Getting started with research

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Abstract

Do you have an enquiring mind and an enthusiasm or thirst for knowledge? Do you want to get involved in radiotherapy research or develop your research expertise? Research should underpin the clinical and educational activities undertaken by Radiation Therapists. For many, research can seem a daunting process that is beyond their expertise or capabilities. All health care practitioners can use research evidence and some may want to undertake their own research but may feel unsure where to start.

This article is aimed at novice researchers (or those with limited research experience) and those wanting to develop their research potential. The discussion should help practitioners identify the necessary skills required to undertake research, where to go for help, the research process (including where research ideas come from), and what to consider when putting together a project team or applying for research funding.

The discussion concludes on the importance of research training and support (or mentoring) for novice researchers or those at the start of their research careers. The national professional body for therapists can play an important role in helping researchers to network with likeminded individuals. Some professional bodies (such as the College of radiographers in the UK) may also provide small research grants to help build research activity, and as such can be a useful starting point when considering research funding.

Keywords

INTRODUCTION

Research should underpin professional activities whether these are clinical or educational, forming part of most job descriptions and central to a radiation therapists' good practice.[1] Traditionally therapists have played important roles within major clinical trials but there is real momentum for therapist driven research into areas outside the major national or international trials that concern both therapists and users. The number of radiation therapists with higher degrees is increasing and the requirement for research activity within radiotherapy undergraduate and postgraduate qualifications means interest in research and research skills within the therapist community is generally more prevalent.

This article is aimed at those with limited or no previous experience of research or those wanting to develop their research capabilities. The article initially will discuss the importance

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of research, what skills are needed to participate in research, followed by a brief discussion of the research process, the importance of getting the people with the relevant skills for your proposed study on your project team[2] and some key points to consider when applying for research funding.

GETTING STARTED: WHY RESEARCH?

Practitioners undertake research for a number of reasons (see Box 1). Research enables therapists to improve patient care as it provides insights into practice and affords the opportunity to test the effectiveness of the care provided.[3]

Utilising research to underpin practice is the ultimate aim of therapists undertaking research, acting as a catalyst for innovative work. Research should be encouraged so that those with an interest or affinity in certain projects can become involved and have ownership of the changes that occur as a result, aiding professional development and job satisfaction.

The therapist's role also requires co-operation and intercommunication with other health professionals so that multidisciplinary research work can be undertaken, thus recognising the overall well being of the patient from a holistic approach via the constructive sharing and mutual exchange of information.[4] This provides an environment for strong and effectively performing teams, rather than professions working in isolation, or even against each other.

Collaboration enables staff groups to work effectively and efficiently together and to educate

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Box 1 Why research?

- Find answers to questions
- Report on current situations
- Understand patient or staff experiences
- Evaluate current techniques
- Investigate new techniques

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each other about their roles and professions, enabling a mutual working environment rather than professional territoriality and ensuring seamless patient care.[5]

Many members of the health professions fail to see or do not wish to see the importance and relevance of research in a clinical setting and it is only by persevering and demonstrating why it is important that their views may be expected to change. Lack of enthusiasm by others can also be the fault of the researcher who must communicate appropriately with others.

Research in a work area requires commitment by everyone and must be encouraged and valued by the whole team, otherwise barriers can exist which may block research findings being utilised and implemented. Research work needs to be valued and must not be just a token gesture in a department if it is to co-exist with radiotherapy procedures on a daily basis.[6] It needs to become a culture, the norm. Research is about sharing work and all therapists need to feel included and have ownership of the work.

Of course research can be flawed; it does not answer all the problems. Good research can only provide insights into the problem being investigated and the original question that was asked. Hence good research training is necessary and should be encouraged as part of the continuous professional development (CPD) of all radiographers.

It is important that radiographers are involved with projects at their centre. 'In-house' research adds to the professional body of knowledge and is excellent for personal portfolios. When trying to get started with research it is worth trying to get involved with clinical trials and commercial studies. These provide confidence to do it alone and may be used to sponsor in-house work and to fund education and courses for staff. Opportunities for research training are likely to increase and as time progresses research involvement is being recognised as a legitimate part of professional activity.

GETTING STARTED: WHAT SKILLS DO YOU NEED?

A good researcher needs to acquire a range of basic (see Box 2) and specialist (see Box 3) skills to produce high-quality outputs. For those thinking about getting involved in research a review of the skills listed in Box 2 may identify some gaps in current expertise that may need attention prior to initiating any project.

There are a number of educational establishments that offer short courses on a variety of basic research skills as well as more specialist courses on research methods (see the web links in the resources section at the end of this article), some even offer e-learning alternatives to reduce the need for time away from the workplace. In addition, it is important for researchers to have good communication skills in order to

1. network
2. put together strong research teams
3. consult with relevant stakeholders to gain access to potential research participants
4. engage interested parties in collaborating on the proposed work (see the article in this edition on patient and public involvement).

It is also important to be willing to invite feedback (however critical) about your work in order to improve the quality of the subsequent study.

GETTING STARTED: THE RESEARCH PROCESS

When undertaking research it is important to follow the research process, Figure 1 shows the standard cycle of events that most novice researchers should follow. Primarily there are two main stages: conceptualisation and operationalisation. Good measurement starts with good conceptualisation.[7] This means being clear about the concept you intend to research and clarifying relevant terms. In addition, the conceptualisation stage includes considering each of the following:

1. Topic analysis
2. Aims and objectives
3. Scope of the study
4. Research questions (hypothesis or proposition)
5. Review of the current literature
6. Methodological tradition or standpoint
7. Sample

Box 2 Basic skills

- Ability to critically review research articles
- Understanding of basic statistics
- Ability to search for literature through electronic databases
- Ability to use a basic spread sheet (for example Excel)
- Ability to use data analysis software
- Able to use a reference organiser (e.g., Reference Manager or Reference works)
- Able to speak in public and use PowerPoint to disseminate results
- Good writing skills

Box 3 Specialist skills

- Specific Research Methodology expertise (for example, Phenomenology, Case Study, Randomised controlled trials, etc.)
- Specific research techniques or methods (for example specialist knowledge in the use of focus groups, product testing, survey design, etc.)
- Statistical analysis techniques (for example ability to undertake regression analysis).

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8. Variables to be studied and variables to be controlled
9. Reliability and validity
10. Timetable of activities and key milestones.

Within the conceptualisation stage it is necessary to consider the research topic or the questions to be answered. For those new to research it is important to consider the resource implications (both the cost of undertaking the project as well as the time commitment from participants) that will be involved. Research for postgraduate qualifications is often seen as 'a means to an end' and the researcher must consider the societal benefit of undertaking the study as well as any potential harm to participants when formulating the questions to be answered. Box 4 indicates where potential new research ideas may develop from.

Following clarification of the research topic a meticulous review of the current literature on the topic is usually required to ensure the answer to the proposed question is not already available from previous research, as well as using previous research to augment the design of the proposed study (by incorporating design approaches that have been used in successful studies). Furthermore, previous research can provide data to inform sample size calculations where appropriate. Specialist research methods (such as Grounded Theory) may require that a thorough review of the literature be reserved until a theory has started to emerge from the data.[8] Box 5 lists some databases that novice researchers may find useful when investigating the current available published evidence.

A detailed proposal should also be prepared during the early design stage serving a number of functions:
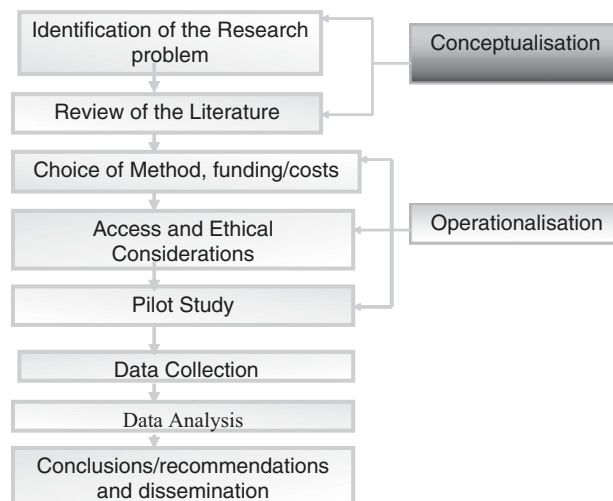

Figure 1. The research process.

Box 4 Where do research ideas come from?

- Observations in clinical practice
- Informal discussions with patients or formal focus groups' discussions with patient groups
- Discussions with colleagues
- Questions raised by published research
- Nationally identified research priorities
- Follow on work from previous studies.

Box 5 Useful databases and websites to search for relevant radiotherapy literature
Databases

- Medline
- CINHAL
- British Nursing Index
- PsychINFO
- ScienceDirect
- IngentaConnect
- Cochrane Reviews database including the Database of abstracts and reviews (DARE)
- National Research Register including the ongoing reviews database (CRD Register of Reviews)
- LILACS—Latin American and Caribbean Literature in Health Sciences

Websites

- UK Royal College of Radiologists (or national equivalent body)
- UK Society and College of radiographers (or national equivalent body)
- UK NICE (National Institute for Clinical Excellence)
- National Library for Health
- TRIP (Turning Research into Practice)
- National Library for Health
- Dogpile Metasearch engine
- Intute: Health and Life Sciences Medicine http://www.intute.ac.uk/healthandlifesciences/medicine/

1. Helps ensure important details about operationalisation of the study have been considered.
2. Can be submitted to relevant ethics and governance approval panels as well as funding bodies.
3. Can be used as a template for the study and used to develop a protocol for individuals involved in data collection providing guidance on when data need to be obtained and in what format.
4. Can be referred to during data analysis to ensure the results' focus on the initial questions posed.

During conceptualisation of the study it is important to consider the research method that will allow you to answer the research questions posed. It is beyond the scope of this article to discuss all the methods and their applications; Figure 2 presents an example of the spectrum of research designs and some radiotherapy examples.

The second stage of the research process is the operationalisation of the project design and involves doing the research and disseminating the results. This stage involves a range of activities including

1. Undertaking a pilot study
2. Data collection
3. Data analysis
4. Synthesis of the results
5. Placing the results in context of published literature
6. Testing the results against the research questions
7. Disseminating the results through journal articles, presentations, and reports to key stakeholders.

GETTING STARTED: THE PROJECT TEAM AND PROJECT MANAGEMENT

Putting together the project team needs as much thought as the project design. Ensuring that the team has the requisite skills to complete the proposed work is important if funding bodies are to feel confident that the project has a high chance of success. There are no hard fast
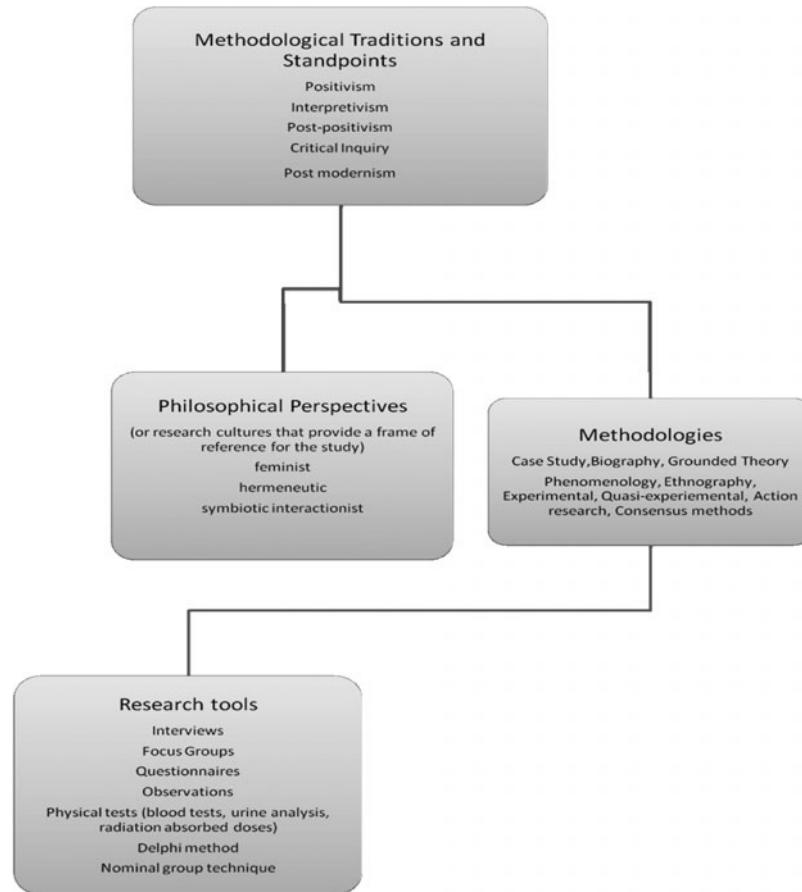
Figure 2. The spectrum of research methodologies, methods and tools.

rules to apply when selecting your project team but some thoughts to consider are provided in Box 6.[2]

As well as considering with care members for the project team, consideration also needs to be given to who will be the project manager. The project manager should be someone with relevant managerial experience as they will be expected to manage the team and the resources to ensure that the project produces the out-comes expected on time and on budget. Many senior therapists already have the requisite skills to be project managers and will have relevant experience in managing teams, and budgets (see Box 6). It is worth thinking about the approach to project management; the critical chain method is one approach. In this method high risk activities are identified in the timeline, and where possible multi-tasking is avoided to ensure maximum chance of success of each of the activities.[2] A buffer is added to the end of non-critical activities in the timeline to protect the start of other critical activities (see Figure 3 for an example timeline utilising the critical chain method). The buffer times can be used as diagnostic tools to alert the team to any circumstances where a recovery plan should be implemented to keep the project on target.

GETTING STARTED: FUNDING THE PROJECT

One of the main challenges for novice researchers when getting started in research is being able to secure funds to buy out your time from normal clinical or educational duties. Even where research is a part of an individual's core duties, funding is usually necessary to provide

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Box 6 Thoughts on selecting the project team(2)

- Working with people you know or who you have worked with previously has its advantages (as well as disadvantages see bullet point 3 below). Getting to know new people takes time and effort and this may slow down progress on your project during the initial stages, so project managers often select people they have worked with before to reduce the time required at the start of a project getting people used to working together.
- Where a team is made up of people who have worked together before with one or two newcomers it is important to ensure that those that join the group are eased into the group dynamics.
- Using teams that have worked together on previous projects can have its drawbacks. When the team is required to work under pressure they may revert to previously tried and tested resolutions to save time. However, not all problems can be resolved this way and where creativity is needed it may be more appropriate to select a new team in order that a wide range of possibilities will be considered before a final approach is decided upon.
- Is there somebody on the team with previous experience in the topic area? This will give the team valuable knowledge of previous research as a well as credibility from a funding perspective.
- Is there somebody on the team with expertise in the chosen research method? This will ensure that important design characteristics are not missed and data analysis is completed to a high standard.
- Does the team have a balance of clinical and academic staff to provide a good range of skills and expertise?

Box 7 Top tips from experienced researchers

- If the term 'research' sounds scary think about it more as a small study this may seem more doable
- Seek help from an experienced researcher in the first instance, get them to either supervise your work or mentor you during the project.
- People often think research is done by other people (who have more skills, talents or more ideas than they have), do not be intimidated we can all participate in research.
- Dedicated time for research is essential.
- Document everything; keep a journal so that you can document when you undertake each activity, how it went, any problems and interesting observations, etc.
- Research is time consuming and in order to complete the project within the timescale you will need to be organised. Always carry some elements of the project that you are working on with you so you can catch up on reading journal articles while waiting for participants to turn up for appointments for example.
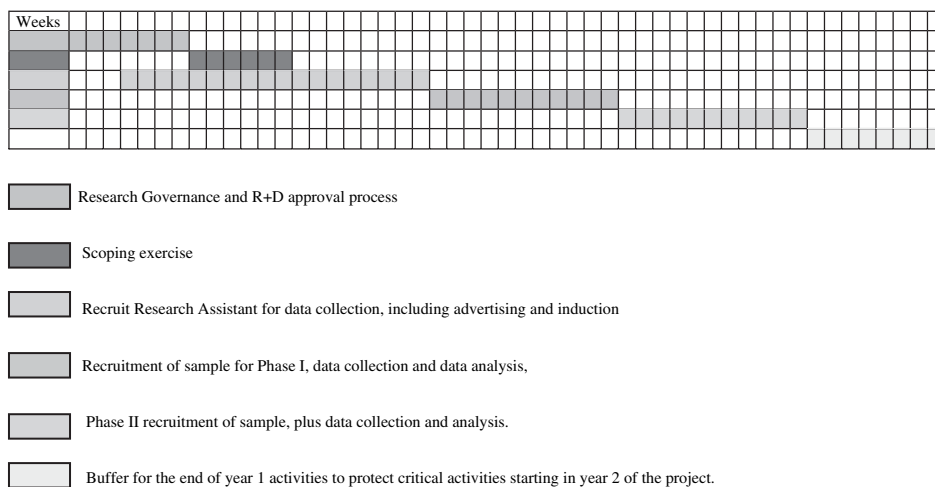

Figure 3. Example timeline using the critical chain method of project management for 1 year of a research study.

appropriate resources for completion of the study. Applying for and securing project funding is not easy even for experienced researchers. Competition is often high and funding bodies have limited budgets so proposals need to have high quality and value for money. Therefore, it is recommended that those new to research join established research teams on other research projects to gain experience and develop a research reputation before attempting to do it alone. It may also be worth looking for funding bodies that target novice researchers or those who are in the early stages of a research career. These funding bodies often have a remit to broaden research activity and in order to build capacity they may look positively on less experienced researchers offering support in order to nurture a research environment. For example, in the UK the Society and College of Radiographers has a funding stream that will support doctoral projects or support individuals to undertake research training as a way of enhancing research capacity. Funding opportunities for UK based therapists can be found on the research and development website, www.RDinfo.org.uk. When identifying possible funders remember to ensure your project reflects the priorities of the funding body[9] as well as priorities of professional bodies, or government agencies. When completing funding applications it is important to follow guidelines stipulated by the funding body;

failure to do so may jeopardise the success of the application.

Funding bodies generally use some form of peer review so it is important to find out how the application will be assessed. Box 8 lists the criteria used by the UK College of Radiographers to assess funding applications.

GETTING STARTED: RESEARCH TRAINING

You may feel that you need some training before you embark on a research project of your own or may be you are thinking about a research career. Research training may be provided in undergraduate and postgraduate courses in the form of single modules covering a broad perspective of research designs. These single modules are usually viewed as an introduction to research methods and further research training may be needed to develop specialist skills. Universities usually offer a range of taught modules or single day events for CPD purposes. In the UK the RDInfo website lists formally taught research courses as well as short courses on a range of research topics. In addition, practitioners should look out for local workshops or study days run by Research and Development Support Units (see http://www.national-rdsu.org.uk/).

Box 8 The CoR Funding Assessment Criteria

- Potential to advance the profession
- Closeness of fit with candidates' career
- Methodology including an assessment of the following:

1. Appropriateness of the method
2. Considerations of data analysis proposed
3. Ethical implications
4. Procedures for testing reliability and validity (or trustworthiness and credibility)

- Value for money
- How the proposed study fits with CoR research priorities
- Potential for follow on work
- Dissemination strategy proposed
- Level of Institutional support.

Those wanting more formal training may want to consider Masters courses in research methodology or a Master of Science degree by thesis, Master of Philosophy (MPhil) or a Doctorate. The Doctor of Philosophy (PhD) qualification usually requires a period of study of a range of research methodologies relevant to the chosen thesis topic. In addition, the newer Professional Doctorate qualifications include a formal programme of research training; both options allow individuals subsequently to give greater intellectual input to research studies[10] rather than remaining simply as data collectors, interviewers or recruiters of research participants.

CONCLUSION

Getting started in research can seem a daunting prospect. However, all that is needed initially is an enquiring mind, lots of enthusiasm and motivation to get involved. It is important to develop the necessary skills required to complete a project to a high standard; so for practitioners with little or no previous experience a good place to start is a research methods training course. Getting involved in local projects with experienced researchers is an excellent way to gain research experience and understanding of the research process. As experience, knowledge and confidence develop practitioners may want to consider further specialist research training before leading their own projects and applying for research funding as a principal researcher. Through this progression practitioners should develop from users of research to data collectors and finally to research leaders. Developing relationships with experienced researchers to mentor early research activity can lead on to the development and fostering of research collaborations and a network of likeminded researchers as research experience becomes consolidated.

This discussion article on how to get started should help identify the skills needed to start, where to go for help and some principles that may guide the early stages of the novice researcher's research experience. It is important

to have good support either through project supervision or mentorship from experienced researchers initially and this can be provided locally within the hospital or workplace, through local educational establishments (Universities) or from professional bodies. In the UK the College of Radiographers Research Group will help direct novice researchers to suitable mentors or supervisors.

RESOURCES

R&D info for funding opportunities: http://rdfunding.org.uk/

R&D info for research training courses: http://www.rdlearning.org.uk/

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