Research from Therapeutic Radiographers: An Audit of Research Capacity within the UK.

Abstract

Research from Allied Health Professionals (AHPs) is anecdotally known to lag behind that of other professions. The developing research landscape within other therapies and internationally led us to question how UK practice in therapeutic radiography was developing. The aim of the survey was to audit research capacity across therapy radiography in the UK.

Method

An electronic survey was sent to Radiotherapy Service Managers (RSM) and research leads in each of the radiotherapy centres in the UK. An adapted version of the 'Auditing Research Capacity' tool (ARC© tool) was used as the basis of the questionnaire.

Results

A total of 45 RSM responded to the survey (67% response rate) and 30 Research radiographers (RR)(45% response rate). A total of 51 RR were in post equating to 40.3 whole time equivalents and averaging 1 RR per centre. Variation was evident in the commitment to the development of a research culture identified by practices such as linking research to the business planning cycle, inclusion of research in recruitment and advertising materials, or having a nominated therapeutic radiographer lead on research for the department. Over a third of responding centres did not have a research strategy and training for RRs was limited; specifically in areas such as writing funding bids, writing for publication and the research and governance process.

Conclusion

A number of short and long-term strategies are proposed that should enhance a positive research culture and improve research capacity for therapeutic radiography led research. These include utilisation of the existing infrastructure provided by the National Institute for Health Research, a lead or co-ordinator for research activity with a remit to motivate others. Development of links and networks, and the development of a research strategy linked to wider Trust research priorities. The research strategy should include mentoring or developing appropriate research skills for those engaged in research (including higher degree qualifications). RSMs should also encourage peer-reviewed publications, and conference presentations from all staff to ensure research results are disseminated to the wider profession.

Key words

Research Capacity Building, radiography, research activity, radiotherapy

Introduction

Anecdotal evidence suggests research from Allied Health Professionals (AHPs) lags behind other professions such as nursing and medicine resulting in limited development and investigations of novel treatments or interventions by AHPs. Hence a need for investment in research training of AHPs has been recommended (1). In 2007 it was identified that the majority of research radiographers lacked the skills required in investigative research and seeking funding (2); discussion through national forums such as the Society and College of Radiographers research network, and the Radiotherapy CTRad Think Tank event in 2013 suggests this situation has not changed during the seven years since this survey. Indeed even practitioners working in research roles may lack the relevant skills to lead research activity; grant writing skills, methodological understanding, statistical analysis, and leadership to name a few(2). This can become a barrier to conducting research (3-6). An audit into the research capacity of nurses indicated that those who had undertaken formal education in research and/or statistics rated their research skills as good or excellent (7) reinforcing the importance of research skills training.

A number of national policy documents reinforce the importance of research for ensuring efficient, safe and innovative service delivery(3, 8, 9).However an organisational culture shift is required if the challenge of increasing research utilisation is to be overcome (10). An audit identified an increase in the number and proportion of therapists (Physiotherapy (PT), Occupational Therapy (OT) and Speech and Language therapy (SLT)) with doctoral qualifications between 1997 and 1999, and 97 therapists identifying themselves as the lead grant holder on national or international research programmes(10). Where AHPs are lead researchers this is most likely to indicate that the primary research questions being investigated are central to AHP service delivery or care. While this audit provides insight into the capacity in therapy professions it does not provide any understanding on available infrastructure to support research development and it cannot be assumed similar capacity developments have occurred within Radiography. In addition, it is now essential to gain input with patient and public involvement (PPI) in research to produce good quality research that is of relevance to patients(11). However, it is unknown how effective radiographers are at achieving this.

An audit of Radiation Therapists (RTs) research capacity in Australia (12) identified 16.8 Full Time Equivalent (FTE) research posts distributed across 13 centres from 36 responding centres (out of a total of 48 centres in Australia). While the majority of those in post spent 80-100% of their time doing research, 5 FTE spent only between 10-50% on research activities with the remaining time dedicated to clinical activities. This is somewhat different to the UK data from the 2007 gap analysis where only 5 research radiographers at that time (out of 70 that reported undertaking research at some level) spent 100% of their time on research activities(2). In the Australian audit challenges cited to undertaking research were time, funding and workload. Over 70% of responding centres from this Australian audit indicated involvement in the development of their own research projects. There were a large number of staff with doctoral and

masters qualifications. However, this was not translated into high numbers of publications, on average one article produced every 3 years per department. Both post graduate training and peer-reviewed publications (where an individual is either lead or co-author) are outcome measures that are considered indicators of research capacity(13).

The progression of the research landscape at an international level led us to question how UK practice was developing. The aim of the study was to assess research capacity across therapy radiography (TR) in the UK. The Department for International Development defines research capacity building as:

"..enhancing the abilities of individuals, organisations and systems to undertake and disseminate high quality research efficiently and effectively" (14).

The first part of the process for building research capacity is capacity assessment hence we undertook to identify the strengths and weaknesses of existing research within therapeutic radiography at both individual and organisational levels.

Method

In order to audit existing research capacity we adopted the 'Auditing Research Capacity' tool (ARC© tool) developed by Sarre and Cook(13) and adapted it to fit the requirements of a survey method (see supplementary materials). The ARC tool was developed through a consensus study and is divided into nine sections (identified below).

1. **Skills development**
2. **Infrastructure**
3. **Close to Practice**
4. **Linkages, Partnerships and Collaborations**
5. **Dissemination**
6. **Continuity and sustainability**
7. **Leadership**
8. **Research Culture**
9. **Research Activity**

The survey was designed on Surveymonkey® as two separate questionnaires to be completed by:

1. The Radiotherapy Services Manager (RSM),
2. The lead research radiographer, consultant radiographer or research co-ordinator for the department.

The survey was piloted with 5 radiotherapy centres from across the UK, a mix of large and small centres enabled refinement of the questionnaire. Links to the questionnaires were then circulated to all radiotherapy departments (including private and NHS establishments) across the UK using the Society and College of Radiographers (SCoR) contacts list. The links were initially sent to the RSM who was asked to complete the manager's survey and to forward the link for the second questionnaire on to their lead research radiographer, a lead Consultant radiographer or a research co-ordinator for their department.

The survey was advertised in the SCoR professional newsletter and on the SCoR web pages ahead of distribution in April 2013. Reminders were sent 3 weeks later to encourage a good response rate.

Data Analysis

Completed questionnaires were exported to the statistical package SPSS (version 21) for analysis.

Respondent characteristics (ie staff complement size) were defined to first contextualise the sample of responders; followed by simple descriptive statistics using bar charts and tables.

Results

A total of Forty-five RSM responded to the survey (67% response rate) and 30 Research radiographers (RRs) (45% response rate); responses were obtained for all 4 devolved countries. The lower response rate for the RRs survey was in part due to some centres not having a RR in post. Figure 1 demonstrates the staff complement for responding centres to show the range of department sizes included in the returned questionnaires.

Skills development

Table 1 indicates the number of therapeutic radiographers from responding centres with higher degree qualifications. Table 2 indicates that only 20% of responding centres have systems for mentoring or supervising novice or junior researchers. Figure 2 shows the range of research training offered to those new to a research post. The emphasis for training was Good Clinical Practice (GCP) and gaining informed consent. Least attention was focussed on developing skills for writing funding bids (n=1 <4% of respondents) or writing for publication (n=3 ≈ 10% of responding centres) with under 30% of research radiographers receiving ethics and research governance training. Unsurprisingly these were the areas respondents felt they needed most training.

Respondents also acknowledged that when appointed as a Research Radiographer protected time for induction was required, especially if this was the first post in a department. Confidence varied across a range of activities with the majority of activities scoring <50% confidence (Figure 3). The most confident activity was the use of quantitative methods (67%).

Research Infrastructure

In 76% of responding centres there was accessible information about the research process for staff, and 61% of centres reported having a research strategy. However, over 60% of centres do not have procedures in place (or were not aware of them) with finance or Human Resources departments to support and manage funding bids. Similarly in ¾ of centres research led by radiographers did not feature in wider Trust strategies. The dissemination of information about research funding opportunities was variable across centres with only a third receiving information through formal routes, approximately a third through informal routes or in an ad hoc way and a third of centres not receiving funding information at all. Furthermore, less than 20% of centres had access to pump priming or research support posts.

Close to Practice

A variety of methods were used to help develop ideas generated from practice issues demonstrated in Figure 4. However, almost half of responding centres (48%) did not have a formal process for developing ideas generated from practice issues.

When asked about access to Patient and Public Involvement 63% of responding centres indicated they did not have access locally to a user forum.

Linkages, Partnerships and Collaborations

Table 3 shows many had links with the clinical research network, but missed opportunities for links with other free services such as the Research Design Service (RDS) with < 10% accessing this service. Only 30% of centres reported formal collaborative links with research centres in HEIs, and < 10% funded joint research posts with a HEI.

Dissemination

A total of 27 peer-reviewed articles were published in the previous 12 months (Table 4), but almost half were from 4 centres. Similarly, the number of conference presentations delivered over the same period (Table 5) shows 95 presentations were attributed to Therapeutic Radiographers for the period; almost half of these (42%) delivered by 3 centres.

Continuity and Sustainability

A total of 17 NIHR portfolio projects, 23 non-portfolio projects and 3 commercially funded projects were reported as active from responding centres. Unfortunately, funding to support radiographer led research was low. For the previous 12 months a total for all centres of £25, 000 was secured for projects where the Principal Investigator was a Therapeutic Radiographer compared with £5,073,000 funding secured for the same centres from multi-disciplinary research where the PI was not a radiographer.

Leadership

Only 50% of responding RSM are members of a research group within their Trust, and almost a third of responding centres did not have a radiographer with a role to lead on research activity. Fifty-one Research Radiographers (RRs) were in post equating to 40.3 Full Time Equivalents (FTE) and averaging 1 RR per centre; 4 centres have 4 RRs and some have zero. The majority of those in post were at band 7 with 13 RRs at band 8. Of those in post <15% lead on their own research the remainder were clinical trials radiographers.

Research Culture

In over 80% of centres research was a standing item on departmental meetings and research was celebrated in a range of ways including via:

- hospital newsletters
- Trust intranet pages
- internal and University study days
- departmental bulletins
- the local press and

- radiotherapy clinical group meetings.

However, almost a third of centres (32.1%) did not include research within the annual business and development plan and over a half of respondents (58.1%) did not include research in marketing and recruitment materials for job adverts or prospective students.

Research Activity

For over half of the RRs > 40% of their time was spent co-ordinating clinical trials and for almost half of RRs approximately 20% (or more) of their time is spent covering routine service delivery (Figure 5-6). Very little time was devoted to writing research proposals or publications (<10%). Writing funding bids was a small proportion of most RRs time a third spent less than 10% of their time on bid writing and two thirds did not spend any time writing bids. This was reflected in the number of bids submitted in total for the previous 12 months (n=6 across all responding centres). Over half of respondents spent <10% of their time on service evaluation, service development and audit, but over half spend more than 40% of their time involved in primary research (either co-ordinating clinical trials or leading their own research projects).

Discussion

Support and Training

Numbers undergoing Post Graduate (PG) training is encouraging with 43 staff qualified to Masters level and a further 58 in progress with Masters level study; comparable with PG qualifications reported by Wright et al (12). Unfortunately the upward trend in higher degree doctoral qualifications in Australia(12) was not apparent yet in this UK survey with only 1 doctoral trained Therapeutic Radiographer identified from responding centres; this is an area where Therapeutic Radiographers need to increase their aspirations. Doctoral training will increase the confidence and capability of TRs to lead research as chief investigators. Formal research education increases confidence in research(7) with education seen as an enabler for research(4, 6). Unfortunately newly appointed RRs appeared to receive minimal formal training once in post and this may add to lack of confidence to undertake research. While training in Good Clinical Practice(15) for research was evident, along with gaining informed consent, limited further training was apparent even in key areas such as ethics and governance approval processes. Traditional Masters programmes may provide insufficient research training to enable Therapeutic Radiographers to lead research programmes and higher doctoral research training or Masters by Research (including Masters by Research and Master of Philosophy) qualifications may be more appropriate for these posts.

If confidence is low in activities such as writing for publication it is likely that outputs (in the form of published articles) will be limited. From the survey it was clear that <10% of responding centres were producing publications. In total, publication levels appear to exceed those reported for Australian Therapeutic Radiographers(12) although this data is now over 4 years old. Training can help with writing skills, working with collaborative partners through a mentorship approach can also be beneficial by tapping into the experience of co-authors(16).

A lack of mentorship may also inhibit RR activity with only 20% of centres providing mentorship for neophyte researchers. Support for higher research degree training could be offered to lead RRs with the expectation that those that are supported then mentor more junior staff (16). Segrott et al go even further and recommend that supervision of junior researchers should be built into the job descriptions of lead researchers(16). Moore et al(17) developed a framework for developing research capacity that identified three categories of staff required to move research forward: innovators; mentors; and champions who would sell the idea of the development process. Awarding time and support for identified innovators and projects is seen as critical to ensuring success(17) and support from managers is also seen as an important enabler for research(4, 6).

Organisational Structures and Processes

While ¾ of responding centres had accessible information on the research process many key infrastructure components were lacking. The 40% that did not have a research strategy are unlikely to maximise research output or development(16). Evidence supports the importance of organisations having strategic approaches to research capacity building with clear objectives and targets for individuals and departments(16). There also should be clear links between research priorities and other key business(16); this appeared lacking in some centres where links to the annual business plan did not exist. Furthermore, the dissemination of information about research funding opportunities was ad-hoc in two thirds of centres and >60% did not have formal procedures (or were unaware of existing processes) with Finance departments to assist in costing funding bids.

Almost half of centres had some system for identifying projects that were related to practice issues; this is important if research is to reflect real issues that are of importance to the service. Good examples included:

- Using existing infrastructure of tumour specific groups to raise project ideas,
- Newsletter calls for projects,
- Raised at a research forum,
- Through normal line management processes or
- Communicated to the lead research radiographer.

Patient and Public Involvement in research is valuable for ensuring research is of relevance to patients and reflects trials that patients would be willing to join. Yet many centres were unaware of user forums or services they could access to develop their research including the Research Design Service (RDS); only 10% of centres were aware of the RDS.

Collaboration is also an important facet of building research capacity(16) providing access to experienced research teams with opportunities for mentorship(18) yet few centres had collaborative research links with Higher Education Institutions (HEIs) (<30%). (18).

Critical to sustainability of radiographer led research is research grant money acquired to support research. In the 12 months prior to the survey only £25,000 in research funding nationally was attributed to Therapeutic Radiographer led research; this is

likely to hinder activity. The combined data for total number of primary studies and amount of research funding obtained for radiographer led research would indicate we are at a lower level of research activity compared with other AHPs(10).

Research Radiographer Activity

There was considerable variation from RR post holders in how their activities were split between clinical trial data collection, routine service delivery and development of their own research programmes; variations in activities maybe reflective of local need and funding arrangements for the post. Covering of routine service delivery is not uncommon with respondents in the Australian survey demonstrating a range of routine service commitments with many posts comprising a 50-50 split between research and clinical work(12).

Leadership and Culture

Research culture refers to the development of an environment that openly values research, has a transparent research vision with strong leadership and the fostering of networking(16, 19). Survey responses indicated varying levels of commitment to a positive research culture. Research was a standing item on departmental meetings in 80% of centres. However, opportunities to further embed research into the vision of the centre were missed with a third of centres failing to link research to the business planning cycle and over half omitting research from recruitment and advertising materials. A third of centres had no radiographer who led on research activity and this will substantially limit the development of a research culture. A total of 40.3 WTE RR posts were reported with 4 centres recording 4 RRs in post; a substantial improvement to the total WTE post holders reported by wright et al(12).

Conclusions and Recommendations

The survey has enabled benchmark data to be recorded on current research capacity within TRs in the UK and has provided an opportunity to identify areas where input or changes could be made to enhance research capacity. Based on the results of this survey it is recommend RSM consider the following short term and long term initiatives to increase research capacity:

Recommendations

Short-term strategies:

- Use existing infrastructure- RDS for free training; Trust R&D systems for costing and contracting, Allied Health Professions Research Network (AHPRN) for networking and free training opportunities.
- A lead or co-ordinator for research activity with a remit to motivate others and to link into wider Trust research forums.
- Develop links and networks, including HEIs and Society and College of Radiographers Research Network (free to access).
- Build mentoring systems utilising medical/physics staff or expertise from HEIs where appropriate.
- Develop procedures for ideas generated from ‘grass routes’ to be fed into wider departmental research groups.
- Develop a research strategy linked to wider Trust research priorities and CoR research strategy and priorities.

Longer-term strategies:

- Build research into the business planning cycle, including costs for research training.
- Support RR training in higher degree (ie Doctoral/PhD study) qualifications with the expectation that these staff will then mentor and supervise neophyte researchers. Utilise HEI expertise to guide decision making on research methods training and types of higher degree training (ie MRes versus PhD or Professional Doctorate).
- Build research into all job descriptions to aid a positive research culture.
- Include research within recruitment material to demonstrate the commitment to research.
- Encourage outputs, publications, and conference presentations from all staff and link outputs to performance indicators of RRs. Utilise expertise of HEIs to help build confidence in publishing.
- Build collaborative research with HEIs.

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Tables

Table 1 Number of therapeutic radiographers from responding centres with higher degree qualifications.

Type of Degree	**Registered on/ in Progress**	**Successfully Completed**
MSc	30	29
MA/MBA	28	14
PhD	1	0
DProf	2	0
EdD	0	1

Table 2 Number of responding centres that have a system for mentoring or supervising junior or novice researchers. (percentage in paretheses)

	Mentoring/supervision available
Yes	9 (20)
No	20 (44.4)
Missing data (failed to answer)	16 (35.6)
Total	45 (100)

Table 3. Linkages with research networks or collaborations

Research Link/collaboration	**Yes**	**No**
Clinical Research Network	86.7%	13.3%
Research Centres in HEIs	30%	70%
Technology Platforms	6.7%	93.3%
Collaboration for Leadership in Health Research and Care	6.5%	93.5%
Research Design Service	9.7%	90.3%

Table 4 Number of peer reviewed articles in the previous 12 months (percentage in parentheses)

Number of peer-reviewed articles	Number of centres
0	17 (37.8)
1	6 (13.3)
2	3 (6.7)
3	2 (4.4)
4	1 (2.2)
5	1 (2.2)

15 centres did not answer this question

Table 5 Number of conference presentations in the previous 12 months (percentages in parentheses)

Number of conference presentations	**Number of centres**
0	10 (22.2)
1	4 (8.9)
2	4 (8.9)
3	5 (11.1)
5	1 (2.2)
7	1 (2.2)
8	2 (4.4)
10	2 (4.4)
20	1 (2.2)

15 centres did not answer this question

Figure 1 Staff complement Full Time Equivalent (FTE) for responding centres

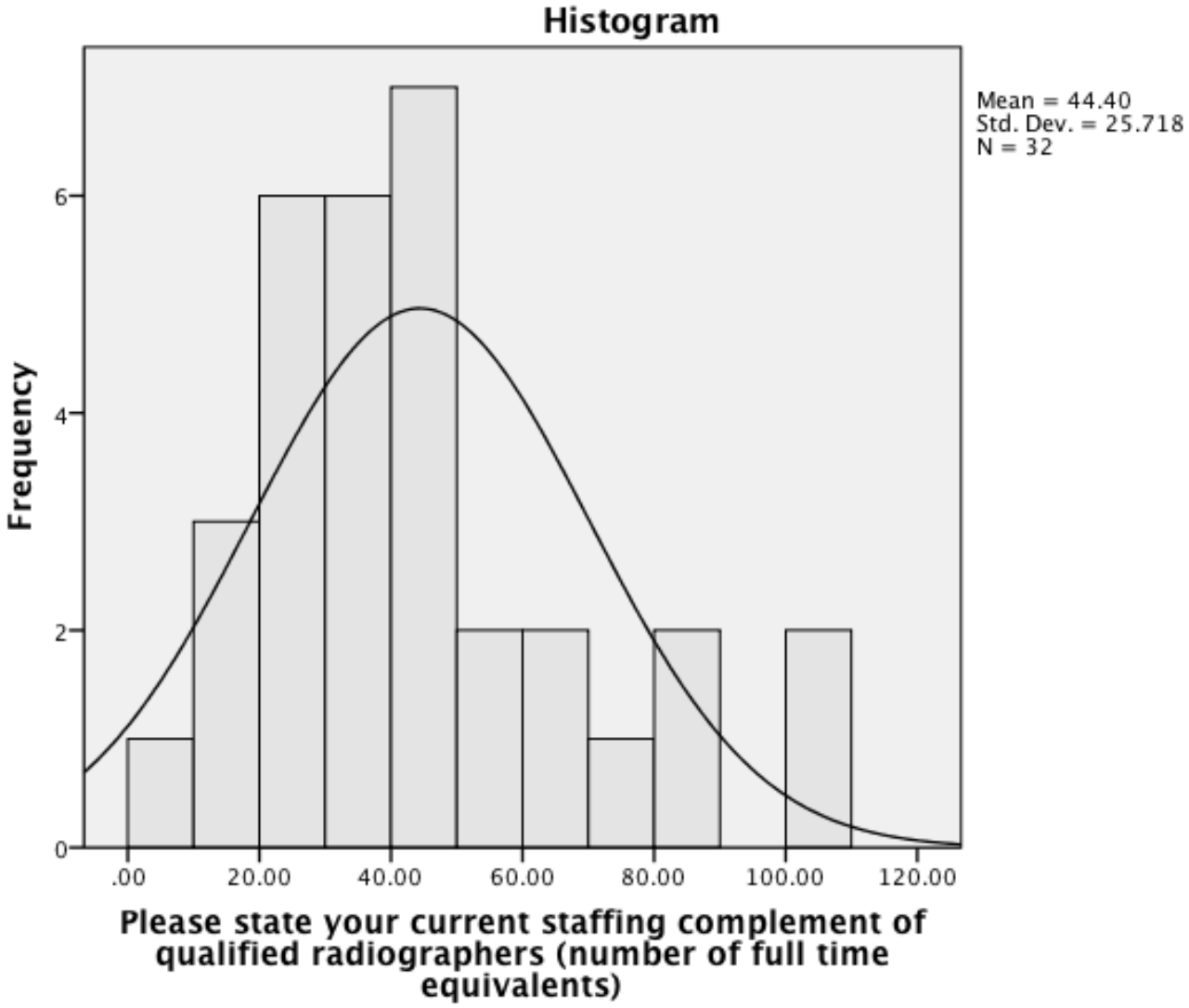
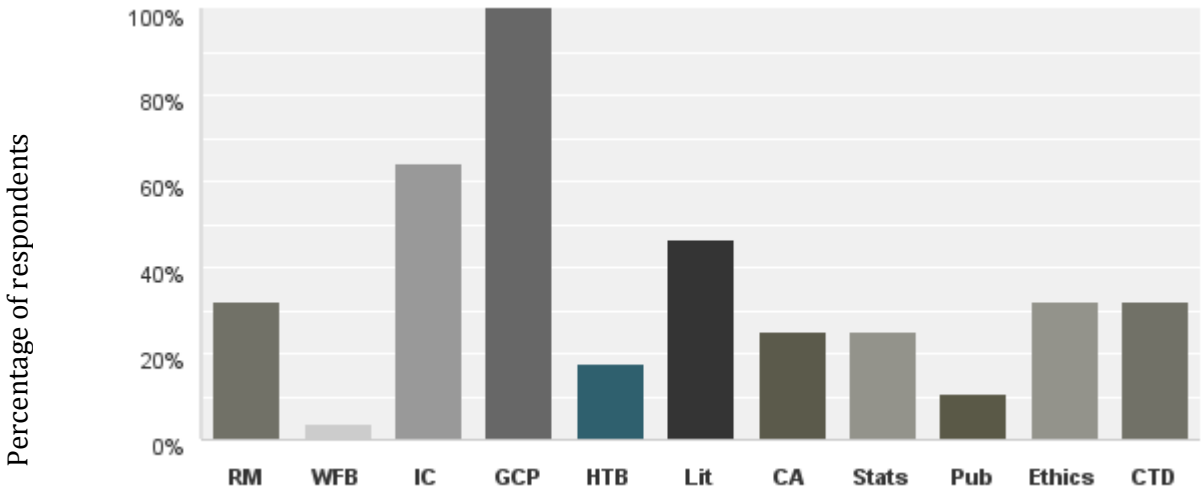


Figure 2 Research Methods Training Provided to Research Radiographers



RM= Research methods

WFB= How to writing funding bids

IC= Gaining Informed Consent

GCP= Good Clinical Practice Training

HTB= Human Tissue Bill

Lit= how to search the literature

CA= Critical appraisal of the literature

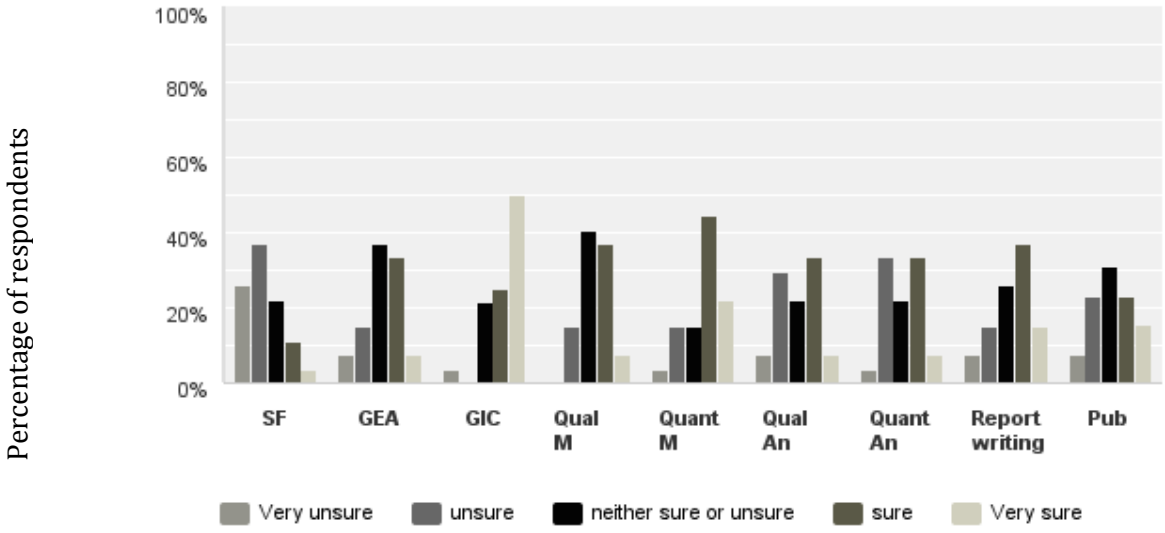
Stats= statistics training

Pub= writing for publication

Ethics= Ethics and research governance training

CTD= Clinical Trials Directive

Figure 3 Research Radiographers Confidence in a range of research activities



SF= Securing research Funding

GEA= Gaining Ethics Approval

GIC= Gaining Informed Consent

Qual M= Using Qualitative Methods

Quant M= Using Quantitative methods

Qual An= Undertaking Qualitative Analysis

Quant An= Undertaking Quantitative Analysis

Pub= Publishing research results

Figure 4 How Research ideas generated from practice issues are developed.

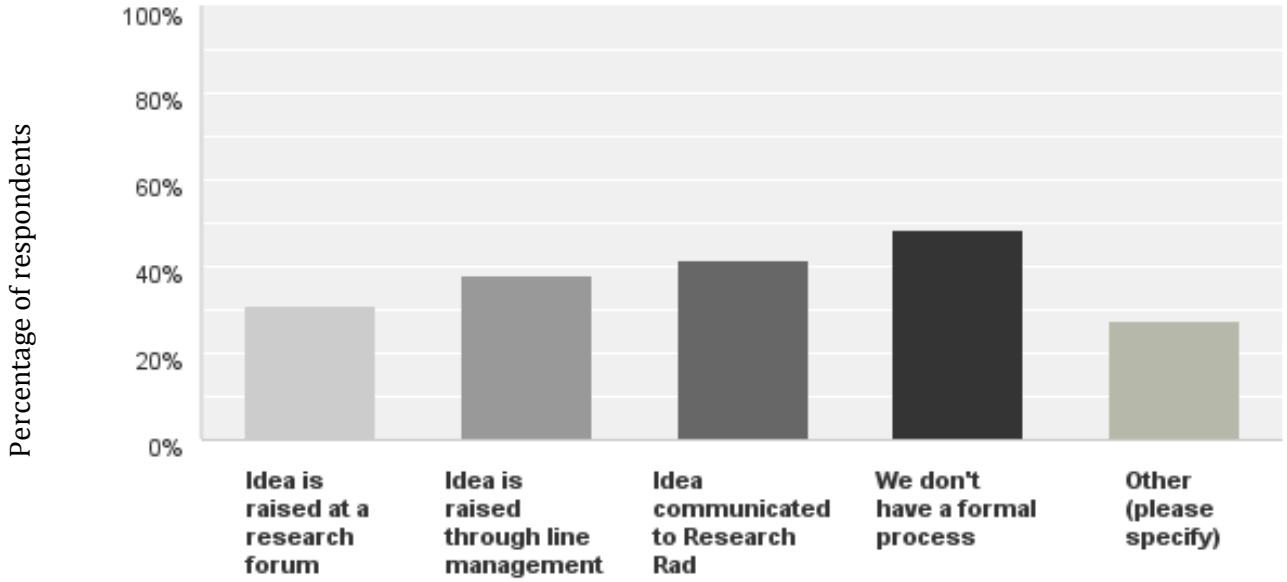


Figure 5 Proportion of RR time spent on co-ordinating clinical trials.

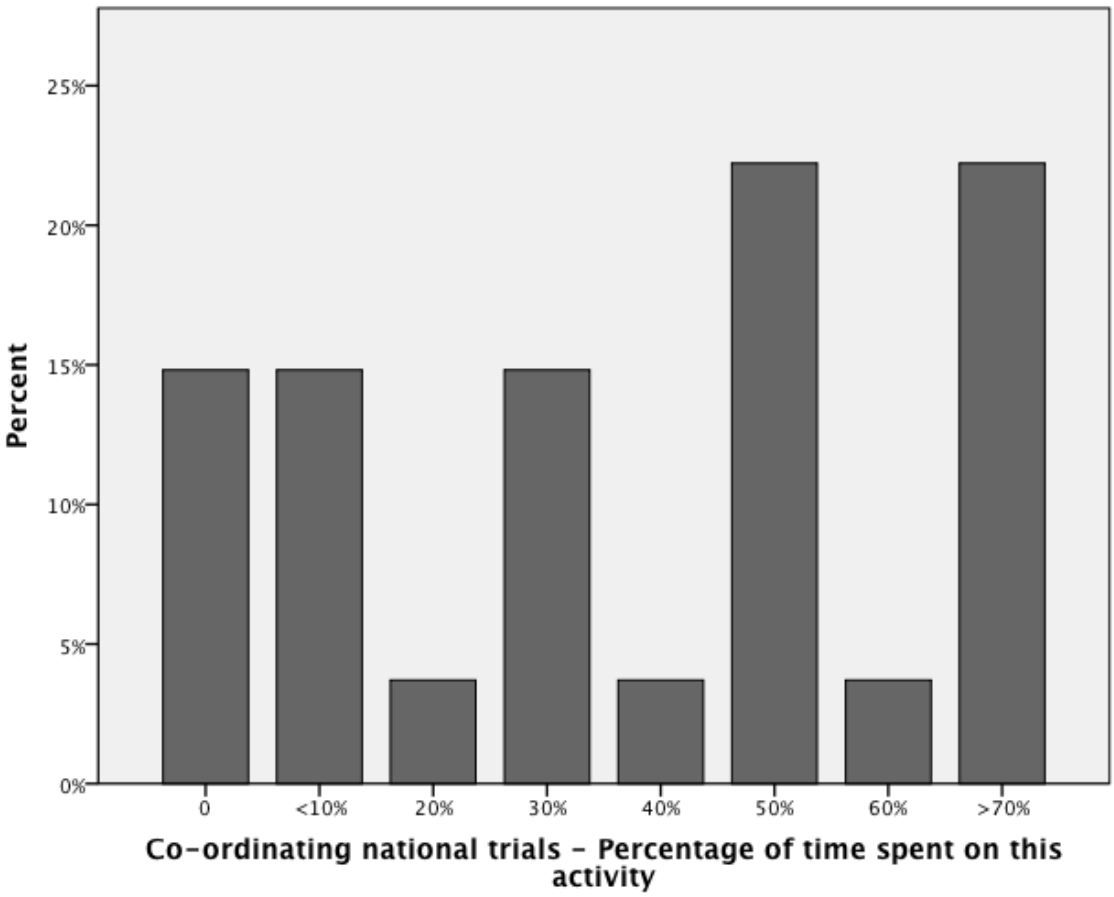


Figure 6 Proportion of time spent on routine service delivery