is also true that some eligible patients are not being referred at all [5,11,12]. Patient age plays a strong influence on PRT usage, with older patients less likely to receive PRT [5,12]. Increasing household income and treatment in a hospital affiliated with a cancer centre have also been identified as factors increasing a patient's likelihood to receive PRT [5]. A previously published review [11] investigated barriers to referral for radiotherapy (in general, not just for palliation) specifically in the Canadian context. Lack of formal training about radiotherapy and limited knowledge of its risks and benefits among physicians was a major theme limiting referrals. Among paediatric oncologists, concerns around toxicity, distance to a radiotherapy centre and family reluctance were cited as major factors impeding referral for PRT. However, this review did not report a quality-assessment procedure for identifying high-quality articles for analysis.

Identifying factors that prevent referrals for PRT can guide future efforts to address these specific concerns and narrow the PRT usage gap. We hypothesise that factors other than clinical benefit significantly influence referral practices (such as distance to radiation facilities, cost and poor understanding of risks and benefits of PRT among referrers). Few studies have directly investigated why healthcare professionals may or may not choose to refer patients for PRT. To our knowledge, no systematic review has specifically addressed this question. We therefore conducted a systematic review to synthesise available evidence on factors impeding PRT referral and to help direct future efforts to increase appropriate referrals and utilisation.

Materials and Methods

Our systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [13]. One co-author (MH) holds a PhD in health research methodology and assisted in protocol development and analysis.

Literature Search

A pre-specified search strategy was developed to answer the question: 'What factors act as barriers to patients accessing PRT by influencing referral patterns by healthcare professionals?' The search was limited to barriers influencing physician referral decisions (rather than, for example, influencing patients' decisions to accept PRT) to allow us to address a specific research question that represents a gap in the available literature. We searched the EMBASE and MEDLINE electronic databases from their inceptions (MEDLINE 1946, EMBASE 1947) until September 2016, using the search strategy shown in Table 1. The search was limited to research carried out on adult humans and published in English. This strategy was informed by previously published research on barriers to referral and barriers to PRT utilisation [11,14].

Eligibility Assessment

Electronic search results were combined and duplicates removed. Two reviewers (JK and JL) reviewed these papers to assess their eligibility for inclusion in our study. Eligible studies were published in a peer-reviewed journal and described factors impeding referral to PRT. Studies published as abstracts only were excluded. Studies must have reported on the perspective and/or behaviour of patients or healthcare providers, and studies that only hypothesised a reason for decreased referrals were excluded. Because the scope of this review was limited to factors influencing providers' decisions to refer patients for PRT, studies of patients already referred for PRT were excluded.

Both reviewers independently assessed study titles and eliminated those deemed ineligible. Each then reviewed the abstracts, or whole text as necessary, of the remaining studies to determine eligibility and the results were compared. Disagreements were resolved by consensus. Reference lists of the assessed studies were hand-searched to find appropriate studies that had been missed by the electronic search.

Quality Assessment

Both reviewers reviewed studies for quality, using the National Institutes of Health resource for systematic evidence reviews [15].

Each reviewer gave an overall rating of poor, fair or good with respect to risk of bias. Studies rated good or fair were included in the review. This resource was selected as it

Table 1
Search strategy to identify papers relevant to barriers to referral for palliative radiotherapy

MEDLINE	EMBASE
(MeSH: Radiotherapy or MeSH: Radiation or text: radiation)	(MeSH: Radiotherapy)
AND	AND
(MeSH: Referral and Consultation OR text: access OR text: barriers)	(MeSH: Patient Referral OR text: access OR text: barriers)
AND	AND
(MeSH: Palliative Care OR MeSH: Neoplasm Metastasis)	(MeSH: Palliative Therapy OR MeSH: Metastasis)

provided individual quality-assessment tools depending on the type of review, and each tool is accompanied by a detailed document to guide proper use. The tools were developed by methodologists from National Health, Lung, and Blood Institute (NHLBI) and Research Triangle Institute International specifically for systematic reviews.

Data Extraction

For papers meeting inclusion and quality criteria we recorded the discipline of survey respondents, participation rate, survey used and barriers to referral reported in the paper. These were also categorised under the conceptual framework described by Sundaresan *et al.* [10]. No meta-analysis was planned based on the expected variability in study methods, survey outcomes and settings. Identified barriers were assigned to categories within Sundaresan *et al.*'s categories based on consensus between the two reviewers (JK and JL).

Results

Literature Search and Eligibility

A PRISMA flowchart detailing the studies included in the literature search and eligibility assessment is shown in Figure 1. We identified 11 papers that met our inclusion criteria.

Quality Assessment

All 11 included papers used a cross-sectional, survey design. Therefore, the National Institutes of Health Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies was used in all cases [15].

All included studies were rated as 'fair' or 'good' by both reviewers overall and were thus studied in the systematic review.

All studies clearly described their study population and stated a clear research question. Response rates were generally low, however. Only three studies [16–18] reached the participation rate of 50% recommended by the National Institutes of Health tool, although two of these [17,18] described the same cohort. Two others [19,20] had response rates between 45 and 50%. No studies used methods to adjust their results for possible confounding variables. Only two studies [21,22], both of which described the same survey population, reported a justification for the selected sample size.

Study Characteristics

All included studies were published between 2001 and 2015. Two studies [21,22] reported on the same survey population, with two separate cohorts (urban and rural family physicians) described. Two other studies [17,18] reported on the same population, a single cohort of family physicians. One study [23] reported on three cohorts assessed with the same survey (members of the American Society of Radiation Oncology [ASTRO], the American Society of Clinical Oncology [ASCO] and the American Academy of Hospice Palliative Medicine [AAHPM]). Therefore, the 11 included studies reported on a total of 12 survey cohorts. Characteristics of the included studies are summarised in Table 2.

Eight studies reporting on seven cohorts targeted mainly family physicians [16–19,21,22,24,25]. All but one of these used a form of a questionnaire originally developed by Samant *et al.* [16]. The remaining study of family physicians [25] presented clinical vignettes to the study participants and asked how likely a family physician was to refer each given patient for oncological management, including PRT.

One study [26] surveyed hospice professionals in the USA; 44% of respondents were non-physician clinical professionals and 35% were non-clinical staff. Two studies included radiation oncologists in their survey sample [20,23]. None of the included studies directly reported patient or family perspectives on barriers to being referred for PRT. Therefore, the scope of our review was limited to barriers affecting referrers' decisions to send patients for PRT.

Barriers to Referral

Barriers to Referral for Palliative Radiotherapy in the Context of Radiotherapy Access

Using the framework developed by Sundaresan *et al.* [10], we assigned identified barriers into the defined categories, as shown in Table 3. This table also shows the proportion of responders in each study who cited a given barrier as significantly affecting their referral decisions. Each study used a slightly different definition for a 'significant' barrier (see Table 3 for details), but generally barriers

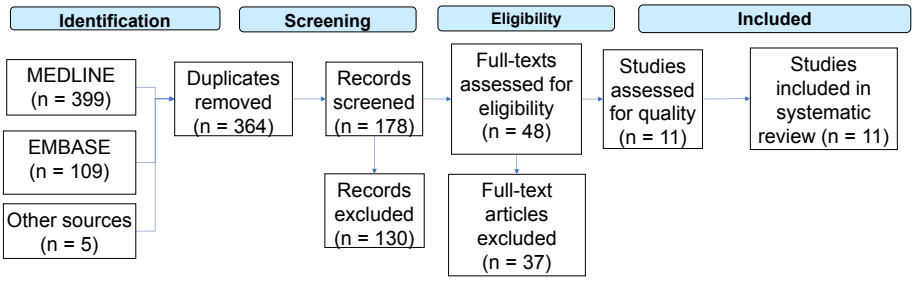

Fig 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [13] flow chart of the systematic review procedure.

were counted as significant if cited as moderately or highly affecting referral decisions. Results from Halkett *et al.* [25] are not shown in Table 3 as this study used clinical vignettes rather than reporting survey results.

Consumer-level factors were often cited as significant barriers to referral. Only two cohorts [16–18] were asked about the effect that patient wishes had on their referral decisions, but this was cited as significant by very high percentages of responders in both these groups (78% and 82%). Patient functional status was another important factor, cited in five cohorts by 53–78% of respondents, although this barrier was only mentioned in studies that studied referral barriers among family physicians. Life expectancy was mentioned in thee cohorts and cited as important by 44–59% of respondents.

Among referrer-level factors, treatment length (mentioned in five cohorts, cited by 51–58% of respondents as an important factor affecting referrals) and inconvenience (six, 24–65%) were commonly-cited barriers to referral. Other cited factors included cancer type or histology (three, 55–80%), uncertainty of benefits (seven, 18–54%) and toxicity concerns (11, 18–43%). Hospice professionals more frequently cited factors related to expense and difficulty in treating patients cost-effectively than did the non-hospice physicians surveyed.

Respondents were asked about a variety of service-level factors across many studies, but these were cited as significant barriers at lower rates than consumer- or referrer-level factors.

Among Family Physicians

Six cohorts described in seven reviewed studies [16–19,21,22,24] included more than 85% family physicians/general practitioners in their survey sample. Most data were published in chart form, so the figures were measured on WebPlotDigitizer [27] to estimate actual rates. Numbers that are also reported in the texts agreed with these estimates within 1 absolute percentage point. None of the included studies directly measured actual referral rates.

Commonly cited referral barriers in these family physician/general practitioner cohorts included patient age (mentioned in five cohorts, reported by 19–48% of respondents in these studies as an important factor) and functional status (five, 53–78%), as well as the referrer's perception of inconvenience to the patient (six, 25–65%), uncertainty of benefit from PRT (six, 30–54%) and concern regarding toxicity (six, 32–49%). Although only two studies [18,19] asked respondents about the effect of patient wishes on referral decisions, this was reported as the most significant factor affecting referral in both (78% and 82%). In two surveys [18,19], 42% of respondents cited a minimum life expectancy as an essential factor for appropriate PRT referral, with the minimum required prognosis ranging from 1.5 to 4 months.

Halkett *et al.* [25] used a different method to assess referral patterns: they showed respondents a series of vignettes with seven clinical cases describing common indications for PRT. For each case, participants were asked whether they would refer for palliative therapy and which therapy (e.g. surgery, chemotherapy, PRT) they thought would be beneficial. In each survey, the described patient's age (45 or 75 years), mobility status (good or poor) and prognosis (4 or 16 weeks) was altered randomly. Answers were then compared against the opinion of an expert panel consisting of a palliative care specialist, two radiation oncologists and two general practitioners. Agreement between the survey participant's opinion and expert consensus on whether to refer ranged from 88 to 96%, although agreement on the benefit of radiotherapy ranged from 31 to 80%. More years in practice and previous training in palliative care increased the likelihood of agreement.

Among Hospice Health Professionals

Lutz *et al.* [26] surveyed workers in US hospices, including physicians, non-physician clinical staff and administrative staff. The most frequently cited referral barriers related to treatment expenses (52–54% of respondents reported this as an important factor), transportation difficulties (60%) and patient life expectancy (59%). Patient (25%) or family (21%) reluctance to utilise radiotherapy was also reported as a barrier by some hospice professionals.

Among Oncology Professionals

Two surveys [20,23] targeted samples of healthcare providers who work closely with cancer patients. Sunderasan *et al.* [20] surveyed a group of cancer physicians in Australia, including medical and radiation oncologists, palliative care physicians, general practitioners, surgeons and medical specialists. Sixty per cent or more of respondents cited the following factors as having 'moderate' or 'significant' effect on referral decisions: concern about acute side-effects of PRT (65%), travel to appointments (64%), patient fear/anxiety (64%), managing treatment toxicity (64%), relocation and accommodation costs (63%) and concern about long-term side-effects (60%). Unique barriers identified in this paper include insufficient systems for psychosocial support (cited by 29% of respondents) and co-ordination of care (25%).

McCloskey *et al.* [23] surveyed members of ASTRO, ASCO and AAHPM. Lack of education and written materials were cited by 40% of responding ASTRO and AAHPM members as inhibiting PRT referral. These respondents also cited lack of communication within a multidisciplinary team, specifically saying that increased multidisciplinary activity would allow radiation oncologists to be directly involved in palliative treatment decisions and to educate other team members about PRT. ASCO members, however, were less likely to endorse these issues, although specific numbers of respondents reporting this barrier were not mentioned in the paper.

ASCO and AAHPM members were more likely than ASTRO members to endorse concerns with travel and treatment duration. AAHPM respondents identified poor reimbursement as a barrier (probably related to fixed per-diem reimbursement rates for American hospice services). Additionally, in free-text comments, respondents emphasised the need for shorter radiation courses to improve access and increase referrals.

Table 2
Characteristics of the 11 studies included in the review

Reference	Number of respondents	Participation rate	Location	Sample population	Survey utilised	Referral rate assessment	Referral rate	Survey medium
[24]	412	31.8%	Catchment area of Cross Cancer Centre, Edmonton, Alberta, Canada	85.4% FP 3.6% MO 3.2% PC 7.7% other or NS	23-item questionnaire adapted from [16]	Self-reported, referred patients for PRT in the past year, and number referred	Yes 68.4% No 27.9% NS 3.6% 1–5 68.1% 6–10 17.4% 11–20 7.8% >20 6.7%	Paper – postal mail
[25]	407	15%	Australia	100% FP	Seven variable vignettes with three question follow-up to each	Clinical scenario, 'Would the GP refer?'	N/A	Paper – postal mail
[21,22]	298	33%	One rural and one urban health authority in British Columbia, Canada	100% FP (two cohorts: one rural, and one urban cohort)	16-item questionnaire adapted from [16]	Self-reported, ever referred a patient for PRT	Urban: 57% Rural: 70%	Paper – postal mail
[26]	480	27%	Hospices in USA	20.7% physician 34.6% administrator 43.9% non-physician clinician Other 0.8%	19-item questionnaire developed by ASTRO and NHPCO researchers	NR	3% of hospice patients receive radiotherapy	Survey sent via fax; responses by fax, postal mail or online
[23]	~860	27% ASTRO 14% ASCO 26% AAHPM	All 50 US states and 4 participants from outside the USA	~75% ASTRO members ~9% ASCO members 16% AAHPM members	82-item questionnaire developed with ASTRO health services committee	None	N/A	E-mail
[16]	34	71%	Oncology update conference, Sudbury, Ontario, Canada	41% FP 59% FP residents	32-item questionnaire	None	N/A	Paper – postal mail
[17,18]	172	50%	Eastern Ontario, Canada	100% FP	30-item questionnaire with expert input, pilot tested	Self-reported, referred patients for radiotherapy, referred to specialised palliative rapid access clinic	56% 9%	Paper – postal mail
[20]	253	47%	New South Wales, Australia	16% RO 5% allied 28% specialist physician 37% surgeon 8% FP 6% NS	13-question custom survey	None	N/A	Paper – postal mail
[19]	498	45.3%	Southern Netherlands	100% FP	Questionnaire based on [16]	Self-reported, have at some time referred for PRT	47%	Paper – postal mail

Two cohorts are reported on by two studies each. Both studies are included in the same cell for these cases.
AAHPM, American Academy of Hospice Palliative Medicine; ASCO, American Society of Clinical Oncology; ASTRO, American Society of Radiation Oncology; FP, family physician or general practitioner; MO, medical oncologist; PC, palliative care physician; NHPCO, National Hospice and Palliative Care Organization; NS, not specified; PRT, palliative radiotherapy.

Table 3
Barriers to referral for palliative radiotherapy categorised by a framework defining access to radiotherapy

		Barriers among family physicians						Among hospice professionals	Among oncology professionals			
		[24]	[21,22]		[16]	[17,18]	[19]	[26]	[23]			[20]
Category	Barrier		Urban	Rural					ASTRO	ASCO	AAHPM	
Availability	No radiation oncology facilities available/lack of local radiation oncology service							10				29
Adequacy												
Affordability	Radiation oncology expense							54				
	Restrictions in reimbursement/reimbursement							52	23	14	42	
Acceptability												
Consumer-level factors												
Transport	Proximity to cancer centre (travel distance)	35				43						
	Difficulty transporting patients							60				
	Travel/transportation								35	33	56	
	Need for patient to stay in town	40										
Unmet psychosocial needs	Insufficient support systems											29
Comorbidity	Age	27	28	19		43	48					
	Life expectancy/short life expectancy		55	44				59				
	Functional status	74	68	53		66	78					
Knowledge, perception, information needs	Patient wishes					78	82					
	Patient reluctance							25				
	Family reluctance							22				
	Insufficient information on assistance available											25
Perceptions of radiotherapy-related inconvenience												
Referrer-level factors												
Knowledge of radiotherapy	Uncertain of benefits	37	30	32	32	54	54					18
	Concern about side-effects or toxicity	37	32	34	36	49	38	31	21	26	42	18
	Occurrence of complications						62					
	Previous radiotherapy	50										
	Cancer type or histology	55				80	63					
	Assumption of lengthening life						46					
	Patient symptoms						63					
	Radiotherapy is ineffective							9				
	Insufficient knowledge of who to refer											11
	Insufficient knowledge of when to refer											18
	Lack of practice guidelines regarding radiation in palliative care								41	20	53	
	Lack of education of referring physicians								44	18	44	
	Delayed onset of symptom relief								17	17	29	

Table 3 (*continued*)

		Barriers among family physicians						Among hospice professionals	Among oncology professionals			
		[24]	[21,22]		[16]	[17,18]	[19]	[26]	[23]			[20]
Awareness of available radiotherapy services and referral processes	Unaware of radiotherapy resources											16
	Uncertainty or insufficient knowledge of referral process	17				27	47					10
Perceptions and communication of radiotherapy, side-effects and impact on quality of life												
Perceptions of radiotherapy-related inconvenience	Inconvenience	30	56	24	48	49	65					
	Treatment time/treatment length too long/duration of radiotherapy	31						47	31	33	58	
	Number of treatments or appointments	36	16	10								
Service-level factors												
Wait times	Wait time for consultation	21			20	53	19					
	Wait time for treatment	25			24	55	21					
	Wait time		22	30								
Clinical pathways within the service	Difficulty contacting radiation oncologist	12	10	14		37	11					
	Moderate accessibility of radiation oncologist						13					
	Poor communication with radiation oncologist/poor communication with physicians							24	21	20	52	
Presence and effectiveness of multidisciplinary team	Lack of multidisciplinary setting for co-ordination of care								40	22	51	

Number represents percentage of responders who indicated that a given factor had a significant impact on decision to refer. Specifically: (i) affected their decision to refer [16]; (ii) influenced referral 'somewhat' or 'a lot' [24]; (iii) limited referral [23,26]; (iv) was 'moderately' or 'very' important in negatively influencing the decision to refer [19]; (v) was a 'moderate' or 'significant' influence on the decision to refer [20].

AAHPM, American Academy of Hospice Palliative Medicine; ASCO, American Society of Clinical Oncology; ASTRO, American Society of Radiation Oncology.

Discussion

This systematic review identified 11 high-quality studies published from 2001 to 2015. Synthesising the data from these studies found that factors unrelated to the effectiveness of PRT influence referral and that these factors can be categorised according to a model of opportunity and access to radiotherapy. Concerns about comorbidity and patient inconvenience are significant barriers, but respondents also admitted that lack of knowledge about expected benefit or outcomes after PRT, or how best to manage expected toxicities, frequently affect referral for PRT. An example we found is that cancer type was rated as a significant consideration impacting referral by several included studies [17–19,24], although the symptomatic benefit of PRT is generally not dependent on histology.

Ease of contacting a radiation oncologist was not identified as a major barrier in our review. McCloskey *et al.* [23] reported a desire among hospice professionals and radiation oncologists for both written guidelines for appropriate PRT referrals and more involvement by radiation oncologists in palliative management. Interestingly, medical oncologists in this study (ASCO members) were less likely to view lack of radiation oncologist participation as a hindrance to referral.

These findings suggest targets for future interventions to increase PRT uptake: initial efforts should target increasing radiation oncologist participation in palliative care to allow for teaching and development of guidelines on appropriate PRT referrals. This approach is supported by a previous UK study [28] in which adding monthly specialist nursing visits for patients with lung cancer and prognosis less than 3 months increased PRT utilisation from 4% to 17%. Although our study identified a specific desire for radiation oncologist participation (as opposed to nursing visits), inclusion of experts knowledgeable in PRT in multidisciplinary palliative and hospice care is supported by evidence and should increase PRT utilisation.

Another included study [16] asked participants their preference on continuing medical education related to PRT and found that workshops or lectures were much preferred over written or computer-based material. This suggests that improving communication among physicians caring for cancer patients is possible and could further address the knowledge gap. Both didactic, in-person teaching and ad hoc participation by radiation oncologists in team-based care of palliative patients should further increase referrer knowledge and increase appropriate PRT referrals.

Previous literature [11] suggests that referrers consider treatment costs and availability together with perceptions of patient inconvenience (such as travel requirements) in deciding whether to refer. We found that treatment length was cited as a significant barrier. Evidence and guidelines continue to suggest that single fraction PRT is as effective as extended PRT in treating pain from bone metastases [29,30]. Improved uptake of this practice may reduce referrer concerns regarding treatment costs and length.

One limitation of this review is the narrow search strategy, which excluded papers dealing with patients already referred to PRT. Including such papers may have provided more insight into physician–patient communication issues, patient perspectives and strategies used by rapid access radiotherapy programmes to streamline referral procedures and educate patients and colleagues about PRT. However, a major purpose of this review was to identify factors that impede providers' decisions to refer so that targeted efforts can be made to improve understanding of PRT and referral rates. Therefore, studies reporting barriers after referral lie outside the scope of this specific review.

Additionally, the cross-sectional survey methodology and generally low response rates (<50% in all but two included studies) may have produced a skewed understanding of barriers to referral. Respondents may, therefore, not be representative of their discipline in terms of understanding of PRT. Notably, nine of the 11 studies relied entirely on postal mail to disseminate their surveys and receive results. Electronic survey methods may require less effort on the part of potential respondents and may be assumed to increase response rates. However, the two studies we analysed that provided for electronic responses both had response rates less than 30%, among the lowest of the included studies.

The included studies also relied on the memory and opinions of respondents, which could cause recall bias to skew results. For example, Lutz *et al.* [26] showed a 3% utilisation rate in their hospice population and identified significant financial barriers as the main reason for low PRT uptake. However, a study in Saudi Arabia [31] showed a similar 3.9% utilisation in a single palliative care unit with no transport or financial concerns, explained only by short life expectancy and a poor performance status. Barriers other than those reported may be influencing referral and PRT utilisation. Future efforts to study referral barriers could attempt to capture physician and patient attitudes at the time of assessment or treatment, reducing the lag between the referral decision and the collection of data relating to it.

Study authors differed on whether self-reported referral rates provide valuable information. As most referrals for PRT come from medical oncologists or surgeons [32], one author suggested that perhaps responding physicians are reporting 'indirect' referrals (sending the patient to a specialist who subsequently referred for PRT) [19]. This hypothesis is supported by one of the included studies, where the number of general practitioners who had ever encountered a patient who needed PRT was similar to the number of general practitioners who said that they had referred patients for PRT [21].

We did not identify any high-quality studies that investigated how patient perspectives affect referrer's decisions. Understanding patient perspectives and how they affect utilisation and referral rates for PRT warrant further investigation.

Conclusions

Our systematic review identified 11 high-quality studies that reported on barriers to referral for PRT among

physicians; these studies all used survey methodology. Factors affecting healthcare professionals' decisions to refer patients for PRT include lack of understanding of expected outcomes and toxicities of treatment, perceptions of patient inconvenience and patient preferences. Different categories of referring physicians emphasise different barriers to referral and thus may benefit from different targeted interventions. Efforts to increase appropriate PRT referrals should include increased expert participation in multidisciplinary palliative care, in-person interprofessional education and shortening treatment courses. Further study should focus on real-time assessment of referral barriers and evaluation of increased PRT referrals after interventions.

Conflicts of interest

The authors declare no conflict of interest.

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