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Gram, E.G.; Jønsson, A.B.R.; Larsen, Lisbet Brønros; Adlouni, M.; Mussmann, B.

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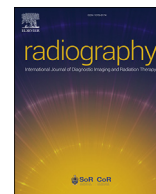
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## Communicating the risk of recall in mammography screening - Enskilment in breast radiography



E.G. Gram <sup>a, \*</sup>, A.B.R. Jønsson <sup>b, d</sup>, L.B. Larsen <sup>c</sup>, M. Adlouni <sup>c</sup>, B. Mussmann <sup>c, e</sup>

<sup>a</sup> Department of Public Health, Section of General Practice, University of Copenhagen, Denmark

<sup>b</sup> Department of People and Technology, University of Roskilde, Roskilde, Denmark

<sup>c</sup> Department of Radiology, Odense University Hospital, Odense, Denmark

<sup>d</sup> Department of Community Medicine, Arctic University of Norway, Norway

<sup>e</sup> Research and Innovation Unit of Radiology, University of Southern Denmark, Odense, Denmark

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### ABSTRACT

**Introduction:** In Denmark, there are no official guidelines on how to inform women about the risk of recall during mammography screening, leading to varied local practices. This study explored the experiences of radiographers at a Danish mammography screening unit and breast cancer assessment clinic communicating the risk of recall and false-positive results.

**Methods:** This study involved 12 weeks of ethnographic fieldwork over the course of one year, along with eleven semi-structured interviews with radiographers.

**Results:** Radiographers worked at the screening unit and the breast cancer assessment clinic. This provided them an opportunity to learn from their colleagues, improve communication skills, and the ability to recognise and respond to emotional reactions. The radiographers were aware that recalls might cause psychosocial consequences and had thus established a local practice sensitive to this. The radiographers informed women at their first screening about the risk of recall and false positives, aiming to mitigate these consequences.

**Conclusion:** These findings highlight the advantages of radiographers working in both screening and clinical settings.

**Implications for practice:** Insights from this study may inspire future guidelines or local screening practices and improve patient care. Furthermore, results may inform department managers' workload organisation.

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### Introduction

A 50-year-old woman comes into the breast cancer assessment clinic, she has attended her first screening and is recalled for further examinations of an abnormal finding on her mammogram. The woman is told that two additional X-rays of the breasts including ultrasound will be performed followed by information about findings. She promptly replies that she is happy that the initial screening included information about higher risk of being recalled at the first screening, and therefore, she did not worry too much about it (Observation made by EGG).

In Denmark, women are invited to screening for breast cancer between the ages 50 to 69 as a part of the Danish Breast Cancer Screening Programme. Systematic breast cancer screening aims to detect breast cancer early to reduce morbidity and mortality.<sup>1</sup>

However, screening tests such as mammography will necessarily cause recalls and false-positive results.<sup>1</sup> The false-positive results are findings that were initially categorised as positive, but upon further examination is found to not indicate breast cancer.<sup>2</sup> This is different from overdiagnosis, where the positive test result is true positive, meaning that the woman does indeed have cancer, but the cancer would not have developed into symptoms or cause mortality had it not been detected.<sup>3,4</sup> Especially, at the first screening there is a higher risk of being recalled for further diagnostics, as the radiologists have no previous images of the women's breasts for comparison.<sup>5</sup> In Denmark, more than 80% of invited women participate in screening, and 8–43% of women who participate in all screenings will experience a false-positive result.<sup>5,6</sup>

Screening mammograms are performed by radiographers, who are also responsible for the communication during the examination. Danish women receive written information about the risk of false positives by a pamphlet, yet there are no official guidelines as to how

\* Corresponding author. Oester Farimagsgade 5, 1353 Copenhagen, Denmark.  
E-mail address: [emma.gram@sund.ku.dk](mailto:emma.gram@sund.ku.dk) (E.G. Gram).

to inform women verbally at the screening unit probing informed decision-making.<sup>7–9</sup> False-positive mammograms and the recall process have proven to cause psychosocial consequences both short- and long-term and therefore it is important to take these processes seriously.<sup>2,10–12</sup> Potential psychosocial consequences include anxiety, changes in behaviour, affecting sleep, and worries about cancer.<sup>13</sup>

The purpose of the study was to explore radiographers' communicative practices and interactions with women undergoing mammography screening, including how the risk of recall and false positives are communicated. This article draws on phenomenological concepts such as *enskilment* to describe how embodied learning upskill radiographers to become more proficient in their work.

**Methods**

This is a qualitative study including participant observations and individual interviews.

*Setting and research participants*

During the fieldwork, EGG participated in the daily procedures of the breast radiology and mammography screening department at a university hospital in Denmark. The observations took place at two sites: one where women are screened as part of the Danish National Breast Cancer Screening Programme, and the breast cancer assessment clinic which women attend when recalled for diagnostics after abnormal findings. All radiographers were invited to participate through their supervisor and could contact EGG by email if they wished to participate in interviews. Radiographers were encouraged to participate but were also informed that they did not have to.

*Participant observations*

EGG conducted 12 weeks of fieldwork from May 2023 to May 2024. The work started with descriptive observations that became more interpretative as EGG gained experience in the field.<sup>14</sup> Initially, observations were broad and explorative, becoming more focused guided by themes as familiarity with the department grew. Regular discussions with departmental staff ensured the continuous refinement and validation of emerging themes.

Throughout this fieldwork, EGG actively participated in the daily activities of clinicians, accompanying them during mammography screening and consultations with women suspected of having

breast cancer. Observations encompassed a wide array of daily practices, including communication and interactions with screening participants, performing mammograms, and inter-collegial discussions about clinical practice. In addition to observing consultations, EGG assisted in various non-clinical. The observation notes included context and information about actors as well as verbal statements. Detailed observations were recorded in a physical notebook during fieldwork and elaborated upon immediately after each observation session.

*Semi-structured interviews*

EGG began the fieldwork by conducting observations capturing the broad spectrum of the radiographers' activities and interactions and identifying the preliminary themes that were then elaborated in individual semi-structured interviews. These interviews delved into local practices about communication, learning, and reflections upon practices. These interviews provided a platform for the radiographers to articulate their experiences, perceptions, and reflections on their practices.<sup>15</sup> The interviews began abstractly covering how they believed they learned something in their work, how they informed their practices, and how they employed those learnings (Appendix 1). Interviews ended with EGG asking about a practice that was noted during observations; how they use their experiences from clinical practice to communicate the risk of false positives and recall. Interviews lasted 25 min to 1 h.

*Analysis approach*

Our study used a qualitative methodology to explore the work practices of radiographers, focusing on the ways in which their experiences and perceptions shaped their professional activities. Observations and interviews were analysed from a phenomenological stand drawing on *enskilment* and *embodiment* allowing us to understand how radiographers develop skills that influence their practice.<sup>16,17</sup> The interviews were thematically coded; using an open and iterative coding approach whereafter the codes were categorised into themes using thematic analysis.<sup>18</sup> This was done abductively, where the initial observations guided the identification of themes, which were then examined in greater detail during individual interviews, and observations then provided context to the interview material.<sup>19</sup> The insights gained from these interviews were thus used to refine and revisit the themes during continued observations. This abductive approach ensured a thorough and

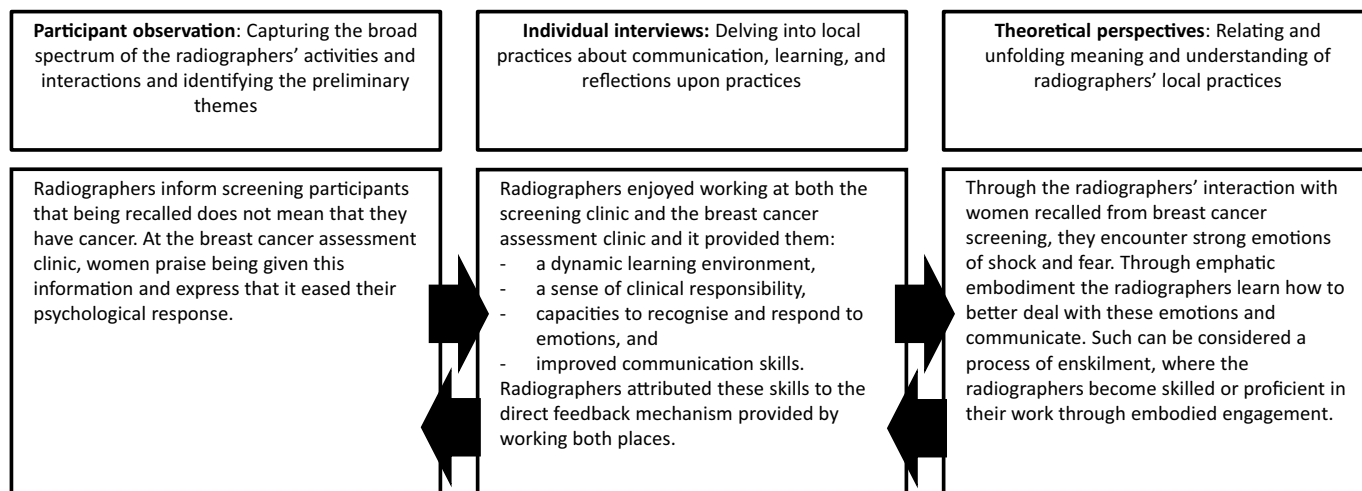


Figure 1. The abductive process of analysis.

evolving analysis of the communicative practices of the radiographers.<sup>20</sup> This process is shown in Fig. 1. We analysed the radiography practices as a phenomenological study of culture to understand what they do and know.<sup>21</sup>

### *Ethical considerations and positioning*

Ethical approval is deemed unnecessary for all interview studies by the Danish Research Ethics Committee. Research authorisation was ensured through collaboration with the chief physician, chief radiographer, and head of research. Prior to each consultation, screening participants provided verbal consent for the presence of EGG. Verbal consent was obtained from all radiographers and written for those who participated in individual interviews. Before the commencement of fieldwork, radiographers had the opportunity to inform their supervisor if they preferred not to be approached.

To maintain confidentiality, all transcribed field notes and interviews were anonymised. Given the small number of radiographers at the department, we refrained from presenting any characteristics that could potentially identify radiographers.

EGG has a background in public health, is educated within health and medical sciences, and is interested in communication and unintended consequences of screening, such as psychosocial consequences, which have affected the focus of observations. EGG and ABRJ were not familiar with the department or its staff prior to the study. LBL, the chief radiologists, was part of the clinical staff, while MA, the chief radiographer, was not directly part of the staff being investigated. BM is the head of the research department. EGG conducted the analysis. ABRJ and BM supervised the process helping to refine themes and contributed to analysis. LBL and MA were not directly involved in the analysis, they were regularly presented with findings throughout the process and were open to the exploratory approach and provided valuable support despite the nature of the results. LBL and MA facilitated access and made significant contributions to the final manuscript by offering insights into the organisational structures and clinical practice guidelines.

## **Results**

This analysis is based on 12 weeks of fieldwork and 11 individual interviews with radiographers. This analysis addresses three themes: dynamic learning environment and clinical responsibility, recognising emotional reactions and improved communication skills, and learning through direct feedback from screening participants. The analysis and overall process of interpretation are shown in Fig. 1.

### *Dynamic learning environment and clinical responsibility*

The radiographers all work at the screening unit and the breast cancer assessment clinic. They described their work environment as dynamic, changing between routine practices with healthy women at the screening unit to more serious consultations at the assessment clinic where women are potentially patients.

*“Working at the screening unit is more relaxed. You don’t have the big, psychological challenges with the women and all that. Or it is limited. The atmosphere is lighter, while at hospital it is heavier and you are dependent on the other professionals, in how fast you are able to work. It is a big difference, but a good combination. I wish that you did that all over the country, because you get both sides of the women. And I think that psychologically, it helps radiographers*

*when they are in clinical situations, that they know about the whole process and everything.”* (Radiographer 2).

Working both places was considered a benefit in regard to the psychological load and the radiographers enjoyed switching between sections. The radiographers also found that it improved their professional skills:

*“I don’t want to say anything bad about only working at the screening unit, but I could not imagine working within mammography and not having the professionalism that I get through working at the assessment clinic. I normally tell my students that they obviously have to learn how to take good images, but the real challenge is understanding when the door opens: who comes in.”* (Radiographer 3)

This radiographer enjoyed the variation and believed that it upskilled their professional work and considered it an incumbent part of their work to participate in clinical activities at the breast cancer assessment clinic. Radiographer 3 also emphasised being able to recognise who comes in and what their needs are as an important part of their work.

The dynamic work environment also offered the opportunity to learn from colleagues. As opposed to working alone at the screening unit, they worked together with radiologists at the assessment clinic.

*“I think that it heightens the level of quality. This discussion, where women are recalled and the doctors discuss the images she had taken at the screening: “have you ever seen this before?” you know, you become part of the image diagnostics, and you have the possibility to go into the doctors and ask: what do you think is wrong, or simply just ask a question or discuss a situation (...) I really think working with breast cancer, we get to learn more about it.”* (Radiographer 3)

At the breast cancer assessment clinic, the radiographers work and interact with radiologists, which provides insights into image diagnostics and knowledge about breast cancer. When interacting with doctors and looking at images together, the radiographers were also confronted with their own work and received direct feedback:

*“I am really proud that we take good images, but a part of it is standing in there (doctor’s office) and seeing: I took that X-ray!”* (Radiographer 4)

The radiographers are quality assured every half year where a random sample of their X-ray images are audited to display tendencies and rate overall quality according to National standards. This means that the radiographers are used to being confronted with their work but doing so in relation to clinical practice was something else:

*“All of us are able to perform what we need to, but women are different and in your (name of quality rating) you might notice that you have a tendency that you can then improve, but nevertheless it is really important that we get good images for those that are to interpret them. These people are responsible to judge if the woman is sick or not (...) Therefore, I would like to take good images so that I know that our doctors are able to do that and I feel a personal responsibility for both the woman and my colleagues.”* (Radiographer 5)

Working together and being part of a bigger department provided feelings of mutual responsibility for providing high-quality

care and diagnostics. Working together with doctors in diagnostics helped radiographers improve their image quality beyond that provided by the official quality assurance programme. Being part of a visible process provided feelings of responsibility.

The opportunity to work more closely together with other radiographers were also highlighted as a source of learning. One radiographer said that:

*“I guess you mimic your colleagues. You know, collecting all of the gems, and then learning from the other. What they said or did, how they behaved, one does learn from your colleagues, when you are not alone.”* (Radiographer 6)

Observing colleagues' practices was beneficial and provided the opportunity to adopt new sayings or ways of working, which was considered valuable to the radiographers.

#### *Learning to recognise emotions and communicate*

The radiographers emphasised that they knew that being recalled induced anxiety and doubts about health.

*“We feel it too, and none of us would want to be in that situation, so we do understand why some of them are afraid. If someone is crying, then you can understand why.”* (Radiographer 6)

Radiographer 6 felt connected to the women attending the clinic and had empathy for their emotions. Another radiographer expressed the process of learning to recognise these feelings of anxiousness and responding to them in a compassionate way:

*“I think that it is about having an understanding of what it means to be recalled, the risk they face, and what it is that they are going through. That you respect that they are anxious and don't just cut it off as nonsense. But it is because you have experienced so many women sitting on the bed and being told that we need more images. You know, it is another world that opens up. Especially when you are told that you may be sick and we have to understand that some will be very anxious in these situations. (...) For those who are afraid, it is important that we match them in that situation (...) I think it is important that you somehow understand the full process and participate in it, so it is more realistic why they are afraid. It is not just about getting four good images; you need deeper insight into what it is that they are afraid of”* (Radiographer 3)

By participating in the recalls, the radiographers learn to recognise emotions as they are more present in memory. Other radiographers expressed that participating in recalls provided more empathy to their provision of care:

*“I think I have learned to use my empathy, and I spend a great amount of time on them if they are afraid, to foster some ease. Because now I know how important that is. If someone opens up about their worries or tells you that someone close to them has had breast cancer, then you have to spend some minutes listening to that story. I believe that will at the end provide a better examination.”* (Radiographer 7)

The radiographers learned to respond to emotions. An examination was considered good not just in regard to image quality but also in regard to the emotional care that could be provided and how well they performed fostering ease and calmness.

Knowing about the full process of screening and recalls helped the radiographers to improve their care in terms of communication

and overall learnings about the right amount of care in specific situations. This was used directly to prepare screening participants:

*“I think you become better in terms of providing information and guidance (...) you become more aware of the meaning of your words, and you provide more targeted information, when you work both places, because you know what is going on. You know what you are not allowed to say, but you also know what you quite subtly can prepare the women for, without having said too much. Something special happens. And I actually think you improve your communication skills. If we were not this specialised, then everything you learn by sitting next to someone when they are told that we have a suspicion of breast cancer, talking to them, weighing your words, gets lost.”* (Radiographer 3)

Working at both the screening and the assessment clinic provided the radiographers the bigger picture. Especially the situations in which women were anxious were memorised and helped guide their practices in regard to communication and to recognise and respond to these emotions.

#### *Learning through direct feedback from screening participants*

At the department, the staff talked openly about the risk of recalls well-knowing that “they scared women” or made them anxious. It was not something that they were afraid to talk about nor did they view it as an error in their work but was attentive to how they could ease the feeling of anxiety. By recognising emotions among the women and their communication skills, the radiographers had developed the local practice of informing women systematically at their first screening that they had a higher risk of recall and that there was a chance that it was not cancer. The radiographers did not systematically communicate this information at subsequent screenings.

*“Since it is the first time that you are here, we don't have any previous images for comparison. So, the doctors that read the images will have to compare to (images of) the other breast. So, if there is the slightest difference, you will be recalled for further examinations. And it does not mean that it is something dangerous, so you don't have to be nervous. But we have to play it safe here.”* (Radiographer 1)

The radiographers informed the women before performing X-rays, explaining to EGG that they did so to prevent the woman from assuming their comments were prompted by something they had observed on the mammogram. During observations, EGG had observed that many women applauded the communication of the risk of false positives when they were recalled. EGG mentioned this in the interviews with the radiographers and asked for rationales and reactions to the practice.

*“I think it is a good idea that we, at the first screening, tell the women that there is an increased risk of being recalled. Yes, because then I learned that when women come in again, they say: it was so good that you told me that I have a higher chance to be called in again. Because now it happened and now I am not as nervous as I might otherwise would have been.”* (Radiographer 6)

This was also emphasised by another radiographer:

*“Most women are so anxious when they are recalled, and some have already made up ideas about in what breast they are sick, and if it has spread, and are certain that they are sick. Some might be*

*able to hide it, but it is important that we inform them at their first screening that they might be recalled even for something that can turn out to be completely harmless.” (Radiographer 4)*

Recognising the needs of the women in the recall situations, they had developed this information practice to ease the feeling of anxiousness when women were recalled. This was learnt by working in clinical settings, where the radiographers receive direct feedback on what they say, do, and their practices in general.

One senior radiographer said that back in time, they matched the recalled women with the radiographer that had taken their mammograms at the screening. Recognising that recalls can be an uncomfortable situation to many, this was employed to ease the level of anxiousness by having a familiar element present. The senior radiographer emphasised that it was no longer possible due to the number of women screened for breast cancer today. The radiographers generally recognised the effort to improve the experience of being recalled as important:

*“Communication is really key. And especially when it comes to breasts, since there is some femininity tied to them, right. It is no different to us than to them. And at the clinical part, it is important to be able to handle crises and emotions. And be present in those feelings. I use this a lot when I perform screenings. I inform them that if it is the first time, we don’t have any images for comparison, and you can also have a lot of breast tissue when you are only fifty years old. And that might cause the doctors to have difficulties differentiating the details. And therefore, we play it very safe. That’s what I always say. Rather one time too much than the opposite. And it doesn’t have to mean anything. We do this not to overlook anything.” (Radiographer 7)*

As radiographers become more experienced, they acquire cultural principles for acting and interpreting women’s reactions to information through a particular shared experience building onto their knowledge, skills, and actions in clinical practice. This provided them with communications skills that were built from direct feedback from meeting women both in the screening situation as well as the recall situation.

## Discussion

In this qualitative study aiming to explore local practices of mammography screening radiographers, we identified three themes which showed that working at both the screening unit and the breast cancer assessment clinic provided a dynamic learning environment for the radiographers that was considered incumbent to their work. Furthermore, working at the assessment clinic allowed them to observe the work of their colleagues and learn from them as well as providing a sense of responsibility for their joint work. Experiencing women’s emotions and caring for them allowed them to recognise these emotions in the screening and improve their response to these. Based on these experiences, they had developed a communicative practice where they informed women at their first screening about the risk of being recalled and false-positive results. They experienced that it eased the emotional stress and anxiousness for women recalled for an abnormal screening.

### Enskilment and embodiment

This analysis emphasises how radiographers learn from being in clinical settings both in regard to professional quality of work,

communication, care, and compassion. This can be considered a process of *enskilment* where the radiographers become skilled or proficient in their work through embodied engagement.<sup>17,22</sup> The concept of *enskilment* draws on phenomenological insights into the relationship between the body, perception, embodiment, and skill acquisition.<sup>16,23</sup> *Enskilment* is not a static transmission of knowledge but a matter of perception obtained through observation and imitation that dynamically come into being through active attention and participation.<sup>17</sup> From this perspective, radiographers’ engagement with breast cancer screening participants can be viewed as an embodied experience that shapes their actions and communication skills in the recall process. The dynamic perspective on embodiment brings attention to how perception and action are rooted in experiences and helps us to understand how simply experiencing specific situations can embody knowledge and affect radiography practices.<sup>17,22</sup> Through the radiographers’ interaction with women recalled from breast cancer screening, they encounter strong feelings of shock and fear, they amend their practices and through emphatic embodiment they learn how to better deal with these emotions and communicate with women in such a state of mind.<sup>22</sup> Through these dynamic learning processes, radiographers use experiences to refine and adapt their skills in response to women’s reactions to being recalled based on feedback from the environment at the breast cancer assessment clinic and interaction with women.

In the interviews, it was evident these learnings were tacit knowledge.<sup>24</sup> EGG had observed radiographers talking about experiences that had influenced them and how they related this to their practices, but when being asked it was difficult to apprehend how this *enskilment* or learning processes occurred.<sup>24</sup> This emphasises that *enskilment* is not a mechanical action but occurs through tacit understanding embedded in bodily practices and habit, not always fully accessible to conscious awareness or verbalisation.<sup>16</sup> A study reported how breast cancer screening radiographers who focus on guiding women are likely to positively influence the women’s screening experience.<sup>25</sup> Another study examined the effect of verbal communication in breast cancer screening and found that it had an effect on measurable outcomes such as discomfort during the procedure.<sup>26</sup> *Enskilment* through dynamic learning environments might therefore impact quality outcomes of breast cancer screening.<sup>12</sup>

The radiographers all appreciated learning from each other and recalled times where they had watched colleagues perform tasks. *Enskilment* recognises the social dimension of learning as taking place through interactions and observing and imitating others.<sup>22</sup> The direct feedback and confrontation of their practical skills in taking X-ray images was also an intersubjective experience that involved responsibility for the women and for colleagues reading the images occurring through interaction and skilful engagement with others. Self-evaluation in the quality of mammography has shown to lead to progress in image quality.<sup>27</sup> Working at the assessment clinic might therefore also improve image quality in performing screening mammograms.

Overall, *enskilment* provides a phenomenologically-grounded framework for understanding how individuals acquire skills through embodied engagement with the world.<sup>28</sup> It emphasises the dynamic, situated, and socially embedded nature of skill acquisition, highlighting the intricate relationship between the body, perception, and action.<sup>16</sup> Acquiring skills to handle psychological responses and knowing about the continuum of patients’ journey is important for the work of the radiographers as to promote a patient-centred care approach.<sup>29</sup> Psychological consequences of being recalled might be substantial and long term,<sup>2,10</sup> thus, focusing on how to minimise this harm is crucial.<sup>30</sup>

## Implications

In Denmark, there are no guidelines on how to inform women about the risk of being recalled and the risk of false-positive test results. Other clinics might be inspired by this local practice to tackle the psychological consequences of being recalled or receiving a false-positive result. Effective communication of information has been shown to be an important factor for the experience of screening.<sup>31</sup> Further, we did not observe this leading to additional questions from the women, making it a time-efficient practice.

The radiographers in this study enjoyed the dynamic environment by working at both the screening and the assessment clinic. Other studies have shown that radiographers can experience an accumulative emotional burden from working with patients,<sup>32</sup> and coinciding with the need for increased screening capacity, projected shortage of radiographers working in breast screening, a dynamic environment might ease that burden and make the work more attractive.<sup>33</sup> A study also suggests that the repetitive nature of working in breast cancer screening is a reason for radiographer shortage, and that radiographers want to specialise in mammography due to clinical exposure and interest in breast cancer.<sup>34</sup> Researchers also suggest that upskilling radiographers in terms of wider involvement and experience contribute to the delivery of a resilient radiographic workforce.<sup>35</sup>

Insights from this study may inspire future guidelines or local screening practices and improve patient care. Furthermore, results may inform department managers' workload organisation and might help clinical radiographers to better understand their practice.

## Conclusion

Breast cancer screening practices at this specific department might improve or probe for an institutional enskilment as the radiographers co-join in practices and work in both breast cancer screening and the breast cancer assessment clinic. In this setting, enskilment occurred through embodied experiences and social interactions, which cannot be transferred simply by passive learning. Through repeated practice and experience, bodily movements became refined and automatic, leading to increased proficiency. The radiographers acquired improved communication skills and developed a local practice where they informed women at their first screening about a higher risk of being recalled and the risk of false positives to ease the psychological consequences. This might inspire future guidelines or local screening practices.

## Ethical statement

The work described has been carried out in accordance with [The Code of Ethics of the World Medical Association](#) (Declaration of Helsinki) for experiments involving humans. This is a qualitative study and did not require ethical approval as per Danish Law. The participants gave written informed consent and were anonymised to ensure privacy rights.

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None.

## Conflict of interest statement

The authors declare no competing interests.

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We acknowledge and thank the department, where this research was conducted, for their patience and time.

## Appendix 1. Interview guide

### Introduction.

Thank for participation.

Inform about the aims and scope of interview.

Inform about anonymity rights and complete informed consent form.

### About the radiographer.

Experience, job role, describe in own words.

### About learning.

Tell about the corporation between the screening and breast cancer assessment clinic?

Examples of learnings in working at the breast cancer assessment clinic?

Specific resources for learning?

The best thing about working both places?

What do you learn from working in the screening?

Did you at some time change some of your practices and why?

### The screening process.

How do you communicate about the screening process?

What do you tell the women?

Why do you think this is important to communicate?

How does the women react to the information?

### End and reflections.

If you were to do a research project, what would it be?

Thank you for your time.

## References

- Gøtzsche PC, Jørgensen KJ. Screening for breast cancer with mammography. *Cochrane Database Syst Rev* 2013;2013:CD001877. <https://doi.org/10.1002/14651858.CD001877.pub5>.
- Bond M, Pavey T, Welch K, Cooper C, Garside R, Dean S, et al. Systematic review of the psychological consequences of false-positive screening mammograms. *Health Technol Assess* 2013;17:1–170. <https://doi.org/10.3310/hta17130>. v–vi.
- Brodersen J, Schwartz LM, Heneghan C, O'Sullivan JW, Aronson JK, Woloshin S. Overdiagnosis: what it is and what it isn't. *BMJ Evid Based Med* 2018;23:1–3. <https://doi.org/10.1136/ebmed-2017-110886>.
- Woloshin S, Kramer B. Overdiagnosis: it's official. *BMJ* 2021;375:n2854. <https://doi.org/10.1136/bmj.n2854>.
- Njor SH, Olsen AH, Schwartz W, Vejborg I, Lyng E. Predicting the risk of a false-positive test for women following a mammography screening programme. *J Med Screen* 2007;14:94–7. <https://doi.org/10.1258/096914107781261891>.
- [No title]. [cited 5 Sep 2024]. Available: <https://www.sundhed.dk/sundhedsfaglig/kvalitet/kliniske-kvalitetsdatabaser/screening/mammografiscreening-dkms/>.
- Hersch J, Barratt A, Jansen J, Irwig L, McGeechan K, Jacklyn G, et al. Use of a decision aid including information on overdiagnosis to support informed choice about breast cancer screening: a randomised controlled trial. *Lancet* 2015;385:1642–52. [https://doi.org/10.1016/S0140-6736\(15\)60123-4](https://doi.org/10.1016/S0140-6736(15)60123-4).
- Gram EG, Jønsson ABR, Brodersen JB, Damhus CS. Questioning “informed choice” in medical screening: the role of neoliberal rhetoric, culture, and social context. *Healthc Pap* 2023;11:1230. <https://doi.org/10.3390/healthcare11091230>.
- Hofmann B. 10.4045/tidsskr.19.0568 Mammography screening has generated considerable professional and public debate. In this study, we investigate whether women receive sufficient information about the benefits and disadvantages of the Norwegian Breast Cancer Screening Program to enable them to make informed, independent choices. Informational material from the Norwegian Breast Cancer Screening Program for 1996, 2003, 2009 and 2017 was analysed and compared with information from the independent inquiry into the mammography screening programme headed by the Research Council of Norway. The criteria that are essential in order to make informed choices are as follows: benefit (absolute and relative reduction in mortality), disadvantages (false-positive results, overdiagnosis, overtreatment and anxiety), implementation (following invitation, recall, and findings requiring treatment), and limitations (interval cancer). Information provided to women has significantly

- improved from 1996 to 2017. Nevertheless, the information in 2017 lacks important details regarding the disadvantages of screening, such as over-diagnosis and overtreatment. *The Norwegian Breast Cancer Screening Program does not provide sufficient information for women to be able to make informed, independent choices. Women are nudged to participate by prescheduled appointments, and the information is insufficiently balanced and nuanced.* Hofmann B. *Får kvinner nok informasjon til å ta informerte valg ved mammografiscreening?* Tidsskr Nor Laegeforen. 02 16 2020;140. <https://doi.org/10.4045/tidsskr.19.0568>. Tidsskr Nor Laegeforen.
10. Gram EG, Siersma V, Brodersen JB. Long-term psychosocial consequences of false-positive screening mammography: a cohort study with follow-up of 12–14 years in Denmark. *BMJ Open* 2023;13:e072188. <https://doi.org/10.1136/bmjopen-2023-072188>.
  11. Lindberg LG, Svendsen M, Dømggaard M, Brodersen J. Better safe than sorry: a long-term perspective on experiences with a false-positive screening mammography in Denmark. *Health Risk Soc* 2013;15:699–716. <https://doi.org/10.1080/13698575.2013.848845>.
  12. Lee JM, Lowry KP, Cott Chubiz JE, Swan JS, Motazed T, Halpern EF, et al. Breast cancer risk, worry, and anxiety: effect on patient perceptions of false-positive screening results. *Breast* 2020;50:104–12. <https://doi.org/10.1016/j.breast.2020.02.004>.
  13. Brodersen J, Thorsen H. Consequences of screening in breast cancer (COS-BC): development of a questionnaire. *Scand J Prim Health Care* 2008;26:251–6. <https://doi.org/10.1080/02813430802542508>.
  14. Angrosino M. *Doing ethnographic and observational research*. SAGE; 2007. Available: <https://play.google.com/store/books/details?id=XEDKGQencScC>.
  15. Spradley JP. *The ethnographic interview*. Waveland Press; 2016. Available: <https://play.google.com/store/books/details?id=KZ3lCwAAQBAJ>.
  16. Merleau-Ponty M. *Phenomenology of perception*. Psychology Press; 2002. Available: <https://play.google.com/store/books/details?id=q3HwhfjRmswC>.
  17. Ingold T. *The perception of the environment: essays on livelihood, dwelling and skill*. Psychology Press; 2000. Available: <https://play.google.com/store/books/details?id=5LpTBlnNGkEC>.
  18. Clarke V, Braun V. Thematic analysis. *J Posit Psychol* 2017;12:297–8. <https://doi.org/10.1080/17439760.2016.1262613>.
  19. Timmermans S, Tavory I. Theory construction in qualitative research: from grounded theory to abductive analysis. *Socio Theor* 2012;30:167–86. <https://doi.org/10.1177/0735275112457914>.
  20. Tavory I, Timmermans S. *Abductive analysis: theorizing qualitative research*. University of Chicago Press; 2014. Available: <https://play.google.com/store/books/details?id=5OYvBAAQBAJ>.
  21. Spradley JP. *Participant observation*. Waveland Press; 2016. Available: <https://play.google.com/store/books/details?id=q7DICwAAQBAJ>.
  22. Gallagher S. *How the body shapes the mind*. Clarendon; 2005. <https://doi.org/10.1093/0199271941.001.0001>.
  23. Ings W. Practical worlds: enskilment as pedagogical practice. *Media Practice and Education* 2024;25:95–109. <https://doi.org/10.1080/25741136.2023.2263826>.
  24. Foos T, Schum G, Rothenberg S. Tacit knowledge transfer and the knowledge disconnect. *J Knowl Manag* 2006;10:6–18. <https://doi.org/10.1108/13673270610650067>.
  25. Nightingale JM, Murphy F, Eaton C, Borgen R. A qualitative analysis of staff-client interactions within a breast cancer assessment clinic. *Radiography* 2017;23:38–47. <https://doi.org/10.1016/j.radi.2016.08.004>.
  26. Shrestha S, Poulos A. The effect of verbal information on the experience of discomfort in mammography. *Radiography* 2001;7:271–7. <https://doi.org/10.1053/radi.2001.0344>.
  27. Zujic PV, Božanić A, Jurković S, Šegota D, Dujimić EG, Čandrić B, et al. The role of self-evaluation and education of radiographers involved in a breast cancer screening program at Clinical Hospital Center Rijeka. *Radiography* 2021;27:1162–5. <https://doi.org/10.1016/j.radi.2021.06.007>.
  28. Csordas TJ. *Embodiment as a paradigm for anthropology*. 2003. Available: <https://play.google.com/store/books/details?id=cSomXwAACAAJ>.
  29. Sharma S, White C, Appavoo S, Yong-Hing CJ. Optimizing patient-centered care in breast imaging: strategies for improving patient experience. *Acad Radiol* 2024. <https://doi.org/10.1016/j.acra.2024.04.047>.
  30. Bolejko A, Zackrisson S, Hagell P, Wann-Hansson C. A roller coaster of emotions and sense-coping with the perceived psychosocial consequences of a false-positive screening mammography. *J Clin Nurs* 2014;23:2053–62. <https://doi.org/10.1111/jocn.12426>.
  31. Ding S, Fontaine T, Serex M, Sá Dos Reis C. Strategies enhancing the patient experience in mammography: a scoping review. *Radiography* 2024;30:340–52. <https://doi.org/10.1016/j.radi.2023.11.016>.
  32. Spacey A, Heaslip V, Szczepura K. Understanding experiences of the radiography workforce delivering medical imaging as part of patients' end of life care: an exploratory qualitative interview study. *Radiography* 2024;30:132–40. <https://doi.org/10.1016/j.radi.2023.10.019>.
  33. Warren-Forward HM. Barriers and incentives for choosing to specialise in mammography- A survey of Australian undergraduate diagnostic radiography students. *Radiography* 2018;24:360–5. <https://doi.org/10.1016/j.radi.2018.05.004>.
  34. Warren-Forward HM, Taylor J. Barriers and incentives for choosing to specialise in mammography: qualitative analysis. *Radiography* 2017;23:32–7. <https://doi.org/10.1016/j.radi.2016.07.009>.
  35. Zelenyanszki C, Vertenten C, Spencer S, Hudson D, Currie R. Extending the scope of practice for experienced assistant practitioners in breast screening and the impact on service resilience. *Radiography* 2022;28:973–80. <https://doi.org/10.1016/j.radi.2022.06.021>.