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ORIGINAL RESEARCH

Investigating Confidence Levels of Saudi Clinical Supervisors in Radiology Departments

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Background: Effective teaching and supervision within hospitals play an essential role in training radiography students. However, inadequate preparation of teaching roles has been highlighted over the last three decades as a problem for many radiographers. This can lead to inadequate preparation and a lack of confidence in the supervisory role, which may affect the students' learning experience. Few studies in Saudi Arabia have investigated the skills and resources needed by radiographers to become effective and confident teachers. Therefore, this study aimed to explore the experiences and confidence of clinical radiographers in teaching radiography students and establish the areas of support they require to be more effective in their clinical teaching role.

Methods: An online questionnaire and semi-structured interviews were used to collect data from radiographers working in Saudi Arabia's radiology departments. Radiographers who were involved in the supervision of students are included in the study. A total of 159 radiographers participated in the study.

Results: The findings showed that radiographers were reasonably confident in four domains: introducing students and familiarizing them within the practice environment, supervision, facilitating students' learning, and assisting students to integrate into the practice environment while some areas required further development. The finding also indicated high number of students believed that providing an accurate perspective on the philosophy of the environment is not applicable to them.

Conclusion: The article concludes with a recommendation for further support and guidance for radiographers in teaching roles from institutions. The study provided insights into the world of clinical supervisors in radiology departments. Informative feedback to students during their clinical training by clinical supervisors is a key strategy to fill the gap between theory and practice experienced by students. Additionally, the importance for implementation of ongoing professional development for radiographers is advised to ensure the quality of clinical placement for radiography students.

Keywords: medical education, clinical practice, confidence, experience, supervision, radiology

Introduction

Effective teaching and supervision within hospitals play an essential role in the training of radiography students. Radiographers have well-defined clinical duties and responsibilities and are also expected to provide hands-on training for students. They are also expected to guide and support radiography student to transfer their knowledge and experience. However, over the last three decades, there have been reports of clinical supervisors who experienced inadequate preparation of such teaching roles, including a lack of support for such an important duty.[1–3]

Clinical supervising and education are effective learning strategies utilized in hospitals worldwide to ensure that each health professional and student practice their duties in a safe, ethical, and effective manner. Therefore, strategies are

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needed to support the role of clinical supervisors and to ensure that students become safe and knowledgeable practitioners.[4,5] It is essential that clinical teachers or mentors are supported to supervise students effectively. Confidence in their teaching ability is considered a key driver to engage and contribute to the student learning experience.[1,6]

Inadequate preparation for the teaching role or a lack of confidence in the supervisory role of radiographers by the students would be detrimental to effective training outcomes. In some cases, radiographers may be unwilling to supervise students, for example, due to heavy workloads or lack of confidence in their teaching ability.[1] For radiography students, effective teaching increases their overall achievements, participation, and self-awareness.[1–3,5]

To the author's knowledge, there are limited studies that have focused on the skills and resources required by radiographers in Saudi Arabia to become effective and self-confident teachers. This study aimed to investigate the level of confidence of among Saudi radiographers in their teaching to aid the establishment of the necessary support for radiographers to become effective in their clinical teaching role.

Materials and Methods

Study Design and Participants

This study involved a mixed- method design to achieve its objectives. A Quantitative approach using a validated questionnaire was used.[1] In addition, a qualitative approach using individual semi-structured interviews was used to explore radiographers' level of confidence in teaching and supervising students, and to gain a deeper understanding in how to support radiographers in their teaching role if it is required. Increasing the level of confidence for radiographers are important to gain great experience to be successful clinical supervisors. Therefore, understanding their level of confidence will help to identify areas for improvement for professional development.[7] Qualitative approach was considered appropriate as it allows to convey is why radiographers have thoughts and feeling that may impact on their role and confidence level as teachers. The results of the questionnaire were used as guide to design the interview questions.

Study Population

A non-probability convenient sampling technique was used. The target sample size of this study was 256 radiographers. The calculation was based on the total registered radiographers (N=4719) in Saudi Arabia, with a margin error of 5% and a confidence level of 90% All radiographers (male and female) involved in the supervision of students in Saudi Arabia's diagnostic imaging departments were included. Radiographers that are not involved in the supervision of students were excluded.

Ethical Considerations

This study was approved by Faculty of Applied Medical Science, King Abdul-Aziz University, Jeddah, Saudi Arabia (Ref Number: FAMS_EC2020_0014). Informed consent was available to the participants. All participants had the right to decline to participate and the right to withdraw from the study at any point without penalty.

Quantitative Data Collection: Questionnaire

An online questionnaire was distributed among radiographers supervising students in Saudi Arabia's diagnostic imaging departments via social media and professional's networks. The participants' demographic data were collected including: gender, age level of education, and years of experience (Table 1).

Permission was obtained from the author of the original paper to use the questionnaire.[8] This questionnaire covered four domains including; 1) insider perspective of the clinical practice environment; 2) a role model and clinical resource; 3) facilitating students' learning in the practical environment; and 4) assisting students to integrate into the practice environment. These domains were used to explore radiographers' confidence level of teaching and supervision using a four-point Likert-type scale. The points are 1 = not confident, 2 = pretty confident, 3 = usually confident, 4 = always confident.

Table 1 Demographic Data of Participating Radiographers

Demographic		N (%)
Gender	Male	91 (61%)
	Female	59 (39%)
Age	18–25 years old	55 (37%)
	26–35 years old	55 (37%)
	36–45 years old	27 (18%)
	46–60 years old	13 (8%)
Education level	Diploma	22 (15%)
	Bachelor	93(62%)
	Post-graduation education	35 (23%)
Years of experience	0–5 years	69 (46%)
	5–10 years	45 (30%)
	10–20 years	22 (15%)
	>20 years	14 (9%)

All information related the study aim, and confidentiality were provided to the participants. Informed consent agreement was provided to t the participant before access to the questionnaire. The survey was presented to participants in two version: Arabic and English.

Qualitative Data Collection: Semi-Structured Interview

A total of (n=14) face to face individual semi-structured interviews were conducted with purposive sampling technique. Participants were interviewed until no new data rose. Interview was considered appropriate to develop an initial understanding of the current situation among radiographers' and their role as clinical supervisors in radiology departments. The interview questions were designed to explore the themes identified in the questionnaire. The main three aspects were included in the interview: a) experience in clinical supervision; b) motivation and barriers in clinical supervision; c) confidence in teaching and supervision. Permission was obtained in order to record the interview responses by using a digital record. Interview transcripts were de-identified and codes were assigned for all quotes to protect the identity of the participants. In term of the trustworthiness/validity of the interview results, the interview questions were piloted and tested to determine the appropriateness of the questions and their relevance. Also, unclear or leading questions were avoided to eliminate response bias.

Data Analysis

Quantitative Likert scale data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics and level of confidence were used to calculate the proportion of each group of respondents. Frequencies and percentages of sociodemographic variables were calculated. Mann–Whitney *U*-test and Kruskal–Wallis test were used to examine the level of confidence between sociodemographic variables. A P value of $p<0.05$ was considered a statistically significant. Qualitative data was subjected to thematic analysis. Participants responses were coded, and mina themes were obtained based on Miles and Huberman's approach.

Results

The data were analyzed to determine the level of confidence among those involved in the supervision of students in diagnostic imaging departments across Saudi Arabia.

Demographics

A total of 400 radiographers participated this study, and 150 participants completed the questionnaire (a response rate of 40%). The participants' demographic data showed that the male and female responses were 90 (61%) and 69 (39%), respectively. The participants' distribution based on their level of education showed 94 (62%) radiographers had a bachelor's degree 24 (15%) had a diploma and 41 (23%) had higher post-graduation education (Table 1).

Quantitative Data Related to the Level of Confidence

The figures illustrate the combined responses of radiographers among the domains. For domain 1 (Figure 1), the data shows the level of confidence in introducing and familiarizing radiography students with the clinical practice environment. In this domain, radiographers were confident to introduce and familiarize radiography students with the clinical practice environment. The majority of radiographers were reasonably confident about all five items (with the responses on the items ranging from 39% to 52%). Interestingly, there was a relatively high number of participants who believed that providing an accurate perspective on the philosophy of the environment is not applicable to them. Regarding domain 2 (Figure 2), radiographers reported confidence in supervising the radiography students during their clinical practice. The results show that most of the radiographers were pretty confident over the five items (with responses ranging from 41.06% to 48.99%). The lowest percentage reported by the participants was related the ability to communicate expectations to students, with 1.34% reporting that they were not confident.

For domain 3 (Figure 3), radiographers were confident in facilitating the radiography students' learning needs in the clinical practice environment and identifying learning needs with students. Most of the radiographers reported that they were pretty confident in all 11 items, with responses ranging from 39.68% to 47.97%. Thirteen participants responded that stimulating students to apply research to clinical learning situations is not applicable to them. For domain 4

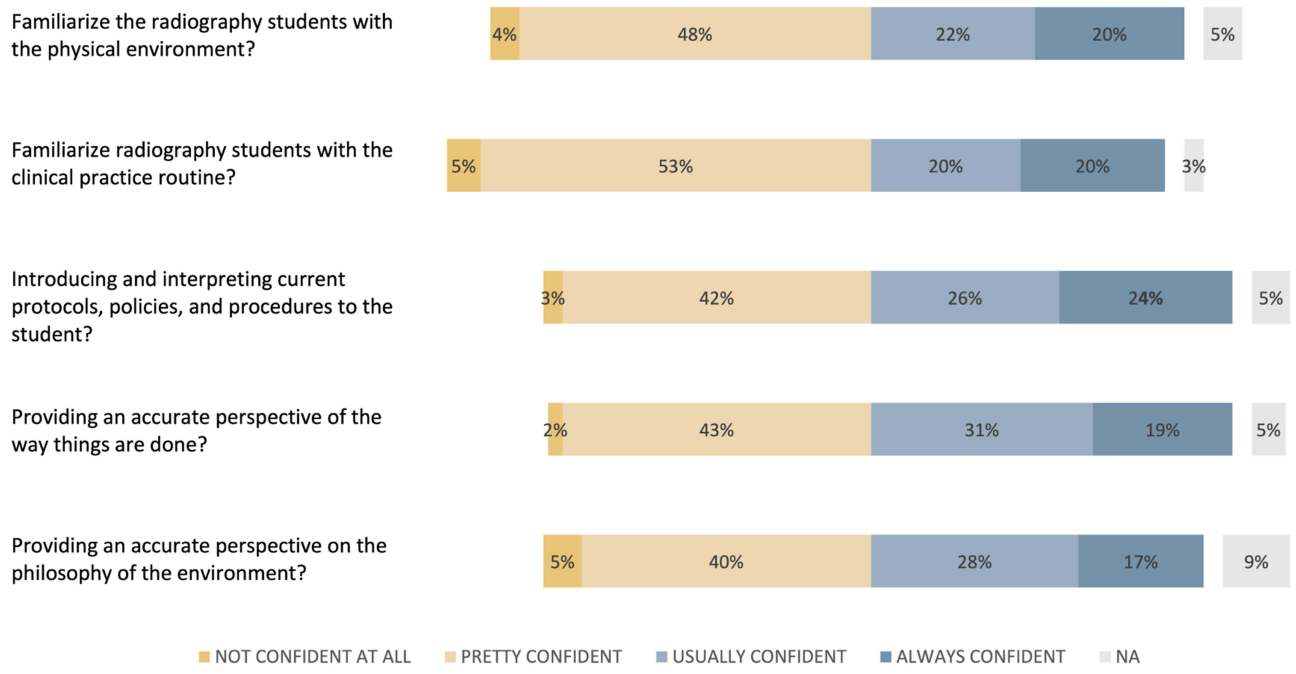

Figure 1 Domain 1 responses regarding introducing and familiarizing students within the practice environment.
Note: Adapted from Heale R, Mossey S, Lafoley B, et al. Identification of facilitators and barriers to the role of a mentor in the clinical setting. J Interprof Care. 2009;23(4):369–379. Published online: 21 Jul 2009. Publisher: Taylor and Francis Ltd, http://www.tandfonline.com.[8]

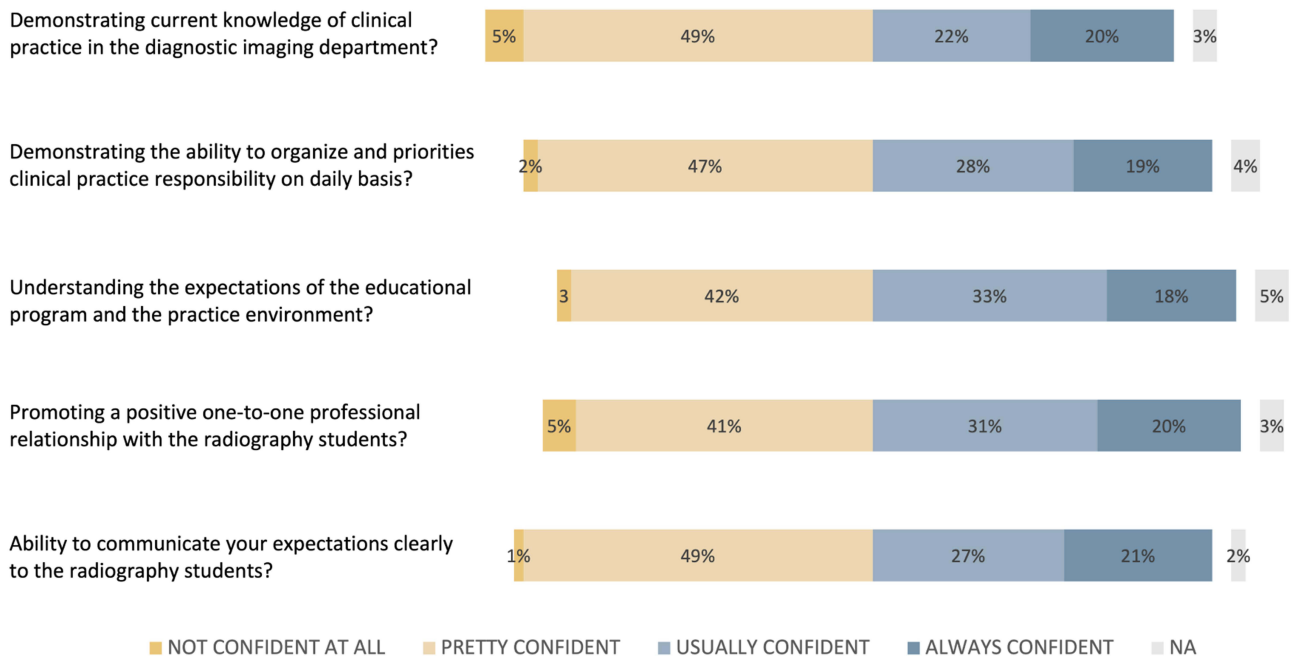

Figure 2 Domain 2 responses regarding confidence related to being a role model and clinical resource.
Note: Adapted with permission from Heale R, Mossey S, Lafoley B, et al. Identification of facilitators and barriers to the role of a mentor in the clinical setting. J Interprof Care. 2009;23(4):369–379. Published online: 21 Jul 2009. Publisher: Taylor and Francis Ltd, http://www.tandfonline.com.[8]

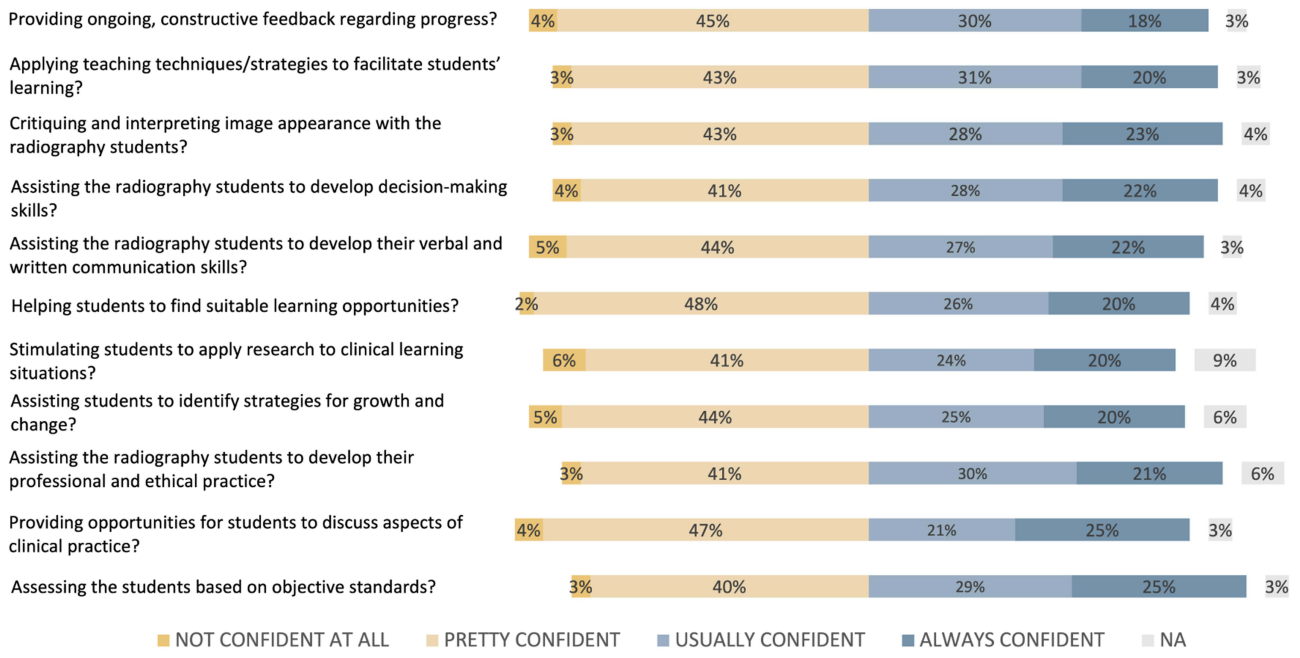

Figure 3 Domain 3 responses regarding facilitating students' learning in the practice environment.
Note: Adapted with permission from Heale R, Mossey S, Lafoley B, et al. Identification of facilitators and barriers to the role of a mentor in the clinical setting. J Interprof Care. 2009;23(4):369–379. Published online: 21 Jul 2009. Publisher: Taylor and Francis Ltd, http://www.tandfonline.com.[8]

(Figure 4), the radiographers reported their confidence level in assisting the radiography students to integrate into the clinical practice environment at the pretty confident level for the five items (responses ranging from 39.46 to 51.01% over the items). However, they reported a lower ratio of confidence for the item related to facilitating student's collaboration with other healthcare members (eg, nurses and radiologists.

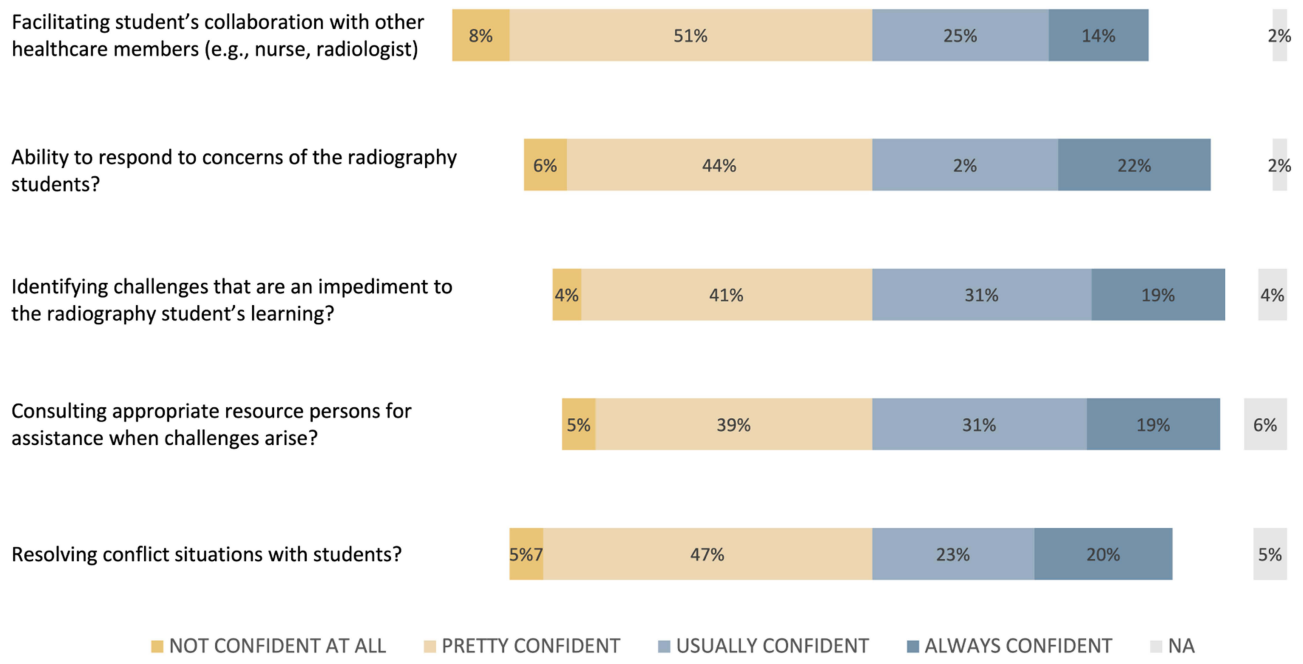

Figure 4 Domain 4 responses regarding assisting students to integrate into the practice environment.
Note: Adapted with permission from Heale R, Mossey S, Lafoley B, et al. Identification of facilitators and barriers to the role of a mentor in the clinical setting. J Interprof Care. 2009;23(4):369–379. Published online: 21 Jul 2009. Publisher: Taylor and Francis Ltd, http://www.tandfonline.com.[8]

Table 2 showed the comparison of confidence domains according to the sociodemographic variables. A significant difference was found between the level of confidence among clinical supervisors in all four domains and age and qualification ($p < 0.05$). In contrast, no significant difference was found between the level of confidence among clinical supervisors in all four domains and gender ($p > 0.05$).

Table 2 illustrates the combined responses of radiography students across all domains. For domain one, the results show a similar level of agreement among students across all factors in this domain. In domain two, students strongly agreed that working in a science-based profession (mean = 4.24, SD = 0.8), direct interaction with patients (mean = 4.24, SD = 0.79), helping patients (mean = 4.52, SD = 0.63), and the nature of patient care (mean = 4.82, SD = 0.73) are the main factors that motivated them to choose radiography as a profession over other factors.

Qualitative Data Related to Teaching and Supervision of Radiography Students

The main four themes that arose from the individual semi-structured interviews were "Motivation to supervise and support radiography students", "Level of confidence in supervising radiography students", "Teaching and supervising strategy", and "Barriers in teaching and supervising students". These four themes comprised several subthemes that emerged during the interview responses.

Theme 1: Motivation to Supervise and Support Radiography Students Formatting

Radiographers (clinical supervisors) highlighted that students' *interest and attitude* are very important. The motivation to teach and support students varied depending on whether the students were considered unmotivated or motivated. Radiography students that were considered as motivated were those showing commitment and interest from the first day in their clinical practice:

> *Some [unmotivated] students do not show an interest to work in specific unit of radiology. However, motivated students should not wait for the radiography staff to tell them what they should do. (Participant: radiography clinical supervisor -2)*

Other radiographers expressed their *passion for teaching* as a motivation to supervise and support students:

Table 2 Comparison of Confidence Domains According to the Sociodemographic Variables

Domains	Demographic		P value
Domain 1	Gender	Male	0.712
		Female	
	Age Group	18–25	0.002
		26–35	
		36–45	
		46–60	
	Qualification	Diploma	<0.001
		Bachelor	
		Master	
		PhD	
		Other, Specify	
	Years of Experience	0–5	0.011
		5–10	
		10–20	
		20–30	
		>30	
	Hospital Category	Public (MOH)	0.526
		Private	
		Semi-public (military-academic)	
Domain 2	Gender	Male	0.248
		Female	
	Age Group	18–25	0.018
		26–35	
		36–45	
		46–60	
	Qualification	Diploma	<0.001
		Bachelor	
		Master	
		PhD	
		Other, Specify	
	Years of Experience	0–5	0.094
		5–10	
		10–20	

(*Continued*)

Table 2 (Continued).

Domains	Demographic		P value
		20–30	
		>30	
	Hospital Category	Public (MOH)	0.083
		Private	
		Semi-public (military-academic)	
Domain 3	Gender	Male	0.083
		Female	
	Age Group	18–25	<0.001
		26–35	
		36–45	
		46–60	
	Qualification	Diploma	<0.001
		Bachelor	
		Master	
		PhD	
		Other, Specify	
	Years of Experience	0–5	0.026
		5–10	
		10–20	
		20–30	
		>30	
	Hospital Category	Public (MOH)	0.267
		Private	
		Semi-public (military-academic)	
Domain 4	Gender	Male	0.035
		Female	
	Age Group	18–25	0.023
		26–35	
		36–45	
		46–60	
	Qualification	Diploma	0.002
		Bachelor	
		Master	

(*Continued*)

Table 2 (Continued).

Domains	Demographic		P value
		PhD	
		Other, Specify	
	Years of Experience	0–5	0.081
		5–10	
		10–20	
		20–30	
		>30	
	Hospital Category	Public (MOH)	0.486
		Private	
		Semi-public (military-academic)	

I am enjoying teaching students. There is nothing more rewarding than seeing the evidence that you have made an impact on students' performance and career. (Participant: radiography clinical supervisor -5)

Theme 2: Level of Confidence in Supervising Radiography Students

In terms of confidence in teaching and supervising students, participants reported that a confident clinical supervisor would positively impact their students' achievement, attitude, motivation, and performance.

A supervisor who has high level of confidence is more likely to support and encourage students to learn. However, asupervisor who lacks confidence is less likely to encourage students, try new techniques, read or tackle difficulties. (Participant: radiography clinical supervisor - 15)

A confident supervisor is amust. Confidence in supervising and teaching students in clinical practice comes from having job-related knowledge, and this would motivate students to learn and work. (Participant: radiography clinical supervisor -9)

Job-related knowledge, skills for teaching and supervision of students in clinical practice, were reported by participants as a way to boost the level of confidence for radiographers as a clinical teacher or/and supervisor:

All clinical supervisors should improve their knowledge and teaching skills as this would impact positively on their level of confidence in supervising students. (Participant: radiography clinical supervisor -8)

Theme 3: Teaching and Supervising Strategy

Radiographers indicated that teaching strategies are varied and can be altered depending on the students' needs:

Some students prefer to spend time observing the work. However, they found that the only way to learn is [hands-on] practice. (Participant: radiography clinical supervisor - 12)

I am usually asking students to learn one thing at atime. Iask the students to observe the work for acouple of days, then they have to focus on reading requests and understanding the requirement, after that they have to focus on parts of an examination such as patient safety and preparation, etc. Students should spend enough time assessing the patient. (Participant: radiography clinical supervisor - 11)

Theme 4: Barriers in Teaching and Supervising Students

The availability of time to teach, workload demand, unmotivated students, and lack of reward were reported by the study participants as significant barriers in teaching and supervising students in clinical practice:

> *Sometimes we faced difficulty in teaching/supervising students due to the high workload. The student just has to stand back and observe. (Participant: radiography clinical supervisor - 10)*

> *With high workload and lack of reward, sometimes Istarted to think why Ishould bother with teaching unmotivated students. (Participant: radiography clinical supervisor -8)*

Discussion

This study explored radiographers' experiences and confidence in clinical supervision/teaching to establish the necessary support for radiographers to become effective in their role as clinical teachers/supervisors. Providing appropriate education for clinical supervisors is essential for effective learning rather than supervisors depending on students' learning feedback.[1,9–11]

Consistent with other studies,[1,5] radiographers in this study reported confidence in introducing and familiarizing radiography students with the clinical practice environment and supervising the radiography students during their clinical practice. Radiographers also feel confident about facilitating the radiography students' learning needs and assisting the radiography students to integrate into the clinical practice environment. The justification for this feeling may be due to radiographers' continuous education.[12] Clinical facilitators need to implement key strategies to achieve continuous professional development through mentorship, feedback, and the creation of communities of practice to bridge the gap between the clinical and academic worlds experienced by undergraduates.[13]

Radiographers reported that they are motivated to teach and supervise to positively impact their students' careers and development. Furthermore, they reported a positive link between the motivation of supervisors and students. When students are motivated to learn, supervisors are motivated to teach these students. Study participants reported that supervisors should keep students motivated. Therefore, it is recommended to develop a connection between supervisors and students. Such a strong "connection to the students and cooperative learning methods positively affected students" motivation. Students' motivation was positively influenced by their connection with the students' environment and the use of cooperative learning methods. According to the study, these findings support the notion that teachers' sense of self-efficacy positively impacts their teaching and students' motivation to learn.[13,14]

Furthermore, to keep students motivated, other learning procedures can be considered. Cooperative learning has been scientifically proven to be effective. Five underlying elements must be incorporated into the situation for cooperative learning to be effective: positive interdependence, individual accountability, positive interpersonal interaction, social skills, and group processes.[13,14]

The radiographers' confidence in supervising students impacts both students and clinical supervisors. In terms of confidence in teaching and supervising students, participants reported that a confident clinical supervisor would positively impact their students' achievement, attitude, motivation, and performance. Students' confidence is an essential factor that enables them to carry out their duties competently in the clinical areas.[15,16]

Clinical supervisors reported they used various strategies to teach and facilitate learning. Radiographers indicated that teaching strategies can be altered depending on the students' needs. They emphasized the importance of tailoring learning to individuals and considering their learning preferences.[17]

As part of a cognitive apprenticeship, the teacher provided suggestions, feedback, and reminders during the scaffolding stage. Once the learner has mastered the skill, the teacher steps back (fading) and only makes suggestions.[16,18] To tailor and introduce a scaffolding approach, radiographers must take student capabilities into account. Therefore, adequate time spent with students is required, and maintaining a long-term relationship enables this to happen. However, time management and not knowing student capabilities were identified as challenges by the radiographers.[18] Students learn differently and so different radiographers require tailored teaching strategies. For instance, some prefer hands-on teaching, others prefer to observe, and others prefer a step-by-step learning process.

Clinical supervisors reported some barriers in teaching and supervising students. The barriers to teaching and supervising students include the time available to teach, workload demands, unmotivated students, and a lack of reward. While this work is additional for radiographers, we recommend developing an incentive structure to encourage this work. Therefore, students and teachers must get to know each other; this is a process that Paton[17] describes as it involves the supervisor asking the student about topics such as relevant personal information to assist in developing rapport, their previous clinical experience, and their expectations while on placement.

Additionally, the lack of compensation for the teaching aspect of the radiographer's job was reported. Incentives to encourage teaching are recommended for the clinical supervisors.[17]

Limitations and Recommendations

This study has limitations. This type of study requires much communication, interaction, meetings, and overall, all sorts of socializing. During a global pandemic, it is very challenging and limiting to conduct this type of study. Some planned data collection methods had to be cancelled, and some approaches such as forming study groups and interviews were hardly scheduled and executed due to the COVID-19 pandemic. Additional limitation in this study relates to the fact that sample may does not accurately represent the population, especially those who are not active on online channels such as social media.

There are some recommendations to support professional development of the teaching role of radiographers. Firstly, combining approaches such as workshops and online initiatives may enhance the teaching/supervisory role. In addition, a peer-mentoring teach-The-teacher scheme between experienced and less experienced radiographers who teach students may improve clinical supervision. Lastly, the development of "communities of practice" would enable radiographers to share their experiences and lift the quality of supervision.

Conclusion

In conclusion, the confidence level of the clinical supervisors is essential to achieve successful training. Radiographers have revealed the importance of continued education to improve existing teaching skills. Radiographers with the required skills and resources should be confident to deliver effective teaching and supervision within hospitals. This study showed that Saudi radiographers are reasonably confident in all domains. These findings can potentially have a positive impact on enhancing the educational process for students and facilitating access to information on areas for improvement in the delivery of training by radiographers.

Development of radiographers as teachers should be part of the continuing professional development criteria to support effective teaching and supervision within hospitals.

Disclosure

The authors report no conflicts of interest in this work.

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