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Understanding Research Motivations and Barriers Among Danish Sonographers in Radiology Departments: A Qualitative Study

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Abstract

Introduction: In Denmark sonographers, undergo profound training and have a notable presence in clinical practice. Understanding the factors behind their limited research engagement is important. This study aimed to examine the factors influencing sonographers' research involvement, focusing on motivational elements and barriers. Our investigation was structured around three key research questions: a) What motivates sonographers to engage in research? b) What obstacles hinder their involvement? c) How can we enhance the participation of sonographers in research in Denmark?

Methods: This study had an explorative inductive qualitative approach. The data collection method was a focus group session with sonographers from the National Sonographers Network.

The focus group session followed a structured guide and was verbatim transcribed. Thematic analysis by coding and identifying themes was performed individually by three

authors. Subsequently, Social Cognitive Theory was incorporated as a framework for further analysis.

Results: Regarding motivations for engaging in research, the themes were Impact on Practice and Personal Interest. In terms of obstacles to research involvement, the themes included Challenges in Staffing and Time Management, Low Priority and Interest, Limited Research Experience and Practical Skills, and Insufficient Support. Regarding enhancements for participation, the themes were Management and Communications and Networks.

Conclusion: Sonographers in Danish public radiology departments demonstrate a high interest in research, driven by personal and clinical practice impacts. Their intrinsic motivation fosters idea generation and collaboration in research. Key barriers include heavy workloads and limited research skills. Cultivating a supportive, research-friendly environment is important for meaningful participation. Enhancing management and colleague support can bridge existing gaps and encourage active research engagement.

Introduction

In Denmark, sonographers in radiology departments are relatively rare, with only an estimated 15 to 20 professionals working in public hospitals, most of whom have a background in radiography. In the UK[1] and the USA,[2] thousands of sonographers are employed across various specialties and frequently work in larger, multidisciplinary teams alongside radiologists. By comparison, in Danish obstetrics departments, sonographers are relatively common and often have backgrounds in nursing or midwifery.

In Denmark, sonographers in radiology departments undergo considerable training, typically performing up to 1,000 examinations and achieving a diagnostic accuracy exceeding 90%. Additionally, some hold master's degrees in sonography from abroad, which contributes to their professional development. Danish sonographers in radiology departments, referred to as Reporting Ultrasound Radiographers or Nurses, are responsible for authoring the final report of their findings, including differential diagnoses, which is a key difference from practices such as Canada,[3] Australia[4] and the USA.[5]

The recent launch of Denmark's first official sonographer educational program in 2024[6] represents a milestone in standardizing training nationwide. However, research engagement among Danish sonographers remains low, despite its critical role in advancing the profession, improving patient care, and strengthening the evidence base for best practices. Increasing sonographers' involvement in research is vital for establishing their role within the healthcare system, ensuring professional recognition, and enhancing clinical outcomes. Research will not only support continuous learning and innovation but also enables sonographers to contribute to the development of evidence-based guidelines, ultimately improving diagnostic accuracy and patient safety. In a profession still emerging in Denmark, research can help define and develop its contributions, reinforce its value, and facilitate its integration into interdisciplinary medical teams.

Existing studies highlights a strong interest in research among sonographers. In 2009, Elliott et al. found that nearly 90% of 218 UK sonographers were interested in research, though only 33% were actively engaged.[7] This finding highlight the discrepancy between interest and engagement in research, a gap that this study aims to address within a Danish context. While quantitative surveys provide valuable insights into interest and engagement, qualitative approaches, such as our focus group discussions, allow for a deeper understanding of the motivations and barriers that underpin these statistics.

A study of 32 countries and 36 council members of the International Society of Radiographers and Radiological Technologists,[8] along with a European study,[9] highlighted variations in sonographer education. In 2021, Harrison et al. surveyed 561 sonographers from 25 European countries, noting that only 33% were involved in research activities.[10]

A recent survey found that 30% of sonographers read peer-reviewed articles weekly, and 42% read them monthly.[11] However, their primary research contribution was performing ultrasound examinations (42%). Barriers to engagement included lack of time, funding, and support, while enablers included opportunities for skill development, job satisfaction, and addressing clinical tasks.[11] Clinical impact for sonographers includes diagnostic accuracy,[12,13] technical quality,[14] and audits.[15] Additionally, areas of interest include ultrasound follow-up,[16,17] communication skills[18] and the role of sonographers.[19]

Building on these findings, this study utilizes Social Cognitive Theory (SCT), developed by Albert Bandura, as its foundational theoretical and analytical framework,[20] to explore how personal, behavioral, and environmental factors influence sonographers' research engagement. SCT offers a framework for examining how personal factors (self-efficacy, outcome expectations), behavioral patterns (previous research involvement), and environmental influences (institutional support, professional culture) interact that influence sonographers' motivation to engage in research. Understanding these dynamics is essential for developing strategies to enhance participation and address barriers, ultimately fostering a more research-oriented profession that can contribute to sustainable healthcare practices.

The aim of this study is to explore the factors influencing Danish sonographers' research involvement, focusing on motivations and barriers. The goal is to identify strategies for enhancing their participation in research and advancing sustainable healthcare practices. This study explores three research questions:

a) What motivates sonographers to engage in research?

b) What obstacles hinder their involvement?

c) How can participation in research be enhanced in Denmark, based on their experiences?

Methodology

The study adopted an explorative inductive qualitative design, grounded in interpretivism: a research approach that emphasizes understanding human experiences and the meanings they create within their natural context.[21] This design was primarily chosen due to the limited amount of published research specifically focusing on sonographers, which has largely been dominated by survey-based studies.[22-32] This methodology enabled us to deeply explore sonographers' complex experiences without preconceived hypotheses, capturing rich data directly from participants.

We used a focus group consisting of eight sonographers from different Danish radiology departments as our primary data collection method. Focus groups allow for rich, interactive discussions where participants can reflect on and respond to each other's experiences, providing a deeper understanding of shared and diverse perspectives on research engagement. The flexibility of the inductive approach allowed the study to adapt to emerging insights during the focus group, ensuring findings were grounded in the participants' perspectives. This was essential for uncovering new themes in an under-explored area. Additionally, we obtained demographic data including age, gender, and years of experience as a sonographer from each participant.

The semi-structured focus group discussion protocol was developed based on the aim of the study, available literature, author brainstorming, and pilot testing to explore the similarities and differences in perspectives and experiences among participants.

The study followed the consolidated criteria for reporting qualitative research (COREQ)[33], a checklist that ensures transparency in the design, conduct, and reporting of qualitative research.

Data collection

Participants were selected via purposive sampling from a national network of sonographers, which includes 15 radiographers performing ultrasound in radiological settings as well as a few researchers and lecturers. Given Denmark's small sonographer population, we aimed for diversity in experience and institutions.

An invitation to participate in the focus group was emailed to all network members two months before the annual meeting. The interview was scheduled as the final item on the meeting agenda.

Eligibility criteria included employment as a sonographer and a minimum of one year of experience. Five days before the meeting, participants received study details and a consent form via email. Oral information and informed consent were obtained on the day of the focus group. Eight sonographers from six public hospitals volunteered. To protect anonymity, hospital details and the focus group date remain confidential.

The focus group was conducted face-to-face with the first and last author in an undisturbed room. Participants were briefed on mobile rules, confidentiality, the study's purpose, and discussion guidelines. A semi-structured guide covered topics including the perception and significance of research, personal involvement, and challenges, collaboration, and support in research (Appendix 1). Data on gender, age, and experience were collected and stored per national regulations. The audio-recording was transcribed verbatim, anonymized, and subsequently deleted.

Data analysis

Thematic analysis, following Braun and Clarke's six-phase process (Figure 1)[34] , was used as the primary methodology. This process includes familiarization, coding, theme identification, review, definition, and reporting.

Initially, data were coded inductively, identifying recurring patterns and concepts. Similar codes were grouped into broader categories. Three coders manually analyzed the focus group data using systematic text condensation, ensuring that themes emerged directly from the data through an inductive approach. To ensure reliability and validity, a subset of the data was reviewed collaboratively by all authors, and thematic coding was refined through discussion until consensus was reached.

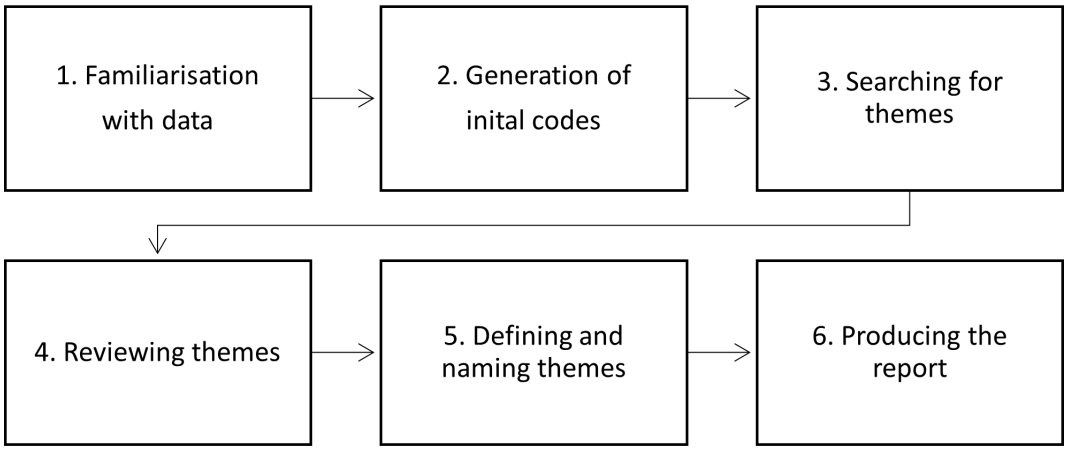

Figure 1. Adaption of Braun and Clarke's six step thematic analysis

Ethical approval

Ethical approval was granted by the University of Southern Denmark's Research Committee (ID 23/47840) on July 28, 2023. All data were anonymized to ensure confidentiality. Participants provided informed consent both orally and in writing, and participation was voluntary. They were informed of their right to withdraw at any time prior to the start of the analysis. Sonographers are referred to by anonymous identifiers (S1-S8) throughout the study.

Research team and reflexivity

The primary facilitator was the first author, with the last author as the secondary facilitator. The researchers and participants had a pre-existing professional relationship through a national sonographers' network with annual meetings since 2021. The researchers and sonographers neither collaborate in clinical practice nor engage in joint research. Participants were aware of the researchers' roles and interests. To enhance objectivity, the other two researchers were blinded to participants' identities and did not participate in the focus group. Strict adherence to data collection and analysis protocols, along with ethical guidelines, ensured the study's integrity.

Results

The participants represented six different public hospitals. The group consisted of five women, and three men. The average age of the participants was 48 years, with an average of eight years' experience as sonographers.

Three main themes and eight subthemes were identified during the analysis. The first theme, *Motivations for Engaging in Research*, captures the reasons participants pursue research, including the perceived benefits for clinical practice and personal interest. The second theme, *Obstacles to Research Involvement*, highlights barriers such as staffing challenges, low priority, limited skills, and insufficient support. The third theme, *Enhancements for Research Participation*, identifies facilitators, particularly management strategies and communication networks (Figure 2).

Key Themes	Subthemes	Quotes
Motivations for Engaging in Research	**Impact on Practice**	*"...I find that research has a direct practical significance for how we conduct our examinations, and various guidelines we must follow in relation to different findings on ultrasound." (S3)* *[mentioned being involved in two collaborative studies] "…but I have also had some ideas myself…" (S7)* *"I had an idea a while ago… I thought it could be interesting to do a project on this because it could save the patients a lot of time and money if we could implement it somehow." (S3)* *"…it is research-based articles that dictate how often we should check them* [aorta controls]." (S5) *"I think it* [research] *is relevant, as our machines are constantly getting new features, and therefore there needs to*

	be research that supports that we can use these functions. One thing is that the supplier says it can, but we need to have some research to support it." (S2) *"…we are at the front. We see the exciting things* [patient cases] ...*"* (S5) *"Last time I spoke with a colleague about fasting* [how long time before scanning is optimal]*, we thought it might be interesting to look into it regionally, in terms of how it's done..."* (S5) *"I looked at half a year's worth of scans... and found that we really didn't find anything on these scans [control scan], so I wrote … to the department, … Now they [patients] only get one scan..."* (S8) *"I can see how it contributes"* [about her own contribution to a specific research project]. (S8) *Sometimes in my work, when I'm scanning, I think it is pointless that I'm spending my time and the patient's time on this. So, if we can streamline things a bit more. Get the general practitioner better prepared so they choose the right examination from the start."* (S8)
Personal Interest	*"The project I was involved in, I found it exciting and fun to be able to use what I know in such a specific way. I became very engaged. Even during my annual leave, I had to* [research] ...*"* (S8). *"Why is everyone fighting to get their name on [scientific articles] …" (S4)* *"I find it super fun and exciting to hear about what people are doing…It's exciting to be involved."* (S5) *"I think being involved in data collection would be exciting…"* (S4) *"I was asked if I wanted to be included [as a co-author]. At first, I thought maybe. But then someone said that I should just say yes, so I did…, what do I need it for?"* (S8)

Obstacles to Research Involvement	**Challenges in Staffing and Time Management**	*"We need to see the patients. So, if we now want to research…, I can't see where the time will come from." (S4)*
		"It takes time. And I could feel from my colleagues that they were wary that it [the research] would impact them [with more patients during a shift]." (S8)
		"We can't even take an extra day off if someone else is off too…" (S8)
		[Speaking about a specific project*] "It never amounted to anything, because then the patients would have to be scanned twice, and there wasn't time."* (S4)
		"It's not like we can just add an extra sequence, as you can with an MRI... You feel the time immediately in ultrasound... and that means I can see fewer patients..." (S2)
	Low Priority and Interest	*"It's difficult to research in ultrasound. [medical] Doctors' interest is low." (S7)*
		"…I could talk about ultrasound, but no one really wants to listen to that." (S2)
		"They [medical doctors] are also often involved in other major projects, especially CT or MRI." (S1)
		"I find it difficult to find any doctors who really want to [do ultrasound]." (S4)
		"...and it rarely happens that there is ultrasound [on the programme]." (S4)
		"…there are also many MRI projects… at our institution compared to ultrasound." (S8)
		"[when compared to other modalities] *…and we are not very highly prioritised, I can tell. And that's probably because we are a small group…"* (S8)
	Limited Research	*"I don't enter a project without an idea that I can complete it. But do I feel equipped for those projects – no, not at all." (S1)*

	Experience and Practical Skills	*"The thing about writing research articles, I have never done it. I wouldn't have a clue where to begin." (S8)*
		"I just think there's so much practical stuff in it too, which I don't know much about." (S4)
		"Just starting up a project. How do you do that?" (S3)
		"I wouldn't have any idea where to start, or even who to talk to, or how to get started at all." (S3)
	Insufficient Support	*"...But it's hard to get started [conducting research]. Sometimes you feel a bit alone…" (S5)*
		"…and I don't think it is easy. [getting support from management]" (S4)
		"It's hard to start on your own. To come up with something." (S7)
		"...I have requested training on how to conduct research... But unfortunately, it has not happened yet." (S1)
Enhancements for Research Participation	**Management**	*"It [research] requires that there is some management backing and support." (S2)*
		"It's mostly about CT and MRI…We clearly have the first 20 projects we could launch from this forum, but what does management prioritize? I think it's a management priority." (S5)
		"We are passionate about our field, but…we are not taken very seriously, and we feel overlooked." (S1)
		"…how do we know it's not being prioritized? Have we tried? I mean, we're sitting here talking about all the opportunities... But it's not because we ourselves are offering anything... But if we now say that it can be done, and have an idea, then we should pursue it..." (S6)
		"Working with data collection and analysis requires that one gets some days [off from clinical work]." (S3)

	"I think that since there are so few of us doing ultrasound and there are so many doing MRI or CT, it's easier to tell them that they can find time to do projects..." (S4) *"I can certainly promote myself. Especially if you are already speaking with some senior medical doctors from other departments. But they also need to know that we are interested. … that's how I started out in the project, they initially thought younger doctors could be involved. But there is such a high turnover with these younger doctors, and they are not so involved in ultrasound. So, it was so unstable, and that's why I was chosen."* (S8)
Communications and Networks	*"We often find that we don't receive the same information that our radiologists do. Then they just forget to inform us…" (S2)* *"…so, it's the random network that determines whether one gets started or succeeds with it...we lack research radiographers." (S2)* *"But if one wants to get better at conducting research, one can start in this group and highlight new guidelines. Then one might also better notice what lacks in guidelines." (S7)* *"Sometimes I miss some information* [about new guidelines]. *I don't know why, not everyone has been informed."* (S3) *"We have not been informed* [about new guidelines]." (S7) *"Often, it is from the young doctors whom we ourselves have trained that inform us, or when I happen to talk with one of my other colleagues* [speaking about a new guideline]. *But it is an oral transmission. It's not something I've read or know where I can read about…"* (S1) *"…With this network, you know someone, and then I could also talk to you (last author)."* (S5) *"It could be fun to start asking what you do, and we contribute to the group."* (S3)

Figure 2. Themes
The themes are presented here with selected quotes.

Motivations for Engaging in Research

Sonographers are motivated by both the desire to impact practice and personal interest.

Impact on Practice

Sonographers recognize the importance of research in the field of ultrasound:

"...I find that research has a direct practical significance for how we conduct our examinations, and various guidelines we must follow in relation to different findings on ultrasound." (S3)

One participant emphasized the importance of technical development and the need for independent research. Additionally, there is recognition that sonographers are often the first to identify interesting research topics. While they participate in collaborative studies, sonographers also generate new research ideas, demonstrating their intrinsic motivation to advance the field of sonography:

[mentioned being involved in two collaborative studies] *"…but I have also had some ideas myself…"* (S7)

Sonographers are often inspired by research projects that benefit patient care by reducing unnecessary procedures and optimizing resource use:

"I had an idea a while ago… I thought it could be interesting to do a project on this because it could save the patients a lot of time and money if we could implement it somehow." (S3)

Personal Interest

Sonographers are strongly motivated by personal interest, and their enthusiasm for engaging in research has the potential for them to explore new ideas or contribute in a meaningful way to research projects.

The eagerness to participate in meaningful projects, even during leisure time, demonstrates a strong desire for participants to advance their knowledge and professional practice:

"The project I was involved in, I found it exciting and fun to be able to use what I know in such a specific way. I became very engaged. Even during my annual leave, I had to [research] *..."* (S8).

However, some participants exhibit lack of enthusiasm toward academic recognition and publishing suggesting that there may be a potential lack of awareness and cultural or institutional factors that influence sonographers' engagement with academic activities:

"Why is everyone fighting to get their name on [scientific articles] …" (S4)

Obstacles to Research Involvement

Sonographers face barriers to integrating research with clinical duties due to time constraints and logistical challenges. Ultrasound research is deprioritized compared to CT

and MRI, and receive a low interest from doctors. Additionally, participants feel lack of the necessary research skills and support, hindering their ability to initiate projects.

Challenges in Staffing and Time Management

The participants consistently highlighted significant logistical and time-related constraints that affect their ability to integrate research activities with their clinical duties:

"We need to see the patients. So, if we now want to research…, I can't see where the time will come from." (S4)

"It takes time. And I could feel from my colleagues that they were wary that it [the research] would impact them [with more patients during a shift]." (S8)

Low Priority and Interest

Ultrasound is often overshadowed by other imaging modalities like CT and MRI. Sonographers struggle to engage medical doctors in discussions and research related to ultrasound, citing a lack of enthusiasm and prioritization:

"It's difficult to research in ultrasound. [medical] *Doctors' interest is low."* (S7)

Participants share their experience about the department's weekly morning teaching session

"…I could talk about ultrasound, but no one really wants to listen to that." (S2)

It seems that there might be more research interest in other modalities in clinical practice:

"They [medical doctors] *are also often involved in other major projects, especially CT or MRI."* (S1)

Limited Research Experience and Practical Skills

Healthcare professionals express a gap in their knowledge and preparedness for conducting research which highlight challenges in initiating projects, understanding practical research aspects, and writing research articles:

"I don't enter a project without an idea that I can complete it. But do I feel equipped for those projects – no, not at all." (S1)

"The thing about writing research articles, I have never done it. I wouldn't have a clue where to begin." (S8)

Insufficient Support

Another barrier for participants is the pervasive lack of support and feelings of isolation. They struggle to initiate research due to insufficient guidance and managerial support:

"...But it's hard to get started [conducting research]. *Sometimes you feel a bit alone…"* (S5)

"…and I don't think it is easy. [getting support from management]" (S4)

Enhancement of Participation

When asked what could be done do enhance sonographers' participation in research management was an important theme.

Management

Enhancing research in ultrasound necessitates strong management commitment to allocate resources effectively and prioritize this field alongside other imaging modalities:

"It [research] *requires that there is some management backing and support."* (S2)

"It's mostly about CT and MRI…We clearly have the first 20 projects we could launch from this forum, but what does management prioritize? I think it's a management priority." (S5)

Moreover, addressing the issue of participants feeling undervalued is important:

"We are passionate about our field, but…we are not taken very seriously, and we feel overlooked." (S1)

While management support is important for advancing ultrasound research, participants also highlighted that themselves also having a role in advocating for their projects being allocated resources, and their presence in the research landscape:

"…how do we know it's not being prioritized? Have we tried? I mean, we're sitting here talking about all the opportunities... But it's not because we ourselves are offering anything... But if we now say that it can be done, and have an idea, then we should pursue it..." (S6)

Communications and Networks

The participants highlight that communication gaps exist within their practice and emphasize the importance of networking to advance research in sonography.

"We often find that we don't receive the same information that our radiologists do. Then they just forget to inform us…" (S2)

One participant highlights the role of informal networks in research success and points out a significant shortfall in research radiographers:

"…so, it's the random network that determines whether one gets started or succeeds with it...we lack research radiographers." (S2)

The participants recognize the benefits of a network for enhancing research capabilities. They see value in using the network to share knowledge and discuss guidelines critical to research:

"But if one wants to get better at conducting research, one can start in this group and highlight new guidelines. Then one might also better notice what lacks in guidelines." (S7)

Discussion

Between Participants expressed a strong desire to engage in research, primarily driven by their motivation to improve clinical practice and advance ultrasound technology. However, logistical challenges, insufficient institutional support, and undervaluation of ultrasound hinder their participation, creating a gap between their enthusiasm and actual involvement. Building on our findings, we use Social Cognitive Theory (SCT) to explore how participants' motivations and challenges shape their research engagement. SCT provides a framework for understanding the participants' research engagement by examining how personal motivation, expected outcomes, and environmental factors interact. This study applies SCT to explore why participants are motivated to conduct research (self-efficacy), how they perceive its benefits (outcome expectations), and how institutional barriers influence their participation (environmental factors). While participants are eager to contribute to research, challenges such as limited support and undervaluation hinder their involvement. Using SCT, we identify key facilitators and barriers, offering insights into how research engagement can be better supported.

Self-Efficacy

We identified intrinsic motivations, such as the desire to influence clinical practice and personal interest, as key factors driving the participants to engage in research. These intrinsic factors boost their self-efficacy - their belief in their ability to achieve specific outcomes. The participants demonstrate high self-efficacy by recognizing the importance of research and applying it to improve practice standards.

The participants actively seek research opportunities to enhance ultrasound technology and patient care. For instance, one sonographer's initiative to research optimal fasting times reflects confidence in addressing clinical issues despite lacking certain skills. However, they often feel unprepared for broader research tasks like project management and academic writing, highlighting a gab between their motivation and confidence in executing more complex research tasks. According to SCT, sustaining research behavior requires a supportive environment that encourages idea generation and provides necessary resources.

Outcome Expectations

The participants generally perceive positive outcomes from engaging in research, including impacts on patient care and personal professional development, which aligns with their positive outcome expectations. However, mixed feelings about academic recognition and publication suggest not all outcome expectations equally motivate them. Some see little benefit in academic aspects, which may deter their involvement in formal research roles. This ambivalence may arise from unfamiliarity with the publication process, perceived irrelevance to clinical roles, or a belief that academic recognition does not significantly benefit their careers or receive local management acknowledgment. Some sonographers feel that the effort involved in publishing outweighs the potential rewards, especially if their main goal is to enhance clinical practice rather than build an academic reputation.

Environmental Influences

The environmental context for the participants includes institutional support, time allocation, and resource availability, all crucial for research engagement. Participants noted that inadequate managerial support and structural resources hinder their ability to act on their motivation. This barrier may lower self-efficacy and affect outcome expectations, as systemic obstacles can diminish the anticipated benefits of research, reducing motivation.

Additionally, communication gaps indicate a lack of effective knowledge and opportunity sharing mechanisms. SCT highlights the importance of observational learning, where individuals are influenced by observing others. Poor communication within professional networks limits the participant's ability to engage in research, as they miss opportunities to learn from and emulate successful peers and mentors.

Our study highlights the dual roles participants occupy in clinical practice and research. Participants expressed interest in research and the challenges they face, such as exclusion and limited time. Sonographers in radiology departments are a scarce resource in Denmark. The participants are all exploring how to expand their responsibilities in clinical practice. While the participants found pre-defined research projects preferable, there is much to gain for the profession if sonographers lead independent clinically relevant research projects. However, evolving professions, priorities and organizational values must be openly discussed with managers to secure the sonographers to have opportunities to impact their practice towards a culture including research. This has also been confirmed by Pedersen investigating radiographers' motivation for research [39]. Many participants primarily identify as clinicians, adding an additional layer to establish a research culture in clinical practice. Especially if there is limited access to mentor support, or none established research culture that can help develop clinical practice.

These constraints conflict with the European Federation of Radiographers Societies' emphasis on research's importance for advancing the profession and enhancing patient care.[36] Most sonographers in the study expressed interest in research but lacked the skills to perform it independently. While half had participated in research, they were often not acknowledged as authors. This aligns with other studies showing 70-90% of radiographers interested in research and 30-33% having participated in research projects.[7,10]

The underutilization of sonographers in research activities is not unique to Denmark but mirrors a global challenge within the healthcare sector.[7,9,10] This disparity underscores a widespread need to reevaluate how healthcare systems worldwide support research activities among specialized practitioners. Bridging this gap is essential not only for the advancement of ultrasound technology but also for ensuring the sustainability of healthcare practices. By fostering a global dialogue on these issues, we can share strategies and lessons learned to collectively enhance the research contributions of sonographers.

Managers play a crucial role in the productivity and performance of sonographers. In this focus group, several sonographers reported having little or no designated time for

professional growth activities like research due to daily workload constraints set by management. This is consistent with studies identifying time as a major obstacle to radiographers' research engagement.[10,37] Despite their key role in daily tasks, sonographers feel underrecognized by managers. Managers are vital for fostering trust[37] and shifting department culture to support research activities.[39] Participants expressed a need for greater managerial interest in their professional development and specific strategies to increase research participation. Management that acknowledges and supports sonographers' professional growth and research interests is essential for creating a research-oriented culture. Integrating research time into work schedules, as done in some institutions, could serve as a model. Additionally, sonographers need to involve management in their project ideas to gain support and protected time.

Institutional support may include mentorship opportunities, funding for research, or access to research networks, while professional culture encompasses the attitudes towards research within the workplace.

Globally, many ultrasound exams are conducted by sonographers and non-radiologists due to increasing demand, while radiologists' interest has declined, however sonographers benefit from informal discussions and trust-building through empathy when sharing challenges.[40] Miles et al. (2022) noted individual variability in sonographer-radiologist relationships and a general lack of awareness about sonographers' roles, may lead to underrecognition.[7] This underappreciation limits their contributions to medical research. Reiso et al. (2020) emphasized the importance of professional communities for meaningful interactions and belonging.[41] Enhancing the visibility and understanding of sonographers' roles requires efforts at both organizational and professional levels.

In Denmark, there are currently no sonographers working in clinical practice who hold a PhD, and there is no master’s program specifically in radiography or sonography. This lack of advanced, specialized education pathways presents a barrier for radiographers and sonographers who wish to transition into research or academic roles. Those interested in an academic career often pursue broader health-related or technology-focused master’s degrees, which, while valuable, may lead them away from clinical practice and create challenges for integrating research within their professional field. The European Federation of Radiographers society (EFRS) has recently established a RadDocs network including radiographers holding a PhD degree, currently comprising 160 European members with numbers continuing to grow. Furthermore, a recent study found Danish radiographers have published fewer than 300 papers, with output dominated by eight radiographers who have each published 10 or more[42], this suggests that only a small number of radiographers are currently active in research, though this number is expected to grow.

Denmark lacks notable examples of sonographers actively engaged in research. This may reflect the relatively recent development of Denmark's sonography programs and research culture. In contrast, the UK and Australia have more established pathways and supportive

research environments[7,10]. As the Danish sonography profession advances, building similar research engagement will require management support, resources, and time—factors seen in these more research-active countries. Future efforts could draw from international examples to foster research opportunities for Danish sonographers.

Strengths and limitations

A strength of our study is the diversity of our focus group, comprising sonographers of different ages, work experiences, and institutional affiliations. This enriched the data, providing a comprehensive view of their perspectives on research. Shared familiarity with clinical sonography among both participants and researchers contributed to the depth of the discussions.

However, we recognized potential moderator bias, as participants' responses might have been influenced by their peers. To mitigate this, the focus group was facilitated by a primary moderator, with a secondary moderator acting as an observer. Since participants were recruited from a national network, there is a possibility of selection bias, as network members may share common experiences or perspectives. Although our study included only eight sonographers, they represent approximately half of the Danish sonographer population. While the findings are not intended to be generalizable, they offer insights that may be transferable to similar professional contexts, allowing for a deeper understanding of shared experiences and challenges.

Conclusion

The sonographers in the present study demonstrate a high interest in research, driven by personal and clinical practice impacts. Their intrinsic motivation fosters idea generation and collaboration in research. Key barriers include heavy workloads and limited research skills. Although our findings offer valuable insights, they are based on a small sample and should be interpreted with caution. Encouraging a more research-supportive environment, including enhanced managerial and peer support, may help facilitate greater involvement, but further exploration is needed to understand how best to achieve this.

Statements and Declarations

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Competing Interests

None

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