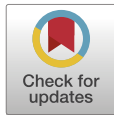




ELSEVIER



Research Article

# What is in it for me? Norwegian radiographers and radiation therapists' experiences from obtaining a master's degree

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## ABSTRACT

**Introduction:** Radiographers and radiation therapists are essential in providing patients with high-quality diagnostic imaging or therapeutic services. Therefore, radiographers and radiation therapists must get involved in evidence-based practice and research. Even though many radiographers and radiation therapists obtain their master's degrees, little is known about how this degree affects clinical practice or personal and professional growth. We aimed to fill this knowledge gap by investigating Norwegian radiographers' and radiation therapists' experiences when deciding to undertake and complete a master's degree and exploring the impact of the master's degree in clinical practice.

**Methods:** Semi-structured interviews were conducted and transcribed verbatim. The interview guide covered five broad areas: 1) the process of achieving a master's degree, 2) the work situation, 3) the value of competencies, 4) the use of competencies and 5) expectations. Data were analyzed using inductive content analysis.

**Results:** The analysis included seven participants (four diagnostic radiographers and three radiation therapists) working at six different departments of varying sizes across Norway. Four main categories emerged from the analysis, of which the categories: *Motivation and Management support*, were categorized into the theme *experiences pre-graduation*, whereas the categories *Personal gain* and *Application of skills* were categorized into the theme *experiences pre-graduation*. The fifth category *Perception of pioneering* embraces both themes.

**Conclusion:** Participants reported great motivation and personal gain, but challenges in management and application of skills post-

graduation. The participants perceived themselves as pioneers, as there is a lack of experience with radiographers and radiation therapists undertaking master studies, hence no culture and systems for professional development are established.

**Implications for practice:** There is a need for professional development and research culture in the Norwegian Departments of Radiology and Radiation therapy. Radiographers and radiation therapists must take the initiative to establish such. Further research should investigate managers' attitudes and perceptions toward radiographers' master's competencies in the clinic.

## RÉSUMÉ

**Introduction:** Les radiographes et les radiothérapeutes jouent un rôle essentiel dans la fourniture aux patients de services d'imagerie diagnostique ou de radiothérapie de haute qualité. Ils doivent donc s'impliquer dans la pratique et la recherche fondées sur des données probantes. Même si de nombreux radiographes et radiothérapeutes obtiennent un diplôme de maîtrise, on sait peu de choses sur l'influence de ce diplôme sur la pratique clinique. Nous avons cherché à combler cette lacune en 1) étudiant les expériences des radiographes et radiothérapeutes norvégiens lorsqu'ils ont décidé d'entreprendre et de terminer un diplôme de maîtrise, et 2) en explorant l'incidence du diplôme de maîtrise sur la pratique clinique.

**Méthodologie:** Des entretiens semi-structurés ont été menés et retranscrits mot à mot. Le guide d'entretien couvrait cinq grands domaines: 1) le processus d'obtention d'un diplôme de maîtrise, 2) la

number 950098) and written informed consent was obtained from all participants.

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situation professionnelle, 3) la valeur des compétences, 4) l'utilisation des compétences et 5) les attentes. Les données ont été analysées à l'aide d'une analyse de contenu.

**Résultats:** L'analyse a porté sur sept participants (quatre radiographes diagnosticiens et trois radiothérapeutes) travaillant dans six services différents, de tailles diverses, répartis sur l'ensemble du territoire norvégien. Cinq catégories principales ont émergé de l'analyse, dont les quatre premières: la motivation, le soutien de la direction, l'application des compétences et le gain personnel, ont été classés en deux thèmes: les expériences avant et après l'obtention du diplôme. La cinquième catégorie, perception du rôle de pionnier, englobe ces deux aspects.

*Keywords:* Radiography; Radiation therapy; Continuous professional development; Master's education; Clinical practice; Continuing education

## Introduction

Radiographers and radiation therapists (hereafter referred to as radiographers) have an essential role in delivering public health and providing patients with high-quality diagnostic imaging or radiotherapy services. To do, this they utilize rapidly expanding advanced technology. Accordingly, it is essential to stay up to date on technological development and the continuously changing evidence [1,2]. Furthermore, there is a need for radiographers to get involved in evidence-based practice and research [3]. Hence, continuous professional development (CPD) is warranted.

To become a radiographer in Norway, one must complete a three-year educational program at a bachelor's level. This general educational program enables radiographers to work on most diagnostic modalities. However, many postgraduate courses provide radiographers with specialized knowledge in a designated area, such as Computed Tomography (CT). Also, to become a radiation therapist, a completed bachelor in radiography plus a one-year postgraduate study in radiation therapy is required (not leading to a complete master qualification).

In Norway, there is an increasing number of radiographers who are completing a master's degree, of which many hold a position in academia as well as clinical work. Many master programs are available for radiographers, such as Master of Science in medical imaging technologies (MRI or Ultrasound) and Master in clinical health care (radiation in diagnostics and therapy). Radiographers might also undertake master's study in the administrative fields, such as economics or management. Hence, a master's degree could be an essential entry point for further CPD but does not automatically lead to a more evidence-based and up-to-date practice.

Performing CPD at a master's degree level can be resource-intensive for an individual due to workload, time consumption, costs, and competing priorities [2,4]. The specialized knowl-

**Conclusion:** Les participants ont fait état d'une grande motivation et d'un gain personnel, mais aussi de défis en matière de gestion et d'application des compétences après l'obtention du diplôme. Les participants se sont perçus comme des pionniers, car il y a un manque d'expérience avec les radiographes et les radiothérapeutes qui entreprennent des études de maîtrise, et donc aucune culture et aucun système de développement professionnel n'est établi.

**Implications pour la pratique:** Les services norvégiens de radiologie et de radiothérapie ont besoin d'établir une culture de développement professionnel et de recherche. Les radiographes et les radiothérapeutes doivent prendre l'initiative d'instaurer une telle culture. D'autres recherches devraient porter sur les attitudes et les perceptions des responsables à l'égard des compétences des radiographes qui détiennent une maîtrise dans la clinique.

edge inherited by CPD acquired from a master's degree is assumed to be a resource for clinical work. Stakeholders especially appreciate clinical health professionals involved in academic work, because this translates research into clinical practice making it possible to have a more evidence-based practice [5]. However, studies have shown that radiographers have limited experience with research [6,7]. A Norwegian survey performed in 2016 (n=697) revealed a discrepancy between the perceived need for research and the actual participation in research projects [8]. Most radiographers' thought that they should take leading roles in research, but few radiographers actually participated in research. The study concluded that radiographers would benefit from training in informal and formal research skills [8].

Mubuuke and Pope identified factors influencing the decision to pursue post-graduate education [3]. Some of the factors were a desire for professional development, new challenges, and a search for professional satisfaction. Additionally, they identified broader factors such as professional changes, requirements of CPD, availability to get funding, availability for postgraduate programs, and search for improved remuneration [3]. However, lack of time and mismatch between the expectation and reality are important barriers to CPD [2,9,10]. Other challenges are support from managers and colleagues [11,12], while professional gain and satisfaction are reported as positive outcomes of CPD [2,3].

The education program for radiographers varies across Europe with respect to academic level, duration, and program type [13–17]. Furthermore, even though possibilities for postgraduate education vary [16], there is generally an increasing demand for higher education and specialized knowledge. As achieving a master's degree does not automatically lead to CPD or an evidence-based practice, it is essential to examine the effects of higher education in the clinical environment. While a few studies have investigated why radiographers choose to undertake a master's degree, even fewer studies have explored how

Table 1  
Study inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Radiographer or radiation therapist working clinically with patients	Completed non-clinical master's degree (e.g., in economics or management).
Completed relevant clinical master's degree	Radiographers in administrative positions
Spoke fluent Norwegian language	
Signed informed consent form	

this degree affects clinical practice. Hence, we aimed to fill this knowledge gap by first investigating Norwegian radiographers' experiences when deciding to undertake and complete a master's degree, and secondly exploring the impact of the master's degree in clinical practice.

## Methods

### *Design*

In this qualitative study, we used an explorative and descriptive approach where the primary perspective was to highlight the participants' subjective experiences. Individual interviews were used as it is well suited to bring out the perspectives and experiences of those involved [18]. We used content analysis with an inductive approach and systematic text condensation, as described by Elo and Kyngas [19].

### *Recruitment of participants*

We recruited clinical radiographers according to inclusion and exclusion criteria (Table 1), where radiographers with clinically relevant master's degrees (e.g., Master's in clinical health care) were eligible for participating. As such, radiographers with master's in economics or management were not invited to participate. Several sampling strategies were used, including informing potential participants about the study through university lecturers, hospital department managers, and the journal of The Norwegian Society of Radiographers. In addition, information about the study was shared on social media, and a nesting strategy (snowballing) among participants was used. Participants contacted the Norwegian Research Group of Radiographers themselves by email if they wanted to participate, and none of the participants were recruited directly. Recruitment was stopped after seven interviews as no further participants came forward.

### *Data collection*

A semi-structured interview guide based on relevant literature and the scope of the study was developed (Table 2), covering five broad areas: 1) the process of achieving a master's degree, 2) work situation, 3) value of specialized skills, 4) use of competence and 5) expectations. The semi-structured interviews were conducted by two members of The Norwegian Research Group of Radiographers (IA and ERA) via Zoom (technology [Zoom Video Communications, Inc., San Jose, USA]), and "dialog validation" was performed to make sure that

statements were understood correctly. The interviews were conducted as a conversation, enabling participants to describe their stories, and emphasizing what they found important. However, the researchers ensured that all topics of the interview guide were covered. The interviews were recorded by a dedicated recorder and transcribed verbatim (IA and ERA). The transcriptions were deidentified and made available to the whole research team.

### *Data analysis*

Data were analysed using inductive content analysis, which enables processing subjective data by a systematic classification process through coding and identification of themes and patterns from the participants [19]. The whole research group read the transcriptions thoroughly to grasp a sense of the material. IA and ERA performed the initial coding which was discussed and revised through several meetings. IA then performed the analysis in cooperation with the research group. The analysis was conducted by using spreadsheets in Microsoft Excel and included several steps. These steps systematically led from meaning units to sub-categories and categories. The process is provided in Fig. 1, showing the analysis process leading from a broad approach in reading transcription to a narrow identification of sub-categories, then categories and themes. The analysis process was not a straightforward process but consisted of multiple discussions and revisions.

### *Ethical considerations*

The study was approved by the Norwegian Centre for Research Data for Medical Research in Norway (approval number 950098) and was carried out following the guidelines from The University of South-Eastern Norway. Written informed consent was obtained from all participants before the interviews were conducted.

## Results

We included seven participants (one man and six women) of whom four were diagnostic radiographers and three were radiation therapists working at six different departments of varying sizes across Norway. The participants had worked clinically for 5-15 years. Their master's thesis covered MRI, radiography, and radiation therapy.

Five main categories emerged from the analysis, of which the categories *Motivation*, and *Management support* were cate-

Table 2  
Main topics in the semi-structured interview guide.

<b>1. Introduction</b>	Can you tell me about the process of achieving a master's degree?
<b>2. About the work situation</b>	Have you experienced any changes in your work situation after you got your master's degree?
<b>3. Value of competencies</b>	In what way did or didn't you experience that your competencies achieved in the master's studies are used?
<b>4. About the use of competencies</b>	Can you describe what promotes and what inhibits you to use your competencies during the working day?
<b>5. About expectations</b>	In what way has the master's degree lived up to your expectations?
<b>6. Conclusion</b>	Finally, is there anything else you think I should know about or that you wish to elaborate on?

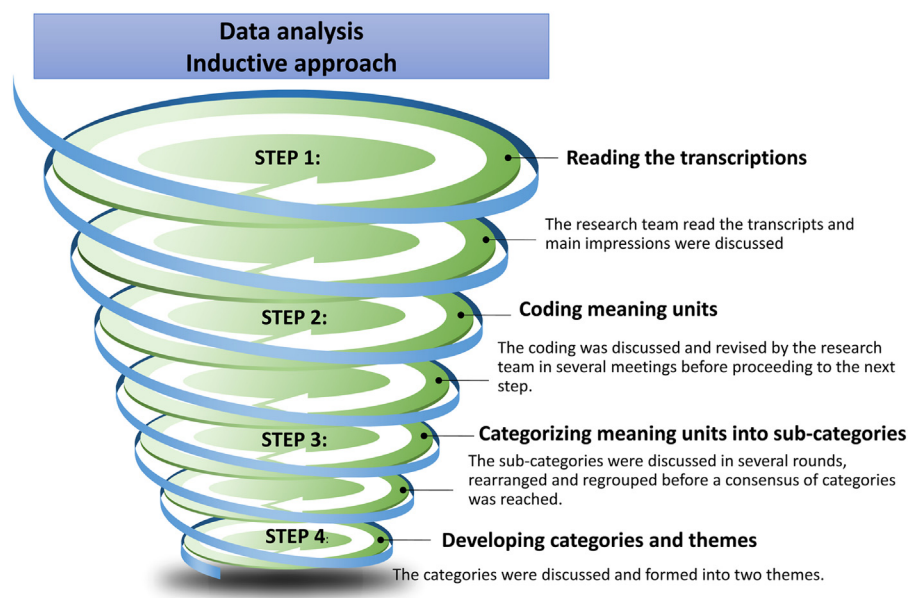


Fig. 1. Steps in the data analysis.

gORIZED into the theme experiences pre-graduation, whereas the categories *Personal gain* and *Application of skills* were categorized into the theme, experience post-graduation. The category *Perception of pioneering* embraces both themes as displayed in Fig. 2.

#### Experience pre-graduation

##### Motivation

All participants described a strong inner professional motivation as a reason to start their master's studies.

*"I felt I stagnated professionally, I wanted to continue to challenge myself." (Participant 5)*

Motivational factors were the joy of gaining new knowledge and a need for further professional development.

*"I just knew I wanted to take a master's degree and that I wanted to immerse myself with MRI which I think is absolutely the coolest thing" (Participant 7)*

Additional motivational factors were an urge for change, professional challenges, and a wish for extended formal education.

*"I am interested in my subject and the further education (post-graduate programs) created such a curiosity that made me want to immerse myself more" (Participant 3)*

Encouragement by colleagues was an important motivational factor for applying to a master's program. Such encouragement was shown in various ways. For instance, one participant was contacted by researchers and joined their research project and described this as a huge motivational boost. Others were encouraged through recognition of their engagement or

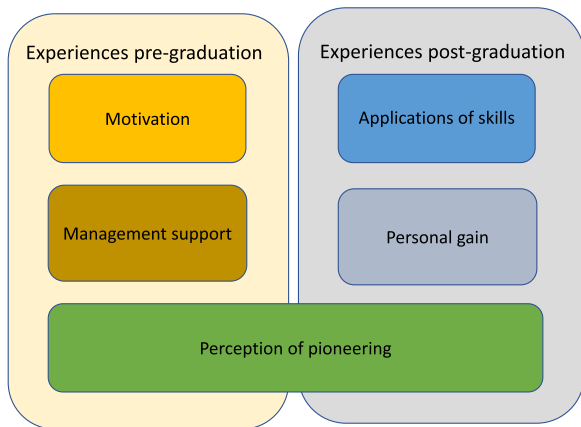


Fig. 2. Overview of categories and themes.

professional discussions during their daily work. Furthermore, participants mentioned personal, pragmatic, and random reasons for why they started their studies, such as a desire for a day-time job or that their family situation was suitable, thus enabling further studies.

Several participants were motivated by a desire to use their improved knowledge and skills in their department.

*"I have learned a lot. The master thesis was spot on both for me and also for the department. And I think that is one of the most important things"* (Participant 6)

#### Management support

The participants reported a varying degree of support from their managers. Most managers were initially supportive. However, participants experienced a lack of real practical support. For instance, one participant was encouraged by the manager to undertake master's studies but experienced no support regarding suitable practical arrangements or resource allocation. Another participant experienced encouragement and support from the manager, but received only an informal oral agreement, resulting in a constant struggle to receive study time. Hence, the participants described a lack of understanding among managers that studying was demanding next to a full-time job. One of the participants had to argue with the management to be allowed to study for a master's degree. The manager did not think that competencies on a master's level were needed in the department.

*"No, we do not need the master's degree in the department," the manager said. The managers are not able to value a master's degree. Many do not have a master's degree themselves"* (Participant 1)

#### Experiences post-graduation

##### Applications of skills

The category "applications of skills" embraces drivers, barriers and potential areas for the use of improved knowledge post-graduation. This included factors such as lack or presence of

support, change in work tasks, expectations towards them and master's degrees as a door opener. These factors are elaborated below.

Several managers did not seem to have a vision for utilising the achieved competencies. The participants stated that the department's focus was mainly on daily operations, and therefore experienced little or no culture for professional development.

*"I wish the management had a clearer vision of how we should work with professional matters. That I do not always have to make suggestions - that we have a common vision of what we want to achieve"* (Participant 3)

According to the participants, the lack of interest, appreciation, support, and understanding from managers and colleagues was a barrier for utilising their acquired competence.

*"There is no tradition or culture among radiographers to take a master's degree, unfortunately"* (Participant 1)

The participants conveyed minor changes in tasks, entailing a less formalized application of the increased competence, like writing procedures, or correcting and proofreading documents. However, one participant was unsure whether changes in tasks were caused by the master's degree or not.

*"I work a lot with procedures development. So yes, I am probably using my degree. But I do not know. I might have gotten the same tasks without the master's degree"* (Participant 5)

Promotors for the use of their acquired competence were described as good support from other colleagues, physicians, and physicists in the department, being allowed to join professional groups, being responsible for teaching in their department, and efforts in making competence visible.

Several participants experienced increased work satisfaction after finishing a master's degree. However, three participants expressed clearly that the master's degree had not led to any change in their professional positions. Three others got new professional positions with extended responsibility, but two of them were unsure whether this was due to their master's degrees.

*"I do not know if it was a direct result of the master's degree or if it was because I took the initiative myself. I applied for a professional position and got it. But whether it was due to the master's degree or my commitment I do not know"* (Participant 1)

The participants experienced a change in expectations towards them after completing their master's degrees. Some participants were expected to contribute more to projects and actively participate in professional matters. The participants reported a feeling of being appreciated by colleagues. One participant experienced being asked for professional advice more often and receiving more professional questions from colleagues.

*"Suddenly, you are the one to answer questions. And that was not the case before. I am consulted often. And it is very nice!"* (Participant 6)

However, the participants' impression was still that radiographers with a master's degree work at a lower level in the hierarchy than physicians and physicists in research.

The participants experienced that the master's degree had "opened doors" professionally regarding new professional positions in academia. One of the participants highly appreciated this as a great use of the master's degree. On the other hand, participants thought it was a pity that most radiographers with a master's degree left the clinical environment for a professional position in academia.

*"It is pity that when you have taken the master's degree you disappear [from the clinic]. I really want to work in depth within the (radiography) discipline in my own workplace... but since it is not possible, I am now looking forward to a position (at a university) allowing me to work with the discipline"* (Participant 5)

#### *Personal gain*

The participants outlined several beneficial consequences post-graduation, such as being better suited to contribute to professional discussions, increased analytical skills, ability to read articles, and passing on professional updates to colleagues critically. One participant stated:

*"I have great use of the master's degree. I read articles in a different way... I can contribute professionally to the discussion in a different way than before. I can help in a different way than I could before."* (Participant 3).

When thinking back, the participants thought they had gained a lot. Besides the joy of learning something new, for instance scientific methods, the participants emphasized the great value of expanding one's horizons. The achieved knowledge expanded their trust in their own abilities and increased their professional self-esteem.

*"I got a lot out of it. But it has cost. So, it is something you must consider in relation to those you have around you..."* (Participant 5)

Furthermore, after completing their master's degree, the participants described an increased professional interest and a more meaningful working day. When asked if they would recommend others to study for a master's degree, the responses were generally positive. However, they highlighted that personal drive and motivation were essential, due to the hard work necessary.

#### *Perception of pioneering*

The category *Perception of pioneering* emerged before and after completing the master's degree. Most participants felt like pioneers. In some departments, the participants were the first radiographer to attain a master's degree. Thus, a supporting system facilitating master's degree studies was absent and a lack of preparedness for utilising their competencies was prominent.

For example, participants expressed that the allocated time for professional development was to some extent granted, but

often based upon informal arrangements that were easily downgraded in a busy day at the department. Thus, participants proposed that designed time for professional development should be agreed upon.

*"This autumn I have had 4-5 days for professional development, and it has been good. But it has its ups and downs. It is a bit unpredictable. But I feel that the manager goes to great lengths"* (Participant 4)

The sense of pioneering gave rise to a feeling of paving the way for others, for instance by negotiating for an increased salary after completing a master's degree. Support from managers and colleagues was warranted, in addition to formal agreements prior to undergoing the studies and a concrete plan for utilisation of competencies when achieving the degree. One participant stated that many research projects are initiated and run by physicians and physicists and that radiographers must be more involved and create their own projects. The participants expressed that radiographers must try to initiate projects themselves and not sit around and wait for others to invite them into research projects. Some suggested the creation of professional positions, including both clinical work, professional development, and research. The participants called for a change in culture to increase and utilise the competencies of managers, radiographers, and other health care professionals.

*"I think that you must have a goal with what you are going to use the competence for. It is so wrong that the competence should not be used"* (Participant 2)

Participants experienced a change in attitude at the workplace after they completed their studies and experienced that it seemed easier to get time off from work while studying and increased salary after completing the degree. The participants reported that an increasing number of radiographers are now taking master's degrees in their departments.

*"My colleagues say that I have gone ahead and paved the way for others. In fact, I thought I would not have to go ahead and pave the way for all things!"* (Participant 3)

## **Discussion**

This study aimed to explore the experience of a master's degree both before and after graduation. To our knowledge, no previous studies have reported what happens in clinical practice after radiographers complete a master's degree. Increased knowledge about motivational factors and utilisation of acquired skills will be of great value for radiographers, managers, and educational staff.

#### *Motivation*

We found that a profound inner motivation for commencing their master's studies was essential, along with support from colleagues. This is in accordance with previous studies describing top motivators for CPD activity and postgraduate educa-

tion to be interesting, developing new knowledge and increasing competency [3,20]. Participants further described a desire to use their achieved competencies clinically and that a motivational factor was a desire for a change in work tasks. However, they were not explicit about which changes they wanted, but one can assume that such changes included participating in quality improvement projects and research. Radiographers are devoted professionals who in general believe that CPD is important [21] and that radiographic research is essential to promote radiography as a profession and evidence-based radiographic practice [2,8,22]. However, radiographers spend little time on CPD [21]. This may indicate that Norwegian radiographers with a master's degree are a small, dedicated group among the professional population in Norway with a particular interest in the radiographic profession.

Our study complements previous findings about motivational factors [4,20] as we found that pragmatic reasons, such as a family situation that made it possible to study, were also considered important for the participants to start their studies.

### *Management support*

The participants reported that managers have a key role in facilitating radiographers to pursue a master's degree. Several studies have demonstrated the importance of financial support, funding availability, and time allocation [3,20] for professional development. However, it could be argued that it is not up to the manager to provide time/allocation to master students if it was the student's idea to pursue a master's degree. Interestingly, we found that managers were generally very supportive initially, but this support was based on oral informal agreements, leading to a lack of resource allocation. This suggests that a formal agreement between managers and the master's candidate is warranted. Furthermore, to improve access to postgraduate radiography education, it is important to demonstrate the need for such education [3]. In fact, one of our participants had to argue with the manager to be allowed to study, since the manager did not think that competencies on a master's level were needed in the department.

### *Applications of skills*

A joint statement by the European Society of Radiology (ESR) and the European Federation of Radiographer Societies (EFRS) states that: All radiographers and radiologists should incorporate a culture of continuous learning into their practice and should be supported in doing so [18]. In Norway, there is a lack of advanced practice for radiographers that require a master's degree. This is a major problem in the Norwegian system. Disturbingly, we found a lack of vision for utilising the achieved competencies and no culture for professional development. Hence, the participants conveyed only minor changes in tasks and a random and informal application of skills. Thus, one may argue that the potential gain of competency that a master's degree provides is underutilized, yielding poor use of

resources in a pressured healthcare system where daily operations and throughput of patients are in focus.

However, the participants experienced a great personal gain in terms of being better suited for professional discussions, having increased analytic skills, being better able to pass on knowledge, and expanding their horizons. Also, some participants reported that their master's degree opened doors to work in academia. In all, the participants described gaining increased professional self-esteem.

### *Perception of pioneering*

Interestingly, most participants felt like pioneers, paving way for others. Vikestad and colleagues [8] reported that only 19% of their respondents in Norway had participated in the research, and of those, only 50% knew how the results of their research had been communicated [8]. Furthermore, a more recent Nordic survey states that radiographer involvement in research and utilization of research evidence in practice is low, hence, strategies should aim to stimulate radiographers' engagement in research [7]. This supports our findings of a lack of culture for radiographers' utilisation of research knowledge and professional development. A barrier for more radiographers engaging in master's studies was described as the lack of real support from managers, lack of financial support systems, and resource allocation during the study period. In addition, the participants described no systems for increased salaries and few changes in tasks post-graduation in the clinic. However, some participants reported that the battle they fought seemed to pay off since some places established more systems facilitating master's education.

### **Limitations**

This study has limitations. Firstly, the number of participants is small. However, they provided rich information about a topic that is unexplored, possibly justifying a small sample size [23]. Secondly, even though it seems that only radiographers with a special interest are undertaking master's studies, the recruitment process may have led to a selection bias where only participants with a special interest in the topic were recruited. Hence, such participants seemed to be representative of the population at hand. Thirdly, all interviews were conducted through Zoom with inherent limitations, such as technical interruptions disturbing participants and loss of valuable information from non-verbal communications. However, Zoom is suggested to be as viable for collecting qualitative data, due to ease-of-use, cost-effectiveness, and data management features [24]. None of our participants expressed disapproval to use of Zoom. Fourthly, as the interviews were conducted in Norwegian, the translation of the quotation to English may miss some important nuances and meaning may be missed or added [25]. We quality-checked the English language in the quotations with an English-speaking colleague.

## Implications

Achieved competencies seem to be underutilised despite a profound inner motivation and a wish for new tasks. Managers and master's candidates should make formal plans for resource allocation during the study period and how the acquired competencies will be used after completion of master's studies. There is a need for professional development and research culture in the Norwegian radiology and radiation therapy departments. Radiographers must take the initiative to establish such, and not wait for an invitation from other health professionals. - Further research should investigate managers' attitudes and perceptions towards radiographers' master's competencies in the clinic. Furthermore, further studies are warranted on how master's competencies affect clinical departments when several radiographers achieve master's competencies.

## Conclusion

This study provides valuable information about why Norwegian radiographers choose to commence their master's studies and what happens in their work situation after graduation. Motivation and management support were perceived essential for beginning the master's studies. We found that the participants reported great personal gain, but poor application of skills post-graduation. The participants perceived themselves as pioneers, as there is a lack of experience with radiographers undertaking master's studies in Norway, hence no culture and systems for professional development are established.

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