

Research interests identified at the coal-face: initial Delphi analysis of Australian radiation therapists' perspectives

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Abstract Radiation therapists (RTs) need to engage more in research for the benefit of their patients and their own professional development. However, radiation therapy in Australia is new to research with an undeveloped research culture, so RTs need direction when wishing to embark upon research projects. This manuscript provides the results of the first stage of a Delphi process aimed at defining RTs' areas of research interest. Questionnaires were sent to all Australian departments of radiation oncology ($n = 41$) asking for a group in each department to identify what problems they experienced while treating patients or working with colleagues, and what areas of radiation therapy they felt required further research by radiation therapists. The response rate was 70.7%. Of the designated RTs who collected the data, 82.8% had greater than 10 years experience and 48.1% had postgraduate qualifications. Two of the researchers categorised the responses and derived a list of themes to describe the identified questions. Of 410 research questions, 374 could be coded (91.2%). The categories defined were "Staff issues" (58.3%), "Technical issues" (28.9%) and "Patient related issues" (12.9%). The RTs were interested in many research areas, but it is of concern that the largest theme identified was "Staff issues", which could indicate some dissatisfaction in the workplace. However, it was clear that RTs are thinking about their practice and identifying gaps in knowledge in the technical and patient related areas. The second stage of this project was to create research areas that represented the themes identified in this first stage and send them back to the radiation oncology departments for prioritising; these data are currently being analysed.

Keywords: Delphi technique, patient related issues, radiation therapy, research topics, staff issues, technical issues.

Introduction and background

There is a need for increased research in the field of radiation therapy. Several studies have highlighted that radiation therapy-related research is required to evaluate new treatment techniques, develop evidence based practice and improve patient care.¹⁻⁴ However, to date, radiation therapists (RTs) in Australia have had little involvement in research and failed to take lead roles in conducting radiation therapy related research projects. Instead, RTs have found themselves in a position where they may be involved in multidisciplinary projects, collecting data for projects designed by radiation oncologists and clinical trials that they may know little about. While RTs involvement in multidisciplinary research (e.g. Trans Tasman Radiation Oncology Group trials) is essential, it is also important that RTs lead research projects that are relevant to their own profession. It has been reported⁴⁻⁶ that RTs' involvement in research is limited by lack of education, support and time. While these factors continue to impinge on RTs Australia-wide, there are new opportunities being created for RTs to become actively involved in research that is directly related to their practice.

First, a number of departments of radiation therapy in Australia have, or are in the process of creating, part time research positions that enable RTs to take time away from working on treatment machines to conduct research (personal communication: R Beldham-Collins, Convenor, NSW Radiation Therapy Research Group, 2008). Second, in New South Wales, the Cancer Institute has created the position of Associate Professor of Radiation

Therapy, with the aim of increasing radiation therapist involvement in research.⁷ Finally, the number of RTs graduating with research degrees is gradually increasing, with 12 RTs reported to be undertaking PhD study in 2006.⁸ These new graduates will be able to take on further research projects and mentor more RTs who wish to conduct research projects.

One of the difficulties that many novice researchers face is deriving relevant and suitable research questions for the clinical environment.⁹ Often, individuals begin with many questions that require answers; however, it is not possible to address all of these questions using one research project. Researchers need to consider many aspects including the appropriateness of methodology required to answer their research question, the time available to conduct the research, resource availability and ethical issues that may be associated with the research question being proposed.

Cox found in a survey conducted in NSW in 2006¹⁰ that although RTs were keen to become involved in research projects, they did not know where to start and struggled to identify whether they were asking the right sort of research questions. Although research priorities have been identified in other health related fields,¹¹⁻¹³ radiation therapy is such a specific discipline that it is likely to have its own particular topics that need to be investigated. The overall purpose of this entire research project was to therefore identify research priorities in Australia in the field of radiation therapy. The aim of this particular manuscript is to provide an understanding of the research areas that are of interest to RTs in Australia.

Method

Ethics approval was gained from the University of Sydney (project number 11-2006/9516, approved 15th January 2007).

Study design

A Delphi survey method was used to identify the research priorities for RTs working in Australia. This survey method has previously been shown to be useful in identifying priorities in adult cancer nursing research,¹¹ emergency nursing,¹² and nursing care within a radiation therapy department.¹⁴ The Delphi survey method uses a series of surveys to gain and analyse specialist opinions on a topic without requiring the practitioners to meet and spend long periods of time together.⁹ This research method achieves a consensus on which topics are important without eliminating topics that are considered to be less important.

Two surveys were used in this study. The first survey, sent to participants in January 2007, asked the leading respondent, (in all cases a designated RT and hereafter referred to as the "designated RT"), to work with a group of representative RTs. The aim of this collaborative group work was to identify three lists of five important questions, problems or approaches relating to radiation therapy that they believe should be studied. Three qualitative questions were posed:

- "What problems do you experience while treating patients in radiation therapy?"
- "What problems do you experience in your work with other colleagues in the department?"
- "What areas of radiation therapy do you feel require further research by RTs?"

These questions have previously been piloted by Barrett, *et al.*¹¹ who conducted a similar study with clinical nurses in Western Australia. Demographic details such as age, education and radiation therapy experience were also obtained from the designated RT, who physically completed the survey on behalf of their representative RT group. Each designated RT was also asked to identify how many RTs participated in the group discussions.

Total data collection time for this initial questionnaire encompassed a period of four months. After this survey was analysed, participants were sent a second questionnaire which was used to prioritise the research areas that were developed through the issues identified in the first survey round. This manuscript describes the results of the first survey. A second manuscript will further describe the second survey and present the research areas that were identified by participants as research priorities.

Participants

All RTs working in radiation oncology departments in Australia were eligible to participate in the study. This sample included RTs working in both treatment and planning as well as Senior RTs and Chief RTs. These participants were included because we were interested in obtaining the perspectives of all RTs who have clinical expertise, and are aware of the needs of their profession and the patients they treat. This participation of RTs was facilitated through their place of employment.

Procedure

The Chief RT in each of the 41 radiation oncology departments in Australia was contacted via mail and provided a copy of the information sheet and first questionnaire. The Chief RTs were located from the list used by the University of Sydney when planning student clinical placements. They were then asked to either complete the questionnaire themselves or allocate one of their radiation therapy colleagues (the designated RT) to read the

information sheet and complete the questionnaire. Completion of the questionnaires indicated informed consent.

Designated RTs were asked to discuss their responses to each of the three questions with their colleagues with a specially called interest group or during a staff meeting. All participants had access to the information sheet and were asked to consent to the study prior to participating in these group discussions. This method of obtaining data was used to facilitate input from all interested RTs in the department.

Two reminder letters were sent to the Chief RTs to increase the response rate for the first questionnaire. All responses were anonymised as requested by the Ethics Committee. The questionnaires did not contain any participant IDs or names. Confidentiality was assured through the use of reply paid envelopes rather than asking participants to send their responses using their own envelopes.

Data analysis

All the responses were initially entered into Microsoft Excel 2003 (Seattle, Washington, USA). This program was used to manage the data. Descriptive statistics were used to describe the sample according to demographic and practical experience. Chi-squared analysis was performed using SPSS Version 16 (College Station, Texas, USA). Qualitative analysis of the data was conducted manually using content analysis by two researchers (JC and GH).

Qualitative data analysis

The issues identified by the participants for each of the three research questions were reviewed and put into research categories. These research categories were used to broadly describe the areas of interest identified. Each researcher derived a list of themes that they felt could be used to describe the issues that had been identified. The researchers then met in a face-to-face meeting to discuss the issues identified, the categories and themes that had been derived, and come to a consensus about which issues should be assigned to each theme. This paper provides a summary of the categories and themes that emerged from the data.

Our second manuscript will describe the steps that followed these methods and the development of the second questionnaire, which was used to prioritise the research areas identified.

Results

Demographics

Responses were received from 29 departments out of the 41 surveyed (70.7% response rate). A total of 190 RTs were involved in the process of identifying areas of research interest, with a mean of 7.3 RTs per department. Of the 29 designated RTs who collected the data for their group, none had less than 5 years experience, only five had 5–10 years experience, and the 24 remaining (82.8%) had greater than 10 years experience. Nineteen (65.5%) held management positions, specifically as manager, director, Chief RT or Deputy Chief. In terms of qualifications, there was a non-significant variation in qualifications (Chi-square, $P = 0.47$), but the largest group (29.6%) held postgraduate coursework qualifications and 18.5% held Research Masters degrees (Figure 1).

Research interests

A total of 410 research interests were identified by the respondents, of which 36 (8.8%) could not be coded. Examples of these responses included uninterpretable responses such as: *How to avoid being a production line* (Q9, S18), *Zooming issues* (Q9, S24), and *How to achieve early retirement* (Q10, S10), and broad responses such as *Education* (Q8, S11) and *Unmatched demands*

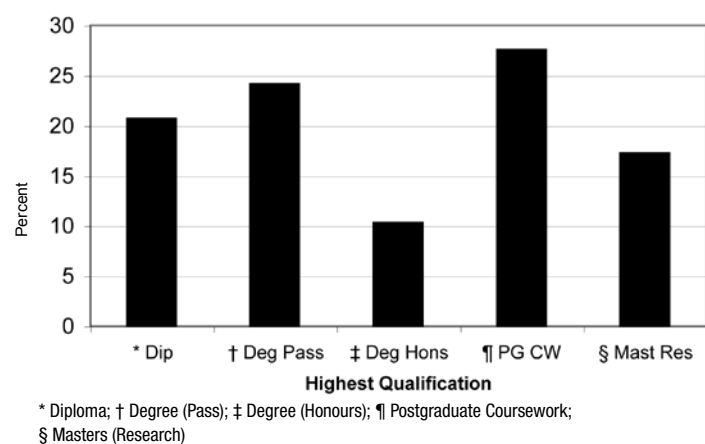


Figure 1: Educational levels of RTs who collected the data. Chi-squared analysis indicates no significant variation across the group ($P = 0.47$). No radiation therapists held any PhDs or qualifications below Diploma level.

(Q8, S21), where it was not possible for the researchers to identify the context or applications.

Thematic groups and categories

The remaining 374 responses were categorised into 13 thematic groups within three overall categories (Figure 2). There was a statistically significant variation in the results (Chi-square, $P < 0.001$).

The largest category was “Staff issues” with 218 (58.3%) responses within the themes of “Radiation therapist education”, “Staff interactions”, “Workload”, “Management”, and “Diversification, recognition and other professional issues”. The second largest category was “Technical issues” with 108 (28.9%) responses in the themes of “Accuracy of patient positioning”, “Techniques/Equipment”, and “Manual handling”.

The smallest category was “Patient related issues” with 48 (12.9%) responses containing “Patient communication”, “Patient education”, and “Psychosocial support.” Some examples of the survey responses can be seen in Table 1.

Discussion

This project was carried out as the first stage of a Delphi investigation aiming to determine the research interests of Australian RTs. Given the very limited research experience in this profession, rather than directly asking respondents to identify research areas for questions, we asked them to more broadly identify “What questions, problems or approaches do you believe should be studied?” They were asked to do this as a group, rather than singly. We felt that both these strategies would encourage sharing of ideas and discussion of problems without anyone having to try to word questions in terms of research questions or hypotheses.

This first survey achieved a high response rate of 70.7%. One hundred and ninety of an estimated >1246 RTs¹⁵ took part in this study nationally. We therefore propose that this sample is likely to be representative of the perspectives of many Australian RTs. The main limitation to the research was that, due to distance and costs, the questionnaire was not administered by the investigators themselves, but by persons nominated by the Chief RT of each department. However, almost half (48.1%) of the designated RTs collecting the data had postgraduate qualifications by either coursework or research which suggests that these designated RTs had an interest in and the ability to collect the data in a rigorous manner.

The high participation rate, plus the large number of themes identified, shows interest in research in the Australian RT

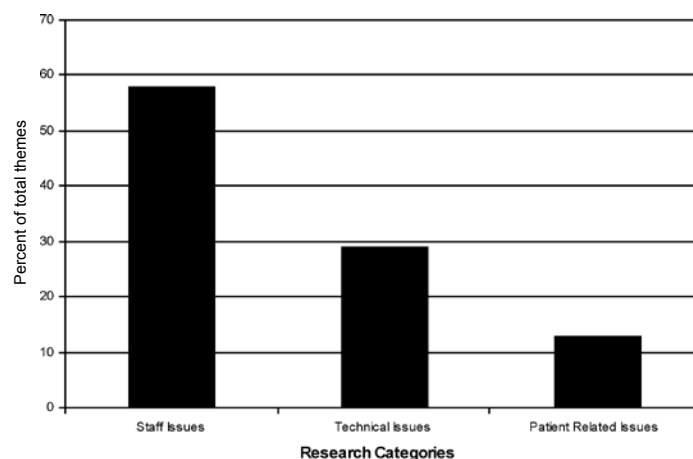


Figure 2: Distribution of responses within the three research categories. Chi-squared analysis indicates a significant variation across the group, $P < 0.001$.

community. The large number of RTs with postgraduate qualifications who collected the data is an indication that individuals are advancing in the field. Furthermore, this participation suggests that the departments are making use of their higher-level qualifications by placing them in positions related to research in some way.

Staff issues

The most surprising aspect of the results was the large amount of interest in the category of “Staff issues” (58.3% of responses). Within this category were two groups which could be described as “Staff concerns” and “Staff interests”. “Staff concerns” (see Table 1, Category 3) included the three most commonly occurring themes of “Management” (14.2%), “Staff interactions” (13.9%) and “Workload” (11.2%) – 39.3% of the themes. We have labelled this large group “Staff concerns” because it appears to indicate a high level of dissatisfaction within the departments, a considerable amount of which relates to departmental management. There were problems identified such as *Hierarchy / Structure* (Q8, S29), *Extra work is not acknowledged* (Q8, S26), *Delegation of duties to share tasks* (Q8, S26), *Bullying: non-acceptance of some staff’s seniority, abusing a seniority position* (Q8, S15), and many others. These findings are consistent with those of Atyeo, who found that RTs’ dissatisfaction with management was a significant occupational stressor.¹⁶ It could be suggested that such comments were encouraged, as one of the three questions was “What problems do you experience with your work colleagues in the department?” However, there was no maximum or minimum number of responses specified, so if there were few problems, there should have been few responses. On the other hand, it might be thought that the large number of “designated RTs” who were themselves managers could have inhibited complaints about management, but the large numbers of management related topics indicate that this was probably not the case. It has been normal practice in Australia to promote Chief RTs, who manage the RT staff and all aspects of radiation therapy, from within the ranks, so they may not have any specific management training.¹⁷ This may be a source of considerable dissatisfaction within the RTs.

The group of “Staff interests” (see Table 1, Category 3) includes the remaining, smaller, themes of “Diversification, Recognition and Other professional issues” (10.2%), and “Radiation therapist education” (8.8%). Comments in these themes include “RTs involvement in clinical trial design is often overlooked.” “RTs come in as a late afterthought, not as an integral member of a multi-D team” (Q10, S5), “PF (port film)/EPI (electronic portal

Table 1: The three categories of responses with their emergent themes and example responses

Category	Emergent themes and example responses	n	*%
1 Patient related issues	Patient communication		
	– Communication with patients: how do we communicate? What should we say to the patients? †(Q7, S1)	10	2.7
	– Communication with patients, especially non-english (sic) speaking ones (with no translators). (Q7, S22)		
	Patient education		
	– Increasing patient awareness of their treatment and their RT's role. (Q7, S3)	13	3.5
	– Lack of knowledge of side effects, both acute and late effects. (Q7, S13)		
	Psychosocial support		
	– Dealing with patient and family anxiety. (Q7, S13)	15	4.0
	– Dealing with depressed patients. (Q7, S2)		
	Symptom management		
– Effective management of side effects. (Q7, S8)	10	2.7	
– Understanding of how complementary therapies interact with radiation side effects. (Q7, S3)			
	Total	48	12.9
2 Technical issues	Accuracy of patient positioning		
	– Effect of organ motion – acceptable variations and set up margins. (Q7, S8)	41	11.0
	– Patient movement during treatment (i.e. when beam is on or between sequenced fields). (Q7, S6)		
	Techniques/Equipment		
	– IMRT beyond prostate and H&N. Is it better in terms of outcomes for patient? (Q9, S5)	48	12.8
	– Implementing new techniques – do we do enough research? Do we know when we are ready? Are we doing it properly? (Q9, S12)		
	Imaging in radiation therapy		
	– Why EPI images are not so great, at angles off orthogonals or in soft tissue areas (Q9, S26)	14	3.7
	– Using imaging modalities to assess patient outcomes to analyse PTV margins (for various sites). (Q9, S6)		
	Manual handling		
– Occupational health & safety equipments/aids (sic) for large/obese patients (Q10, S27)	5	1.1	
– Physical demands on staff (i.e. lifting, rotating etc). (Q7, S6)			
	Total	108	28.9
3 Staff issues	Staff concerns – staff interactions		
	– Team dynamics, sometimes differences in personality traits. (Q8, S4)	52	13.9
	– Strong personalities, quiet staff do not have a chance to speak up. (Q8, S1)		
	Staff concerns – workload		
	– Not enough time to meet the holistic needs of the patient. (Q7, S14)	42	11.2
	– Not enough time/resources for training new staff/students. (Q8, S2)		
	Staff concerns – management		
	– Investigate validity of colleague driven management instead of top down management in our workplace. (Q8, S3)	53	14.2
	– Encouraging some staff to make decisions and take ownership. (Q8, S7)		
	Staff Interests – diversification, recognition and other professional issues		
– How to motivate RT community into research and wider professional involvement. (Q9, S5)	38	10.2	
– Job satisfaction: role development, broadening experiences, utilising skills. (Q9, S14)			
Staff interests – radiation therapist education			
– Investigating supervisory techniques used in clinical education and PDY supervision by RTs: what works, what doesn't? Developing supervisory guidelines & support courses to develop RT skills in this area (Q10, S3)	33	8.8	
– Lack of knowledge of current chemotherapy regimes. (Q7, 13)			
	Total	218	58.3

*Percentage of total number of responses. † Notation for Question and Survey numbers: Q7 = Question 7, S1 = Survey 1.

imaging) moves: who should make the decision – RT or RO (radiation oncologist)?” (Q9, S6), “Dissemination of information throughout radiation therapy – are we learning enough from each other?” (Q9, S12), “Maintain staff knowledge of evolving technologies and an acceptance of new technologies in a dept (sic) (managed rate of change)” (Q8, S19). Role expansion is a topical area, with the UK and Canada in particular creating expanded and senior roles in radiation therapy,^{18,19} and the Australian Institute of Radiography is now investigating role expansion in Australia.²⁰ Our range of data and the categories presented show that the RT population is well aware and supportive of broadening the role of the RTs, for example “Management of side effects – is this an RT or oncology nurse responsibility?” “What is most efficient and effective for the patient?” (Q9, S8), and “Job satisfaction: role development, broadening experiences, utilising skills” (Q9, S14).

In attempting to define the scope of RTs' research, we need to be aware of what is our central area of theoretical knowledge, and it could be argued that most of the topics listed under “Staff issues” and particularly the group we have labelled “Staff concerns”, are peripheral to the field of radiation therapy. Management, for instance, is not taught in undergraduate radiation therapy programs in Australia and is not listed under the definition of an RT,²¹ so although it is obviously important to our respondents, it is the sort of research that might be better carried out by a management researcher. However, this unexpected finding and the need for staffing issues to be addressed within radiation therapy warrants further investigation.

Technical issues

As would be expected, the category of “Technical issues” was popular, with 28.9% of responses. It is clear that the RTs are aware of new technical developments such as intensity modulated radiation therapy, image guided radiation therapy and gating, and that they are asking important questions about them. It was particularly heartening that some of these questions were evaluative rather than procedural. Hence, instead of asking “How do we do IMRT?”, RTs asked questions such as “Fors and againsts of IMRT technology – is cost worth the benefit?” (Q9, S8), and “IMRT beyond prostate and H&N. Is it better in terms of outcomes for patients?” (Q9, S5). This demonstrates the critical frame of mind that is a pre-cursor to research.²

Patient related issues

“Patient related issues” was the third category, with 12.9% of responses. RTs have always had a strong interest in patient care, which is illustrated by responses such as “Gaps in provision of care, inadequate processes to formally assess patients for ongoing suitability for treatment” (Q7, S9), “Patient issues e.g. misunderstanding instructions, nervous, claustrophobic, how to best support them” (Q7, S6), and “What level of support for our patients is suitable (from RTs) in the context of today's multidisciplinary team?” (Q7, S3). This third response illustrates one of the difficulties experienced in identifying themes, because it could fit as well into “Staff interests” (within the theme of “Diversification”) as it does into “Patient related issues”. However, this ambiguity illustrates the profession of radiation therapy's close integration of the technical, behavioural and educational roles. It may be that fewer patient related questions were identified because RTs already feel that they are doing a good job at providing patient care and therefore do not need to change. In spite of this, research is still required in this area to ensure patient care is maintained or improved and that we are addressing the changing needs of our patients.

The future

It was encouraging to see the strong interest evinced in this project. It is clear that RTs are thinking about their practice and identifying gaps in knowledge and important areas to be investigated. The next step in this project was to create research areas that represented the themes identified in this first stage, and send them back to the radiation oncology departments for prioritising. This has been done; the data are currently being analysed, and will be reported on later. We believe that the final data will give us a list of viable research areas that can be presented to the RT population for future research. This step, along with support from more experienced mentors and enrolment in research degrees for some RTs, will allow more rapid progression in research for the profession.

Conclusion

Australian RTs are showing interest in research and were able to identify important topics that needed investigation. Several of these topics are in core areas of radiation therapy practice such as techniques and patient care, so can be the focus of future research projects led by RTs. The majority, however, are in non-core areas such as management, and may relate to structural problems within Australian departments of radiation oncology. These topics also warrant further investigation.

The next stage of this project provides information on RTs' research priorities, and will enable research leaders to create research projects that will interest RTs. It is hoped that this process, in the long term, will lead to greater RTs' involvement in research, which should not only help patients, but will also help advance the profession.

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