Signa Vitae

ORIGINAL RESEARCH

Emergency residents' skill level in chest X-ray interpretation

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Abstract

Background: Emergency residents frequently perform chest X-rays (CXRs) in emergency departments (ED), yet their competency in interpreting these images is often questioned. This study evaluates the competency of ED residents in interpreting and diagnosing CXRs, and primarily determines their confidence and accuracy in CXR reading. Additionally, the current study assesses the factors influencing residents' skills and the possibility of making medical decisions based on CXR images. **Methods**: An electronic survey was distributed to all Saudi emergency medicine residents (612 at the time of the study), collecting demographic data and participant characteristics, including sex, years of practice, elective rotation, interest in diagnostic radiology, and frequency of CXR readings per week. The survey had a response rate of 69.6% (426/612) and included the most commonly encountered CXR cases, each accompanied by a brief clinical description. Respondents selected the correct answers from multiple choices and rated their diagnostic confidence on a Likert scale from 1 to 5. **Results**: The accuracy of interpreting the ten CXR images was 70.6%, while the overall diagnostic confidence was notably low at 29.0%. Normal chest radiographs exhibited the highest interpretation accuracy (99.7%) but with only 23.8% confidence. The highest confidence was reported for diagnosing Pneumoperitoneum at 64.6%. The residents who completed an elective in diagnostic radiology had a higher diagnostic accuracy than those who did not receive adequate training ($p = 0.0088$). Despite their training, all ED residents indicated a significant lack of adequate training ($p < 0.0001$). **Conclusions**: Emergency residents displayed moderate accuracy in interpreting CXRs; however, they could not make medical decisions based solely on their interpretations. Further research is needed to determine the most cost-effective technique for reducing misinterpretations, and introducing artificial intelligence may be a future solution to increase CXR interpretation accuracy.

Keywords

Residency program; Chest X-ray; Emergency medicine; Radiographs; Diagnostic error; Radiology education; Pneumothorax

1. Introduction

Accurate interpretation of chest X-rays (CXRs) is crucial in emergency medicine, as errors can lead to negative patient outcomes [1]. Emergency Departments (EDs) play a critical role in the interpretation and initial diagnosis of radiological findings. CXR is the most commonly used imaging modality in clinical investigations worldwide [2, 3]. However, the interpretation of CXR remains a vital task that is prone to diagnostic errors, particularly when decisions are made based on the initial interpretation in the ED [2, 4]. Immediate reporting of radiographs in EDs can significantly reduce interpretive errors and patient recalls, though it does not eliminate all discrepancies [5, 6].

It is estimated that 22–50% of ED patients are referred for radiographic examinations [7]. As patients are increasingly referred for cross-sectional imaging, such as computerized tomography (CT) scans, the demand for ED residents to possess sufficient skills for diagnosing and interpreting CXR results has intensified, especially given that on-call radiologists are not always available. However, reports indicate a misinterpretation rate of 0.3% to 17% for radiographs by both ED and Radiology departments [8–10].

The most commonly missed findings in radiographic images are fractures, dislocations, air-space diseases, and pulmonary nodules [10]. To address the lack of radiographic interpretation skills, hospitals have implemented several strategies, including the provision of teleradiology services in the ED and having on-site radiologists present [11, 12]. Despite these measures, reducing interpretative and diagnostic errors in the ED remains

a significant concern. Previous studies have suggested that the implementation of diagnostic tools, such as checklists, can enhance the quality of care in the ED and reduce service costs [13]. Additionally, research has shown that these tools can improve radiology knowledge among ED residents [14–16].

Factors associated with successful CXR interpretation include the level of training, field of specialization, interest in pulmonary medicine, and overall certainty [3, 6, 15, 16]. The current educational system for ED residents is deficient in training courses aimed at diagnosing and interpreting radiographic images. Furthermore, there is limited information available regarding the skill levels of ED residents in reading and diagnosing CXR images. Notably, up to 91% of radiology departments require in-depth education on CXR diagnosis and interpretation [4]. Additionally, Shammari *et al.* [17] demonstrated that family medicine residents' skills are suboptimal, highlighting the need for improved radiology training courses. Previous research has examined CXR interpretation accuracy among radiologists and the impact of training interventions, but limited data exist on the specific competency levels and confidence of emergency medicine residents in Saudi Arabia. This study aims to evaluate the accuracy and confidence of ED residents in interpreting common CXR findings, identify factors influencing their skills, and explore potential strategies for improving their diagnostic capabilities.

2. Materials and methods

2.1 Study design

After Ethical Review Board approval, all participants provided informed consent before completing the electronic survey. A survey-based cross-sectional study was conducted at King Fahad Medical City (KFMC IRB No. 22-394) in the ED Residency Programming centers across the entire Kingdom of Saudi Arabia (KSA) between August 2022 and February 2023. This study was performed in compliance with and approved by the Saudi Board of Emergency Medicine (SBEM) Residency Training, regulated by the Saudi Commission for Health Specialties (SCFHS). This study focused on emergency residents and compared training levels, thereby revealing gaps, informing training recommendations and patient care improvement in Saudi Arabia.

2.2 Study subjects

All Emergency Medicine residents enrolled in residency programs across the KSA were eligible to participate in this study (n = 612) to allow for comparison of results, with an anticipated response rate of >70%. Participants who were not trainees in the Emergency Residency program or were working in departments other than the ED were excluded. Based on relevance to emergency medicine practice, the study assessed residents' abilities to interpret radiographs that they are most likely to encounter in their daily practice, chosen to meet the commonly missed diagnostic criteria. This selection helps identify areas where residents might struggle and need additional training, ensuring that the selected cases were appropriate for assessing the skill level of ED residents. Ultimately, by identifying strengths and weaknesses in CXR interpretation

skills, this study aimed to contribute to improving patient care in emergency settings.

3. Data collection

3.1 Questionnaire distribution

A survey was conducted using an electronic platform (Alchemer, USA), in which questionnaires were distributed to residents via email and WhatsApp as their contact information was readily available in the SCFHS database. Each invitation had a unique link, and a reminder email was sent to complete the survey. The participants could access questionnaires on mobile phones, tablets, or computers. Emails sent to the participants included the contact information from the study's principal investigator. Participants provided informed consent before completing the questionnaire, which was designed to be anonymous and had no time limit.

3.2 Survey content

The content of the questionnaire was based on a literature review [17]. The questionnaire covered two domains *i.e.*, Emergency Resident selection and CXR interpretation (**Supplementary material**). The questionnaire began with background questions that collected demographic data, including participants' gender, years of practice, interest in diagnostic radiology, having completed an elective course in diagnostic radiology, and perceived adequate training in interpreting CXR images. The survey comprised ten cases, each beginning with a brief clinical scenario and a corresponding CXR image. Participants were then presented with a multiple-choice question to identify the most likely diagnosis. Additionally, they were asked to assess their confidence level for each case using a 5-point rating scale.

Overall, the questionnaire was structured to gather both quantitative and qualitative data, enabling a thorough analysis of the factors influencing ED residents' skills in CXR interpretation. This comprehensive approach is vital for identifying gaps in training and informing future educational strategies.

3.3 CXR selection

After obtaining permissions, the CXR images were derived from Radiopaedia, an international radiology educational web resource. Initially, a set of 10 CXR was adapted from a previous study [17]; these images were then tested, and validated, based on the judgment of experienced radiologists, a pilot study conducted by a panel of experts assessed the images for suitability and difficulty for emergency residents. Each radiograph was selected to represent a range of common emergency conditions encountered in the ED, including both frequently seen pathologies and those known to be commonly missed [6, 10]. The selected images included both PA (posterior-anterior) and lateral (LL) views, where appropriate, for the specific clinical scenario being presented.

The CXR were copied (as previously mentioned), converted into JPEG format, ensured to have a high-quality resolution, and loaded onto an electronic survey platform (Alchemer, formerly SurveyGizmo, USA). To achieve the highest response

rate, each participant was asked to complete the survey, which included a questionnaire featuring 10 CXRs and a follow-up method [18, 19].

3.4 Confidence level assessment

For each scenario, the participants were asked to assess their interpretation's degree of confidence using a five-point Likert scale, ranging from 5 (high confidence) to 1 (low confidence) [20]. High confidence is indicative of high recognition accuracy [21].

3.5 Statistical analysis

Data were analyzed using GraphPad Prism version 9.5.1 developed by Dotmatics (San Diego, CA, USA). Categorical variables are presented as frequencies (N) and percentages (%). Continuous variables are presented as medians, reflecting a non-normal distribution, as confirmed by the Shapiro-Wilk test. For continuous variables, non-parametric tests such as the Mann-Whitney U test were utilized for comparisons between two groups, and the Kruskal-Wallis test was used for comparisons among more than two groups. Categorical variables were compared using the Chi-squared test. Spearman's rank correlation coefficient (ρ) was employed to assess the correlation between overall diagnostic confidence and accuracy. Multivariable logistic regression analysis was performed to identify factors associated with diagnostic accuracy, with statistical significance set at a p-value < 0.05.

4. Results

4.1 Characteristics of the study participants

A total of 426 residents participated in this study, including 136 females (31.9%) and 290 males (68.1%). The distribution of residents by training year was as follows: Year 1 (23.5%), Year 2 (21.6%), Year 3 (24.6%), Year 4 (21.1%), and Year 5 or greater (9.1%). Over half of the participants (52.6%) expressed an interest in diagnostic radiology, but only 8.5% had completed an elective radiology rotation. The majority of respondents reported reading more than 10 CXRs per week (Table 1).

4.2 Diagnostic accuracy and confidence in interpretations

Table 2 summarizes the diagnostic accuracy and confidence of participants in interpreting CXR images in the survey. Concisely, the overall accuracy in interpreting the 10 CXR images was 70.6% (Table 2). While the accuracy rate appears moderate, the overall diagnostic confidence was considerably lower at 29.0%, suggesting a disconnect between knowledge and certainty in applying that knowledge. Strikingly, no participant correctly interpreted all the 10 cases.

The case of "normal chest radiography" yielded the highest interpretation accuracy at 99.7%, as expected. However, the corresponding confidence level was only 23.8%. This could indicate a tendency to overcall abnormalities, even in the presence of a normal image. Conversely, "pneumothorax" exhibited high diagnostic accuracy (94.4%) with higher diag-

TABLE 1. Participants' characteristics.

Variables	Male		Female		Total
	N	(%)	N	(%)	
Years in practice					
1 yr	70	(70.0)	30	(30.0)	100
2 yr	57	(62.0)	35	(38.0)	92
3 yr	67	(63.8)	38	(36.2)	105
4 yr	62	(68.9)	28	(31.1)	90
>5 yr	34	(87.2)	5	(12.8)	39
Interest in diagnostic radiology					
Yes	163	(72.8)	61	(27.2)	224
No	127	(62.9)	75	(37.1)	202
Had an elective in radiology					
Yes	20	(55.6)	16	(44.6)	36
No	270	(69.2)	120	(30.8)	390
Average number of CXR read per week					
>10	254	(70.8)	105	(29.2)	359
≤10	36	(53.7)	31	(46.3)	67

CXR: chest X-ray; N: number of participants; %: percentage.

TABLE 2. Diagnostic accuracy and confidence in the interpretation of chest X-ray cases.

Variable (Clinical case)	Diagnostic Accuracy (%)	Diagnostic Confidence (%)
Left lower lobe	44.1	13.4
Normal chest X-ray	99.7	23.8
Lung abscess	68.9	36.5
Pneumomediastinum	66.7	20.0
Lobar collapse	50.7	7.1
Pulmonary edema	34.6	14.3
Pneumoperitoneum	91.5	64.6
Empyema	75.1	25.6
Pneumothorax	94.4	62.8
Coronavirus disease 2019 pneumonia	80.0	21.4
Overall accuracy and confidence	70.6	29.0

nostic confidence (62.8%, median = 5). This may be attributed to the relatively clear-cut radiographic signs of pneumothorax compared to other conditions.

Pulmonary edema proved the most challenging diagnosis, with only 34.6% accuracy and a low confidence level of 14.3%. The subtle and often atypical presentations of pulmonary edema on CXR likely contribute to this difficulty. Given the recent prevalence of severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2), the study assessed accuracy and confidence in diagnosing COVID-19 pneumonia. The accuracy was reasonably high at 80%, but confidence was low (21.4%, median = 3). Fourth-year residents demonstrated

significantly higher confidence compared to first- and second-year residents ($p = 0.0161$), suggesting that experience plays a role in managing the uncertainties associated with this diagnosis. The overall diagnostic confidence level was 29.0%. There was a positive correlation between accuracy and diagnostic confidence among ED residents ($\rho = 0.69$; $p = 0.029$). Furthermore, there was a significant difference in the degree of confidence among ED residents at different levels ($p = 0.0067$).

4.3 Impact of radiology training on diagnostic skills and confidence among ED residents

Table 3 summarizes the training levels of the ED residents and their ability to interpret CXR. Initially, we defined the level of training based on whether the respondents had taken an elective course/rotation in diagnostic radiology. We then assessed whether there was a sex preference for taking such courses or rotations. Only 8.5% (n = 36) of participants had undergone an elective rotation in diagnostic radiology. Although there was no statistical difference between the sexes ($p = 0.1483$), more females tended to have undergone elective rotation in diagnostic radiology (11.8%, n = 16) compared to male participants (5.4%, n = 23). When comparing the level of residency and whether the participants had received the appropriate training, it was surprising to observe that the majority (>90%) of the respondents did not have any form of training in interpreting the CXR images. First- and second-year residents were the least trained (99.3%). Although the residents in their fourth year were the most trained (3.5%, n = 15), a significant number of respondents did not receive adequate training. However, ED residents who reported completing an elective in diagnostic radiology demonstrated a higher diagnostic accuracy than those who did not receive adequate training ($p = 0.0088$). Similarly, we compared the diagnostic accuracy of trained ED residents and untrained residents interested in diagnostic radiology. Trained residents maintained higher accuracy than untrained residents interested in diagnostic radiology ($p = 0.0078$). Furthermore, trained residents were more confident in their diagnosis than non-trained and untrained residents with an interest in diagnostic radiology ($p = 0.0206$, $p = 0.0245$). There was no difference in the diagnostic confidence between untrained and non-trained with interest in radiology ($p = 0.6558$). Finally, no significant differences were observed in the number of CXR readings per week regarding accuracy or confidence.

4.4 Factors associated with diagnostic accuracy

We performed a multivariable logistic regression analysis to determine factors associated with diagnostic accuracy. Interestingly, completing an elective rotation in diagnostic radiology emerged as a significant factor associated with improved diagnostic accuracy among ED residents ($\chi^2 = 39.78$, $p = 0.044$).

TABLE 3. Report of adequate training in interpreting CXR according to different characteristics.

Variables	Adequate elective training in interpreting chest X-ray				
	Yes		No		p value
	N	(%)	N	(%)	
Sex					
Male	23	(5.4)	267	(94.6)	0.1483
Female	16	(11.8)	120	(88.2)	
Years in practice					
1 yr	3	(0.7)	423	(99.3)	
2 yr	3	(0.7)	423	(99.3)	
3 yr	8	(1.9)	418	(98.1)	<**0.0001**
4 yr	15	(3.5)	411	(96.5)	
>5 yr	10	(2.3)	416	(97.7)	

N: number of participants; bold p-value: significant difference.

5. Discussion

This study assessed the competency of emergency medicine (EM) residents in interpreting and diagnosing CXRs, focusing on their confidence and accuracy. Furthermore, it explored factors influencing their skills and potential approaches to enhance diagnostic abilities.

Our findings reveal that EM residents exhibit moderate accuracy (70.6%) in interpreting CXRs, yet their overall diagnostic confidence is considerably lower at 29.0%. This discrepancy between accuracy and confidence suggests a potential gap in their training and practical experience, potentially leading to hesitation in making critical decisions based solely on CXR interpretations. Notably, no resident was able to correctly interpret all the ten cases, highlighting the complexity of CXR interpretation and the need for improvement. This finding aligns with another study which showed that emergency physicians' sensitivity to detecting abnormalities varies from 20% to 64.9%, with specificity between 94.9% and 98.7% [8].

A significant lack of adequate training in diagnostic radiology was reported by the majority of residents, which appears to contribute to the lower confidence levels. These findings collectively highlight that the lack of confidence in CXR interpretation among trainees is multifaceted, stemming from inadequate training, limited exposure, the complexity of cases, and psychological pressures. Addressing these issues through enhanced training and support could help improve confidence levels in future practitioners. Furthermore, this study also identified that completing an elective rotation in diagnostic radiology was significantly associated with improved diagnostic accuracy among ED residents [3, 15].

The high accuracy observed in interpreting normal CXRs (99.7%) contrasts sharply with the lower confidence levels (23.8%) for these cases. This might indicate an over-reliance on identifying abnormalities, leading to a lack of focus on confirming normality. Conversely, pneumothorax cases demonstrated both high accuracy and confidence, potentially due to

the relatively distinct radiographic features of this condition.

The significant challenges residents faced in diagnosing pulmonary edema, characterized by low accuracy and confidence levels, underscore the difficulty in recognizing subtle or atypical presentations of this condition on CXR. This finding aligns with existing literature highlighting the diagnostic challenges of congestive heart failure and pulmonary edema based on CXR alone [22, 23]. Additionally, the moderate accuracy in diagnosing pneumonia associated with SARS-CoV-2, coupled with low confidence, is particularly relevant given the prevalence of this condition in emergency departments. The observed higher confidence among fourth-year residents compared to junior residents suggests that clinical experience plays a critical role in improving diagnostic skills, although formal training remains crucial.

The strong positive correlation between accuracy and diagnostic confidence ($\rho = 0.69$; $p = 0.029$) emphasizes the importance of building both knowledge and self-assurance in CXR interpretation. The observed differences in confidence levels among residents at different training levels further support the role of experience in skill development.

A striking finding from our study was the reported lack of adequate training in CXR interpretation among the majority of residents, a deficiency that was evident across all years of training. Residents who completed an elective rotation in diagnostic radiology demonstrated significantly higher diagnostic accuracy and confidence, underscoring the value of dedicated training programs in enhancing CXR interpretation skills. However, the limited number of residents undertaking such electives highlights a potential gap in the current EM residency curriculum. Multivariable logistic regression analysis confirmed that completing an elective rotation in diagnostic radiology was a significant factor associated with improved diagnostic accuracy. This finding reinforces the importance of incorporating structured radiology training into EM residency programs.

The moderate accuracy and low confidence levels observed in this study raise concerns about the potential for misinterpretations and their impact on patient care. Despite the years of training, the reported lack of adequate training suggests a gap in the current ED educational system. These findings underscore the necessity for targeted interventions to improve CXR interpretation skills among EM residents. Implementing structured training programs, incorporating diagnostic checklists, and leveraging artificial intelligence tools could potentially enhance diagnostic accuracy, boost confidence, and ultimately improve patient outcomes in the ED [24–26]. Such initiatives would not only address the current gaps in training, but also equip residents with the necessary skills to make more accurate and confident diagnostic decisions.

It is also important to note that with appropriate postgraduate training, radiographers achieve similar proficiency in reading and diagnosing CXR images as radiologists. This suggests that with appropriate training and practice, an individual in the clinical setting can gain sufficient knowledge and confidence in diagnosing and interpreting CXRs [27]. This study assessed the accuracy and confidence levels of ED residents in diagnosing common emergencies exclusively.

Interestingly, the current study showed that pulmonary edema had the lowest interpretation accuracy (Fig. 1). Pulmonary edema can be misinterpreted with a chest radiograph showing bilateral pulmonary infiltrates [17]. Therefore, it is crucial for physicians and residents to examine radiographs before reading patients' clinical history and data to limit the risk of misdiagnosis [28].

In contrast, the majority of residents, despite their level, were able to accurately identify normal CXR (Fig. 2). Similarly, when participants were given a case of pneumothorax, both the accuracy level and the degree of confidence in diagnosing the case was high, regardless of the level of residency of the participants (Fig. 3). However, although 80% of the COVID-19 pneumonia cases were correctly identified (Fig. 4), the confidence rate of diagnosis fell within the lower 25th percentile. This finding is surprising because previous studies have suggested that exposure to similar radiographs enhances the physicians' ability to recognize and diagnose images [29]. These data indicate the need for more training on COVID-19 pneumonia radiography by ED residents, especially owing to the high demand for accurate and confident diagnosis of COVID-19 cases [23].

Furthermore, our data indicated that most male and female ED residents lacked adequate training in diagnostic radiology. This lack of training could explain the reduced confidence observed in diagnosing the ten most common ED cases. Previous studies have suggested implementing diagnostic tools, such as checklists to aid physicians and residents in diagnosing CXR, which was demonstrated to increase both the accuracy of the diagnosis and confidence in diagnosing a common case [14, 15, 26, 30, 31]. While diagnostic confidence was assessed in this study to explore the relationship between perceived certainty and diagnostic accuracy, it is important to acknowledge that confidence alone is not a direct measure of diagnostic efficacy. Diagnostic confidence reflects the resident's subjective perception of their ability to interpret CXRs but does not account for the accuracy of their interpretations. As highlighted in prior research, high confidence in an incorrect diagnosis can lead to over-reliance on erroneous findings, potentially compromising patient care. This limitation is particularly relevant when interpreting challenging cases, such as pulmonary edema in this study, where diagnostic accuracy was low (34.6%) despite varying levels of confidence. Overconfidence in incorrect diagnoses may result in delayed or inappropriate management decisions, underscoring the need for objective measures of diagnostic performance [32, 33].

6. Limitations

This study has several limitations. The cross-sectional design limits our ability to establish causality between training, experience, and CXR interpretation skills. The reliance on a survey-based assessment is subject to recall bias and social desirability bias, and may not fully reflect the residents' actual performance in a clinical setting. Additionally, the study population was limited to EM residents in Saudi Arabia, which may restrict the generalizability of the findings to other regions or healthcare systems. The survey included a limited number of CXR images, featuring primarily simple, non-complicated images, and did not encompass any rare radiological findings

Does this radiograph show normal or abnormal findings?

☐ 1 Normal

☐ 2 Abnormal

What is your final diagnosis?

☐ 1 Pneumonia

☐ 2 Pulmonary edema

☐ 3 Interstitial lung disease

☐ 4 Aortic dissection

☐ 5 Normal chest X-ray

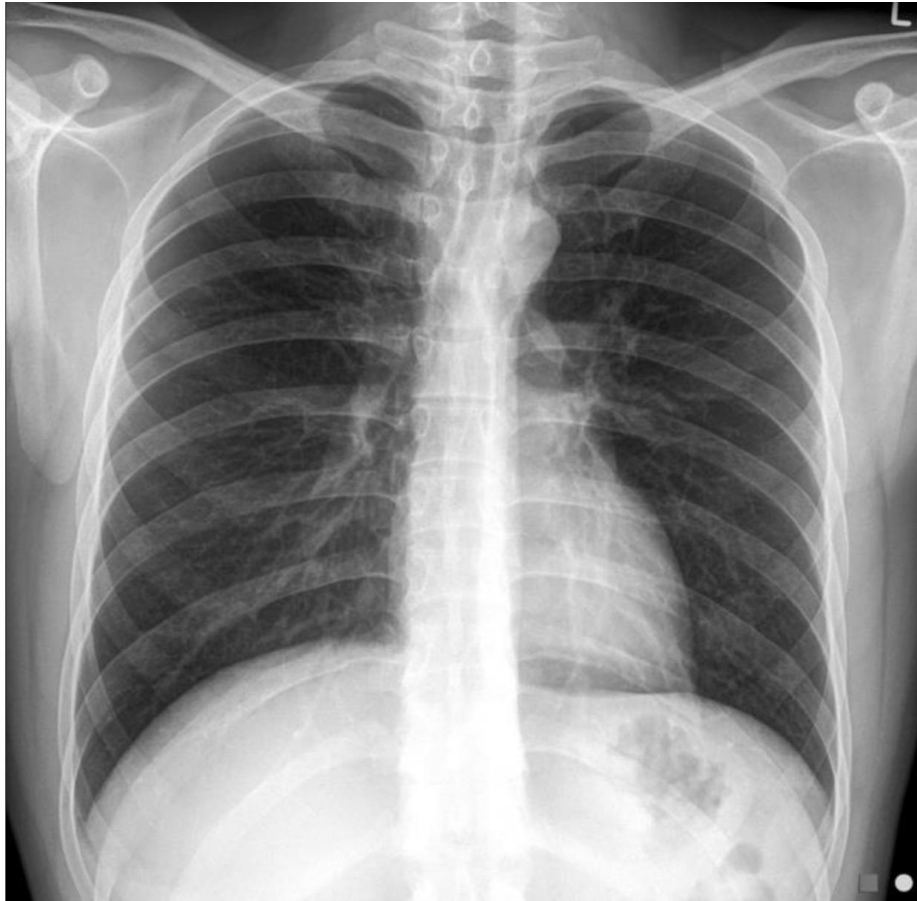**How do you rate your degree of confidence in interpreting the CXR of this case?**

1	2	3	4	5

Low   High

F I G U R E 1. A question from the survey on pulmonary edema. CXR: chest X-ray.

**Does this radiograph show normal or abnormal findings?**

☐₁ Normal

☐₂ Abnormal

What is your final diagnosis?

☐₁ Normal Chest X-ray

☐₂ Pneumonia (Left Upper Lobe)

☐₃ Pleural effusion

☐₄ Pneumonia (Right Lower Lobe)

☐₅ Lung Cancer

How do you rate your degree of confidence in interpreting the CXR of this case?

1	2	3	4	5
Low				High

F I G U R E 2. A question from the survey on normal chest X-ray. CXR: chest X-ray.
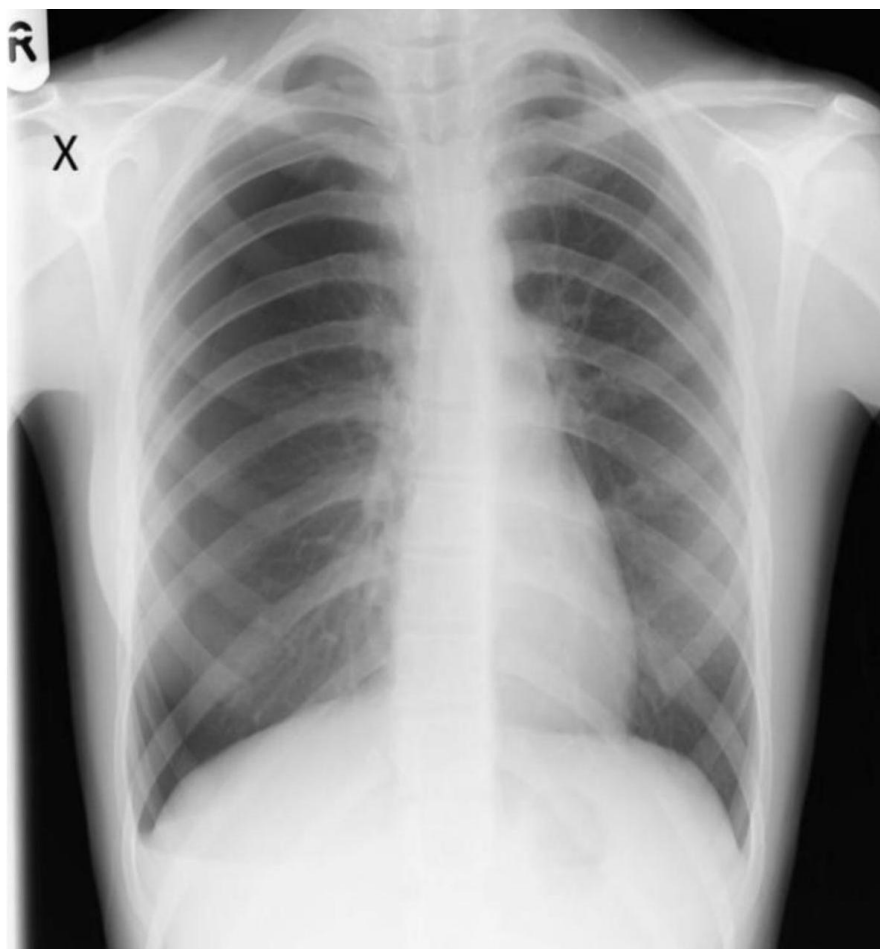
Does this radiograph show normal or abnormal findings?

☐₁ Normal

☐₂ Abnormal

What is your final diagnosis?

☐₁ Normal Chest X-ray

☐₂ Pneumonia

☐₃ Pneumothorax

☐₄ Pleural effusion

☐₅ Rib fracture

How do you rate your degree of confidence in interpreting the CXR of this case?

1	2	3	4	5
Low				High

FIGURE 3. A question from the survey on pneumothorax. CXR: chest X-ray.
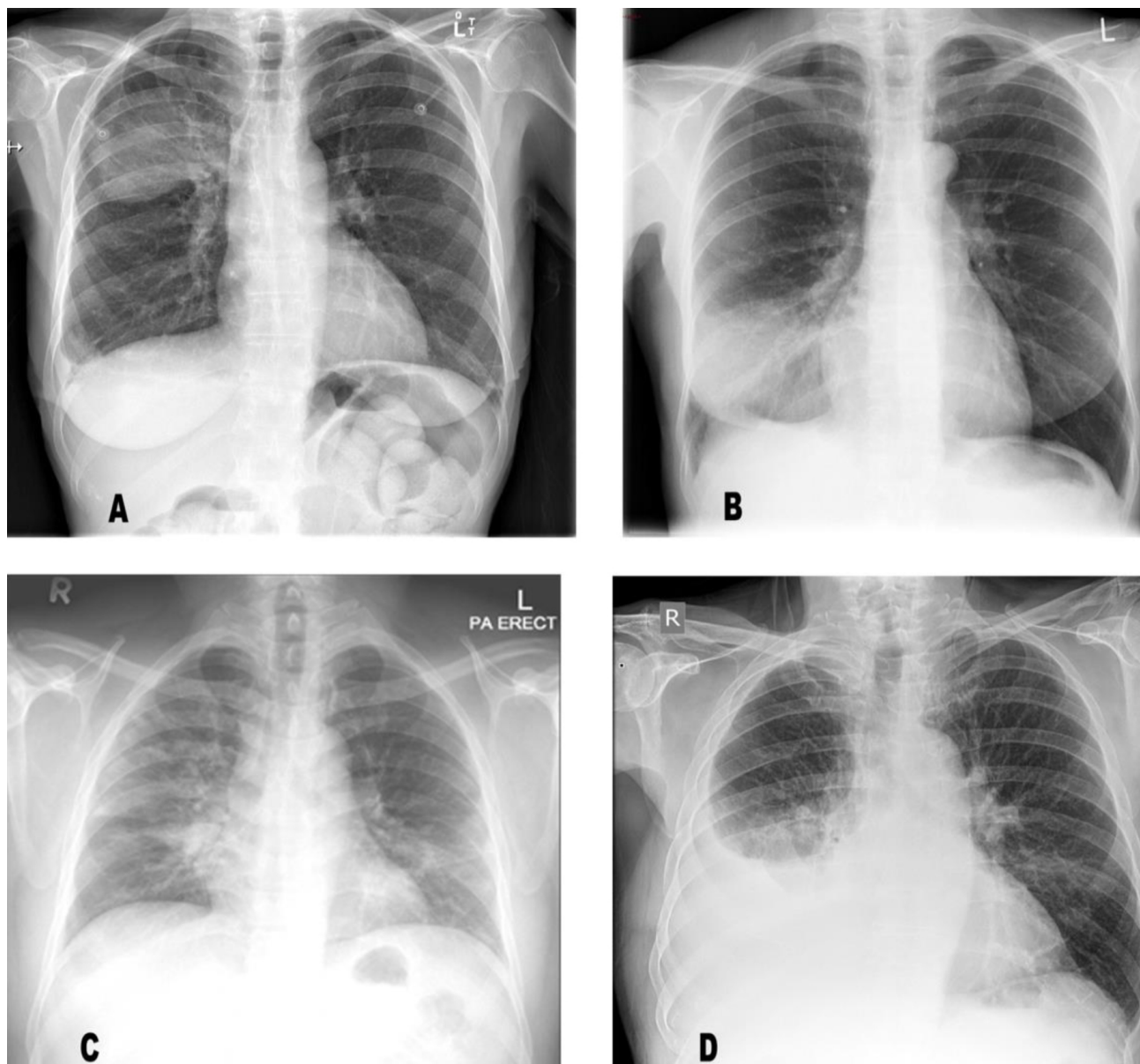
FIGURE 4. A question from the survey on COVID-19 pneumonia. CXR: chest X-ray.

or diagnoses, which might not fully represent the spectrum of cases typically encountered in the ED. Finally, we did not assess the impact of diagnostic errors on patient outcomes, which remains an important area for future research. This study explores the disconnect between diagnostic confidence and accuracy, highlighting that confidence does not equate to efficacy. Overconfidence in incorrect diagnoses can compromise patient care, necessitating the development of objective performance metrics to enhance diagnostic practices.

7. Implications and future directions

Our findings have important implications for emergency medicine training. EM residency programs should prioritize incorporating comprehensive and structured radiology training, including elective rotations, and simulation-based learning. Such training should focus on improving both diagnostic accuracy and confidence in CXR interpretation. Future research should explore the effectiveness of different educational interventions in improving CXR interpretation skills among EM residents. Studies could compare the impact of traditional teaching methods with innovative approaches, such as artificial intelligence-assisted training. Additionally, research is needed to identify the optimal timing and duration of radiology training within the EM residency curriculum. It is also important to evaluate the impact of improved CXR interpretation skills on patient outcomes, such as reduced diagnostic errors and improved clinical decision-making. Finally, future studies should investigate the potential role of artificial intelligence in assisting EM residents with CXR interpretation, particularly in resource-limited settings where access to radiologists may be limited.

8. Conclusions

Emergency medicine residents demonstrate moderate accuracy in interpreting CXRs, but their confidence levels are suboptimal. This study clearly shows a significant lack of adequate training in CXR interpretation. Completing an elective rotation in diagnostic radiology is strongly associated with improved diagnostic accuracy. These findings highlight the need for enhanced radiology training in EM residency programs. Implementing such training is essential to improve CXR interpretation skills and, ultimately, enhance patient care.

AVAILABILITY OF DATA AND MATERIALS

The data used to support the findings of this study is available upon reasonable request.

AUTHOR CONTRIBUTIONS

NBA, RIT and MA—designed the research study. NBA and RIT—writing-original draft preparation and performed the research. MA—supervision, reviewed and edited the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Institutional Review Board (IRB) of King Fahad Medical City (KFMC IRB No. 22-394). Informed consent was obtained from all participants prior to their participation in the study.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at `https://oss.signavitae.com/mre-signavitae/article/1964944820886487040/attachment/Supplementary%20material.pdf`.

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