

Clinical placement challenges associated with radiography education in a low-resource setting: A qualitative exploration of the Ethiopian landscape

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ABSTRACT

Introduction: Clinical placements (CP) are of paramount importance in the learning and the acquisition of key competencies in terms of knowledge, skill and professional attributes required for clinical radiography practice. This study explored the challenges faced by radiography students and educators in relation to clinical placement and training in Ethiopia.

Methods: A qualitative approach using focus group discussion and interviews were used to explore the experiences of students and educators, respectively, pertaining to challenges encountered in relation to the clinical placement of students across four university affiliated hospitals. Data obtained was analysed using a structured three step framework and the coding approach employed in a thematic analysis.

Results: Participants comprise of third- and fourth-year undergraduate radiography students (n = 14) and educators [academic faculty (n = 7) and clinical practice educators (n = 8)]. Four main themes were identified, which relate to deficiencies of an existing training curriculum and its implementation strategies, inadequate resource and infrastructure within the CP environments and absence of advanced training opportunities.

Conclusion: This research showed that there are many and varied challenges encountered by both students and educators in relation to CP and training of radiography students in Ethiopia. These challenges could potentially affect the future performance of students/practitioners and/or the appropriate application of the core clinical radiography skills and competencies in the world of work.

Implications for practice: Clinical radiography training in resource-limited settings will require urgent attention and support with modern infrastructure including simulation to augment their clinical development to acceptable standards.

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Introduction


Radiography education is multifaceted and typically incorporates a split between didactic classroom teaching and practical components usually undertaken within a clinical

environment through blocks of formal placements.^{1,2,3,4,5} Similar to other health and care programmes, radiography education constitutes approximately 50% of clinical placement (CP).⁶ CPs are an essential component of the radiography training curricula and play an essential role in developing a student's skill, knowledge base and emotional capacity in preparation for professional practice.^{2,7,8} Additionally, CPs provide students the opportunity and context through which theoretical concepts can be better understood. In an Australian study⁷ that assessed the academic performance of a cohort of first year radiography students immediately prior to and after their first clinical placement, significant improvements were noted, which reinforces a deeper understanding of theoretical concepts presented through lectures.

Abbreviations: CP, Clinical placement; MRT, Medical Radiologic Technology; UAA, University of Addis Ababa; FM, Faculty Member; PER, Placement educator/Radiographer; ST, Student.

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Professional radiography skills, attributes and work experience are also acquired through CPs as part of the radiographers' education at the undergraduate level. For example, Portanier and colleagues reported development of clinical practice confidence of radiography students after undertaking supervised CP sessions in a magnetic resonance imaging (MRI) centre of a large teaching hospital, despite other associated challenges.⁹ Thus, these placement opportunities provide students with experiences of the real life working environment^{7,10} while learning and integrating theory with practice. However, this clinical learning can sometimes be hindered by over-emphasis on didactic teaching and the absence of structured reflective time together with other settings-specific challenges.^{9,10}

In some settings, students and practice educators/clinical supervisors sometimes end-up using clinical placement time for reflection, teaching, and learning instead of focussing on acquisition of clinical work experience.^{11,12} Of note, the challenges to clinical radiography placement are unique to all settings and may not always relate to over-emphasis on didactic teaching and absence of structured reflective time. Previous studies,^{13,14,15,16,17,18} mostly from low-resource settings highlight some of the unique challenges faced by radiography students in relation to clinical practice placement. In this context, a low-resource setting refer to those settings, irrespective of their location, without adequate and modern teaching and learning infrastructure.¹⁹ The challenges range from inadequate supervision and/or mentorship, inappropriate behaviour from supervisors to lack of access to well-resourced placement centres. Additional challenges including lack of dedicated training imaging equipments, high student-to-placement site ratio and lack of radiation monitoring badges for students were previously reported.^{13,14,15,16,17,18} It was noted that these challenges need to be given urgent consideration as part of efforts to harmonise practice through the training and development of radiography students and educational programmes, respectively.¹⁸ The challenges associated with clinical placements are not limited to radiography students in low-resource settings. In a United Kingdom study, Hyde (2015)²⁰ explored the challenges experienced by students on their first clinical radiography placement and reported the following: difficulty in relating and/or working with clinical staff, moving around the department, and handling very ill patients.

There exists a large variability in terms of resources for clinical radiography education and practice globally and across Africa^{19,21–23} and thus, findings from other regions may not be translatable. Broadly, there is paucity of research in relation to the challenges of clinical placement and training in radiography education, particularly, from the Eastern Africa region. The University of Addis Ababa (UAA) runs a four-year medical radiologic technology (MRT) (radiography) programme in partnership with some locally affiliated hospitals and may be facing unique regional challenges in relation to clinical placement. This study aims to bridge the evidence gap by exploring the challenges faced by both MRT students and educators in relation to CP at affiliated hospitals and other clinical facilities across Addis Ababa. Findings from this study could potentially serve as lessons that feed into the development and advancement of radiography education policies for other low-resource settings for improved student experience and safe practice.

Methods

Study design and setting

This is an explorative cross-sectional study designed using a qualitative methodology employing focus group discussion and in-

depth interviews.²⁴ This methodological approach allows in-depth data collection especially from the participants' lived experiences.²⁵ In this study, the CP challenges faced by students and educators is the key data under consideration. Of note, our focus group discussions were structured ([Appendix 1](#)) to obtain insights into what the participants think and their understanding of the phenomena under investigation.²⁶

The study was carried out at the Department of Medical Radiologic Technology (MRT) of the University of Addis Ababa located in the premise of Black Lion Hospital. The department has 103 full time undergraduate students enrolled on the MRT program at the time of study.

Ethical approval and consent

Ethical approval was obtained from the Research Ethics Committee of the Center for Health Sciences Education, College of Health Sciences, University of Addis Ababa. All participants provided written informed consent prior to their involvement in the study and before the start of data collection.

Participant recruitment and data collection

The focus group interviews and discussions were conducted between February and March of 2019. Of the 103 undergraduate students on the MRT program, the third and fourth years, comprise of 22 and 26 students, respectively. At the time of the study, the MRT program has a faculty strength of 19 while the total staff strength at the placement sites equal to 50. Thus, the participants comprise of third and fourth year undergraduate MRT students and educators including academic and clinical staff. The placement sites include the four government hospitals affiliated to UAA (See [Table 1](#)). The CP components of the MRT program at the UAA commence after the second year which explains why first, and second year students were excluded from this study. Accordingly, the study was publicised only to the eligible year groups, faculty members and clinical practice educators and they were all informed that participation was voluntary.

With respect to students, one focus group for each year group was carried out. Focus groups were employed for this cohort to provide a 'safe space' for collective voices to be shared and heard, giving confidence to some participants who might otherwise have been reluctant to come forward.

The faculty members were purposively recruited based on their level of involvement and number of years engaged in the supervision of students for clinical practice. They were also informed that participation in the study was voluntary. Similarly, the clinical placement educators were recruited purposively, from all the placement sites. The recruitment aimed at the departmental leads and the radiographers responsible for mentoring students. Face-to-face interviews were employed for data acquisition among these cohort. The sessions were carefully conducted with further probing and occasional repetition of questions to ensure data saturation was achieved. All participants were provided a detailed study information sheet before and a debriefing information at the end of each of the focus group/interview sessions.

Data analysis

The focus group discussion and interviews were conducted in the Amharic (the official language in Ethiopia) and was digitally recorded. This was then transcribed and translated into English by the principal investigator (MJK). To ensure accuracy, a senior independent researcher (TMN) who is fluent in both Amharic and

Table 1
Characteristic of participants.

No	Participant status	Affiliation		Sex	
				Male	Female
1	Student	Addis Ababa University (AAU), Department of MRT	Year 3	4	4
			Year 4	4	2
2	Faculty	AAU, Department of MRT		5	2
3	Clinical placement educator (Radiologic technologist)	Black Lion Hospital		2	0
		St. Paul Hospital		2	0
		Ras Desta Damtew Hospital		1	1
		Yekatit 12 Hospital		2	0

English reviewed the translations and discussed with the principal investigator until a consensus was achieved. The data generated was analysed using a structured three step framework and the coding approach employed in a thematic analysis.²⁷

Rigour of the study

To overcome the dilemmas associated with qualitative research, the principles described by Yardley²⁸ were applied as a guide throughout this study. The focus group discussions with students were carried out by an academic team member from another discipline (Department Midwifery) to avoid *power dynamics, influence, and bias*. The study team demonstrated a sense of *commitment and rigour* by thoroughly checking the accuracy of the translations, the actual analysis, and interpretations. Verbatim quotes were used in the study in an attempt to report directly in the participants voice to achieve sensitivity. All attempts have been made to accurately outline the stages of this research process for *transparency, coherence, and replicability*. The interviews and focus group discussions were structured and guided by open-ended questions developed based on literature (Appendix 1) in relation to MRT students' clinical placement and practice. Of note, the focus group and interview questions were adjusted to follow the flow of the discussions. To the best of our knowledge, this the first study from the Eastern African region that explores the *important* topic relating to challenges to clinical placement in radiography education and it is hoped that the findings would make a *positive impact* moving forward.

Results

Four main themes, encompassing eight subthemes were identified from the data as highlighted in Fig. 1. The conceptual framework depicting the emergent themes relate to key challenges of radiography skills training through clinical placement within a low-resource setting. The participants comprise of third and fourth year undergraduate MRT students (n = 14) and educators [faculty (n = 7) and clinical practice educators (n = 8) from all the placement sites)]. Thus, a response rate of 29.2%, 36.8% and 16.0% from the students, faculty, and clinical placement educators, respectively, was achieved.

Theme 1: suitability of the clinical training environment

Participants highlighted challenges encountered in relation to the teaching and learning of intended clinical skills at the clinical placement sites. These are broadly themed around inconvenient placement sites and lack of collaboration among imaging practitioners and clinical educators.

Subtheme 1: inconvenient placement sites

Participants reported an inconvenience in relation to a high student-to-placement site ratio. There exist a mismatch between number of students placed at a hospital or imaging centre and the available resources to support their learning. This is a key challenge to teaching and learning of clinical skills as highlighted by a faculty member:

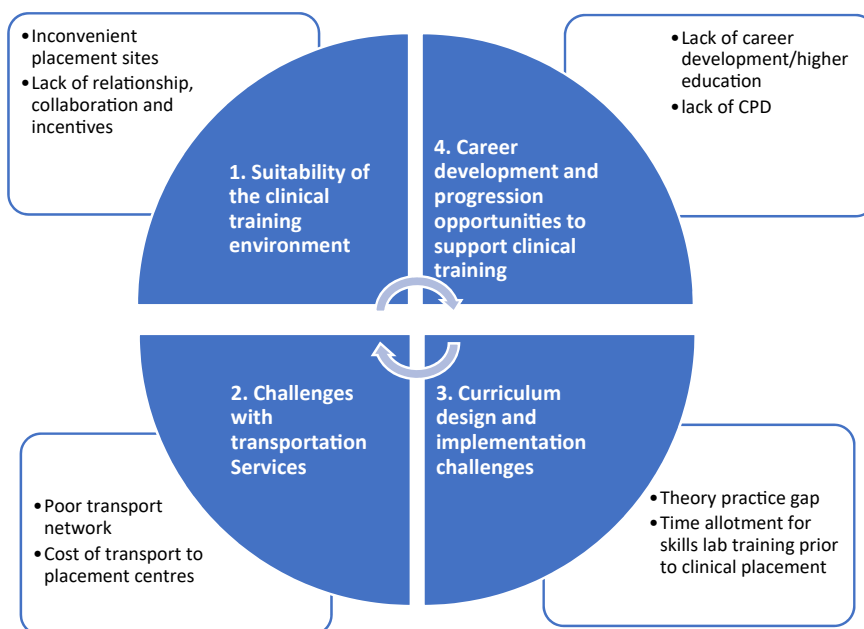


Figure 1. Schematic diagram of the themes and subthemes relating to the clinical training challenges in radiography education in Ethiopia.

'We are encountering many problems concerning clinical practice. Among other things, mismatch between the number of students we have and the available placement area' [Faculty member (FM) 3].

The suitability of available resources at the placement sites for teaching and learning were also questioned. Of note, the participants mentioned that resource availability and suitability vary across the placement centres with some considered well-equipped and suitable for teaching and learning while others classed as unsuitable. This was described as below by clinical practitioners from some of the placement sites:

'There is shortage of imaging equipments in our hospitals; one machine is out of order currently and we are using only one machine. Therefore, it is difficult to teach students as well as service provision to patients', [Placement educator/Radiographer (PER) 2].

'We do have one old machine which we cannot use to properly teach future practitioners, we do also have only one CT scanner but with only one machine, we cannot accept many students at once because we always need to attend to many patients on a daily basis ... therefore, it is difficult to serve all patients while training students because we are mostly in a hurry to serve patients in order to avoid complaints', (PER 3).

The student perspective was supported as below:

'Most of the hospitals do not accept more than two students to train on one machine because of patients' privacy or comfort. Therefore, they return some of us back to the university and the department tries to solve this problem by placing us in turns every other day, this means we practice for half of the intended time allocated for practice', [Student (ST) 4].

Subtheme 2: lack of relationship, collaboration, and incentives

There appears to be no partnership between the academic and clinical colleagues to facilitate student training. In cases where there exist some partnerships, there are no well-defined roles for clinical educators and other imaging practitioners at the placement site as well as no form of appreciation for their efforts at contributing to student learning. Most participants mentioned the existence of these problems and thought it has readily impacted their clinical teaching and learning as highlighted below:

'Our department assigns supervisors from a pool of instructors, but they are not given much opportunity to teach at the placement area and usually come to take attendance and it will be good if they are included fully in our teaching activities', (ST 6).

'... the other thing is that instructor's role in clinical education practice is not clearly defined', (FM 6).

'... and also, either radiographers or radiologic technologists working in hospitals are not that much willing to teach students because of lack of any incentives - monetary or issuance of letter of appreciations', (FM 3).

'... We are not also given any incentive for training students, this also discourages us', (PER 3).

Theme 2: Challenges with transportation services

The transport network to some placement sites are relatively poor and this has been highlighted as a key challenge for all participants. Thus, the lack of transportation or inconvenience with transportation disrupted attendance and, in some instances, made students very anxious as they are mostly late or absent. This theme

was highlighted by all participant groups and in particular, cost of transportation for the round journey to clinical placement is a challenge especially for some students when they miss the only available university transport.

'... another problem relates to transportation services. We use one service in common with all students at the college of health sciences. This service has to go to all areas in order to drop each student; Most of the time we reach our site very late. Therefore, we could not use our time effectively'. (ST 7)

'We are encountering many problems concerning clinical practice. Among other things ... shortage of transportation services ... (FM 3)

Theme 3: Curriculum design and implementation challenges

Key deficiencies were noted with the current curriculum in relation to clinical practice in the local context. The curriculum is more "technologist" focussed and thus the need for revision is considered urgent to suit the training of the modern university professional. Additional deficiencies relate to time allocation to cover courses and lack of a skills lab/simulation training time and facilities to demonstrate technical concepts prior to the start of CP.

Subtheme 1: theory practice gap

Students reported having observed that what they learned in class is not practiced in real situation. Thus, most student participants mentioned that they observed some radiographic techniques and protocols are not applied according to the standard they have learned in the class.

'There is a gap between what we have learned in the class and what we observed during our practice.' (ST 4)

'... We do not see what we have learned in the class, and we are told that it is important. For example, we learned in the class about darkroom, and film processing ... but there is no darkroom where we practiced.' (ST 4)

Subtheme 2: time allotment for skills lab training prior to clinical placement

Students proposed that the time distribution for each subject and course placement should be revised so that the theory and practice components are well-balanced and coordinated. The importance of the skill lab training prior to CP was mentioned.

'We recently started to practice in skill lab before we go to practice on actual patients. I found this is good and helpful in developing our confidence but, time allotted for it is not enough and it should include all imaging modalities, not only ultrasound,' (ST 7).

'The curriculum should be revised, for example there are obsolete procedures which are not currently in practice. For instance, Dark room processing. Instead of this, the time should be rearranged for some other necessary topics or subjects', (ST 6).

Theme 4: Career development and progression opportunities to support clinical training

This theme was identified by all three participant groups - students, faculties, and practitioners. All participants believe that there is need for higher education opportunities including regular continuous professional development opportunities in the area of medical imaging in Ethiopia.

Subtheme 1: lack of career development/higher education opportunities

The absence of higher education opportunities in radiologic technology locally in Ethiopia has been mentioned as a problem causing poor learning and teaching. It is believed that with these opportunities, both clinical and academic faculty will be well-placed to support and mentor students on their journey to becoming qualified practitioners.

‘... another thing is that of lack career development pathway and opportunities’ (PER 1).

Subtheme 2: absence of continuous professional development (CPD) opportunities

Participants mentioned that multiple factors have contributed to poor teaching-learning in clinical placement including lack of CPD activities. It is argued that students would benefit from current and improved practical skills and protocols from their instructors and mentors who have obtained latest knowledge through CPD.

‘... The department should work on continuous career development opportunities to better serve patients and build confidence in teaching students.’ (PER 1)

Discussion

Radiography education has a significant component (approximately 50%) relating to clinical confidence acquisition through CP and this is similar to other health and care programmes. However, the delivery of this critical radiography training component is associated with challenges which appear to be settings-specific. The challenges identified from this study, from a relatively low-resource setting, relate to deficiencies of an existing training curriculum and its implementation strategies, inadequate resource and infrastructure within the CP environment and absence of advanced training opportunities.

Theme 1: suitability of the clinical training environment

Learning is complex and is described as a function of activity, context, and culture.²⁹ The cultural and contextual elements of clinical learning are settings-specific and in this case are embedded within the clinical placement environment. Thus, the suitability of the placement environment is also determined by availability of resources and the departmental culture as well as the quality of relationships between the academic and clinical departments. The quality of social interactions within the clinical department is critical to the student experience and enhancement of student learning.^{17,29} On the contrary, our findings indicate that there appears to be no partnership between the academic and clinical colleagues at the time of this study to facilitate student learning during their CP. In cases where there exist some partnerships, there are no well-defined roles for clinical educators and other imaging practitioners at the placement site as well as no form of appreciation for their efforts at contributing to student learning. Clinical educators play pivotal roles in students' clinical skill acquisition and overall learning experience.^{30,31,32} It is therefore important that these professionals are fully included in the teaching and learning process through proper collaborative initiatives and partnerships to enhance the CP experience of students. In addition, the clinical educators could be equipped with clinical teaching and feedback skills through practice educator workshops and bespoke CPD activities and through certification programmes prior to official appointment as educators to ensure quality. Participants reported

an inconvenience in relation to a high student-to-placement site ratio. There exists a mismatch between number of students placed at a hospital or imaging centre and the available resources to support their learning.^{13,14,15,16,17,18} The suitability of available resources at the placement sites for teaching and learning were also questioned. Of note, the participants mentioned that resource availability and suitability vary across the placement centres with some considered well-equipped and suitable for teaching and learning while others classed as unsuitable.

Theme 2: Challenges with transportation services

Transportation has been identified as an issue for the students which has impacted negatively on their clinical placement. However, other studies have shown that often there is lack of transportation³³ or elevated transportation costs beyond the means of students.^{34,35,36} A previous study,⁴⁰ highlighted the lack of personal upkeep allowance (pocket money) and its impact on the learning activities of Ethiopian health undergraduate students. The challenges with transportation service network and cost impacts on the attendance of both students and clinical supervisors. For instance, in a similar study conducted in rural communities in Canada, the transportation variables in terms of cost and availability also affected not only the student nurses but also the client who may make treatment decisions based on inadequate services.³⁷ With these, the implications of poor transportation do not only affect students' education, but also the clinical supervisors who train these students and ultimately the patients.

Theme 3: Curriculum design and implementation challenges

One key concern for the students on CP is the theory practice gap. Studies have shown that there are mixed opinions when respondents give their views on theory and practice gap with no correlation between what is taught in class and what is practiced in CP.³⁷ In professional education, the concept of theory-practice integration has received more attention because of its importance in the future role of professionals.³⁸ For example, ST4 has identified a gap in technological knowledge transfer as they are being taught obsolete radiographic imaging in theory which is entirely different from the current trends experienced in CP.¹⁷ Our findings are more leaning towards improving clinical experience and competence by adopting the model where teaching of theoretical concepts are immediately followed by clinical placements with support from the academics who delivered the theory in class.

Students have advocated for an even allocation of time across the different imaging modalities to build their confidence including the effective clinical skills session in the laboratory before CP. Penman and Oliver (2000)³⁹ have reiterated that the time allocated to CP may vary and it is still subject to debate. To further improve clinical skills, higher education institutes offering radiography training should design their curricula to cater for adequate training within the clinical skills laboratory of the university and the CP sites. Also, the use of clinical instructors/tutor could serve as teacher at both sites to ensure a unified learning outcome and a clear link between both theory and practice. More importantly, it should be agreed by all parties that theory and practice will continue to explore mechanisms and processes by which clinical training can be further improved and developed to bridge the practice-theory gap.^{37,46}

Theme 4: Career development and progression opportunities to support clinical training

The absence of higher education opportunities in radiography locally in Ethiopia has been mentioned as a problem causing poor

learning and teaching. It is believed that with these opportunities, both clinical and academic faculty will be well-placed to support and mentor students on their journey to becoming qualified practitioners. The radiography profession has experienced and will continue to experience a rapid progressive change with the new wave of technological advances. The COVID-19 pandemic has also necessitated the introduction of new ways of clinical practice, and this will potentially remain in the post-COVID era.^{41,42,43} Undoubtedly, there is a need to adequately prepare students as well as qualified radiographers through bespoke career development initiatives including the provision of higher degree qualifications in radiography. The participants acknowledged that such provisions will be a motivation for pursuing a career in radiography in Ethiopia as reported elsewhere.^{44,45} This study has therefore, highlighted the urgent need for higher education opportunities including regular continuous professional development opportunities. The use of CPD is an ongoing professional activity in which a practitioner identifies, undertakes, and evaluates learning appropriate to the maintenance and development of the highest standards of practice within an evolving scope of practice. The provision of continuous professional development opportunities will serve as a motivation to students and practitioners while contributing to the global efforts for the harmonisation of radiography standards to keeping a safe practice. A meta-analysis of 37 studies⁴⁷ suggest that faculty development programmes foster knowledge and professional skills of medical and allied health faculty, which is perceived to improve educational environment significantly. Of note, academic faculty development through understanding of pedagogical principles, evidence-based teaching and learning frameworks as well as feedback skills are key to improving standards of medical imaging and radiography education in Ethiopia.^{48–50}

Limitations

This study aimed to explore the challenges relating to clinical placement in a low resource setting with Ethiopia as a case study. The findings are thus intrinsically linked to this context and limit the transferability of the findings to all radiography training landscapes and/or environments. However, the challenges discussed might resonate across other low and resource limited settings. Secondly, there are elements of potential language translation failure which may have resulted in a few alterations during transcription. The sample size obtained is relatively small, however, we carefully achieved saturation of the acquired data over multiple participant groups to ensure data quality.

Conclusion

The responsibility for preparing radiography students and ensuring they have a quality experience during CP resides with both the educational institution and their clinical partners. Some of the challenges highlighted in this study are due to varied reasons from; rapid advances in technology, increase in demand for imaging services, inadequate funding for both education and infrastructural projects. On that note, this research has suggested various mechanisms and processes in addressing the concerns raised. Clinical radiography training in resource-limited settings will require urgent attention and support with modern infrastructure including simulation to augment their clinical development to acceptable standards. Others, include the collaboration between educational institutions and service providers to ensure a unified learning platform for the students. In summary, the findings from this study can be used as a guide for strategic review of educational policies to improve students overall learning experience during clinical placements.

Conflict of interest statement

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.radi.2022.04.014>.

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