

# Challenges Faced by Students, Instructors and Technologists during the Clinical Placement of Radiology Technology Students for clinical Practices: a qualitative research

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## Research article

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**Challenges Faced by Students, Instructors and Technologists during  
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clinical Practices: a qualitative research**

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## **Abstract**

**Background:** Clinical placements are of paramount importance to medical radiology technology students, as it allows them to acquire the necessary skills to be successful technologists. The main objective of this study was to assess the challenges faced by students, instructors, and technologists during the clinical placements of radiology technology students at four College of Health Sciences-affiliated hospitals.

**Method:** A qualitative approach using focus group discussions and semi-structured interviews was used to explore the challenges experienced by students, instructors, and technologists during the clinical placements of medical radiology technology students from Addis Ababa University, Ethiopia. Twenty-two radiology technology students in the Department of Radiography took part in the study from an available pool of 73 students. In addition, seven out of the 19 available instructors was interviewed. Two technologists from each affiliated hospital were also selected for face-to-face interviews. A categorization approach was used to analyze the data with the goal of identifying core themes.

**Results:** Our qualitative analysis led to the identification of nine themes from the focus group discussion and face-to-face interviews. From the students' and instructors' points of view, love of profession, transportation services, clinical supervision, theory-practice gap, hands-on practice, imaging modalities, availability of a skills lab, insufficient practicing area, and curriculum were considered as important factors in the clinical placement experience.

**Conclusion:** This research showed students and instructors faced many challenges during the clinical placements of radiology technology students from Addis Ababa University, and these challenges may significantly affect the future performance of these students as technologists.

### **Keywords:**

Clinical placement; health professional instructors; radiologic technologist; Ethiopia; health sciences; hospital practice; challenges

## **Introduction**

Clinical placements are a compulsory component of the training program for radiology technology students at the Department of Radiography, College of Health Sciences, Ababa University. The teaching and learning process at the Department of Radiography involves both a theoretical and practical approach. After completing the theoretical part of their studies within the classroom, students are then placed in different affiliated hospitals within Addis Ababa to train on different imaging modalities like radiography, computerized tomography (CT), magnetic resonance imaging (MRI) and ultrasound (US). This practical part of their curriculum begins during the second semester of their second year and continues in parallel with classroom learning until the end of their fourth year. The clinical training starts with three months of conventional radiography and is followed by training in CT, MRI, and US for three months each.

Clinical placements are critically important for medical radiology students because they assist students in acquiring the necessary knowledge, skills, and attitude to succeed as technologists [1]. According to the New Castle Mater Hospital's comprehensive program produced for radiation therapy educators, emphasizing clinical education, adult learning, and preceptorship is important in supporting undergraduate medical radiation science students. Moreover, the implementation of an orientation program and department-wide preceptors facilitates learning in the clinical environment [2].

Several challenges have been documented in some countries regarding clinical placements. A study done in Ghana identified a lack of training equipment, too many students in a small duty room and a significant gap between practice and theory as considerable challenges to clinical placements. Additionally, in a study conducted in Zimbabwe, most students were concerned with their lack of supervision [3].

The Radiology Technology program run by the Department of Radiography at Addis Ababa University may face similar problems, however no studies have examined the context-specific issues for radiology technology students during their clinical placements in Ethiopia. Thus, this study aimed at assessing the problems encountered by students, instructors, and technologists during the clinical placement of student technologists in hospitals affiliated with Addis Ababa's College of Health Sciences.

## **Materials and Methods**

### **Study Area:**

This study was carried out in the Department of Radiography, College of Health Sciences, School of Medicine, on the premises of the Black Lion Hospital.

### **Study Design**

A qualitative approach that employed focus group discussions and face-to-face interviews was used in this study. These methods were selected because they allowed us to gather adequate and in-depth information regarding the challenges faced by students, instructors, and technologists during the clinical placement of radiology technology students.

### **Study Population**

Eligible participants for this study included medical radiology technology students who were in their third or fourth years and currently engaged in training at the Department of Radiography. In total, we had 22 third-year students and 26 fourth-year students. There were 19 eligible instructors in the Department of Radiography. The third group of participants consisted of technologists working in four governmental hospitals affiliated with the College of Health Sciences at Addis Ababa University. In general, 50 technologists work in these hospitals.

### **Sampling procedure**

#### *Students*

One focus group was organized for each academic year. As the clinical practice begins during the second semester of the second year, the study did not include first-year students. Second-year students were also excluded because they had not yet started practicing during the time this data was collected. Accordingly, both third- and fourth-year students were informed about the objective of the research and told that participation was purely voluntary. From those willing to participate, one focus group was organized for both third- and fourth-year students.

#### *Instructors*

One focus group of instructors was selected by the purposive method, with consideration going to instructor seniority and their time engaged in supervising students. The instructors were informed that the study was purely voluntary.

#### *Technologists*

Two technologists, one department head and one technologist who used to be in charge of mentoring students in their department, were selected for face-to-face interviews depending on their willingness to participate in the study. Generally, six open-ended questions were developed in relation to radiology technology students' clinical practice to stimulate discussion. The focus group and interview questions were adjusted to follow the flow of the discussion.

The following questions were used to stimulate discussions regarding the problems encountered by medical radiology technology students during their clinical practice.

**Questions asked to students:**

1. What does it mean for you to be a medical radiology technology student?
2. In your opinion, what challenges have you encountered during your clinical practice?
3. What was your expectation of your clinical practice environment?
4. Which clinical experience has met your expectation?
5. How do you think the clinical practice experience can be improved?

**Questions asked to instructors:**

1. How would you describe the current experience of radiology technology students during their clinical practice?
2. In your opinion, how do you think the clinical placement of radiology technology students by the Department of Radiography can be improved?

**Questions asked to technologists:**

1. How would you describe your experience of teaching skills to radiology technology students?
2. What problems did you encounter when teaching students?
3. How would you suggest improving the clinical practice of radiology technology students?

**Data Collection**

After obtaining permission to conduct this study, two focus group discussions with students and one focus group discussion with instructors were arranged separately to generate data in response to the research questions. In addition, face-to-face interviews with two technologists from each affiliated hospital were conducted in order to collect data from each workplace.

In order to collect data from the participants, focus group and interview guides were prepared and used based on previous studies. The focus group discussions with students were carried out by a lecturer from another discipline (Midwifery) so as to avoid power influence. The lecturer was well oriented with the study.

For students and instructors, the group discussions were held in the Department of Radiography meeting room, which was well illuminated and had an adequate number of chairs and a table for group discussions.

Face-to-face interviews with selected technologists were conducted in their respective hospitals.

### **Data Analysis**

The focus group discussions and in-depth interviews were conducted in the Amharic language. The discussions were digitally recorded and the data was transcribed and translated into English by the principal investigator. Several measures were employed to ensure that the English transcripts would be comparable to the original Amharic data. Specifically, the translation was conducted independently by the principal investigator and a senior staff member who could speak both languages and who had conducted research in the past. The two translated versions were then examined by the investigator and the recorded discussions were reviewed until it was believed to be matching. The researchers selected the three levels of coding method as appropriate for coding the data [14]. See table 1 for the three levels of codes for one of the themes:

### **Results**

The qualitative analysis of the focus group data led to the identification of nine themes that affected radiology technology students' clinical practice. These themes are: love of profession, transportation services, clinical supervision, the gap between theory and practice, hands-on practice, imaging modalities, availability of a skills lab, adequacy of the placement area, and the curriculum. Each of these themes is further explored below.

#### **From the students' point of view:**

## **Love of Profession**

This theme emerged from most of the focus group discussions where students described the radiology technology profession as lovely and interesting and they joined the program based on their own interest.

One of the participants said:

*I enjoy using the current imaging modalities to help diagnose a patient's medical issue.' (S8)*

However, some students expressed that even though they liked the profession it offered no professional growth ladder or career development opportunities. Moreover, some students felt that there was discrimination between their profession (as future technologists) and others.

One of the participants said:

*I like the profession and I feel like I am helping patients in diagnosing their problem and this gives me satisfaction. But when I learned that this program has no associated master's program, I felt that this profession is limited. (S3)*

Another participant described that:

*In comparison to other health sciences programs, equal attention was not given to this program. For example, resources are not equally distributed amongst the programs. But I still like the profession. (S6)*

## **Transportation Services**

The lack of adequate transportation was identified by all focus group participants as an obstacle to their success during their clinical placements. These issues caused them to be late to their placements, which negatively impacted their experience.

One of the participants said:

*One of our problems is in regards to the availability of transportation services. We share one service with all College of Health Sciences students. This service has to go to all areas in order to drop each student. Most of the time we reach our placement late. Therefore, we could not use our time effectively given that we are typically late by an hour or more. (S7)*

The problem with the transportation services was also mentioned by instructors during our focus group discussions. They indicated that this issue inhibited their ability to properly supervise students.

One of the instructors said:

*We are encountering many problems concerning students getting to their clinical practice. Among other things there is a shortage in the available transportation and the problems with the transportation services also prevent instructors from properly following up with students regarding their clinical practice....there is also follow up problem on parts of the instructors this is also because of lack of transportation services. (Ins3)*

### **Theory-practice gap**

Many of the participants in the focus groups indicated that there was a gap between what they learned in the classroom and what they learned in the clinic. They found that they observed some radiographic techniques that were not applied according to the standard they had learned in class.

One of the participants said:

*There is a gap between what we have learned in the class and what we observed during our clinical placement. For instance, according to the theory we learned in class, there are some body parts that are better visualized when using the tube at an angle. However, we found that technologists do not apply this technique. (St4)*

The same participant said:

*We do not see what we have learned in the class and yet we are told that it is important. For example, we learned that we have to protect both the patient and their relatives from unnecessary radiation. However, the technologists I observed did not adhere to this standard. I don't know if it's that they forgot it or if they were simply being negligent. (Stu4)*

### **Clinical Supervision:**

Clinical supervision was identified as a concern by all of the student focus group participants and everyone indicated that they were unhappy with the supervision given by the department staff. Most students indicated that they were not even aware of how they were going to be evaluated.

One of the participants said:

*Our department assigns supervisors from the available instructors; however, they are simply there to deliver letters of permission for the placement area and to take attendance. Some of the instructors don't even deliver the letter on time and our department is not strict enough on this issue. (Stu6)*

Another participant said:

*I do not know how I will be evaluated at the end of my clinical placement. I am simply told my mark and I have to accept whatever the mark is. This is done by the technologists and sometimes we are evaluated by a person who has not taught us previously. This is very disappointing for the students. (Stu4)*

Participants also offered a solution to this issue.

One of students said:

*Our supervisors should follow and help us during our practice and during our evaluation to avoid any unnecessary exercises of power by the technologists. The department should communicate with the hospital through our supervisors to tackle any problems that arise in the hospitals because of our presence. (Stu7)*

Instructors have also mentioned that they have failed, to some degree, in supervising students, and they attribute this to the lack of transportation.

One of the instructors said:

We as instructors have a difficult time following up with students due to the poor transportation system. (Ins3)

Another participant said:

*The other thing is that the instructor's role in a student's clinical practice is not clearly known. (Ins6)*

### **Hands-on Practice:**

All participants of one student focus group identified a lack of hands-on practice as a significant problem in their clinical placements, especially when faced with US examinations. Given that US examinations are one of the most important types of examination, with many cases seen per day, students felt that they would have benefited from more hands-on time with this technique.

One of the participants said:

*Regarding the practicing area, some hospitals do not allow us to practice in such a way that we can achieve our objectives. This is especially a problem for US examinations, which is a very important modality for us given that many cases are seen here. This center would have been an excellent place to develop our skills. (Stu8)*

The participants in the focus group discussion also offered the following solution:

*Our department (the Department of Radiography), together with the Dean, and the CEO of the College of Health Sciences, should facilitate the practicing environment for students (Stu5)*

### **Imaging modalities:**

Many of the participants from one of the focus groups indicated that the imaging modalities were rarely available or were broken and not repaired on time.

One of the participants said:

*Special Radiological Procedures is one of the subjects we learned in class, but many of the machines/procedures discussed in class, like fluoroscopy, were not present in any hospital we*

were assigned to. Therefore, our skill in these radiological procedures is highly compromised. (Stu1)

Another Participant said:

*The machines are not used to their full capacity. In some hospitals the machines do not work properly and no one is willing to repair them. They simply say that the machine is out of order, which may last for many months or years before someone fixes it. It seems like no one pays attention to the service they are providing the patients or the quality of the training in our clinical practice. (Stu4)*

Participants in the instructor's focus group also mentioned problems regarding imaging modalities.

One of the instructors said:

*It is my understanding that there are few modern imaging modalities like CT and MRI in a governmental set up. This limits our ability to produce skilled students. (Ins4)*

### **Availability of a Skills Lab/Demonstration Room**

Some students in the focus group discussions identified the lack of a skills lab as a problem in their clinical practice.

One of the participants said:

*We recently started practicing in the skills lab before we practiced on actual patients. I found this to be very helpful in developing our confidence. However, an insufficient amount of time was allotted for this practice and it should include all imaging modalities not just US. (Stu7)*

### **Curriculum:**

Almost all of the fourth-year participants in the focus group suggested that the theory and practical aspects of their curriculum should be better coordinated.

One participant said:

*Generally, we practice on four imaging modalities: X-rays, CT, MRI, and US. While the time allotted for X-rays, CT, and MRI is more or less sufficient, the time given for US practice is much less than required. Another problem is that the classroom learning and the clinical practices are carried out in the second semester of the student's final year, which means that we are practicing before we completely learn the theory. In my opinion, instructors may have to revisit the curriculum. (Stu8)*

Another participant said:

*I believe that the curriculum should be revised. For example, there are obsolete procedures that are not currently in practice, such as dark room processing, and yet we are still learning about them. Instead, this time should be utilized for some other necessary topics (Stu6).*

### **Placement sites**

Most of the participants in the focus group indicated that the practicing areas were inadequate.

One of the participants said:

*Most of the hospitals do not accept more than two students to train on one machine because of patient privacy and comfort. Therefore, they return the rest of us to our department and the department tries to solve this problem by placing us in the hospital every other day. This means that we practice for half of the intended time. (Stu4)*

The solution offered by one these participants was:

*...more practicing areas should be located by our department in order to allow students to fully practice the various imaging modalities and to get different experiences. (Stu4)*

### **From the instructors' point of view:**

Almost all of the themes that were identified by the students' focus group discussions were identified by the focus group discussion with instructors.

One of the instructor participants said:

*We are encountering many problems concerning the students' clinical practice. Among other things, there is a mismatch between the number of students we have and the available placement*

*areas. There is also a shortage or complete absence of transportation services. Moreover, the technologists working in the hospitals are not very willing to teach students because of the lack of any incentives (be it monetary or through the issuance of letters of appreciation). Also, some students are less interested or not willing to be assigned to some institutions. There is also a follow-up problem on the part of the instructors, and this is also due to a lack of transportation services. (Ins3)*

Another participant said:

*Many of the important points have already been raised, but I want to mention some like the transportation service problem, the lack of demonstration rooms, the lack of student interest, and the lack of supervision among instructors because of the issues with the transportation services. Given these issues, I cannot say that the department is fully adhering to its teaching requirements. (Ins5)*

### **From the technologists' points of view:**

The technologists also mentioned many problems encountered during the training of radiology technology students.

One of the technologists said:

*We only have one MRI machine. This machine is used for many patients and radiologists use it for research purposes. Therefore, our focus is more on serving patients than on teaching students. As a result, students are not trained well. (Tech1)*

*Another thing is that the students seem dissatisfied. They say that they do not have an interest in the field because of the lack of career development opportunities.*

*We also noticed that the students do not have enough theoretical background, especially regarding MRI. This shows that there is a gap between theory and practice. Their hands -on training time is also not sufficient to develop their skill on an MRI.*

One of the technologists offered the following solutions:

*Technologists should be invited by the department to give lectures to equip students with the basic MRI physics.*

*The department should work on narrowing the gap between theory and practice.*

*Students should be given sufficient time to practice these techniques, and enough knowledge and resources to be successful.*

*The department should work on career development to motivate technologists. To produce better performance and build confidence in performing their duties. (Tech1).*

Another technologist said:

*Students are not interested in practicing these techniques as they either come late or don't come regularly. When we ask them why they were late/absent, they complain of the lack of transportation services.*

*There is a shortage of machines in our hospitals. One machine is currently out of order and we are only using one machine. Therefore, it is difficult to teach students and serve patients at the same time. (Tech2)*

Another technologist said:

*We are also not given any incentive for training students and this discourages us. (Tech3)*

## **Discussion**

Our discussions with radiology technology students have shown that there are a number of challenges regarding their clinical practice experiences. Nine themes of concern were identified: love of profession, transportation services, clinical supervision, theory-practice gap, hands-on practice, imaging modalities, availability of a skills lab, number of placement area, and curriculum.

The medical radiology technology students and their instructors have clearly identified that there were transportation service problems, and as a result, they could not report to their placement area on time and utilize their time properly. Moreover, All students in this study indicated that inadequate clinical supervision was a major concern. According to the participants, the instructors' supervisory role in assisting students is of paramount importance to facilitate their learning, to enable smooth communication with the department, and to avoid unnecessary confrontations between students and technologists in the department. The students also wanted instructors to be more involved in their evaluation process and thought that this would improve their practice experience. The importance of clinical supervision identified in this study was similar to that found in a study done in the College of Nursing and Midwifery at Shiraz University of Medical Science, Iran [7]. They found that "Clinical nursing supervision is an ongoing systematic process that encourages and supports improved professional practice".

Although these are two different disciplines, supervising students was viewed as critically important in both cases to achieve the intended objective of improving professional practice.

Many students noticed that there was a gap between what they were taught in the classroom and what they learning during their clinical practice. For example, the proper use of a gonad shield to avoid unnecessary radiation exposure to patients was not practiced in many of the hospitals. Furthermore, students witnessed technologists not using the proper radiographic positioning techniques as they had learned in the classroom. For example, angling the tube to the required degree so as to target the area of interest accurately was a very important concept in the classroom but was not applied by technologists.

The amount of hands-on practice was also one of the concerns identified by radiology technology students. According to them, some important affiliated hospitals were not willing to allow them to practice on some of the imaging modalities, especially US. This can significantly affect student competency in the various imaging techniques, which will therefore affect their ability to be successful technologists.

students also identified an inadequate number of imaging modalities as a concern during their clinical practice. They noticed that there was a lack of machines in some hospitals and many machines were out of order and were not maintained properly. Similar findings were observed in a study done in Ghana, which revealed that some of their hospitals had inadequate specialized imaging modalities [5].

Many of the radiology technology students indicated that their time in a skills lab helped develop their abilities and increase their confidence when practicing with patients. However, the time allotted in the lab was insufficient and did not involve all imaging modalities. Research by Bugaj and Nikendei [13] emphasizes the importance of clinical training in a safe and fault-forging environment prior to the real-life application of these techniques at the bedside or in the operating room.

Another concern of the radiology technology students was in regards to the curriculum. Students identified that there was a time allocation and placement problem with the curriculum and they indicated that there is a need to revisit the curriculum so as to better coordinate classroom theory with clinical practice.

## **Conclusion**

This study showed that both students and instructors encountered many challenges during the clinical practice of radiology technology students at different College of Health Sciences-affiliated hospitals. The factors that were identified to affect the clinical training of the radiology technology students were: lack of transportation services, inadequate clinical supervision, theory-practice gap, lack of hands-on practice, shortage of imaging modalities, inadequacy of their skills lab, shortage of placement areas, and an inappropriate administration of the curriculum. The thoughts and ideas collected from students and instructors through our interviews play an important role in improving student learning. Both groups raised similar problems and they agreed that these challenges should be tackled so as to make the clinical placement experience more conducive to skill development. The technologists in the hospitals were willing to train students, but they felt that they needed to be acknowledged and provided with some incentives.

## **List of abbreviation**

CT: Computerized Tomography

MRI: Magnetic Resonance Imaging

US: Ultrasound

## **Declarations**

### **Ethics approval and consent to participate**

Ethical approval was granted by the Research Ethics Committee of the College of Health Sciences, Addis Ababa University, Ethiopia. Written informed consent from each participant was obtained before data collection.

### **Consent for publication**

Not applicable

### **Competing interests**

The authors declare that they have no competing interests

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**Authors' contributions**

All of the authors have been participated in the design of the proposal, data collection, data analysis and writing up. All authors read and approved the final manuscript.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Questions.pdf](#)
- [Table1converted.pdf](#)
- [Interviewwiththetechnologists.pdf](#)
- [InstructorsFGD.pdf](#)
- [StudentsFocusGroupDiscussion.pdf](#)