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A cross-sectional student survey of the impact of the Covid-19 lockdowns on clinical placement in England

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ABSTRACT

Introduction: Clinical placement is an essential aspect of student radiographers' training. The Covid-19 pandemic proved challenging for diagnostic radiography students disrupting clinical placements. This study aims to explore the impact of Covid-19 on first and second year student diagnostic radiographers' in clinical practice during the Covid-19 lockdown periods and Covid-19 waves in England.
Method: A cross-sectional online survey was used to attain quantitative attitudinal 5-point Likert and qualitative free-text response data. Descriptive and inferential statistics data analysis applied the Mann–Whitney U test and Kruskal–Wallis H test. The qualitative data were thematically coded and analysed for patterns of reoccurring themes.
Results: There were $n = 85$ responses from $n = 9$ different counties within England. Students reported missing between $n = 1–14$ weeks of placement. There was a lack of (41%; $n = 35$) or limited radiography staff (21%; $n = 18$) in the clinical departments and a lack of a range of X-ray examinations available (67%; $n = 57$) during the Covid-19 lockdowns, which affected completing practice assessments. Negative effects included stress, anxiety and worry (68%; $n = 58$); positive effects included team working (16.4%; $n = 14$), learning to work under pressure (12.9%; $n = 11$), and preparation for qualifying (8.2%; $n = 7$).
Conclusions: This study identified that students needed more support in this critical aspect of their training. There were both positive and negative responses; notably, the results highlight how the Covid-19 lockdowns have strained the National Health Service (NHS) and adversely affected radiography students.
Implications for practice: The findings underscore the need for university educators and student liaison radiographers within hospitals to have an awareness of the mental health and practical learning needs of the students they are instructing post-Covid-19 lockdown.

Introduction

For healthcare students, clinical placement is an essential aspect of their training. It enables them to understand the practical side of their chosen profession, giving an insight into what they will do in the future.[1] However, for many student diagnostic radiographers,[2] healthcare profession students,[2] and medical students[3,4] the coronavirus (Covid-19)[5] pandemic affected this experience, particularly causing interruptions to clinical placement availability.[2] These changes occurred to mitigate the spread of Covid-19[6] but, in turn, have had consequences on educational learning, clinical experience and mental wellbeing.[7]

Multiple United Kingdom (UK)[8–10] and global studies[11,12] have focused on clinical practice educators' perspectives on the challenges of balancing increasing workload and student supervision during the first Covid-19 wave. Raising similar concerns as student radiographers[5] about the impact of Covid-19 during the first wave. Cushen-Brewster, Strudwick, Doolan and Driscoll–Evans[9] had previously captured the feelings of third-year radiography students in clinical practice during the first English Covid-19 lockdown period, highlighting the positive and negative effects on mental health, learning and transition to qualification. The findings reflected comparable results to the multi-site study on student radiographers by Rainford et al.[13] with data from England and $n = 11$ other countries during the first lockdown of Covid-19. The student's voice highlighted categories such as financial concerns, confidence when imaging Covid-19 patients, personal protective equipment (PPE), concerns about exposure to Covid-19, and

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missing clinical placement. Although it is recognised that the pandemic would have affected each country differently, similarities were noted in the student's responses and to comparable other international studies,[14–16] and UK studies.[17,18]

These findings represent the student voice[19] raising common themes working through the first ovid-19 lockdown period and are significant enough for further research into clinical placements during the second and third lockdown periods in England. Therefore this study aims to explore the impact of Covid-19 on first and second year student diagnostic radiographers' in clinical practice during the Covid-19 lockdown periods (March–June 2020; October–December 2020; January–February 2021)[20] and Covid-19 waves (March 2020–June 2020; and September 2020–April 2021)[19] in England.

Method

This study used a cross-sectional survey to collect qualitative and quantitative data to capture the trends in responses and free-text descriptions of participants' feelings and experiences.[21] The survey consisted of $n = 11$ open and closed questions using a 5-point Likert attitudinal scale and free-text responses on participants' views to explore the reasoning behind their responses (a copy of the questionnaire has been included in the supplementary material).

The survey requested information regarding the year of study, the county in England where they attend university, if there were a lack of radiographers or range in X-ray examinations during the lockdown, and how Covid-19 negatively and positively affected their placement. The survey tool used Microsoft Forms[22] to collect

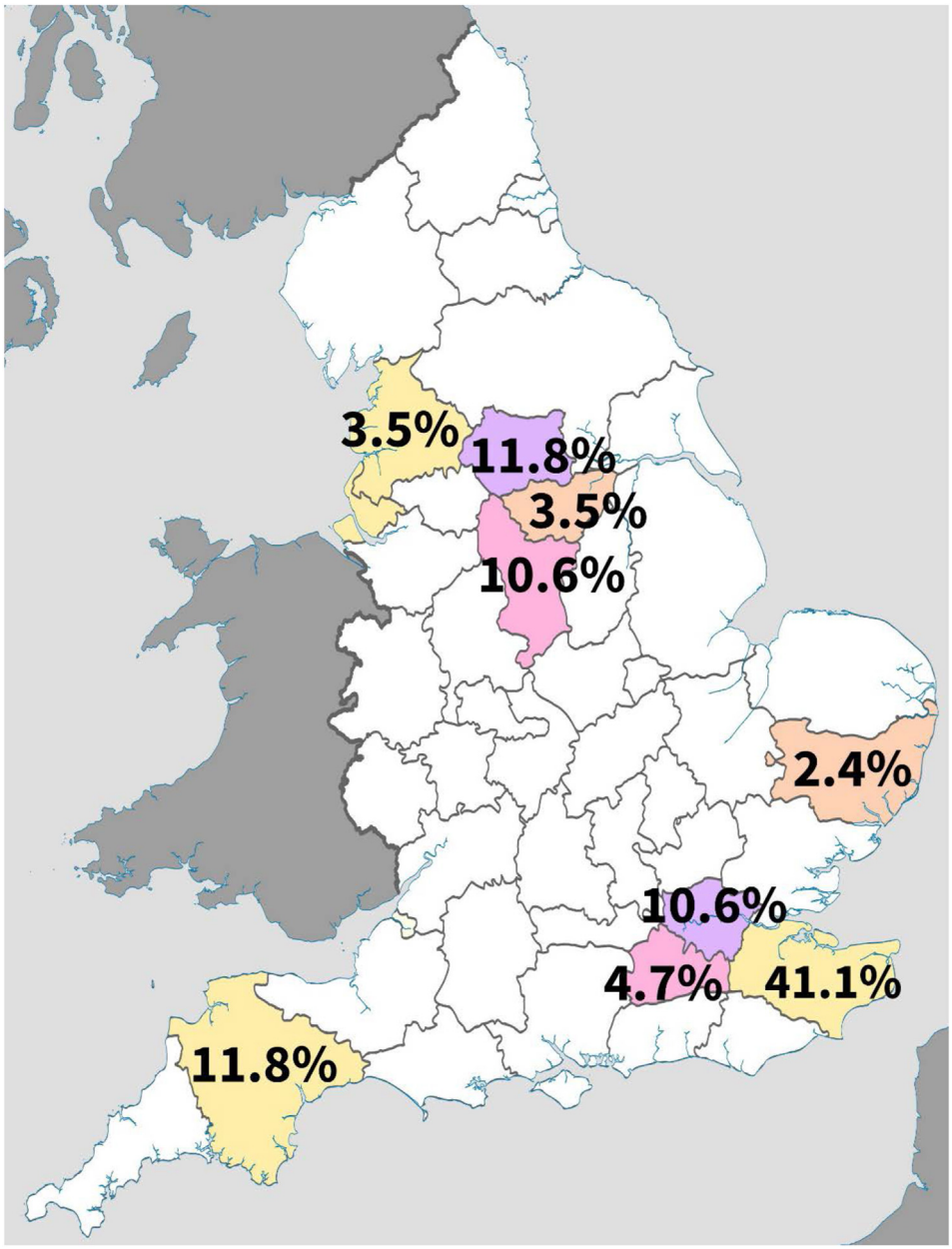

Figure 1. Regions of England where participants were located (shown in percentages).

Table 1a
Subgroup analysis of Cohort level response to placement attendance during the lockdown.

Independent		Dependent variables (% within row)		Row total	Two independent variables					
					Mean rank	Sum of Ranks	Mann Whitney	Wilcoxon	Z	Asymp.Sig
Variables	Levels	Yes	No							
Cohort	Year 2	$n = 7$ (17.0%)	$n = 34$ (83%)	$n = 41$	29.26	1199.50	338.5	1199.5	−5.723	p = 0.001
	Year 3	$n = 35$ (79.5%)	$n = 9$ (20.5%)	$n = 44$	55.81	2455.50				
Column Total		$\boldsymbol{n = 42}$	$\boldsymbol{n = 43}$	$\boldsymbol{n = 85}$						

Table 1b
Subgroup analysis of location level response to placement attendance during the lockdown.

Independent		Dependent variables															
		(% within row)			Three or more independent variables				Pairwise comparison							
Variables	Levels	Yes	No	Row total	Mean rank	Kruskal Wallis	df	Asymp.Sig	Pair	Sig.	Pair	Sig.	Pair	Sig.	Pair	Sig.
Location	1.Derbyshire	$n = 9$ (100%)	$n = 0$ (0%)	$\boldsymbol{n = 9}$	58.5	31.345	8	$p = 0.001$	1–2	$p = 0.05$	2–4	$p = 0.82$	3–7	$p = 0.25$	5–7	$p = 0.51$
	2.Devon	$n = 5$ (50%)	$n = 5$ (50%)	$\boldsymbol{n = 10}$	38.75				1–3	$p = 0.01$	2–5	$p = 0.64$	3–8	$p = 0.48$	5–8	$p = 0.84$
	3.Kent	$n = 16$ (45.7%)	$n = 19$ (54.3%)	$\boldsymbol{n = 35}$	37.06				1–4	$p = 0.03$	2–6	$p = 0.64$	3–9	$p = 0.00$	5–9	$p = 0.00$
	4.London	$n = 4$ (44.4%)	$n = 5$ (55.6%)	$\boldsymbol{n = 9}$	36.56				1–5	$p = 0.07$	2–7	$p = 0.24$	4–5	$p = 0.76$	6–7	$p = 0.19$
	5.North West	$n = 1$*(33.3%)*	$n = 2$*(66.7%)*	$\boldsymbol{n = 3}$	32.17				1–6	$p = 0.37$	2–8	$p = 0.44$	4–6	$p = 0.55$	6–8	$p = 0.32$
	6.South Yorks	$n = 2$*(66.7%)*	$n = 1$*(33.3%)*	$\boldsymbol{n = 3}$	45.33				1–7	$p = 0.02$	2–9	$p = 0.00$	4–7	$p = 0.30$	6–9	$p = 0.06$
	7.Suffolk	$n = 0$ (0%)	$n = 2$*(100%)*	$\boldsymbol{n = 2}$	19				1–8	$p = 0.02$	3–4	$p = 0.95$	4–8	$p = 0.56$	7–8	$p = 0.60$
	8.Surrey	$n = 1$*(25%)*	$n = 3$*(75%)*	$\boldsymbol{n = 4}$	28.88				1–9	$p = 0.15$	3–5	$p = 0.72$	4–9	$p = 0.00$	7–9	$p = 0.00$
	9.West Yorks	$n = 4$*(40%)*	$n = 6$*(60%)*	$\boldsymbol{n = 10}$	72.9				2–3	$p = 0.83$	3–6	$p = 0.53$	5–6	$p = 0.46$	8–9	$p = 0.00$
Column Total		$\boldsymbol{n = 42}$	$\boldsymbol{n = 43}$	$\boldsymbol{n = 85}$												

anonymised responses. Before completing the survey, participants received an information sheet on the nature of their participation, the purpose of the study, what information will be gathered, how the results will be disseminated, informed consent, and the right to withdraw.[23] A pilot version of the survey was tested for readability, order of questions and online returns of completed data. Ethical approval was gained from the University Ethics Committee (ETH2122-S19/RPR/09).

Sample

Purposive sampling methods were used to recruit current second and third year radiography students from universities across England who had experienced lockdown during their studies. The survey was sent electronically via email to all radiography courses in England for 'gatekeeper' permission to invite their diagnostic radiography students to participate. The survey ran between December 2021 to February 2022, with a reminder sent six weeks before the closing date.

Data analysis

The data collected were analysed against demographic variables of the year group and location data for patterns and trends of responses. The ordinal Likert responses were analysed using SPSS Statistics[24] and presented in descriptive statistics of the number of responses and percentages for each scale question. The year group comparisons (two independent groups) used non-parametric inferential statistics of the Mann–Whitney U test (Wilcoxon) for a difference ($<p = 0.05$). The geographic location comparisons (three or more independent groups) used non-parametric inferential statistics of the Kruskal–Wallis H test (one-way ANOVA on ranks) for a difference ($<p = 0.05$) and pairwise comparisons.

Open-ended questions were analysed using thematic analysis. Students' answers were examined for patterns of reoccurring themes, ideas and feelings[25] through downloading the Microsoft Excel[26] codebook and importing it into NVivo.[27]

Results

There were $n = 85$ responses from students across $n = 9$ different counties in England; the percentage breakdown of the location of participants is shown in Fig. 1. The participant demographics consisted of $n = 41$ s (48%) and $n = 44$ third year students (51%).

The remaining questions are placed into subthemes, including placement attendance, disruption to clinical assessment, disruption to the normal range of examinations and consideration of stress, anxiety and worry.

Placement attendance

Students were asked whether Covid-19 had caused any interruptions to their clinical placement, with a significant difference

Table 2a
Subgroup analysis at cohort level for lack of radiographers in the department to complete clinical assessments during the lockdown.

Independent		Strongly agree	Dependent variables (% within row)			Strongly disagree	Row total	Two independent variables					
Variables	Levels		Agree	Neutral	Disagree			Mean rank	Sum of Ranks	Mann Whitney	Wilcoxon	Z	Asymp.Sig
Cohort	Year 2	n = 6 (14.6%)	n = 12 (29.3%)	n = 10 (24.3%)	n = 9 (22%)	n = 4 (9.8%)	n = 41	42.32	1735	874	1735	−0.253	p = 0.80
	Year 3	n = 6 (13.6%)	n = 11 (25%)	n = 13 (29.6%)	n = 10 (22.7%)	n = 4 (9.1%)	n = 44	43.64	1920				
Column Total		n = 12	n = 23	n = 23	n = 19	n = 8	n = 85						

Table 2b
Subgroup analysis at location level for lack of radiographers in the department to complete clinical assessments during the lockdown.

Independent		Strongly agree	Dependent variables (% within row)			Strongly disagree	Row total	Three or more independent variables			Pairwise comparison								
Variables	Levels		Agree	Neutral	Disagree			Mean rank	Kruskal Wallis	df	Asymp.Sig	Pair	Sig.	Pair	Sig.	Pair	Sig.	Pair	Sig.
Location	1.Derbyshire	$n = 2$ (22.2%)	$n = 5$ (55.6%)	$n = 2$ (22.2%)	$n = 0$ (0%)	$n = 0$ (0%)	$\boldsymbol{n = 9}$	25.22	11.288	8	$p = 0.186$	1–2	$p = 0.25$	2–4	$p = 0.61$	3–7	$p = 0.25$	5–7	$p = 0.37$
	2.Devon	$n = 1$ (10%)	$n = 5$ (50%)	$n = 1$ (10%)	$n = 3$ (30%)	$n = 0$ (0%)	$\boldsymbol{n = 10}$	37.75				1–3	$p = 0.01$	2–5	$p = 0.58$	3–8	$p = 0.16$	5–8	$p = 0.32$
	3.Kent	$n = 4$ (11.4%)	$n = 6$ (17.1%)	$n = 13$ (37.2%)	$n = 9$ (25.7%)	$n = 3$ (8.6%)	$\boldsymbol{n = 35}$	46.79				1–4	$p = 0.10$	2–6	$p = 0.75$	3–9	$p = 0.93$	5–9	$p = 0.94$
	4.London	$n = 1$ (11.1%)	$n = 3$ (33.3%)	$n = 2$ (22.2%)	$n = 2$ (22.2%)	$n = 1$ (11.1%)	$\boldsymbol{n = 9}$	43.33				1–5	$p = 0.18$	2–7	$p = 0.55$	4–5	$p = 0.85$	6–7	$p = 0.78$
	5.North West	$n = 0$ (0%)	$n = 1$ (33.3%)	$n = 1$ (33.3%)	$n = 1$ (33.3%)	$n = 0$ (0%)	$\boldsymbol{n = 3}$	46.33				1–6	$p = 0.63$	2–8	$p = 0.06$	4–6	$p = 0.51$	6–8	$p = 0.08$
	6.South Yorks	$n = 1$ (33.3%)	$n = 1$ (33.3%)	$n = 0$ (0%)	$n = 1$ (33.3%)	$n = 0$ (0%)	$\boldsymbol{n = 3}$	32.83				1–7	$p = 0.93$	2–9	$p = 0.36$	4–7	$p = 0.37$	6–9	$p = 0.35$
	7.Suffolk	$n = 1$ (50%)	$n = 0$ (0%)	$n = 1$ (50%)	$n = 0$ (0%)	$n = 0$ (0%)	$\boldsymbol{n = 2}$	26.75				1–8	$p = 0.00$	3–4	$p = 0.70$	4–8	$p = 0.14$	7–8	$p = 0.07$
	8.Surrey	$n = 0$ (0%)	$n = 0$ (0%)	$n = 2$ (50%)	$n = 0$ (0%)	$n = 2$ (50%)	$\boldsymbol{n = 4}$	64.25				1–9	$p = 0.04$	3–5	$p = 0.97$	4–9	$p = 0.70$	7–9	$p = 0.26$
	9.West Yorks	$n = 2$ (20%)	$n = 2$ (20%)	$n = 1$ (10%)	$n = 3$ (30%)	$n = 2$ (20%)	$\boldsymbol{n = 10}$	47.5				2–3	$p = 0.29$	3–6	$p = 0.33$	5–6	$p = 0.49$	8–9	$p = 0.23$
Column Total		$\boldsymbol{n = 12}$	$\boldsymbol{n = 23}$	$\boldsymbol{n = 23}$	$\boldsymbol{n = 19}$	$\boldsymbol{n = 8}$	$\boldsymbol{n = 85}$												

($p = 0.001$) in the responses from the second years compared to the third years. Notably, 80% of third year students missed out on allocated placement time, whereas only 17% of second year students reported missing placement (Table 1a). The amount of placement missed ranged from 1 to 14 weeks across both years. This calculated an average of 2 weeks missed by second year students and 6 weeks missed by third year students during the three lockdown periods (March–June 2020; October–December 2020; January–February 2021),[20] and both Covid-19 pandemic waves (March–June 2020; and September 2020–April 2021)[19] in England.

The subgroup analysis of the amount of clinical placement missed (Table 1b) calculated a significant difference in responses by location ($p = 0.001$), with pairwise comparisons noting students from Derbyshire missed the most placement (100%) and Suffolk the least (0%). However, small sample groups have limited comparisons; patterns can be identified, such as Devon, Kent, London, North West and West Yorkshire having split responses.

Disruption to clinical assessments

Using the Likert attitudinal responses students agreed ($n = 35$; 41%) that there were a lack of radiographers in the department to assist with assessments and learning experiences (Table 2a), without a significant difference between year groups ($p = 0.80$). The subgroup analysis at the location using the Kruskal–Wallis test displayed a p-value of $p = 0.186$; there is likely no difference in scoring tendency between locations. Although pairwise comparisons demonstrated Kent and Derbyshire had variation ($p = 0.01$) due to neutral and disagreed responses, West Yorkshire and Derbyshire varied ($p = 0.04$) due to the spread of responses by West Yorkshire, and Surrey to Derbyshire ($p = 0.00$) due to low sample comparisons (Table 2b).

The free text qualitative responses identified through thematic analysis commented upon either a lack of (41%; $n = 35$) or limited radiography staff (21%; $n = 18$) on clinical practice during the lockdowns to assist with signing off paperwork, with some moving paperwork online but clinical radiographers either didn't have access to login to the university systems to sign off competencies or hadn't had time to complete the specific university training to gain a computer account due to the Covid-19 workload. Other common and reoccurring trends included the inability to complete practical assessments resulting in stress, anxiety, and pressure levels.

> "*Staff weren't willing to sit and do the paperwork or give useful information/tips, including feedback and help for assessments. My assessments were delayed, and I know others had difficulty having an assessor free*" [YR2 RAD6]

> "*I should have been signed off in certain areas, which I still have not been due to not having enough staff in the area as an assessor. This has caused more pressure for me to complete this whilst in my final year*" [YR3 RAD11]

Disruption to the normal range of examinations

Questions on the availability of the normal range of X-ray examinations during the lockdown periods demonstrated no difference between the year group of students ($p = 0.84$; Table 3a) or by location ($p = 0.75$) and pairwise comparison of locations (Table 3b).

The free-text responses demonstrated that 67% ($n = 57$) of students agreed that there were not the usual range of X-ray examinations during the lockdown. Extremities (37.6%; $n = 32$) and spines (30.5%; $n = 26$) were the examinations that were missed the most by students (Fig. 2). Additionally, 87% ($n = 74$) were not allowed to do mobile chest X-rays due to Covid-19 infection

Table 3a
Subgroup analysis at cohort level for lack of range of normal X-ray examinations during the first and second Covid-19 lockdowns.

Independent		Strongly agree	Dependent variables (% within row)			Strongly disagree	Row total	Two independent variables					
Variables	Levels		Agree	Neutral	Disagree			Mean rank	Sum of Ranks	Mann Whitney	Wilcoxon	Z	Asymp. Sig
Cohort	Year 2	n = 10 (24.4%)	n = 15 (36.6%)	n = 12 (29.3%)	n = 3 (7.3%)	n = 1 (2.4%)	n = 41	43.51	1784	881	1871	−0.196	p = 0.84
	Year 3	n = 8 (18.2%)	n = 24 (54.6%)	n = 6 (13.6%)	n = 4 (9.1%)	n = 2 (4.5%)	n = 44	42.52	1871				
Column Total		n = 18	n = 39	n = 18	n = 7	n = 3	n = 85						

control restrictions on their permitted scope of practice during the lockdown.

Consideration of stress, anxiety and worry

There was a consensus among the students (68%; $n = 58$), particularly the second year students (73%, $n = 30/41$), that they felt stress, anxiety or worry, which affected their concentration during practice assessments (Table 4a). From the Mann–Whitney result (Table 4a), we can conclude that there was no significant difference between cohort groups ($p = 0.20$). The Kruskal–Wallis result is further analysed in pairwise comparisons to assess any patterns or trends in responses that indicate no significant difference by location ($p = 0.32$; Table 4b). A minor difference between Derbyshire and Surrey responses was noted due to the sample size difference.

Concerns about returning to practice

The overall findings from the previous questions reflect the student responses on amount of radiographers available in the departments, the lack of range of X-ray examinations during the Covid-19 lockdown and the impact on their stress, anxiety, and concentration (Fig. 3), which have all impacted upon their learning.

Free text responses highlighted the top concerns students struggled with before returning to clinical placement and the challenges that were faced. Common occurring themes included getting Covid-19 (49.4%; $n = 42$); spreading Covid-19 to family and friends (24.7%; $n = 21$); completing assessments (n = 16); the impact on their clinical learning and knowledge (17.6%; $n = 15$); missing placement hours (14.1%; $n = 12$); using PPE (12.9%; $n = 11$).

> *"Will I get experience in the X-ray room or be sent cleaning and preparing patients because they are busy and short staffed, and it will help out ….most of the time. Will I get lucky and have a radiographer who is prepared to support students. Will I get Covid-19 and take it to my family"* [YR2 RAD9]

> *"Not being able to gain experience on mobiles/theatre etc. as quite often didn't want students to keep numbers/contacts down ….extra unnecessary things to think about like PPE and communication issues"* [YR2 RAD37]

> *"Getting Covid-19 spreading it through my family and not being able to look after my children if I got ill"* [YR3 RAD11]

> *"Going into 2nd year with only 8 weeks of clinical experience was quite daunting. The first concern was being able to do basic X-Rays. You'll always have this niggling feeling in the back of your mind that you aren't good enough, and some Radiographers reinforced that by saying that we should be at a higher standard"* [YR3 RAD34]

How Covid-19 affected students in practice

It was identified that students were concerned with the lack of time spent in other modalities (36.4%; $n = 31$), a lack in the range of X-rays 67%; $n = 57$); using PPE (21%; $n = 18$); missing placement (14%; $n = 12$); shortage of radiographers or radiographers being too stressed to teach (11.7%; $n = 10$).

> *"Unable to observe certain procedures due to not being (mask) fit tested, not really knowing anyone from the cohort and only seeing people on placement, and not being able to practice positioning prior to placement due to being online for lectures"* [YR2 RAD25]

> *"Not having an understanding/being competent in some modalities, e.g. fluoroscopy, endoscopy, bariums, computed tomography, ultrasound ….worry that I would look like I didn't know what I was doing due to lack of practice; lack of socialisation with other students"* [YR3 RAD29]

The positives of being in clinical placement during the Covid-19 lockdowns

Respondents were also able to identify positive attributes of the pandemic's effects on their clinical placement. Some praised its impact on infection control (18.8%; $n = 16$) as it provided a cleaner work environment and conveyed the importance of PPE. Some students identified that they saw staff pull together to overcome challenges (16.4%; $n = 14$), as well as learning to work under pressure (12.9%; $n = 11$), preparation for qualifying (8.2%; $n = 7$); and having time between patients to talk to the radiography staff (7%; $n = 6$).

> *"I felt that I was making a contribution to the placement site at a time when the placement site was under immense pressure. It felt like I made a difference to the patients I cared for"* [YR2 RAD11]

> *"I've seen the NHS at its most stretched … I felt like a member of the team very quickly … I got a lot of unique experiences with patients"* [YR2 RAD21]

> *"Seeing how teams pull together to overcome challenges ….Being involved with the extraordinary effort of working clinically throughout the pandemic is character building ….Working throughout the NHS' most challenging period has built resilience"* [YR3 RAD44]

Discussion

The survey provided a picture of how the Covid-19 pandemic impacted student radiographers in critical aspects of their training. Notably, the results highlight how the Covid-19 lockdowns have strained the National Health Service (NHS) and adversely affected radiography training. The findings identified several important factors. Firstly, students missed a significant number of placement weeks, with some losing out on as many as 14 weeks. This result alone is critical as placement hours are a major contributing factor to the training of student radiographers. A lack of radiographers in the department and a lack of the normal range of X-ray examinations resulted in some students' delays in completing assessments, which impacted their ability to get paperwork signed off. In addition, students experienced stress, anxiety and worry due to fears of

Table 3b
Subgroup analysis at location level for lack of range of normal X-ray examinations during the first and second Covid-19 lockdowns.

Independent		Dependent variables (% within row)						Three or more independent variables				Pairwise comparison							
Variables	**Levels**	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Row total**	**Mean rank**	**Kruskal Wallis**	**df**	**Asymp.Sig**	**Pair**	**Sig.**	**Pair**	**Sig.**	**Pair**	**Sig.**	**Pair**	**Sig.**
	1.Derbyshire	$n = 1(11.1\%)$	$n = 6(66.6\%)$	$n = 2(22.2\%)$	$n = 0(0\%)$	$n = 0(0\%)$	$\boldsymbol{n = 9}$	41.17				1-2	$p = 0.68$	2-4	$p = 0.41$	3-7	$p = 0.21$	5-7	$p = 0.18$
	2.Devon	$n = 2(20\%)$	$n = 4(40\%)$	$n = 3(30\%)$	$n = 0(0\%)$	$n = 1(10\%)$	$\boldsymbol{n = 10}$	45.45				1-3	$p = 0.68$	2-5	$p = 0.68$	3-8	$p = 0.26$	5-8	$p = 0.24$
	3.Kent	$n = 6(17.1\%$	$n = 17(48.6\%)$	$n = 7(20\%)$	$n = 5(14.3\%)$	$n = 0(0\%)$	$\boldsymbol{n = 35}$	44.67				1-4	$p = 0.68$	2-6	$p = 0.44$	3-9	$p = 0.92$	5-9	$p = 0.60$
	4.London	$n = 3(33.3\%)$	$n = 4(44.4\%)$	$n = 1(11.1\%)$	$n = 0(0\%)$	$n = 1(11.1\%)$	$\boldsymbol{n = 9}$	36.78				1-5	$p = 0.49$	2-7	$p = 0.22$	4-5	$p = 0.33$	6-7	$p = 0.11$
Location	5.North West	$n = 0(0\%)$	$n = 2(66.6\%)$	$n = 0(0\%)$	$n = 1(33.3\%)$	$n = 0(0\%)$	$\boldsymbol{n = 3}$	51.67	4.989	8	$p = 0.75$	1-6	$p = 0.30$	2-8	$p = 0.28$	4-6	$p = 0.19$	6-8	$p = 0.14$
	6.South Yorks	$n = 0(0\%)$	$n = 1(33.3\%)$	$n = 2(66.6\%)$	$n = 0(0\%)$	$n = 0(0\%)$	$\boldsymbol{n = 3}$	57				1-7	$p = 0.33$	2-9	$p = 0.87$	4-7	$p = 0.47$	6-9	$p = 0.38$
	7.Suffolk	$n = 1(50\%)$	$n = 1(50\%)$	$n = 0(0\%)$	$n = 0(0\%)$	$n = 0(0\%)$	$\boldsymbol{n = 2}$	23.75				1-8	$p = 0.46$	3-4	$p = 0.36$	4-8	$p = 0.67$	7-8	$p = 0.72$
	8.Surrey	$n = 2(50\%)$	$n = 1(25\%)$	$n = 1(25\%)$	$n = 0(0\%)$	$n = 0(0\%)$	$\boldsymbol{n = 4}$	30.88				1-9	$p = 0.80$	3-5	$p = 0.61$	4-9	$p = 0.50$	7-9	$p = 0.26$
	9.West Yorks	$n = 3(30\%)$	$n = 3(30\%)$	$n = 2(20\%)$	$n = 1(10\%)$	$n = 1(10\%)$	$\boldsymbol{n = 10}$	43.85				2-3	$p = 0.92$	3-6	$p = 0.37$	5-6	$p = 0.77$	8-9	$p = 0.34$
	Column Total	$\boldsymbol{n = 39}$	$\boldsymbol{n = 18}$	$\boldsymbol{n = 7}$	$\boldsymbol{n = 3}$	$\boldsymbol{n = 85}$													

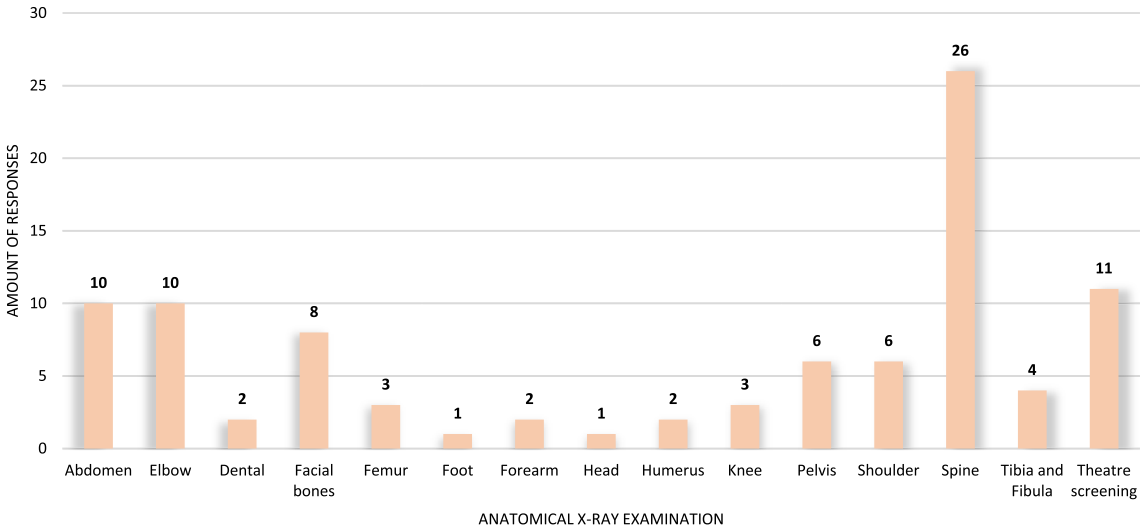

Figure 2. The number of X-ray examinations stated as lacking by students.

Table 4a
Subgroup analysis at cohort level for stress, anxiety or worry that you might contract the virus on clinical placement during lockdown and effect on concentration during clinical assessments.

Independent		Strongly agree	Dependent variables (% within row)			Strongly disagree	Row total	Two independent variables					
Variables	Levels		Agree	Neutral	Disagree			Mean rank	Sum of Ranks	Mann Whitney	Wilcoxon	Z	Asymp.Sig
Cohort	Year 2	n = 11 (26.8%)	n = 19 (46.3%)	n = 5 (12.2%)	n = 4 (9.8%)	n = 2 (4.9%)	n = 41	39.67	1626.5	765.5	1626.5	−1.275	p = 0.20
	Year 3	n = 8 (18.2%)	n = 20 (45.4%)	n = 3 (6.8%)	n = 11 (25%)	n = 2 (4.6%)	n = 44	46.1	2028.5				
Column Total		n = 19	n = 39	n = 8	n = 15	n = 4	n = 85						

contracting the virus, which affected their concentration during practice assessments. However, the study also identified positive experiences during the pandemic, including teamwork, preparation for qualification and working under pressure.

The concerning matter of the significant number of placement weeks missed means that students will be going into the following year or employment lacking the same amount of experience as previous cohorts. There is also a clear difference between the second year students compared to the third year students (Table 1a), suggesting possible implications for employers recruiting newly qualified radiographers, as further support will need to be offered. Tay, Wei, Aw and Lai[28] recommend a curated orientation programme of professional support, and advice to newly qualified radiographers transitioning from Covid-19 era students to practitioners. Whilst the second year students transitioning to the third year will require catch-up sessions provided by their educational institutions and stakeholders in accordance with the Health and Care Professions Council recommendations.[29]

Additionally, the findings noted a lack of non-urgent examinations in clinical placement during the Covid-19 lockdowns impacted the placement experience and practical aspects of learning. For example, an absence of extremity examinations can have notable implications on students, as they are the profession's basic skills.[16] Some students expressed stress and pressure when they could not complete their practice assessments in a timely manner, resulting from a scarcity of extremity X-ray examinations (Fig. 2). Furthermore, students merely attending clinical placement do not automatically lead to learning. Students require an immersive and hands-on clinical learning environment where they will receive support from their supervisors. If staff are "*unwilling to teach*" [YR2 RAD15], as stated by one participant, students' learning will be hindered.[30] This supports the findings from the first wave of Covid-19 lockdown of Tay, Wei, Aw and Lai[28]; Tay, Cai, Chow and Lai[31]; and Akudjedu et al.,[10] where students reported problems completing specific assessments for lack of non-urgent examinations.

Students also reported experiencing stress, anxiety and worry during their second year (73%; n = 30/41) and third year (64%; n = 28/44; Table 4a), which affected their concentration during practice assessments and are comparable to previous studies.[9,12,15–18] The staff on placement need to be conscious of the impact stressful environments can have on students, especially during assessments. The NHS People Plan[32] suggests a coordinated approach regarding improving the clinical experience and being attentive to individuals' health and wellbeing.

Lastly, while students are on clinical placement, their risk of contracting the virus greatly increases. It is easily spread within households[6] and poses a risk to those with underlying health conditions.[33,34] This was one of the top concerns for many of the students surveyed, as some feared spreading it to family members; one student expressed their concerns by saying, *"Getting Covid-19, the stress of spreading it to my family and people outside of clinical placement and not being able to perform well in my practice added to the stress"* [YR2 RAD4]. These findings correlate to international student radiographer studies,[13–17] and literature reviews[12,19] highlighting similar concerns from the first wave of the Covid-19 lockdown.

Potential limitations of the study findings included the low response rate, and not all universities in England with a diagnostic radiography programme responded, limiting broader inferences of the data.

Table 4b
Subgroup analysis at location level for stress, anxiety or worry that you might contract the virus on clinical placement during lockdown and effect on concentration during clinical assessments.

Independent		Strongly agree	Dependent variables (% within row)			Strongly disagree	Row total	Three or more independent variables				Pairwise comparison							
Variables	Levels		Agree	Neutral	Disagree			Mean rank	Kruskal Wallis	df	Asymp.Sig	Pair	Sig.	Pair	Sig.	Pair	Sig.	Pair	Sig.
Location	1.Derbyshire	$n = 1$ (11.1%)	$n = 3$ (33.3%)	$n = 0$ (0%)	$n = 5$ (55.5%)	$n = 0$ (0%)	$\boldsymbol{n = 9}$	55.22	9.276	8	$p = 0.32$	1–2	$p = 0.09$	2–4	$p = 0.96$	3–7	$p = 0.48$	5–7	$p = 0.78$
	2.Devon	$n = 3$ (30%)	$n = 5$ (50%)	$n = 0$ (0%)	$n = 2$ (20%)	$n = 0$ (0%)	$\boldsymbol{n = 10}$	37.3				1–3	p = 0.22	2–5	$p = 0.38$	3–8	$p = 0.07$	5–8	$p = 0.12$
	3.Kent	$n = 7$ (20%)	$n = 17$ (48.6%)	$n = 2$ (5.7%)	$n = 5$ (14.3%)	$n = 4$ (11.4%)	$\boldsymbol{n = 35}$	44.63				1–4	$p = 0.11$	2–6	$p = 0.25$	3–9	$p = 0.30$	5–9	$p = 0.34$
	4.London	$n = 2$ (22.2%)	$n = 5$ (55.5%)	$n = 2$ (22.2%)	$n = 0$ (0%)	$n = 0$ (0%)	$\boldsymbol{n = 9}$	37.78				1–5	$p = 0.76$	2–7	$p = 0.28$	4–5	$p = 0.40$	6–7	$p = 0.93$
	5.North West	$n = 0$ (0%)	$n = 2$ (66.6%)	$n = 0$ (0%)	$n = 1$ (33.3%)	$n = 0$ (0%)	$\boldsymbol{n = 3}$	50.67				1–6	$p = 0.97$	2–8	$p = 0.30$	4–6	$p = 0.27$	6–8	$p = 0.07$
	6.South Yorks	$n = 0$ (0%)	$n = 1$ (33.3%)	$n = 2$ (66.6%)	$n = 0$ (0%)	$n = 0$ (0%)	$\boldsymbol{n = 3}$	54.67				1–7	$p = 0.94$	2–9	$p = 0.91$	4–7	p-0.30	6–9	$p = 0.22$
	7.Suffolk	$n = 0$ (0%)	$n = 1$ (50%)	$n = 0$ (0%)	$n = 1$ (50%)	$n = 0$ (0%)	$\boldsymbol{n = 2}$	56.6				1–8	$p = 0.02$	3–4	$p = 0.43$	4–8	$p = 0.29$	7–8	$p = 0.09$
	8.Surrey	$n = 3$ (75%)	$n = 0$ (0%)	$n = 1$ (25%)	$n = 0$ (0%)	$n = 0$ (0%)	$\boldsymbol{n = 4}$	23.13				1–9	$p = 0.07$	3–5	$p = 0.66$	4–9	$p = 0.87$	7–9	$p = 0.12$
	9.West Yorks	$n = 3$ (30%)	$n = 5$ (50%)	$n = 1$ (10%)	$n = 1$ (0%)	$n = 0$ (0%)	$\boldsymbol{n = 10}$	36.15				2–3	$p = 0.37$	3–6	$p = 0.47$	5–6	$p = 0.83$	8–9	$p = 0.34$
Column Total		$\boldsymbol{n = 19}$	$\boldsymbol{n = 39}$	$\boldsymbol{n = 8}$	$\boldsymbol{n = 15}$	$\boldsymbol{n = 4}$	$\boldsymbol{n = 85}$												

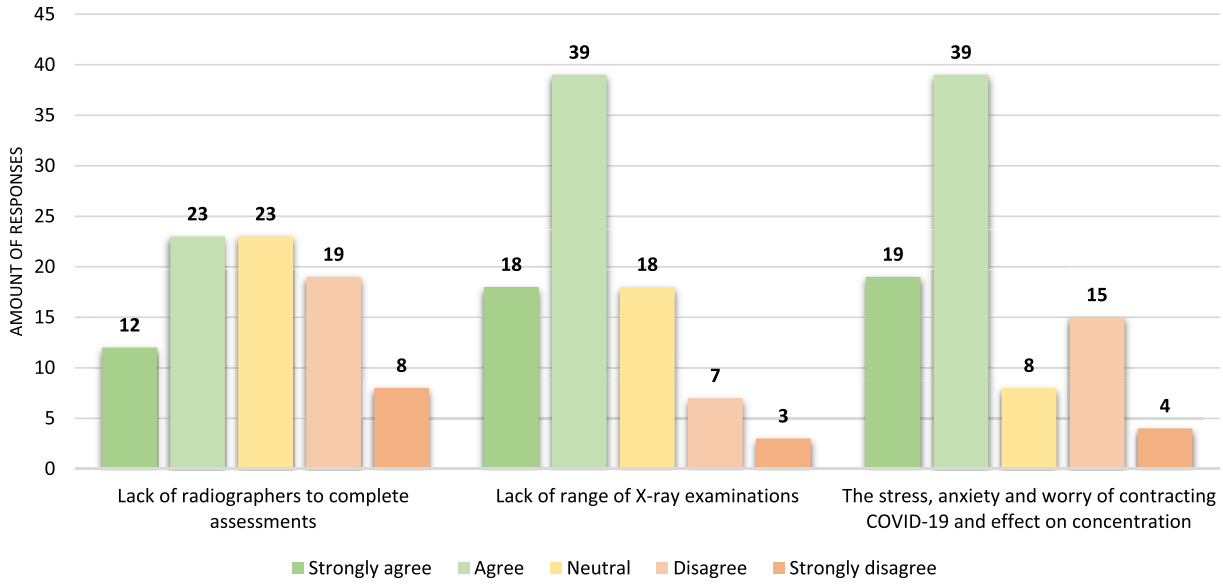

Figure 3. Overall responses to Likert questions.

Conclusion

This study aimed to identify the effects of Covid-19 on the clinical practice aspect of student radiographers' education in England. Though limited, the results have demonstrated the positive and negative impact on students, with different aspects affecting each academic year disparately. The findings underscore the need for university educators and student liaison radiographers within hospitals to have an awareness of the mental health and practical learning needs of the students they are instructing post-Covid-19 lockdown.

Declaration of interest statement

There are no conflicts of interest.

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None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.radi.2022.11.006.

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