



City Research Online

City, University of London Institutional Repository

Citation: Skelton, E., Malamateniou, C. & Harrison, G. (2022). The impact of the COVID-19 pandemic on clinical guidance and risk assessments, and the importance of effective leadership to support UK obstetric sonographers. *Journal of Medical Imaging and Radiation Sciences*, 53(4), S107-S115. doi: 10.1016/j.jmir.2022.10.003

This is the published version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <https://openaccess.city.ac.uk/id/eprint/28972/>

Link to published version: <https://doi.org/10.1016/j.jmir.2022.10.003>

Copyright: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

Reuse: Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

City Research Online:

<http://openaccess.city.ac.uk/>

publications@city.ac.uk

Clinical Perspective

The impact of the COVID-19 pandemic on clinical guidance and risk assessments, and the importance of effective leadership to support UK obstetric sonographers

Emily Skelton^{a,b,*}, Christina Malamateniou^{a,b,c} and Gill Harrison^{a,d}

^a Division of Radiography and Midwifery, School of Health and Psychological Sciences, City, University of London, EC1V 0HB, UK

^b Perinatal Imaging and Health, King's College London, SE1 7EH, UK

^c Haute Ecole de Santé Vaud, Lausanne, Switzerland

^d Society and College of Radiographers, 207 Providence Square, London, SE1 2EW, UK

ABSTRACT

Introduction: The COVID-19 pandemic had a profound impact on the provision of obstetric ultrasound services, leading to the publication of new guidance and requirement for individual departmental risk assessments in the UK. The impact of these changes on clinical practice for UK obstetric sonographers is not currently well reported in published literature.

Methods: Obstetric sonographers working in the UK ($n = 138$) used the Qualtrics XM™ platform to complete an anonymous, online questionnaire about their experiences during the pandemic. Participants responded to closed-type questions about national guidance, risk assessment and their perception of support, and provided additional detail about their experiences in these areas through free-text response options.

Results: Over 90% of respondents were aware of or had read guidance issued by professional organisations, although challenges for its implementation in departments were identified. These were commonly related to the clinical working environment and included limitations on physical space (76.3%), time constraints (67.5%) and ventilation (61.3%). Sonographers felt most supported by their ultrasound colleagues (83.5%) and line managers (41.2%). They felt least supported by senior management and leadership personnel (60.8%), other antenatal colleagues (51.5%) and professional organisations (41.2%).

Conclusion: Obstetric sonographers will need support from the wider service team and professional organisations to facilitate post-pandemic recovery of the workforce. Formal clinical supervision programmes may be beneficial in facilitating a more holistic approach to peer-support, although there is currently limited evidence of their use in sonographic practice.

RÉSUMÉ

Introduction: La pandémie de COVID-19 a eu un impact profond sur la prestation de services d'échographie obstétrique, entraînant la publication de nouvelles directives et l'obligation d'effectuer des évaluations des risques dans chaque service au Royaume-Uni. L'impact de ces changements sur la pratique clinique des échographistes en obstétrique du Royaume-Uni n'est actuellement pas bien rapporté dans la littérature publiée.

Méthodologie: Des échographistes en obstétrique travaillant au Royaume-Uni ($n = 138$) ont utilisé la plateforme Qualtrics XM™ pour remplir un questionnaire anonyme en ligne sur leurs expériences pendant la pandémie. Les participants ont répondu à des questions fermées sur les directives nationales, l'évaluation des risques et leur perception du soutien, et ont fourni des détails supplémentaires sur leur expérience dans ces domaines grâce à des options de réponse en texte libre.

Author Contributions: ES and CM conceptualised the study. All authors developed the study design. ES analysed the data and drafted the paper. All authors revised the paper for publication.

Declaration of Competing Interests: GH is the Professional Officer for Ultrasound at the Society and College of Radiographers.

Ethical approval: This study was granted approval from the School of Health and Psychological Sciences Research Ethics Committee at City, University of London (reference: ETH2021-1240, approval date: 09 March 2021).

* Corresponding author: Division of Radiography and Midwifery, School of Health and Psychological Sciences, City, University of London, EC1V 0HB, UK
E-mail addresses: emily.skelton@city.ac.uk (E. Skelton), christina.malamateniou@city.ac.uk (C. Malamateniou), gillh@sor.org (G. Harrison).

Résultats: Plus de 90 % des personnes interrogées connaissaient ou avaient lu les directives émises par les organisations professionnelles, bien que des défis aient été identifiés pour leur mise en œuvre dans les services. Ces difficultés étaient généralement liées à l'environnement de travail clinique et comprenaient les limitations de l'espace physique (76,3 %), les contraintes de temps (67,5 %) et la ventilation (61,3 %). Les échographistes se sentent le plus soutenus par leurs collègues échographistes (83,5 %) et leurs supérieurs hiérarchiques (41,2 %). Ils se sentaient le moins soutenus par les cadres supérieurs et le per-

sonnel de direction (60,8 %), les autres collègues du secteur prénatal (51,5 %) et les organisations professionnelles (41,2 %)

Conclusion: Les échographistes en obstétrique auront besoin du soutien de l'équipe de service au sens large et des organisations professionnelles pour faciliter le rétablissement post-pandémique de la main-d'œuvre. Des programmes formels de supervision clinique peuvent être bénéfiques pour faciliter une approche plus holistique du soutien par les pairs, bien qu'il y ait actuellement peu de preuves de leur utilisation dans la pratique échographique.

Keywords: COVID-19; Guidance; Obstetrics; Risk assessment; Sonographers; Ultrasound

Introduction

The National Health Service (NHS) Fetal Anomaly Screening Programme (FASP) in the United Kingdom (UK) offers two routine ultrasound examinations to expectant mothers and birthing people during their pregnancy [1]. The medical purpose of these scans is to assess fetal growth and development, and identify conditions which may require specialist intervention during pregnancy or immediately after birth [2]. Antenatal detection can also give expectant parents time to receive support and counselling regarding any fetal diagnosis, and to consider their options for continuing the pregnancy [3]. In the UK, antenatal screening scans are primarily performed by obstetric sonographers who are expertly trained to acquire and interpret fetal ultrasound images, as well as produce a written report which is representative of the scan findings [4]. Radiographers and sonographers also have an integral role in the provision of high-quality, inclusive and supportive parent-centred care during fetal ultrasound examinations to enhance parental experiences of imaging during pregnancy [5].

During the COVID-19 pandemic, many healthcare professionals were required to make significant changes to their practice to facilitate continuity of clinical service provision, whilst ensuring the safety of staff and service users [6]. In diagnostic medical imaging, recommendations were made by professional organisations to re-organise services by postponing non-urgent examinations in response to increasing demands on in-patient services and to mitigate staff sickness [7]. Within obstetric ultrasound departments internationally, newly published COVID-19 specific guidance suggested modifications to shorten scan protocols or defer scans which were not essential for immediate clinical management [8] and necessitated the need for updated risk assessments to identify and mitigate against potential risks to staff, expectant parents and the public [9]. Occupation-specific risks for obstetric sonographers included the challenge to adhere to physical distancing recommendations when scanning, concerns over poorly ventilated and small scan rooms, and lack of available personal protective equipment (PPE) [10].

Another significant change to the provision of fetal ultrasound imaging services was the advice issued by professional organisations to temporarily restrict those accompanying

pregnant people at scans in an attempt to minimise virus transmission [8]. However, frequent updates on this guidance in response to updated knowledge as the pandemic progressed, often rendered it ambiguous and inconsistent [11]. As a result, national variation in the implementation of this guidance was noted between clinical centres [12] and this was widely criticised in the news [13,14]. When UK lockdown restrictions then began to ease during the Summer of 2020 [15], pressure was placed on the workforce from the media and parent advocacy groups to reinstate partner and accompanying persons' attendance at scans [16]. Guidance published by the Royal College of Obstetricians and Gynaecologists to address this in December 2020, placed the onus on re-opening of ultrasound scan rooms at the discretion of individual clinical departments, stating that pregnant women and people "should contact their local maternity unit to determine whether a partner or visitor can attend with them [17]." Observations were subsequently made of the nationwide "postcode lottery" for partners' attendance at scans [18], which parents found to be confusing and unfair [12]. This increasingly resulted in parental frustration being directed towards sonographers (who were often the first face-to-face contact with expectant parents during this time) and may have been a contributing factor to the high levels of occupational burnout reported during the pandemic [10]. Concern for sonographer well-being was also raised as a result of additional stressors incurred through the pandemic such as increased cleaning requirements in the scan room but with no additional time allocated to complete these activities, and personal concerns about virus transmission to their family and friends [19].

Whilst research is beginning to emerge on the impact of the pandemic on UK obstetric sonographers [10], the full extent is yet to be completely recognised. The aim of this clinical perspective is to provide a rapid insight into to the implementation of new guidance, completion of risk assessments and perception of support within obstetric ultrasound departments during the COVID-19 pandemic. As the workforce enters a period of recovery following the pandemic, this work highlights key considerations for future practice changes with a clear emphasis on visible and effective leadership and increased support for obstetric sonographers. It is hoped that the findings reported from

this study will encourage discussion in clinical departments, and help inform decisions for future best practice.

Methods

Reporting of the survey methods is guided by the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) [20].

A UK-wide, online, anonymous cross-sectional survey was developed and built on the Qualtrics XM™ platform (version February 2021, Qualtrics, Provo, USA) [21]. Prior to launch, the survey questions were piloted by members of the Society of Radiographers' Ultrasound Advisory Group, who gave suggestions on the wording of questions to improve accessibility. The survey contained multiple choice and Likert-style questions related to guidance, risk assessment and support for obstetric sonographers during the COVID-19 pandemic. Basic demographic information including age, geographical location and employment status was also collected, although no directly participant-identifying data was requested to maintain anonymity of the survey. Participants could also provide additional detail to their responses via free-text boxes if they chose too.

Snowball sampling was employed and weblinks to access the survey were circulated via social media channels (Twitter, Facebook, LinkedIn) and professional networks. The survey was open to responses between 9th March–6th May 2021. Responses to all questions were requested via the survey platform, but participants were not forced to answer all questions. Respondents could also change their answers as desired prior to submission of the survey by using navigation options embedded in the platform. All gave their consent to take part electronically after accessing the accompanying digital participation sheet. They were required to confirm that they met the inclusion criteria (aged 21 or over, a qualified sonographer, and performing obstetric ultrasound examinations in the UK since March 2020) before accessing the full questionnaire. There were no incentives offered to participants. Ethical approval was granted by the School of Health and Psychological Sciences Research Ethics Committee at City, University of London, (reference: ETH2021-1240, received 9th March 2021), and all data were managed and stored as per university guidance.

Descriptive statistics are reported for each questionnaire domain (COVID-19 guidance, risk assessment and support), with illustrative free-text quotes used to provide additional context.

Results

A total of 138 sonographers provided responses, with an average survey completeness of 81%. Most participants self-reported as white/British/Welsh/Scottish/Northern Irish/Gypsy or Irish Traveller (86.5%) females (96.6%) aged between 51–60 years old (34.8%) and working within the NHS (96.6%). Three peaks relating to clinical experience were noted, with approximately 20% of respondents reporting to have either 0–5, 11–15 or 26+ years of experience respectively. Full participant demographics are presented in Table 1.

COVID-19 guidance

All active respondents (100%) reported they were aware of or had read COVID-19 guidance jointly published by the Society of Radiographers (SoR), Royal College of Obstetricians and Gynaecologists (RCOG), Royal College of Midwives (RCM) and British Medical Ultrasound Society (BMUS) [22]. Sonographers' awareness and reading of other guidance [9,23,24] ranged from 91.3%–95.7%. Several sonographers noted that because of additional workload and stressors, it had been challenging to find the time to read all guidance in detail during the pandemic:

“There has been no time to read professional documents and implement recommendations...”

Using a Likert scale (where 0=not useful at all, and 10=extremely useful), the mean score for the usefulness of all COVID-19 guidance was 5.2 (standard deviation = 2.3), indicating that they were found to be neither helpful nor unhelpful (see Fig. 1). Some respondents alluded to the guidance being too broad and not aligned to the specific needs of obstetric ultrasound departments:

“I don't think they have taken into consideration the environment whilst scanning.”

Guidance by NHS England [23] and the RCM/RCOG [24] was most commonly used or referred to within departmental policies ($n = 50$, 23.3%). Fewer reported using or referring to guidance jointly produced by the SoR, RCOG, RCM and BMUS [22] ($n = 47$, 21.9%) or SoR and BMUS [9] ($n = 34$, 15.8%). Twenty-eight respondents (13.0%) reported either no use of published guidance to support departmental policies, or uncertainty of what had been used:

“The antenatal department hasn't made us aware of the guidance implemented. Often changes are made without the sonographers being made aware.”

Others reported developing their own guidance to use within their clinical department:

“We have written our own guidance in lieu of using/implementing the [named guidance] above.”

One respondent questioned their departmental guidelines for their lack of transparency in reporting the evidence base that had been used in their development:

“Local guidelines changed without always quoting where their current information had been taken from...”

Most respondents ($n = 68$, 85.0%) were aware of departmental difficulties for implementing COVID-19 guidance, with the most common challenges being physical space limitations (76.3%), time constraints and impact on workflow (67.5%), resistance from the public (61.3%) and ventilation in scan rooms (61.3%).

Table 1
Participant demographics

Age Group	21-30, <i>n</i> = 12 (13.48%)
	31-40, <i>n</i> = 20 (22.47%)
	41-50, <i>n</i> = 24 (26.97%)
	51-60, <i>n</i> = 31 (34.84%)
	61+, <i>n</i> = 2 (2.25%)
Gender	Female, <i>n</i> = 86 (96.63%)
	Male, <i>n</i> = 2 (2.25%)
	Prefer not to say, <i>n</i> = 1 (1.12%)
Ethnicity	White / British/ Welsh / Scottish / Northern Irish / Gypsy or Irish Traveller, <i>n</i> = 77 (86.52%)
	Asian / Asian British, <i>n</i> = 4 (4.49%)
	Mixed / Multiple ethnic, <i>n</i> = 2 (2.25%)
	Other, <i>n</i> = 2 (2.25%)
	Black / African / Caribbean / Black British, <i>n</i> = 1 (1.12%)
Education	Prefer not to say, <i>n</i> = 3 (3.37%)
	University degree (postgraduate), <i>n</i> = 79 (87.00%)
	DMU, <i>n</i> = 5 (5.00%)
	University degree (undergraduate), <i>n</i> = 3 (3.00%)
Years of experience	Prefer not to say, <i>n</i> = 3 (3.00%)
	0-5, <i>n</i> = 19 (21.35%)
	6-10, <i>n</i> = 13 (14.61%)
	11-15, <i>n</i> = 18 (20.22%)
	16-20, <i>n</i> = 13 (14.61%)
	21-25, <i>n</i> = 9 (10.11%)
	26+, <i>n</i> = 17 (19.10%)
Professional memberships	Society of Radiographers, <i>n</i> = 79
	British Medical Ultrasound Society, <i>n</i> = 40
	Royal College of Midwives, <i>n</i> = 9
	International Society of Ultrasound in Obstetrics and Gynecology, <i>n</i> = 2
	Royal College of Nursing, <i>n</i> = 1
	Other, <i>n</i> = 1
	Prefer not to say, <i>n</i> = 1
Geographical location	England – South East, <i>n</i> = 20 (22.47%)
	England – North West, <i>n</i> = 13 (14.61%)
	England – South West, <i>n</i> = 13 (14.61%)
	England – East, <i>n</i> = 10 (11.24%)
	England – London, <i>n</i> = 9 (10.11%)
	England – East Midlands, <i>n</i> = 6 (6.74%)
	England – West Midlands, <i>n</i> = 5 (5.62%)
	England – Yorkshire and the Humber, <i>n</i> = 4 (4.49%)
	Wales, <i>n</i> = 3 (3.37%)
	Scotland, <i>n</i> = 2 (2.25%)
	Prefer not to say, <i>n</i> = 4 (4.49%)
Employment status	Full-time employment (NHS/public sector), <i>n</i> = 44 (49.44%)
	Part-time employment (NHS/public sector), <i>n</i> = 42 (47.19%)
	Part-time employment (private practice), <i>n</i> = 1 (1.12%)
	Other, <i>n</i> = 1 (1.12%)
	Prefer not to say, <i>n</i> = 1 (1.12%)

“We were supplied with air conditioning but this turned out to not be adequate ventilation, so we actually only have half of our scan rooms that are actually appropriately ventilated.”

Risk assessment

During the pandemic, most respondents (*n* = 126, 77.2%) were aware that a risk assessment had been carried out in their department. Of these, 61.1% (*n* = 58) were undertaken by line managers or members of the senior management team. Fourteen (14.7%) reported they were unsure of who had carried out the risk assessment. There were 28 respondents (22.8%)

who were unaware that a risk assessment had taken place. Several provided additional information to suggest that risk assessments completed by external staff were inadequate leading to the need for them to be repeated:

“...there is some disagreement between the staff actually working in the environments and what the health and safety advisor and management’s assessments state so again there is a review.”

Following the assessment, the most frequently identified risk factor was the departmental waiting area (*n* = 60, 82.2%). Space in the scan room (*n* = 49, 67.1%) and individual risks in-

To what extent do you feel these guidelines have been useful to your clinical practice?

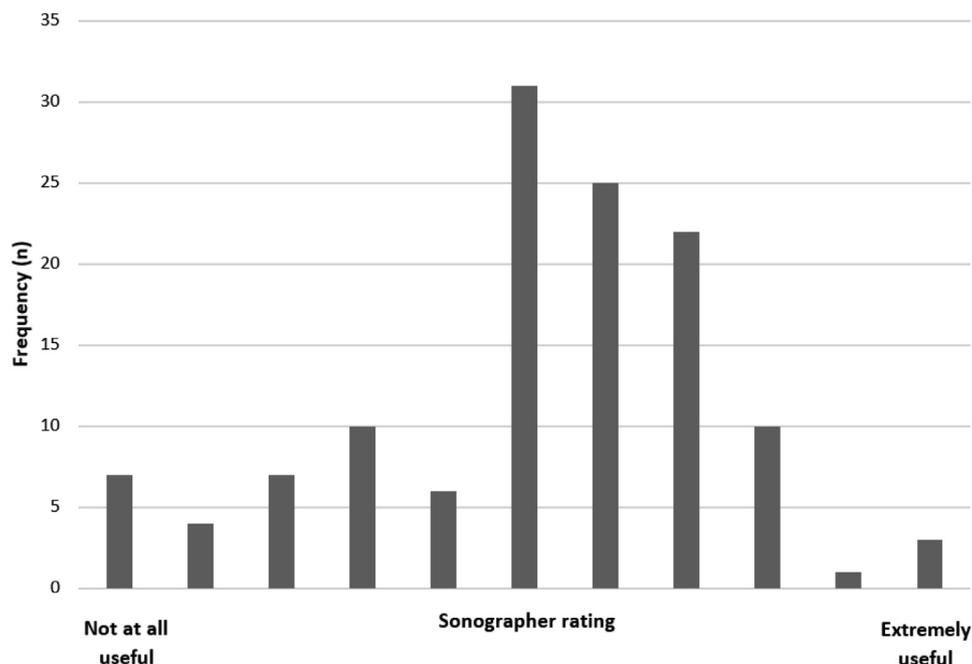


Fig. 1. Perceived usefulness of COVID-19 guidelines for obstetric sonographers. Bar chart demonstrating sonographers' perceived usefulness of COVID-19 guidelines for obstetric ultrasound (mean score = 5.2/10)

Were any of the following factors highlighted as part of the risk assessment?

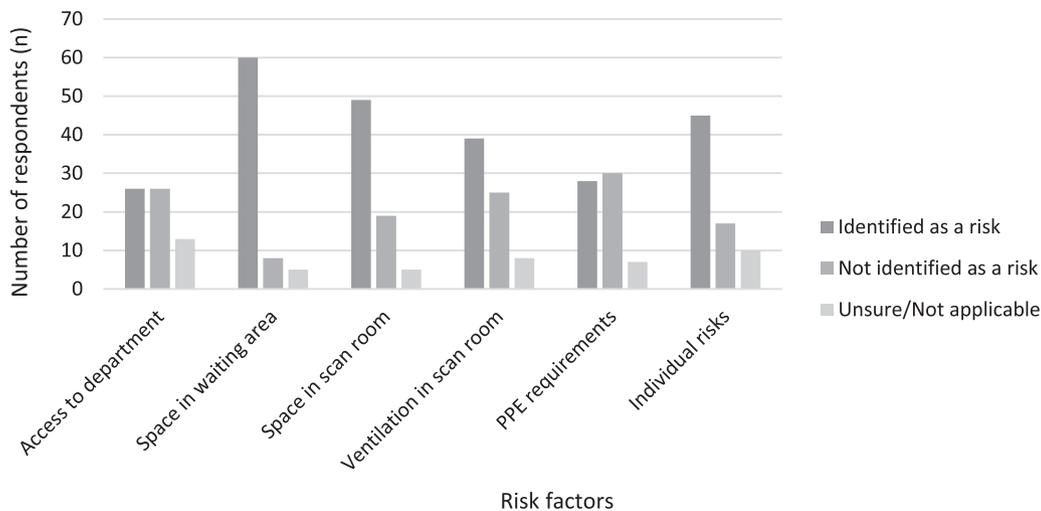


Fig. 2. Results of departmental risk assessments. Bar chart demonstrating results of risk assessments undertaken in obstetric ultrasound departments during the COVID-19 pandemic

cluding shielding for clinically vulnerable staff ($n = 45, 62.5\%$) were also commonly reported as identified risks (see Fig. 2). Just over half of respondents to this question ($n = 39, 54.2\%$) answered that ventilation in the scan room was identified as a risk.

“Frustratingly, our rooms were deemed safe, despite being small. We ended up scanning in a corner wedged between wall and couch in order to achieve 2m distance.”

To mitigate identified risks, respondents reported changes had been made to departmental waiting areas ($n = 53, 76.8\%$), requirements for PPE ($n = 38, 59.4\%$) and for clinically vulnerable staff ($n = 37, 55.2\%$). Although the space in some scan rooms was adapted after being identified as a risk ($n = 32, 45.7\%$), only a small proportion of sonographers ($n = 6, 9.1\%$) reported changes to ventilation in the scan room:

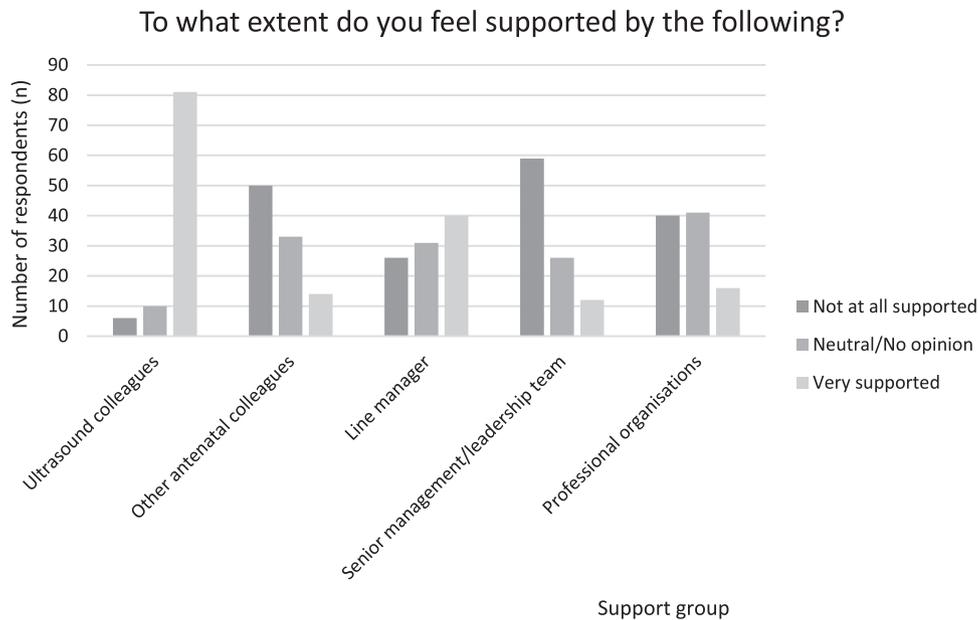


Fig. 3. Perception of support for obstetric sonographers. Bar chart demonstrating obstetric sonographers' feelings of support from colleagues during the COVID-19 pandemic

"...very inadequate ventilation [in scan rooms] but was deemed acceptable risk..."

Support

Respondents felt support during the COVID-19 pandemic was most often provided by their ultrasound colleagues ($n = 81$, 83.5%):

"Fellow sonographers have been vital emotional support during a truly difficult professional time."

Departmental line managers were also rated as very supportive by 41.2% of sonographers ($n = 40$), although challenges to their role were acknowledged:

"...line managers support the best they can, however the final decisions always lie with the senior management team who don't understand the complexity of our role."

Sonographers reported they did not feel at all supported by senior management/leadership teams ($n = 59$, 60.8%), other colleagues in the antenatal care team ($n = 50$, 51.5%) and professional organisations ($n = 40$, 41.2%) (see Fig. 3).

"Higher management, maternity colleagues and our unions have succumbed to social and public pressures...and have not considered the actual sonographer's health and well-being."

Discussion

Challenges to the provision of imaging services include sonographers' doubts as to the usefulness of various published COVID-19 guidance in supporting clinical practice, and the difficulties for their implementation within UK obstetric ul-

trasound departments due to environmental and service constraints. Childs *et al* reported an inconsistent "department-by-department" approach to the implementation of protocol changes for Australasian sonographers during the pandemic, explained by lack of professional regulation [25]. Whilst regulation is a long-standing and contentious issue within the UK workforce, and previous campaigns have been unsuccessful on the grounds that the potential for public harm is not sufficient to warrant statutory regulation [26], it has to be questioned whether this would impact on local practice.

The findings from this survey demonstrate that due to the variable local interpretation of risk assessment, mitigation strategies largely did not prioritise the scan room environment and indirectly, sonographer safety. From the free-text responses, it could be suggested that this contributed to sonographers' overall perception of a lack of support from senior management teams and professional organisations during the pandemic, resulting in a lack of confidence in leadership. A recent qualitative study by Adeyemo *et al* identified six key themes for effective leadership in times of crises including prioritising workers' health and safety, effective and transparent communication and being physically present within the team [27]. Effective communication should have been used to produce guidance material, that would be easier to read and provide brevity and clarity during a period where it was challenging to find time to anything else than clinical work. Involving stakeholders in decision-making processes such as the development of new guidelines is also an important leadership practice [28], and the survey responses suggest obstetric sonographers were often not consulted in their production or local implementation.

Our results showed that obstetric sonographers felt least supported by their senior management teams during the COVID-19 pandemic. It has been previously reported that feelings of

not being adequately heard, protected, prepared, supported and cared for may cause anxiety in staff [29], and a lack of confidence in employers negatively affects healthcare professionals' willingness to work during a time of crisis [30]. Prior to the pandemic, obstetric sonographers were also reported to be at a high-risk for occupational burnout [31,32] because of the physical exertion of scanning coupled with increasingly heavy workloads through workforce shortages, and emotional demands of giving unexpected news in cases of fetal anomaly or miscarriage [33]. It is likely that additional pandemic related stressors served to exacerbate long-standing issues within the workforce, resulting in high levels of occupational burnout observed in UK obstetric sonographers during the pandemic [10]. Additional consideration should also be given to the potential impact of high levels of occupational burnout on the implementation of new clinical guidance and increased requirements for departmental risk assessments. Although there is no research specific to obstetric sonographers currently published, a recognised consequence of burnout is disengagement from work [34], and this could result in sonographers being less receptive to practice changes, perceiving new guidance and working practices as increased work related demands.

In addition to clear and effective leadership, obstetric sonographers may also benefit from increased peer-support through formal clinical supervision initiatives following the pandemic, which have previously demonstrated success in other groups of allied health professionals [35,36]. Supervision provides an opportunity for healthcare professionals to discuss and reflect on their practice with their supervisor in a safe and supportive environment [37]. Although not commonly used within sonography, positive outcomes reported in nursing professionals include reduced feelings of isolation, improved teamwork and a feeling of being better supported in a crisis [38]. Proctor's model, which encompasses the restorative (emotional), formative (skills development) and normative (organisational) domains of practice [39], is commonly used to support clinical supervision sessions which may be delivered individually or as a group [40]. The Society of Radiographers have previously published guidance to support the development of supervision in imaging departments [41], however, there is currently no consensus on the optimum framework for allied health professionals [42], and research specific to the UK sonographic workforce is limited at present [43].

This study is strengthened by the careful development and piloting of the survey questions. A remote approach to data collection was required due to restrictions on the conduct of face-to-face research, however this helped to facilitate sharing of the survey weblink, and enabled a wider reach of participants. In addition, maintaining anonymity of the responses meant that sonographers were more likely to share true reflections on their experience without concern about being identified [44]. However, some weaknesses are also noted. Limitations in the cross-sectional survey design are acknowledged and there is potential for inflation of negative responses because at the time the survey was live, the UK was in its third national lockdown for COVID-19 [15]. Although the survey findings reported

are descriptive in nature to facilitate their rapid dissemination into the professional community, they provide a unique insight into the provision of obstetric ultrasound services during the period between March 2020 and May 2021, and highlight opportunities to support the workforce in the aftermath of the COVID-19 pandemic.

Conclusion

The longer-term implications of COVID-19 on the sonographic workforce are currently largely unknown. This survey identifies some areas for reflection and learning to prepare for the possibility of future global health crises, and to facilitate the recovery of obstetric ultrasound service provision following the pandemic. In particular, greater support and demonstration of effective leadership from senior management, clinical leads and professional organisations will be essential. Future use of support initiatives, such as formal clinical supervision programmes, in sonographic practice require further evaluation to determine their potential benefits for the workforce and to consider the most effective strategies for implementation.

Funding

This work was funded by the College of Radiographers' Doctoral Fellowship Award (DF017) and the School of Health Sciences at City, [University of London](#). Support from the City Radiography Research Fund has been instrumental for the dissemination of this research.

CRedit authorship contribution statement

Emily Skelton: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Christina Malamateniou:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Gill Harrison:** Methodology, Writing – review & editing.

Data availability

Survey respondents did not agree for their data to be shared publicly, so supporting data is not available.

Acknowledgements

The authors would like to thank Professor Susan Ayers and the members of the Society of Radiographers' Ultrasound Advisory Group who helped to develop the online questionnaire. The authors would also like to thank Dr Nicholas Drey and Ms Alison Welton for their support during the ethical review process. Finally, thank you to all the obstetric sonographers who completed this survey.

References

- [1] NHS Fetal Anomaly Screening Programme. *NHS Fetal Anomaly Screening Programme Handbook*; 2021 <https://phescreening.blog.gov.uk/2021/07/23/new-fasp-handbook/>.
- [2] National Institute for Health and Care Excellence. Overview | Antenatal care for uncomplicated pregnancies Guidance NICE. 2019 <https://www.nice.org.uk/guidance/cg62> (accessed March 20, 2020).
- [3] Blakeley C, Smith DM, Johnstone ED, Wittkowski A. Parental decision-making following a prenatal diagnosis that is lethal, life-limiting, or has long term implications for the future child and family: A meta-synthesis of qualitative literature. *BMC Med Ethics*. 2019;20:1–19.
- [4] The Society and College of Radiographers. The role of the radiography workforce in obstetric ultrasound. 2016;1–2.
- [5] Skelton E, Webb R, Rutherford M, Malamateniou C, Ayers S. The impact of antenatal imaging in pregnancy on parent experience and prenatal attachment: a systematic review. *J Reprod Infant Psychol*. 2022.
- [6] Haldane V, De Foo C, Abdalla SM, et al. Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries. *Nat Med*. 2021;27:964–980.
- [7] Royal College of Radiologists. RCR advice on non-urgent and cancer imaging during the coronavirus pandemic. Coronavirus Update. 2020. <https://www.rcr.ac.uk/posts/rcr-advice-non-urgent-and-cancer-imaging-during-coronavirus-pandemic>.
- [8] International Society of Ultrasound in Obstetrics and Gynecology. ISUOG Consensus Statement on organization of routine and specialist ultrasound services in the context of COVID-19. 2020 <https://www.isuog.org/static/3622f29b-f189-4165-93024c4bf2ad6e8a/ISUOG-Consensus-StatementCOVID-19.pdf>.
- [9] Society of Radiographers. Covid-19: Ultrasound frequently asked questions. <https://covid19.sor.org/diagnostic-radiography-faqs/ultrasound/> (accessed Oct 9, 2021).
- [10] Skelton E, Harrison G, Rutherford M, Ayers S, Malamateniou C. UK obstetric sonographers' experiences of the COVID-19 pandemic: Burnout, role satisfaction and impact on clinical practice. *Ultrasound*. 2022;1–11.
- [11] Lalor J, Ayers S, Celleja Agius J, et al. Balancing restrictions and access to maternity care for women and birthing partners during the COVID-19 pandemic: the psychosocial impact of suboptimal care. *BJOG An Int J Obstet Gynaecol*. 2021;128:1720–1725.
- [12] Thomson G, Balaam MC, Nowland R, et al. Companionship for women/birthing people using antenatal and intrapartum care in England during COVID-19: A mixed-methods analysis of national and organisational responses and perspectives. *BMJ Open*. 2022;12:1–12.
- [13] BBC News. I faced miscarriage alone - my partner had to wait in the car park. 2020. <https://www.bbc.co.uk/news/uk-53613348> (accessed Feb 8, 2021).
- [14] The Guardian. Pregnant women going for scans alone told they cannot film baby. 2021. <https://www.theguardian.com/lifeandstyle/2021/jan/31/pregnant-women-going-for-scans-alone-told-they-cannot-film-baby> (accessed Feb 8, 2021).
- [15] Institute for Government. Institute for Government. Timeline UK Gov. coronavirus lockdowns. 2021. <https://www.instituteforgovernment.org.uk/sites/default/files/timeline-lockdown-web.pdf> (accessed July 27, 2021).
- [16] Birthrights. Human rights implications of changes to maternity services during the Covid-19 pandemic. 2020 <https://www.birthrights.org.uk/wp-content/uploads/2020/07/Birthrights-Covid-19-Human-Rights-Committee-Briefing-July-2020.pdf>.
- [17] Royal College of Obstetricians and Gynaecologists. *Guidance for antenatal screening and ultrasound in pregnancy in the coronavirus (COVID-19) pandemic* [Accessed 19 OCT 2022]. <https://www.rcog.org.uk/media/40vjuzvg/2020-12-09-guidance-for-antenatal-screening-and-ultrasound-in-pregnancy.pdf>.
- [18] Iacobucci G. Partners' access to scans and birth is a postcode lottery, data show. *BMJ*. 2020;371:m3876.
- [19] Childs J, Osborne B, Lamb K, Maranna S, Esterman A. The initial impact of COVID -19 on Australasian sonographers part 3: Sonographer professional, personal, and social wellbeing. *Sonography*. 2021;8:109–115.
- [20] Eysenbach G. Improving the quality of web surveys: the checklist for reporting results of internet E-surveys (CHERRIES). *J Med Internet Res*. 2004;6:1–6.
- [21] Qualtrics XM. 2020. <https://www.qualtrics.com>.
- [22] The Society and College of Radiographers. Obstetric ultrasound examinations during the Covid-19 pandemic. 2020 https://www.sor.org/getmedia/d2ec6e28-e21f-4f7b-a416-6c09d560d717/obstetric_ultrasound_examinations_during_the_covid-19_pandemic_v2.pdf_2.
- [23] NHS England. Supporting pregnant women using maternity services during the coronavirus pandemic: actions for NHS providers. 2020. <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/12/C0961-Supporting-pregnant-women-using-maternity-services-during-the-coronavirus-pandemic-actions-for-NHS-provi.pdf> (accessed Feb 8, 2021).
- [24] NHS England and NHS Improvement. Guidance for antenatal screening and ultrasound in pregnancy in the evolving coronavirus (COVID-19) pandemic. 2020; 2: 1–8.
- [25] Childs J, Maranna S, Osborne B, Lamb K, Esterman A. The initial impact of COVID -19 on Australasian sonographers part 2: Changes to sonographic examination protocols and access to personal protective equipment. *Sonography*. 2021;8:100–108.
- [26] HEE. Right-touch assurance for sonographers based on risk of harm arising from practice : report to Health Education England. *Prof Stand Auth Heal Soc Care* 2019. https://www.professionalstandards.org.uk/docs/default-source/publications/policy-advice/right-touch-assurance-for-sonographers-a-report-for-hee.pdf?sfvrsn=9cfd7420_13.
- [27] Aveyemo OO, Tu S, Keene D. How to lead health care workers during unprecedented crises: a qualitative study of the COVID-19 pandemic in Connecticut, USA. *PLoS One*. 2021;16:1–15.
- [28] Covello VT. Best practices in public health risk and crisis communication. *J Health Commun*. 2003;8:5–8.
- [29] Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *JAMA - J Am Med Assoc*. 2020;323:2133–2134.
- [30] Devnani M. Factors associated with the willingness of health care personnel to work during an influenza public health emergency: An integrative review. *Prehosp Disaster Med*. 2012;27:551–566.
- [31] Johnson J, Hall LH, Berzins K, Baker J, Melling K, Thompson C. Mental healthcare staff well-being and burnout: A narrative review of trends, causes, implications, and recommendations for future interventions. *Int J Ment Health Nurs*. 2018;27:20–32.
- [32] Shields M, James D, McCormack L, Warren-Forward H. Burnout in the disciplines of medical radiation science: a systematic review. *J Med Imaging Radiat Sci*. 2021;52:295–304.
- [33] Johnson J, Arezina J, McGuinness A, Culpam AM, Hall L. Breaking bad and difficult news in obstetric ultrasound and sonographer burnout: Is training helpful? *Ultrasound*. 2019;27:55–63.
- [34] Hakanen JJ, Schaufeli WB, Ahola K. The job demands-resources model: a three-year cross-lagged study of burnout, depression, commitment, and work engagement. *Work Stress*. 2008;22:224–241.
- [35] Ducat WH, Kumar S. A systematic review of professional supervision experiences and effects for allied health practitioners working in non-metropolitan health care settings. *J Multidiscip Healthc*. 2015;8:397–407.
- [36] Snowdon DA, Sargent M, Williams CM, Maloney S, Caspers K, Taylor NF. Effective clinical supervision of allied health professionals: a mixed methods study. *BMC Health Serv Res*. 2019;20:1–11.
- [37] Brunero S, Stein-Parbury J. The effectiveness of clinical supervision in nursing: An evidenced based literature review. *Aust J Adv Nurs*. 2008;25:86–94.
- [38] Cutcliffe JR, Sloan G, Bashaw M. A systematic review of clinical supervision evaluation studies in nursing. *Int J Ment Health Nurs*. 2018;27:1344–1363.
- [39] Proctor B, Marken M, Payne M. Enabling and ensuring: supervision in

- practice. *Supervision: a Cooperative Exercise in Accountability*. Leicester: National Youth Bureau; 1986:21–34.
- [40] Gardner M, McKinstry C, Perrin B. Group clinical supervision for allied health professionals. *Aust J Rural Health*. 2021;29:538–548.
- [41] Society of Radiographers. Professional supervision—advice and guidance document. 2013;: 1–7.
- [42] Pollock A, Campbell P, Deery R, et al. A systematic review of evidence relating to clinical supervision for nurses, midwives and allied health professionals. *J Adv Nurs*. 2017;73:1825–1837.
- [43] Coleman G, Hyde E. Is there a role for professional supervision in supporting the professional and personal wellbeing of the sonographic workforce? A literature review. *Radiography*. 2022;28:991–998.
- [44] Braun V, Clarke V, Boulton E, Davey L, McEvoy C. The online survey as a qualitative research tool. *Int J Soc Res Methodol*. 2021;24:641–654.