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MEDICAL INTERNS' SKILL LEVELS IN EMERGENCY CHEST X-RAY INTERPRETATION

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ABSTRACT

Objectives: The research aims to evaluate the proficiency of medical interns in identifying critical findings on chest X-rays, such as pneumothorax, pleural effusion, pulmonary edema, pneumonia, and other urgent conditions. It also seeks to determine the interns' capability to differentiate between normal and abnormal findings, as well as their ability to prioritize and communicate these findings to senior medical staff promptly.

Materials and Methods: A cross-sectional online questionnaire-based form used to collect data from medical interns across different medical schools around Saudi Arabia. Pearson correlation was carried out to see relationship between x ray interpretation scores and Degree of confidence. Fischer exact test was conducted to find association between the demographic characteristic and diagnostic accuracy of x rays.

Results: A total of 545 medical intern from different unveracities participated in this study. The lowest diagnosis accuracy (27%) when identifying a case of left lower lobe pneumonia. On the other hand, the highest identifying a case (60.9%) was COVID-19 pneumonia. In case of life-threatening conditions, only 13.1% of them are highly confidence of their diagnosis in case of pneumoperitoneum and 23.8% highly confidence of their diagnosis in case of pneumothorax. Normal CXR was answered incorrectly by 47.7% of the participants. The performance among recently started interns for some conditions are better than recently finished interns. Moreover, there is no significant differences in the performance between those who are interested in radiology with who are not. More than half of the participants advise to do extracurricular courses, practical case-based training in college and Volunteer work in radiology to improve the CXR Interpretation Skill.

Conclusion : The competence of medical interns in interpreting chest X-rays varied across different medical conditions. Only 27.0% of interns correctly identified Left Lower Lobe Pneumonia, while 60.9% of them were able to identify COVID-19 pneumonia. Medical interns' competencies have limitations across different medical conditions, therefore increasing the exposer to radiological cases during internship and adequate training in college is recommended.

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1. INTRODUCTION:

The internship year, despite its transitory nature, presents a significant opportunity for personal growth and strategic career planning. [1] The realm of medical internship has witnessed substantial advancements since its inception in the mid-20th century. [2] In the context of Saudi Arabia, this training extends over a 12-month timeframe, characterized by meticulously supervised exposure to diverse medical specialties. The core components encompass a two-month engagement in general surgery, internal medicine, pediatrics, obstetrics, and gynecology, along with a mandatory one-month involvement in family medicine. This structured foundation is obligatory, while the remaining duration is allocated to elective rotations. [3]

In the healthcare system, the field of diagnostic radiology has undergone rapid expansion since the inception of X-rays in 1895. [4] The chest X-ray serves as a vital diagnostic tool due to its wide availability, cost-effectiveness, and minimal radiation impact. It remains the primary imaging choice for assessing and managing cardiac and pulmonary issues. [5] This enduring relevance is further underscored by recent innovations in diagnostic imaging such as advancements in artificial intelligence (AI), imaging agents, and ultrasound technology, are reshaping early disease diagnosis and personalized medicine. AI-integrated systems and computer vision are enhancing efficiency and precision in image analysis, promising significant improvements in the diagnosis and treatment of diseases. [6]

The importance of diagnostic radiology becomes even more pronounced in emergency department (ED) settings, as these departments become increasingly crucial touchpoints for patient care across medical facilities. Radiological evaluations are often a foundational component of the diagnostic approach in the ED, offering insights into the medical and surgical conditions of patients. These radiographic examinations play a pivotal role in the decision-making process. [7]

Amidst these developments, an emerging concern has come to light within the context of medical internship. It has been observed that there exists a notable deficit in the exposure of students to radiology rotations. This disparity in the extent of engagement with radiology during the internship period raises pertinent questions about the comprehensiveness of the training curriculum and the potential impact on the future practice of these aspiring medical professionals. Consequently, it becomes imperative to undertake a rigorous assessment of the acumen of medical interns in the interpretation of chest X-rays.

2. METHODOLOGY:

A cross-sectional online questionnaire-based study was conducted on July 2023 using an online questionnaire to collect data from Medical interns across different medical schools around Saudi Arabia. In accordance with the study's goals, an electronic Google Form survey was distributed via social media platforms. This survey sought to assess the competency level of medical interns in interpreting common X-ray abnormalities and to explore the barriers and enablers that contribute to the development of adequate X-ray interpretation skills. The study questionnaire was developed by reviewing recent literature and questionnaire used in previous study [8]. The survey's distribution was facilitated with the support of 18 data collectors from different universities, a measure taken to ensure the presence of a sufficiently large participant cohort that effectively represents the target population. The data collected were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) software. Age was reported as mean $\pm$ SD for continuous variables, while gender was described using frequencies and percentages for categorical variables.

2.1 Statistical analysis:

Sample size was 545 participants. Taking 5% margin of error, and a 95% confidence interval. 10 X-rays were selected to check the skill of students. For each correct diagnosis 1 score was given and for wrong diagnosis 0. The analysis involved both descriptive and inferential statistical tests.

Descriptive statistics were used to summarize and describe the characteristics of the study participants and the findings. Frequencies and percentages were calculated for categorical variables. For continuous variables like Correctly Identified x rays, mean and standard deviation was calculated for normally distributed variables while median and Inter-Quartile Range (IQR) was calculated for non-normally distributed variables. Normality of data was checked by Shapiro–Wilk test tests. Pearson correlation was carried out to see relationship between x ray interpretation scores and Degree of confidence.

Fischer exact test was conducted to find association between the demographic characteristic and diagnostic accuracy of x rays. The significance level for all statistical tests was set at $p < 0.05$, indicating a 95% Confidence Interval. All statistical calculations were performed using IBM SPSS version 27.0.1

3. RESULTS:

Among 545 participants, 66.2% are male, and 33.8% are female. Most are at the early stage of their internship (78.3%). About 34.1% have an interest in diagnostic radiology, while 25.9% have radiology as part of their internship rotations. The respondent's study at various universities, with Taibah University (18.3%) and King Faisal University (20.2%) having the highest representation.

Table 1 Sociodemographic Characteristics of participants

		Count	Column N %
What is your gender?	Female	184	33.8%
	Male	361	66.2%
At what stage are you?	Finished internship recently	118	21.7%
	Started internship recently	427	78.3%
Do you have interest in diagnostic radiology?	No	359	65.9%
	Yes	186	34.1%
Have you taken or are you taking Radiology as part of your internship rotations?	No	404	74.1%
	Yes	141	25.9%
At which university are you studying?	South	192	35.2%
	Riyadh	23	4.2%
	Western	186	34.1%
	North	18	3.3%
	Eastern	126	23.1%

Students correctly identified Left Lower Lobe Pneumonia in 27.0% of cases. This suggests that there is room for improvement in their ability to recognize this specific condition on X-ray images. An encouraging 52.3% accuracy rate was achieved by students in identifying Normal chest from X-ray images. This demonstrates a relatively strong proficiency. Students achieved a commendable 54.7% accuracy rate in identifying Lung Abscess. This signifies a reasonable level of competency in diagnosing this particular condition. Students correctly identified a Pneumo-mediastinum in 48.1% of cases. Students achieved a 30.3% accuracy rate in diagnosing Lobar Collapse. A 35.0% accuracy rate in identifying Pulmonary Edema indicates some proficiency in recognizing this condition, though there is room for improvement. Students displayed a reasonable ability to identify Pneumoperitoneum, with a correct diagnosis rate of 54.5%. A correct diagnosis rate of 46.2% for Empyema showcases a moderate level of competence among students in identifying this. Students correctly identified Pneumothorax is only 49.2% of cases. An impressive 60.9% accuracy rate was achieved by students in identifying COVID-19 Pneumonia. This is particularly noteworthy given the importance of timely detection during the COVID-19 pan-

demic

Table 2 Diagnostic competency of participants to interpret X-ray.

		Count	Column N %
Left Lower Lobe Pneumonia	Correct	147	27.0%
	Wrong	398	73.0%
Normal Chest X-ray	Correct	285	52.3%
	Wrong	280	47.7%
Lung Abscess	Correct	298	54.7%
	Wrong	247	45.3%
Pneumo-mediastinum	Correct	262	48.1%
	Wrong	283	51.9%
Lobar Collapse	Correct	165	30.3%
	Wrong	380	69.7%
Pulmonary edema	Correct	191	35.0%
	Wrong	354	65.0%
Pneumoperitoneum	Correct	297	54.5%
	Wrong	248	45.5%
Empyema	Correct	252	46.2%
	Wrong	293	53.8%
Pneumothorax	Correct	268	49.2%
	Wrong	277	59.8%
COVID-19 pneumonia	Correct	332	60.9%
	Wrong	213	39.1%

Correct identification of X-rays has a range of values, with a median of 4. The majority of observations fall between 3 and 5 correct identifications, but there is variability, including some individuals with no correct identifications (minimum of 0) and others with high numbers (maximum of 8) (Table 3).

Table 3 X-rays correctly identified out of 10.

	Median	Maximum	Minimum	IQR(Q_3-Q_1)
Correctly identified x rays	4	8	0	2(5-3)

Individuals vary in their confidence levels when interpreting X-rays. About 43.3% feel Fairly Confident, 35.4% are Somewhat Confident, and 16.5% are Highly Confident. A small proportion, 0.9%, express No Confidence at all.

Pearson correlation was carried out to see the relationship between x-ray interpretation skills and degree of confidence. The positive correlation coefficient of 0.275 suggests a moderate positive linear relationship between "Degree of confidence" and "X-ray interpretation skill." This means that as "X-ray interpretation skill" increases, "Degree of confidence" tends to increase as well.

Table 4 Degree of Confidence of participants in Interpreting X-rays Correctly

		Count	%
Degree of confidence	Fairly Confident	236	43.3%
	Somewhat Confident	193	35.4%
	Highly confident	90	16.5%
	Slightly Confident	21	3.9%
	Not Confident at all	5	0.9%

Table 5 Correlation between x-ray interpretation skills and degree of confidence

		Degree of confidence
X-ray interpretation skill	Pearson Correlation	.275**
	Sig. (2-tailed)	.000
	Sum of Squares and Cross-products	2055.073
	Covariance	3.778
	N	545

Facilitators of X-Ray Interpretation Skill Development: "All of the above" is the most popular choice, with 50.6% of respondents indicating that multiple factors could facilitate skill development. These factors likely include extracurricular courses, practical case-based training, and volunteer work in cardiology clinics. Extracurricular educational courses and practical case-based training in college each received equal support, with 23.1% of respondents choosing each option. Volunteer work in cardiology clinics was selected by a smaller portion, at 3.1% of respondents (Figure 1)

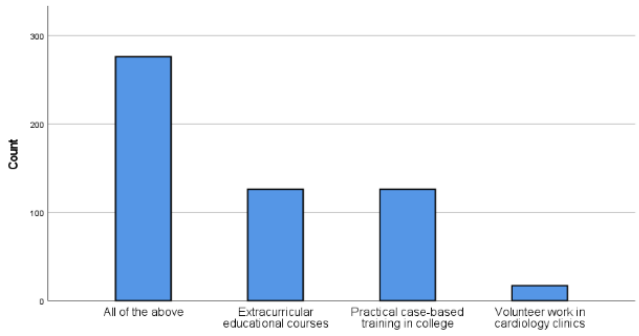

Figure 1 what could facilitate Saudi medical interns' development of X-Ray interpretation skills

4. LIMITATIONS IN DEVELOPING X-RAY INTERPRETATION SKILLS:

"All of the above" was again the top choice, with 41.7% of respondents identifying multiple limitations. These limitations encompass factors like dependence on radiologist expertise, inadequate training in college, lack of resources, and the inherent difficulty of X-ray interpretation. Dependence on radiologist expertise was chosen by 21.8% of respondents. Inadequate training in college was selected by 23.9% of respondents. Lack of resources and the perception that X-ray interpretation itself is difficult received smaller proportions of responses, with 5.7% and 7.0%, respectively.(Figure 2)

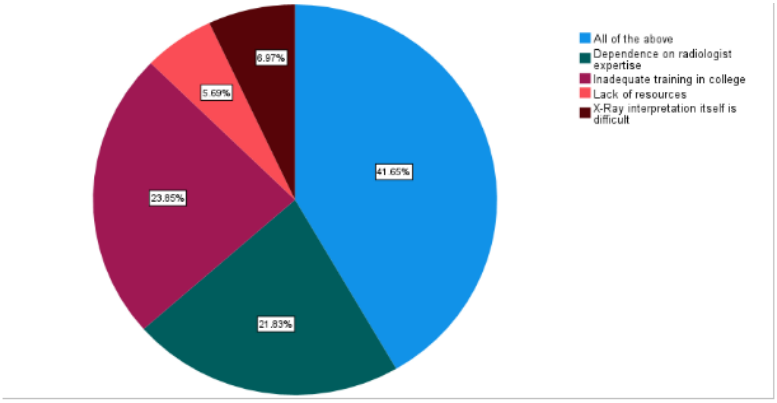

Figure 2 What are the limitations of Saudi medical interns in developing X-Ray interpretation skills?

The Table 6 presents a comprehensive analysis of diagnostic accuracy in lung X-rays across various medical conditions, stratified by gender. Notable disparities include significantly lower accuracy among females in diagnosing Normal Chest X-rays (44.0% correct) compared to males (56.5% correct), with a p-value of 0.006. Similarly, Empyema diagnoses were less accurate among females (35.3% correct) compared to males (51.8% correct) with a significant p-value of 0.003. However, most conditions showed no substantial gender-based differences. The Table 6 also compares the diagnostic accuracy of lung X-rays between interns who recently completed their internship and those who recently began theirs. Notable differences include better performance among recently started interns for conditions like Normal Chest X-ray (55.7% correct vs. 39.8%), Pneumo-mediastinum (51.3% vs. 36.4% correct), and Empyema (41.7% vs. 62.7% correct). Conversely, for conditions like Left Lower Lobe Pneumonia and Lung Abscess, the recently finished interns showed slightly higher accuracy. These results suggest that internship experience influences diagnostic proficiency, with varied effects across different medical conditions.

Table 6 Association of demographic factors with diagnostic accuracy of lung x-rays

		What is your gender?				At what stage are you?			
		Female		Male		Finished internship recently		Started internship recently	
		Count	%	Count	%	Count	%	Count	%
Left Lower Lobe Pneumonia	Correct	59	32.1%	88	24.4%	33	28.0%	114	26.7%
	Wrong	125	67.9%	273	75.6%	85	72.0%	313	73.3%
p-Value		.056				.74			
Normal chest X-ray	Correct	81	44.0%	204	56.5%	47	39.8%	238	55.7%
	Wrong	103	56.0%	157	43.5%	71	60.2%	189	44.3%
p-Value		.006				.002			
Lung Abscess	Correct	82	44.6%	216	59.8%	65	55.1%	233	54.6%
	Wrong	102	55.4%	145	40.2%	53	44.9%	194	45.4%
p-Value		.001				.920			
Pneumo-mediastinum	Correct	88	47.8%	174	48.2%	43	36.4%	219	51.3%
	Wrong	96	52.2%	187	51.8%	75	63.6%	208	48.7%
p-Value		.943				.009			
Lobar Collapse	Correct	60	32.6%	105	29.1%	38	32.2%	127	29.7%
	Wrong	124	67.4%	256	70.9%	80	67.8%	300	70.3%
p-Value		.397				.642			
Pulmonary edema	Correct	61	33.2%	130	36.0%	45	38.1%	146	34.2%
	Wrong	123	66.8%	231	64.0%	73	61.9%	281	65.8%
p-Value		.567				.234			
Pneumo-peritoneum	Correct	92	50.0%	205	56.8%	57	48.3%	240	56.2%
	Wrong	92	50.0%	156	43.2%	61	51.7%	187	43.8%
p-Value		.132				.127			
Empyema	Correct	65	35.3%	187	51.8%	74	62.7%	178	41.7%
	Wrong	119	64.7%	174	48.2%	44	37.3%	249	58.3%
p-Value		.003				.002			
Pneumothorax	Correct	100	54.3%	168	46.5%	41	34.7%	227	53.2%
	Wrong	84	45.7%	193	53.5%	77	65.3%	200	46.8%
p-Value		.085				.001			
COVID-19 CHEST X RAY	Correct	106	57.6%	226	62.6%	69	58.5%	263	61.6%
	Wrong	78	42.4%	135	37.4%	49	41.5%	164	38.4%
p-Value	.258					.5339			

The Table 7 scrutinizes the potential connection between individuals' interest in pursuing a career in diagnostic radiology and their diagnostic accuracy across various medical conditions. Notable results include a slightly lower diagnostic accuracy among those interested in Pulmonary Edema (30.1%) compared to their disinterested counterparts (37.6%), although this difference was not statistically significant. Conversely, in the case of Pneumothorax, individuals without an interest in diagnostic radiology outperformed those interested (53.5% vs. 40.9%), with statistical significance (p = 0.005). However, for most other medical conditions, interest in the field did not have a substantial impact on diagnostic proficiency, suggesting that other factors may play a more significant role in shaping expertise in diagnostic radiology.

Table 7 Association of diagnostic accuracy of lung x-rays with interest in radiology

		Do you have interest in diagnostic radiology?				p-Value
		No		Yes		
		Count	%	Count	%	
Left Lower Lobe Pneumonia	Correct	101	28.1%	46	24.7%	.396
	Wrong	258	71.9%	140	75.3%	
Normal chest X-ray	Correct	198	55.2%	87	46.8%	.063
	Wrong	161	44.8%	99	53.2%	
Lung Abscess	Correct	203	56.5%	95	51.1%	.224
	Wrong	156	43.5%	91	48.9%	
Pneumo-mediastinum	Correct	166	46.2%	96	51.6%	.234
	Wrong	193	53.8%	90	48.4%	
Lobar Collapse	Correct	111	30.9%	54	29.0%	.649
	Wrong	248	69.1%	132	71.0%	
Pulmonary edema	Correct	135	37.6%	56	30.1%	.082
	Wrong	224	62.4%	130	69.9%	
Pneumo-peritoneum	Correct	200	55.7%	97	52.2%	.429
	Wrong	159	44.3%	89	47.8%	
Empyema	Correct	170	47.4%	82	44.1%	.468
	Wrong	189	52.6%	104	55.9%	
Pnuemo-thorax	Correct	192	53.5%	76	40.9%	.005
	Wrong	167	46.5%	110	59.1%	
COVID-19 CHEST X RAY	Correct	218	60.7%	114	61.3%	.898
	Wrong	141	39.3%	72	38.7%	

The Table 8 examines how different levels of confidence in X-ray interpretation relate to diagnostic accuracy across various medical conditions, along with corresponding p-values. Highly confident individuals consistently displayed superior diagnostic accuracy, with sig-

nificant differences in most cases. For instance, in conditions like Left Lower Lobe Pneumonia, Normal Chest X-ray, Lung Abscess, Pneumo-mediastinum, Pneumo-peritoneum, Empyema, and Pneumothorax, those highly confident outperformed others. However, exceptions were observed in Pulmonary Edema and COVID-19 Chest X-ray, where confidence levels had less influence.

5. DISCUSSION:

Chest X-ray (CXR) considered one of the common and initial imaging modalities that is used in emergency department. Also, numerous diseases can be diagnosed with CXR. Accordingly, the aim of this study was to give a general overview of the medical interns' current mean competence level in reading CXR. In addition, the competency of medical interns was comparable with interns without interest in radiology. Common emergency cases are provided in this study that all doctors should be able to identify.

Surprisingly, the study showed that medical interns had the lowest diagnosis accuracy when identifying a case of left lower lobe pneumonia. It should be mentioned that in general practice, pneumonia is the most common indication for ordering a CXR. [9] CXR significantly lowers the rate of misdiagnose in case of pneumonia because the clinical presentation alone does not predict the disease. [10] Similarly, a study showed that lower lobe pneumonia is the most misinterpreted CXR finding. [7] Another comparable study showed that lower lobe atelectasis is the CXR finding that is most misinterpreted. [9] It is difficult to diagnose lower lobe pathology by frontal view CXR which might be the cause of these similar results. Therefore, lateral view CXR does, in fact, provide a better assessment of lower lobe pathology. [10] Because 15% of the lung is hidden by cardiovascular and mediastinal structures, the lateral view is helpful in interpreting abnormalities that are not clearly apparent on the frontal view. [11, 12].

The majority of participants accurately identified the COVID-19 pneumonia case. Likewise, a study published in 2021 showed that the highest correctly interpreted image is a case of COVID-19 pneumonia. This finding is expected given that the study was carried out nearly after the COVID-19 pandemic. It has been demonstrated that prior exposure to similar radiological cases increase the possibility of accurate and correct interpretations. [13] Hence, the more the physicians are exposed to radiological images the better they will be in interpretate the image.

Table 8 Association of diagnostic accuracy of lung x-rays with Degree of confidence in x ray interpretation

		Degree of confidence in x ray interpretation										
		Fairly confident		Highly confident		no confident		slight confident		Somewhat confident		
		Count	%	Count	%	Count	%	Count	%	Count	%	
Left Lower Lobe Pneumonia	Correct	60	25.4%	38	42.2%	0	0.0%	0	0.0%	49	25.4%	.001 .
	Wrong	176	74.6%	52	57.8%	5	100.0%	21	100.0%	144	74.6%	
Normal chest Xray	Correct	121	51.3%	39	43.3%	5	100.0%	21	100.0%	99	51.3%	.001
	Wrong	115	48.7%	51	56.7%	0	0.0%	0	0.0%	94	48.7%	
Lung Abscess	Correct	124	52.5%	40	44.4%	4	80.0%	20	95.2%	110	57.0%	.001
	Wrong	112	47.5%	50	55.6%	1	20.0%	1	4.8%	83	43.0%	
Pneumomediasti	Correct	96	40.7%	42	46.7%	4	80.0%	16	76.2%	104	53.9%	.002
	Wrong	140	59.3%	48	53.3%	1	20.0%	5	23.8%	89	46.1%	
Lobar Collapse	Correct	73	30.9%	22	24.4%	0	0.0%	5	23.8%	65	33.7%	.273
	Wrong	163	69.1%	68	75.6%	5	100.0%	16	76.2%	128	66.3%	
Pulmonary edema	Correct	81	34.3%	23	25.6%	1	20.0%	12	57.1%	74	38.3%	.049
	Wrong	155	65.7%	67	74.4%	4	80.0%	9	42.9%	119	61.7%	
Pneumoperitone	Correct	132	55.9%	39	43.3%	5	100.0%	21	100.0%	100	51.8%	.001
	Wrong	104	44.1%	51	56.7%	0	0.0%	0	0.0%	93	48.2%	
Empyema	Correct	130	55.1%	34	37.8%	0	0.0%	3	14.3%	85	44.0%	.001
	Wrong	106	44.9%	56	62.2%	5	100.0%	18	85.7%	108	56.0%	
Pnuemothorax	Correct	98	41.5%	64	71.1%	4	80.0%	19	90.5%	83	43.0%	.001
	Wrong	138	58.5%	26	28.9%	1	20.0%	2	9.5%	110	57.0%	
COVID-19 CHEST X RAY	Corrrect	158	66.9%	50	55.6%	4	80.0%	9	42.9%	111	57.5%	.055
	Wrong	78	33.1%	40	44.4%	1	20.0%	12	57.1%	82	42.5%	

Pneumoperitoneum and tension pneumothorax are life-threatening X- ray cases. Therefore, misdiagnosis in such cases likely to be fetal. In this study 54.5% of the participants correctly answered the case of pneumoperitoneum and 49.2% correctly answered the case of pneumothorax. However, only 13.1% of them are highly confidence of their diagnosis in case of pneumoperitoneum and 23.8% highly confidence of their diagnosis in case of pneumothorax. Unlike other study which showed that the highest confidence level was in the case of pneumothorax. [11] Low confidence level cause delayed in the diagnosis which will significantly increase the morbidity in case of Pneumoperitoneum. [14] Additionally, if a simple pneumothorax diagnosis is delayed in ventilated patients, tension pneumothorax is more likely. [15]

Normal CXR was answered incorrectly by 47.7% of the participants. Likewise, other study showed that the success rate is 76.6% of the resident detect the normal CXR comparing with 92.6%. [16]The presence of distracting results may be the cause of this misperception. Patients who have normal chest X-rays that are misdiagnosed may be given improper care, which could have adverse effects and complications. On the other hand, other comparable study showed 83.8% of the participants detect the normal CXR. [8] This might be because of the quality of training and multiple exposure of such a case.

Interestingly, the performance among recently started interns for some conditions are better than recently finished interns. Additionally, there is no significant differences in the performance between those who are interested in radiology with who are not. These results suggest that internship experience influences diagnostic proficiency, with varied effects across different medical conditions. Furthermore, highly confident individuals consistently displayed superior diagnostic accuracy, with significant differences in most cases. Similarly, a study showed that compared to consultants who did not practice respiratory medicine, specialist registrars had a greater diagnosis accuracy. [10] surprisingly, another study showed that there is no correlation between diagnostic accuracy or diagnostic confidence. [8]

CXR reading can be very challenging, even for thoracic imaging experts. In addition, medical students, residents and practicing physicians' CXR interpretation abilities are subpar, which has been found to cause patient management errors and negative patient outcomes, including avoidable death. [17] In this study more than half of the participants advise to do extracurricular courses, practical case-based training in college and Volunteer work in radiology to improve the CXR Interpretation Skill. According to a previous survey, 87% of physicians in practice believe that formal radiologic training should be compulsory during medical school. [18] additionally, a study also implies that undergraduate medical school curriculum benefit from early introduction to e-learning radiology modules to improve CXR interpretation skills. [19] On the other hand, 41.65% of the participants suggest that

dependence on radiologist expertise, inadequate training in college, lack of resources, and the difficulty of X-ray interpretation limit the CXR interpretation skills. However, the least selected choice is lack of resources. This is expected because nowadays the internet provides many great resources. In September 2023, a Google search for "Radiology Educational Resources" revealed 162,000,000 results. Overall, the results of the current study showed the necessity for strategies aimed at medical interns to improve their chest X-ray interpretation abilities.

6. CONCLUSION:

The chest X-ray is a crucial diagnostic instrument owing to its widespread accessibility, affordability, and minimal radiation exposure notably in the emergency settings. It continues to be the preferred imaging modality for evaluating and addressing cardiac and pulmonary conditions. Based on the results of this study, the competence of medical interns in interpreting chest X-rays varied across different medical conditions. Gender and internship experience had some influence on diagnostic accuracy, while highly confident individuals consistently displayed superior diagnostic accuracy. Medical interns recommended various factors to facilitate skill development, including extracurricular courses, practical case-based training in college, and volunteer work in radiology departments. High competencies in recognizing COVID-19 pneumonia (60.9%) are corelated to the high exposer to such cases during the pandemic, highlighting the importance of prior exposer among interns for better interpretations.

Overall, the study underscores the importance of enhancing the chest X-ray interpretation skills of medical interns, as this proficiency is crucial for accurate diagnosis and patient care, especially in emergency settings. Strategies to improve training, build confidence, and provide exposure to diverse radiological cases should be considered to bridge the gap in competence and ensure that aspiring medical professionals are well-prepared for their future practice. Further efforts in medical education and training can help address these challenges and ensure better patient outcomes in the field of diagnostic radiology.

7. LIMITATION AND RECOMMENDATION:

The methodology employed in conducting the study, specifically the use of a cross-sectional online survey, inherently carries the risk of selection bias. This bias stems from the fact that not all demographic groups have equal access to the internet or the necessary skills to navigate online platforms efficiently. This limitation is critical to acknowledge, as it underscores the complexities of accurately interpreting the study's implications. Addetionally,

The challenge of interpreting X-ray images, already significant due to the technical expertise required, is further intensified by a perceived shortage of resources. The common assumption that the internet can resolve this issue by providing accessible information is overly simplistic. In reality, the process of finding high-quality, relevant online resources is fraught with difficulties, highlighting a gap between expectation and practicality.

In light of these challenges, it is recommended that future research adopt more rigorous methods to mitigate these limitations. Enhancing resource availability and ensuring access to high-quality information is paramount. Initiatives could include developing specialized training programs to improve the interpretation skills of professionals working with X-ray images and creating vetted, reliable online repositories of information. Additionally, incorporating more objective data collection methods, such as direct observations or verified diagnostic results, could reduce the reliance on self-reported data and minimize the risk of bias.

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