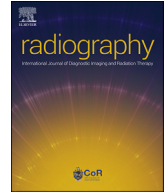




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The role of radiographers in ultrasound: A survey of the national societies within the European Federation of Radiographer Societies (EFRS)

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ABSTRACT

Introduction: Ultrasound is one of many areas of specialism for radiographers to develop their skills in. As part of a wider suite of surveys, the European Federation of Radiographer Societies (EFRS) wanted to investigate the extent and scope of practice for radiographers practising ultrasound across Europe. This report details the results of the initial survey, exploring the views of the EFRS countries' National Radiographer Societies.

Methods: An electronic survey was sent to representatives of the 43 national radiographer societies who were members of the EFRS. Questions asked about radiographer practice in ultrasound within individual countries, scope of the role, particularly report writing, in addition to investigating current ultrasound education, barriers and opinions on priorities for radiographer ultrasound practice.

Results: Forty individual responses were received, from a total of 27 countries, covering 62.8% of the EFRS member societies invited to participate. Radiologists or specialised medical practitioners performed ultrasound in the majority of countries. Radiographers practise ultrasound in 48% of countries and 11% have some limited involvement in ultrasound. Countries without radiographer engagement in ultrasound reported legislative issues or lack of acceptance from the medical professions (52%) and/or limited specific ultrasound education (39%) as predominant factors. In most countries where radiographers practise ultrasound, clinical reporting is a descriptive report or checklist approved by a medical doctor/radiologist.

Conclusion: The results highlight the scope of practice and barriers faced in some EFRS countries to enabling radiographers to develop their skills and competencies in ultrasound.

Implications for practice: Priorities for radiographer societies to assist in the development of ultrasound as a pathway for radiographer progression in countries, where it is not yet available, include education programmes, acceptance by medical professionals and changes to legislation.

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Introduction

Throughout most of Europe there is a recognised shortage of radiologists and increasing demand for ultrasound services.^{1–4} In some countries radiographers are undertaking ultrasound examinations after undergoing education and clinical training.^{1,5–9} The Centre for Workforce Intelligence suggested that within Europe the

United Kingdom (UK) is one of the few countries to utilise the role of sonographer.¹⁰ A radiographer undertaking ultrasound examinations is often referred to by the title 'sonographer', which is defined in the UK as "A healthcare professional who undertakes and reports on diagnostic, screening or interventional ultrasound examinations"¹¹, with the minimum qualifications for a sonographer being full programmes of study accredited by the Consortium for the Accreditation of Sonographic Education (CASE).^{11,12}

A survey by the European Society of Radiology (ESR) in 2013, whilst having a low response rate, suggested that 13.6% of radiologist respondents worked with sonographers.⁵ The European Federation of Radiographer Societies (EFRS) wanted to investigate the current prevalence of radiographer involvement in ultrasound across the EFRS community. The aim was to understand the extent of practice, particularly report writing responsibilities, barriers and opinions on priorities for radiographers practising ultrasound. This article reports the initial survey results from the EFRS national societies.

Literature review

A 2017 editorial sparked debate in Europe by discussing the UK model for sonography, whereby sonographers take responsibility for reporting any examination they performed.⁷ In many European countries the final ultrasound report has been the responsibility of medical practitioners. The editorial hypothesised that training, existing working practices and lack of financial compensation for the additional skills and responsibility were potential influencing factors for the difference between the UK sonographer practice and that of many other European countries. It was suggested that a practitioner with appropriate and extensive ultrasound training, regardless of background profession, is preferable to a medically qualified practitioner with limited or no training.⁷ Medical professionals from Europe responded, highlighting how ultrasound is used as a clinical tool by clinicians in their specialist area of practice, rather than a separate imaging modality.

Radiographers have participated in ultrasound since the 1980s in the UK.¹³ A review demonstrated that within the UK, sonographers were undertaking a range of other examinations in addition to "autonomous scan performance and reporting", including interventional procedures.¹³ A 2016 study of European countries' professional societies highlighted that radiographers performed ultrasound in only two countries, Ireland and the UK. Six countries responded to the survey, limiting the overall generalisability.¹⁴ Findings concurred with a study of ten European radiographer associations in 2012, which reported that the UK and Ireland were the only two countries where radiographers performed all types of ultrasound examinations.¹⁵ The Netherlands had some radiographer involvement in all areas of ultrasound, although not as widespread as the UK and Ireland.¹³ All respondents had radiographer sonographic practice in some aspects, most commonly abdominal, but to varying levels. Again, legal issues were reported reasons for limited involvement in ultrasound. The ESR (2013) survey established that sonographers worked in a small number of countries namely Austria, Belgium, Germany, Ireland, Lithuania, Montenegro, Netherlands, Spain and the UK.⁵ Despite the limited sample of radiologists responding and disparity of distribution across the responding countries, few reported sonographer practice within their centres and fewer had fully independent reporting sonographers working with them.

In December 2020, the ESR published an ultrasound imaging consensus statement¹⁶ and report the differences in legislation for ultrasound practice across Europe. They reinforce the importance of the person undertaking the examination being legally responsible for the ultrasound report, which concurs with expectations in

the UK.¹¹ The position statement suggests the UK and Ireland enable non-medical ultrasound practitioners to practise ultrasound because of the funding model of state run medical care, however advocate that ultrasound examinations should be performed by medical specialists with appropriate training. Dietrich et al. (2019),¹⁷ whilst acknowledging the highly skilled role of the sonographer in the UK, highlight the controversy around the non-medical sonographer role, advocating that ultrasound examinations should be performed by medical doctors.¹⁷ If performed by sonographers, examinations should be reported by the medical doctor.¹⁷ As technology develops, requests for imaging investigations continue to increase and radiologists report staffing shortages.² Anecdotal evidence suggests that radiographers are keen to develop ultrasound skills across some European countries. No large-scale survey of radiographer input into ultrasound services was evident in recent literature, leading to this initial survey of EFRS member radiographer societies.

Methods

An on-line survey using SurveyMonkey™ was developed, as part of a suite of EFRS ultrasound surveys, investigating practice from the radiographer society perspective, education providers and individual sonographers. This survey aimed to explore views of EFRS national radiographer societies across Europe. Before disseminating the survey to representatives of the 43 national radiographer societies (all member of the EFRS), a pilot study was distributed to colleagues in five countries. The questionnaire was written in English and included a range of closed, Likert scale and free text questions. The survey was sent in March 2019, was available for two months and a reminder sent to EFRS member institutions by the secretariat, to encourage completion.

According to the Health Research Authority tool, ethics approval was not required for this internal survey of national societies.¹⁸ Clear explanation highlighted that the study would be published using anonymous data and would comply with the EU General Data Protection Regulation (GDPR). Participants were asked for agreement before proceeding with the survey.

Descriptive statistics were used to display the results. Common themes were collated using thematic analysis of the free text comments.¹⁹

Results

There were 40 responses from national radiographer societies, covering 62.8% of the EFRS member societies and 27 countries [Fig. 1]. Seven countries provided multiple responses from different radiography societies or representatives. Several responses from participants within an individual country were different. Where statements such as whether radiographers perform ultrasound in their country had a positive response from one respondent, it was assumed that some radiographers were practising within that country.

Respondents reported that radiologists were the predominant profession undertaking ultrasound examinations in their country (97.5%), followed by specialised medical doctors performing ultrasound scans within their own field (80%) and radiographers (62.5%) (see Fig. 2). Further scrutiny of the results found that in 13 (48%) countries radiographers undertake ultrasound examinations; comprising Austria, Denmark, Estonia, Finland, France, Ireland, Malta, Netherlands, Norway, Poland, Spain, Sweden and the UK. Three countries reported a small number of radiographers had very limited involvement in ultrasound practice; Italy, Portugal and Switzerland, two of these were specifically vascular ultrasound. Eleven countries (41%) reported no radiographer involvement in

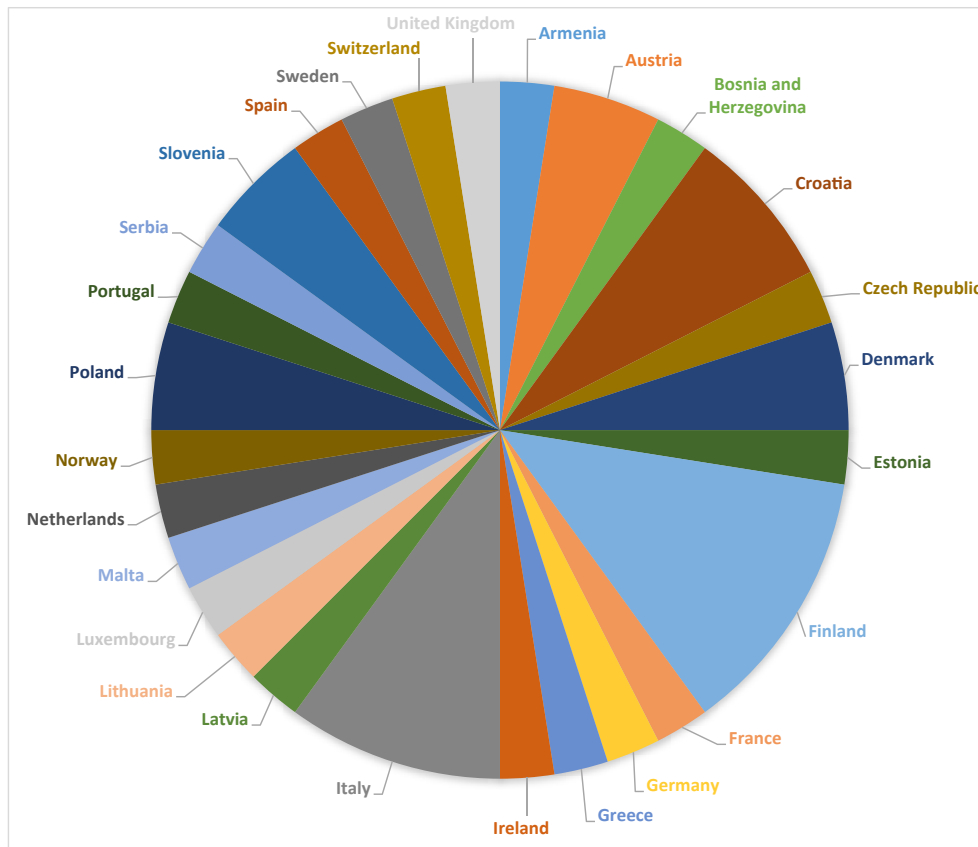


Figure 1. Countries responding to the survey.

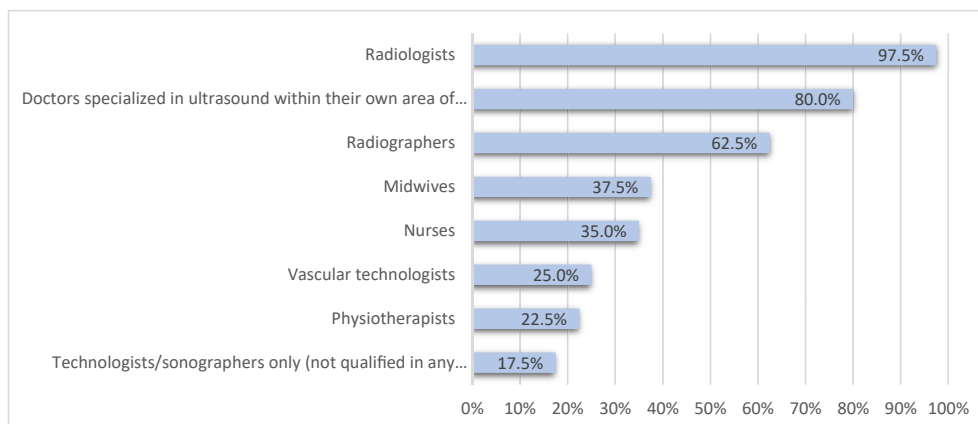


Figure 2. An overview of who performs ultrasound examinations (actual responses).

ultrasound, five (50%) of which had not been approached by radiographers interested in developing their skills and undertaking ultrasound, whereas three (33%) had. All three countries reporting limited radiographer involvement in ultrasound had been contacted by members interested in extending their skills.

Frequently identified barriers to radiographer ultrasound practice were legislative issues or lack of acceptance from medical professionals (52%) and/or limited specific ultrasound education programmes (39%) [Fig. 3]. The question 'do you (your society) think that radiographers can be adequately trained to perform ultrasound examinations?' had a positive response from the majority of respondents (n = 21, 91%).

Current education provision for ultrasound, in countries where ultrasound is performed by radiographers, was predominantly short/focused courses or postgraduate ultrasound specific programmes, lasting 6 months (n = 5, 25%), 12 months (n = 8, 40%) or 18 months (n = 3, 15%).

Other questions explored clinical practice of radiographers, where radiographers were employed within ultrasound services. Two respondents (4%) reported that radiographers provide a full interpretative report and provide advice on further investigations (UK and Norway). The majority (30%) indicated that radiographers provide a descriptive report (Italy, Finland, Ireland and Spain) or a checklist report, finalised/validated or written by a medical doctor

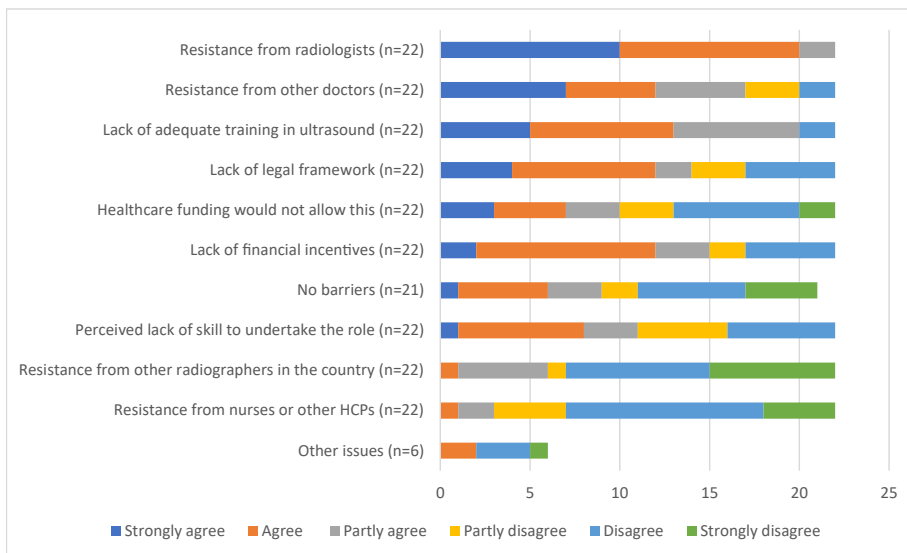


Figure 3. Barriers to radiographers performing ultrasound examinations.

(22%) (Austria, Portugal, Italy, Estonia) [Fig. 4]. Respondents from France, Poland, Sweden and Serbia ‘sometimes’ write a report. Further comments suggested that full reports were provided for obstetric examinations, but signed off by a radiologists for all other examinations or decisions were based on local hospital policy. Radiographer societies were considering changes to enable radiographers to report ultrasound examinations in three countries, however discussions were in the early stages.

Radiologists or cardiologists were responsible for the examination if a radiographer performs the ultrasound scan in 16 (76%) cases (n = 21), representing 12 of the 15 countries responding to the question. One suggested that responsibility lies with the person who signs the report and the employer jointly, suggesting that if the radiographer writes the report they take responsibility for that report in conjunction with their employer.

Further questions elicited views of national radiographer societies on different aspects of the role [Fig. 5]. There was strong agreement (100%) that radiographers need to continue to update their skills, some level of agreement (86.6%) that radiographers should provide the final report and can evaluate/vet ultrasound

requests, to ensure that ultrasound is the most appropriate examination for the clinical indications (86.6%).

Respondents were asked to explain their priorities for role expansion and professional development for ultrasound practice. Themes are given below (direct quotes in italics):

- Appropriate training and education, including a dedicated ultrasound programmes (n = 10)
- Acceptance by radiologists/doctors (n = 5); *“doctors protecting their professional status”* [respondent R13]
- Law defining who can perform ultrasound (n = 5)
- Continuing professional development (CPD) (n = 3)
- Independent reporting *“as in the UK”* (n = 2); *“A radiographer specialised in ultrasound should provide a final report on all ultrasound scans that they perform”* [R16]
- Salary/incentive (n = 2)
- Team-working with support from radiologists/others, when required (n = 2)
- A European statement and support from ESR (n = 2)

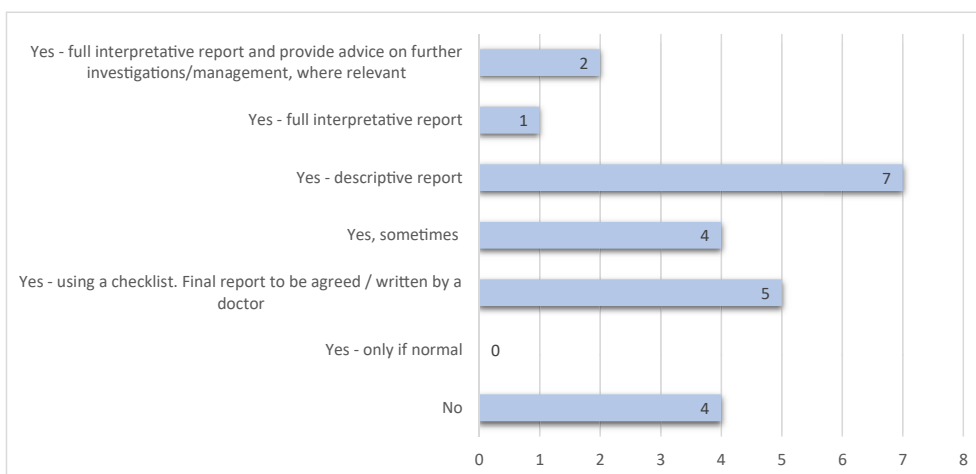


Figure 4. Ultrasound report writing by radiographers.

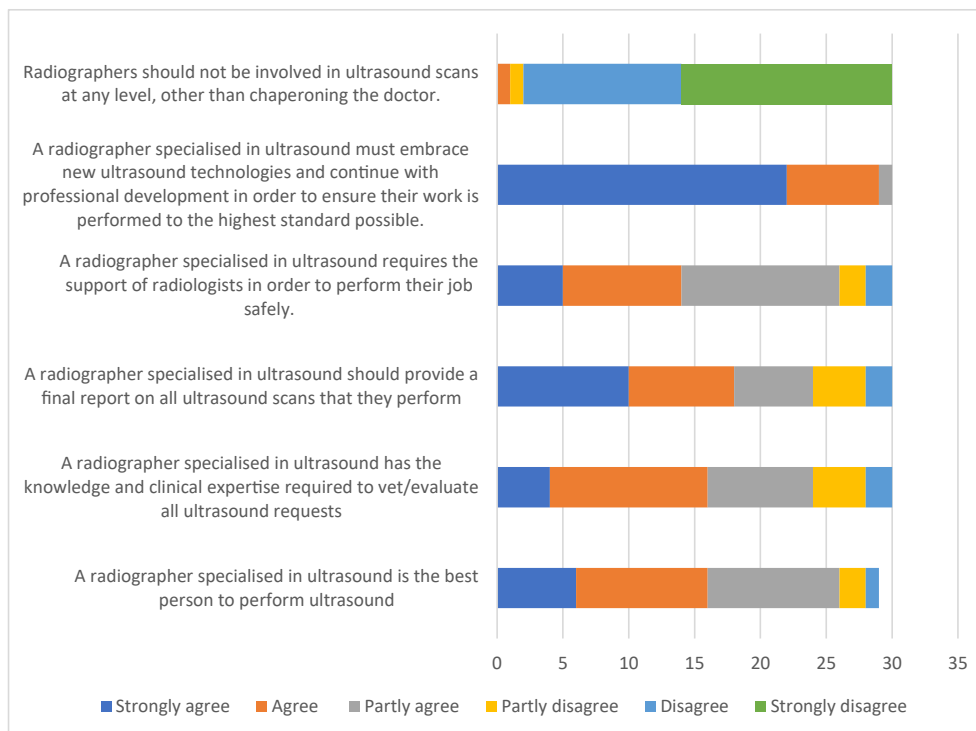


Figure 5. Response to the question asking to what extent participants agreed or disagreed with statements about the radiographers' role within ultrasound.

Discussion

This current survey included responses from 27 EFRS countries. Results were compared with the findings of the 2013 ESR study of 24 countries.⁵ Responses differed for nine countries, with six (Denmark, France, Norway, Italy, Poland and Sweden) now reporting that radiographers do undertake ultrasound. Two countries (Portugal and Switzerland) report that a few radiographers are undertaking ultrasound examinations, either in specialised areas such as vascular or are limited to those with postgraduate education. In 2013, two German radiologists reported working with sonographers,⁵ whereas the response from German radiographer societies in this study suggested that radiographers do not perform ultrasound examinations. Whilst Prentakis et al.'s study only covered six countries,¹⁴ the findings from this current study were the same for the UK and Ireland, however as with the ESR study radiographers were unable to work in ultrasound in Poland and Switzerland.⁵

Almost 90% of respondents ($n = 29$) supported, to some extent, the survey question asking if a radiographer specialised in ultrasound is the best person to perform ultrasound. This represented 20 National Societies. It is essential that ultrasound examinations are performed by someone with the appropriate skills, knowledge and competence.^{20,21} Whilst this survey was predominantly focused on radiographer sonographers it was noted that two countries (Armenia and Slovenia) identified a lack of radiographer involvement in ultrasound but specified that nurses and/or midwives undertake ultrasound examinations. It is outside the scope of this study to ascertain if ultrasound is used as their main role or as a point of care tool within their nursing or midwifery practice. Three countries (Austria, France and Portugal) had radiographers, but reported no midwife or nurse involvement in ultrasound. Practitioners, regardless of background should also be working to agreed standards, with evidence of team working and on-going audit of practice.^{22,23} If the survey was repeated, it would be useful to know

if there are national agreed standards of ultrasound practice for anyone undertaking ultrasound examinations.

Clinical report writing

Clinical report writing should include an "actionable report" which answers the clinical question and provides a diagnosis, where possible, or guidance on further action such as additional imaging investigations or referral to a specialist.^{11,24,25} The range of permitted clinical reporting responsibility varied across the responding countries. Three countries, UK, Malta and Norway, stated that radiographers provide full independent interpretative reports, whilst radiographers in Malta do not offer advice on further management. Of the radiologist respondents in the ESR study four out of nine, where sonographers practised ultrasound, said that sonographers were supported to provide a definitive report, which provides a diagnosis.⁵ In several countries a radiographer's role includes an element of ultrasound scanning, it is unclear from this survey if all countries use the title sonographer.⁵ Some countries retain and use the title of radiographer, which might have an impact on the ESR study results. Variability in reporting practice might be related to payment structures in different countries, particularly those who do not have a National Health Service arrangement as seen in the UK.^{7,16}

Barriers

Key reasons for lack of radiographer input into ultrasound service provision were predominantly lack of appropriate education provision for radiographers, resistance from the medical professions and legal constraints. Of the countries that do not have radiographers undertaking ultrasound examinations, most had no ultrasound education or ultrasound was included within the primary radiography degree course. Respondents highlighted that

high quality education provision was needed to enable radiographers to progress their careers, with one suggesting that:

“It would probably be important to have a base document on the knowledge and skills required for this field. Perhaps the EFRS could generate a training plan with minimum contents for radiographers working in this field. National societies could rely on such documents to help train radiographers in ultrasound.” [R33].

The ESR⁵ study was primarily a survey of radiologists within individual units, whereas the more recent study by Prentakis et al.¹⁴ investigated professional societies, as did this study. Likewise Bento et al. surveyed radiographer professional bodies and trade union organisations, reporting that Sweden and Portugal had no legislation to enable radiographers to practise independent ultrasound examinations.¹⁵ Estonia, Finland and the Netherlands described over 200 hours clinical experience in ultrasound within their programmes. It was uncertain from the results if these programmes were radiography programmes enabling some level of ultrasound practice upon qualification or whether the focus was on education within the radiography programme, facilitating an appreciation of ultrasound and its relation to the patient pathway.¹⁵ Surveying the EFRS professional societies, particularly the radiographer societies in the case of this current study, allows for a slightly more consistent approach for each country. Despite that, some countries had a number of radiographer societies with varied responses, suggesting disparity of practice within countries.

Whilst the 2016 survey had limited responses, it aligned with the findings of this current study, in that ultrasound practice by radiographers is not widespread in Europe.¹⁴ Justification was that it was the “preserve of the medical staff”, as demonstrated in some countries within this present study [Fig. 3]. This would benefit from further exploration, due to the small sample sizes involved. Recent studies have highlighted protectionism amongst sonographers when considering new models of sonographer education in the UK.^{26,27} This includes direct entry to ultrasound education at both bachelor's (education level 6) and master's level (education level 7) for non-health care professionals. As 14 national societies reported resistance from radiologists and 13 identified resistance from medical doctors, it has to be questioned whether similar protectionism amongst European medical practitioners is constraining radiographer development into independent reporting ultrasound roles. The role of the sonographer has been shown to be of high efficacy in previous studies,^{28–34} however European publications are still suggesting that non-medical sonographers should not be reporting ultrasound examinations.^{16,17} Non-medical sonographers can have an impact on patient throughput in clinical departments,^{17,29} which can reduce waiting times, particularly given the reported shortage of radiologists.^{2,35}

Legislation was the most common response from respondents in this survey for lack of ultrasound practice amongst radiographers, in those countries where radiographers are not working within ultrasound. It is difficult to ascertain from this study if legislative issues are the reason for, or the excuse for lack of progression in this area of radiographic practice. Additional research is needed to investigate this further. Lack of regulation is an ongoing concern in the UK, particularly as education reforms enabled direct entry access to sonography for non-healthcare professionals.^{10,27,36–38} The development of the sonographer role however continues despite this lack of regulation for those who are unable to become regulated as, for example, a radiographer or midwife. In the UK radiographers are regulated by the Health and Care Professions Council, despite some solely undertaking ultrasound examinations and no longer working in their primary radiography roles. Others are utilising their skills to

expand into multimodality specialist roles in a specific area of practice, using a wide range of imaging tools to assess patient conditions e.g. head and neck or breast.³ Without statutory regulation, radiographers in the UK working in ultrasound would not be able to undertake some of the extended role skills, such as referring for examinations using ionising radiation or administer medicines under current regulatory frameworks³⁷ which will limit practice and continuity of care for patients.

Limitations

Limitations of the study include different interpretation of some questions due to language barriers. The risk of leading questions was not highlighted in the pilot and this could also have impacted on the survey responses, particularly when asking for opinions about who would be best placed to undertake ultrasound examinations. A total of 50% of EFRS national society countries responded to the survey. Not all questions were answered by each respondent. The low response rate makes it challenging to draw broad conclusions about the findings and to understand the extent of radiographer involvement in the delivery of ultrasound services across all the EFRS European national societies. The results from those EFRS societies that did respond (62.8%) do allow for improved awareness of the current situation in those countries. Further consideration is needed to determine how best to engage with those radiographer societies in countries that have not responded as it is difficult to hypothesise whether their non-response was due to lack of sonographer practice in their country or a reluctance to engage with the survey.

Conclusion

The results of this study found that although there is still variability in practice, more countries now have radiographers taking an active role in the delivery of ultrasound services. Although the majority of examinations are carried out by medical practitioners, the survey results demonstrate that some countries have independent reporting radiographers/sonographers. In many countries where radiographers do undertake ultrasound examinations, they are limited to descriptive reports or checklists, which are counter signed or re-written by a radiologist.

There are a number of barriers to radiographers performing ultrasound examinations, commonly related to limited access to focused education and training, scope of practice constraints due to the law within countries and evidence that services are led by medical colleagues. Development of high quality ultrasound specific educational programmes would be valuable to support the advancement of radiographer skills. Interprofessional learning with medical colleagues could potentially help to break down some of the barriers to implementation of a new service in countries.

Further research is recommended into the efficacy of ultrasound practice in countries where radiographers are just beginning to actively participate in the delivery of ultrasound services. Audit findings for those radiographers who are developing additional interpretative reporting practice or extending their ultrasound role further, for example undertaking interventional work, would add to the evidence base to support the on-going development of the radiographer role in ultrasound.

Conflict of interest statement

None.

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