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Experiences of clinical supervisors regarding the clinical training of radiography students in Zambia

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ABSTRACT

Introduction. Clinical supervisors play a vital role in the training of radiography students. There is a lack of published research that investigates the experiences of clinical supervisors in the facilitation of practice-based learning for radiography students.

Objective. This qualitative study aimed to explore the experiences of clinical supervisors regarding the clinical training of radiography students in Zambia.

Methods. A qualitative research design, with a phenomenological approach, was used. Data were collected using semi-structured interviews with a purposive sample of ten clinical supervisors of radiography students working in the Lusaka and Copperbelt provinces of Zambia. Data were transcribed verbatim and analysed thematically.

Results. Clinical training of radiography students impacts positively or negatively on clinical supervisors. Experiences, such as the availability of X-ray equipment and teaching aids, positive attitude of students towards learning, positive clinical supervisor characteristics, and knowledge and experience in radiography, positively influenced clinical supervisors in the facilitation of students' learning. On the other hand, insufficient clinical education knowledge, inadequate supply of resources, out-dated X-ray equipment, shortage of clinical supervisors, over-enrolment of students and a lack of support from stakeholders, negatively affected clinical supervisors in the facilitation of students' learning.

Conclusions. The findings shed light on the experiences of clinical supervisors regarding the clinical training of radiography students. There is a need to support clinical supervisors in enhancing their experiences. It is recommended that a clinical supervision course be developed and that continuing professional development (CPD) on clinical education be provided. In addition, incentives should be implemented for clinical supervisors. There is also a need to increase imaging consumables and staffing levels in teaching hospitals.

Keywords experience, qualitative research, radiographer

LAY ABSTRACT

Clinical supervisors at two teaching hospitals in Zambia were asked about their experiences in teaching radiography students to take X-rays. They identified both positive and negative experiences when teaching radiography students during clinical training.

INTRODUCTION

Clinical training of radiography students is an essential part of radiography education. It enables students to develop their knowledge, skills, attitudes, and competence.^[1] In the Zambian radiography education system, designated radiographers working in hospitals affiliated with higher education institutions (HEIs) are responsible for clinical training of radiography students and are referred to as clinical supervisors. There are three main tasks of clinical supervisors: managerial, educational, and supportive.^[2,3] The managerial task involves organising and managing training resources.^[3] The educational task involves four areas: clinical teaching, role model-

ling, feedback provision, and assessment of students' competence.^[3-5] The supportive task deals with supporting students with personal issues, and learning difficulties and disabilities.^[3,6] This combination of undertakings associated with effective clinical training of students makes this activity very demanding and complex.

In Zambia, there are currently three HEIs offering undergraduate radiography programmes: one diploma and two degree qualifications. Evelyn Hone College (EHC) started offering a three-year diploma in radiography in 1970.^[7] Over the past 50 years, the curriculum has evolved in terms of a change in clinical practice requirements. The predominant efforts in the

initial years were to train a radiographer with sufficient skills to practice with very little supervision in plain film and contrast aided studies.^[8] The curriculum was designed with more weighting towards psychomotor skills. The advent of increased access to different imaging modalities necessitated the need to increase the scope beyond plain-film and contrast studies.^[9] In recent editions, the diploma in radiography programme was revised to include basic ultrasound, computed tomography (CT), mammography, nuclear medicine (NM), and magnetic resonance imaging (MRI).^[10] A review of the 2014 diploma in radiography curriculum objectives had an emphasis on the theory component

as it constituted 80% of the course, and the balance (20%) pertained to clinical training.^[11] First-year students are fully involved in preclinical courses such as physics, anatomy and physiology, imaging technique, and simulations of clinical practice at the college campus. The rest undertake radiography-related subjects at the campus and clinical practice at hospitals affiliated with the HEIs.^[10]

In 2011, the ministry of health identified radiographer shortages as one of the challenges in the delivery of quality healthcare in Zambia.^[12] This resulted in the establishment of a four-year bachelor's degree in radiography by the Lusaka Apex Medical University (LAMU) in 2012, and a five-year bachelor's degree in radiography by the University of Zambia (UNZA) in 2018. These degree curricula have been designed with equal weighting between theory and clinical practice.^[13,14] The programmes are designed with the first year dedicated to preclinical courses, which include physics, radiation protection, biology, mathematics, and patient care which are undertaken at the university campus. In the other years, students continue with radiography-related subjects at the campus and undertake clinical training at affiliated hospitals with the HEIs.^[13,14] The clinical training is initially limited in the second year, then gradually increases up to a point where the didactic components are equal. The degree curriculum also incorporates aspects of radiographic image interpretation, increased research, and management competence attainment.^[13,14]

Despite the vital role clinical supervisors play in the facilitation of practice-based learning, there is limited research on this subject. In Zambia, an increase in the number of radiography training programmes and students has resulted in an accompanying growth in demand for associated clinical departments and clinical supervisors. The main author (researcher) observed and often heard clinical supervisors expressing concern and dissatisfaction with their experiences in the facilitation of practice-based learning to radiography students. The aim of this study was therefore to explore the experiences of clinical supervisors regarding the clinical training of radiography students in Zambia.

METHODOLOGY

Study design and population

The study utilised a qualitative research design with a phenomenological approach. It was part of a larger study focusing on strategies to support radiographers in the clinical supervision of radiography students. The study population comprised clinical supervisors working at the main clinical training centre and placement centre of the Lusaka and Copperbelt provinces of Zambia, respectively. The two sites were purposively selected because of their predominant involvement in the clinical training of radiography students. The inclusion criterion was clinical supervisors with more than two years' experience in the clinical training of radiography students. Purposeful sampling was utilised to arrive at the ten participants. The participants' demographic characteristics are presented in Table 1. The majority (n=8) had more than 11 years experiences in the clinical supervision of students.

Data collection and analysis

Data were collected using semi-structured interviews following approval from the University of South Africa (UNISA) and Tropical Diseases Research Centre (TDRC) research ethics committees, permission from the ministry of health in Zambia, and heads of X-ray departments at the study sites. The central focus was exploring the experiences of clinical supervisors regarding the clinical training of radiography students in Zambia. The interviews provided

in-depth qualitative data and offered an opportunity to validate the data for accuracy and relevance through questioning and probing.^[15,16] To ensure anonymity, numbers were given to each participant and used instead of their names. The researcher directly recruited participants with the help of the heads of the radiology departments (chief radiographers).

A pilot study was conducted in June 2018, with a convenience sample of two clinical supervisors within the study population. After the pilot study, ten interviews were conducted in July 2018. The venues were a room in the departments that allowed for privacy and comfort. Before each interview, informed consent and permission to audio record the proceedings were obtained from each participant. Data collection stopped upon reaching a data saturation point after interviewing ten clinical supervisors. A data saturation point occurs when no new information emerges.^[16] The average duration of the interviews was 35 minutes per participant. The audio recordings were first listened to and then transcribed verbatim by the lead researcher. The verbatim transcriptions were analysed by the lead researcher and co-author (co-researcher) using the Braun and Clarke^[17] five-phase thematic framework: familiarisation with data, generating initial codes, searching for themes, reviewing, and naming of themes.

Trustworthiness

Trustworthiness was attained by appraising the study using the Lincoln and Guba

Table 1. Demographic characteristics of participants (n=10)

| CHARACTERISTIC | VALUE | FREQUENCY |
|--|------------------------|-----------|
| Gender | Male | 6 |
| | Female | 4 |
| Location | Lusaka province | 6 |
| | Copperbelt province | 4 |
| Position | Chief radiographer | 2 |
| | Principal radiographer | 2 |
| | Senior radiographer | 1 |
| | Radiographer | 5 |
| Highest radiography qualification | Diploma in radiography | 2 |
| | BSc radiography | 6 |
| | MSc radiography | 2 |
| Work experience in the clinical training of radiography students | 2-10 years | 2 |
| | 11-15 years | 4 |
| | > 16 years | 4 |

Table 2. Themes and sub-themes which emerged in this study

| THEMES | SUB-THEMES |
|---|---|
| Theme 1 Positive experiences of clinical supervisors regarding the clinical training of radiography students | <ul style="list-style-type: none"> Availability of X-ray equipment and clinical teaching aids Positive attitude of radiography students towards learning Knowledge and experience in the radiography profession Positive clinical supervisor characteristics |
| Theme 2 Negative experiences of clinical supervisors regarding the clinical training of radiography students | <ul style="list-style-type: none"> Out-dated X-ray equipment and inadequate supply of X-ray films Shortage of clinical supervisors and over-enrolment of students Insufficient knowledge about clinical teaching and learning Lack of support from external institutions Lack of support from hospital managements |

model.^[18] The appraisal was conducted in terms of the following criteria: credibility, dependability, confirmability, and transferability. Credibility was achieved through a pilot study and collection of data from different levels of hospitals and clinical supervisors.^[15] Member checks were utilised to determine the accuracy of the collected data. Also, the transcripts were returned to the participants to allow them to determine whether the words in the transcripts matched what they had said.^[19] The co-author also performed a peer-debriefing by checking the themes and sub-themes generated during data analysis.^[16] Dependability was ensured through a dense description of all research processes.^[15,16] To ensure confirmability, the participants' comments in their own words are in italics and indented words.^[16] Lastly, all research processes have been described in detail to allow for the transferability of the study findings.^[15,19]

RESULTS

Following data analysis, two themes and nine sub-themes emerged (Table 2).

- Theme 1: positive experiences of clinical supervisors regarding the clinical training of radiography students**
- Sub-theme 1: availability of X-ray equipment and clinical teaching aids**

Participants explained that without the available X-ray equipment, it was impossible to allow radiography students to apply theory into practice. Allowing students to

use X-ray equipment was reported as a positive experience for the clinical training of radiography students.

I try as much as possible to utilise the available X-ray equipment to help radiography students learn (Participant 6).

The availability of a professional code of conduct for radiographers issued by the Radiological Society of Zambia (RSZ) served as a teaching aid when teaching professional ethics, morals, and standards of behaviour to radiography students.

I base my teaching of professionalism to students on a code of conduct for radiographers issued by the RSZ (Participant 6).

The availability of assessment forms was also reported as a positive experience in the clinical training of radiography students.

The schools of radiography at the end of the clinical attachments gives us guidelines on how to assess students (Participant 3).

One of my positive experiences is the use of an assessment tool. I use a tool to assess radiography students. This involves assessing students in all angles such as behaviour, dress code, and clinical performance (Participant 8).

Clinical and performance assessment forms for radiography students provided clinical supervisors standardised assessment criteria approved by the HEIs.

- Sub-theme 2: positive attitude of radiography students towards learning**

The positive attitude of radiography students towards learning was identified as a positive experience in the facilitation of practice-based learning for students. Participants listed a willingness to learn, and being quick to follow instructions as positive attitudes of radiography students towards learning.

It gives me joy when I know that the students are enjoying what I am teaching them and if they are adapting quickly to instructions (Participant 8).

When students are given questions in groups and they have done their best it makes me feel good and confident in teaching them (Participant 5).

Most students are willing to learn (Participant 6).

This positive attitude was described as vital in the establishment of a good working relationship and a conducive learning environment.

- Sub-theme 3: knowledge and experience in the radiography profession**

Being knowledgeable and experienced in radiography was another commonly discussed positive experience in the clinical training of students identified during interviews. Comments clustered into this sub-theme had to do with the use of knowledge to teach students, knowing what was acceptable, and the use of personal experience to teach them.

I use my experience in teaching professionalism to students. In this line, I can tell them that from my experience this behaviour is not acceptable (Participant 4).

I use the experience to teach students (Participant 8).

To maintain clinical training standards, all participants believed that only knowledgeable and experienced radiographers should be appointed as clinical supervisors.

- Sub-theme 4: positive clinical supervisor characteristics**

Three positive characteristics of clinical supervisors were reported: a passion for

promoting the profession, kind-heartedness, and sharing of responsibilities. Participants reported passion as vital in the development of the next generation of radiographers.

The motivation is the feeling of knowing that you can impart what you learned in school to another person (Participant 1).

My passion is to help the students become radiographers like me (Participant 2).

I am always motivated to teach students because they are our future colleagues (Participant 4).

All participants reported supporting students with health problems and learning difficulties.

There are some whom I support. When the student is sick in the clinical area, I help them or facilitate them to see a medical doctor (Participant 8).

I take the slow learners at a slower pace and assess them separately to help them learn at their own pace (Participant 2).

Kind-heartedness helped in building a working relationship between clinical supervisors and students. This was described as a positive experience in the facilitation of practice-based learning for students. Participants also indicated that positive experiences in the clinical training of students are characterised by sharing responsibilities.

The shared responsibility with colleagues motivates me to do the assessments because it reduces the workload and errors (Participant 1).

My colleagues help me update myself with certain information regarding the content to teach the students. We meet to update ourselves on recent knowledge to avoid giving false information to the students (Participant 2).

Most expressed satisfaction with the support received from their colleagues in their role as clinical supervisors of radiography students.

- **Theme 2: negative experiences of clinical supervisors regarding the clinical training of radiography students**

- **Sub-theme 1: out-dated X-ray equipment and inadequate supply of X-ray films**

Most of the participants were dissatisfied with the condition of the X-ray equipment. They frequently cited negative experiences related to limited X-ray equipment, and old and faulty X-ray machines. Participants reported improvising clinical demonstrations due to faulty X-ray equipment. This prevented clinical supervisors from teaching best practices to students.

Sometimes the poor condition of the erect bucky of which from time to time we have to engage the management to fix it (Participant 1).

Sometimes the equipment does not work properly, such as the collimators which are off-centred (Participant 8).

The inadequate supply of X-ray films was another negative experience in the facilitation of practice-based learning reported during interviews.

The major challenge is the non-availability of X-ray films. One digital equipment (filmless) is just being installed. So, we depend on X-ray films for the other two analogue machines (Participant 1).

Another participant from a different hospital added similar comments.

Not always that we have X-ray films. We only have one digital equipment, the other six are analogue, which depends on X-ray films (Participant 9).

These comments are an attestation that the inadequate supply of X-ray films negatively affected clinical supervisors in the clinical training of radiography students.

- **Sub-theme 2: shortage of clinical supervisors and over-enrolment of students**

Most of the participants expressed clear views about the shortage of clinical supervisors and work overload. This reduced their time to be with radiography students. Clinical supervisors' priority is patients.

Being overwhelmed with a lot of work makes me forget to give feedback to radiography students on their clinical performance (Participant 2).

Over-enrolment of radiography students by the HEIs further exacerbated this problem. Most of the participants complained

about overcrowding of students in the clinical department due to the over-enrolment of students.

There has been an over-enrolment which has been the biggest challenge encountered so far. There is too much pressure to handle many radiography students and at the same time attend to clinical duties (Participant 5).

The biggest challenge we have is over-enrolment in schools. We don't have enough equipment and radiographers to meet the numbers (Participant 7).

Participants suggested that the Health Professions Council of Zambia (HPCZ), the regulator of medical and allied health professions, monitor radiography student enrolment.

- **Sub-theme 3: insufficient knowledge about clinical teaching and learning**

Insufficient knowledge about clinical teaching and learning amongst clinical supervisors was identified as a negative experience in the facilitation of students' learning. They reported using their personal experience in teaching radiography students. They felt that clinical supervisors should be knowledgeable and competent in imparting appropriate knowledge, attitudes, and skills to radiography students.

The main problem is the lack of clinical supervision training. Training will enable me to work more confidently (Participant 5).

I would like the school to support us by training radiographers in clinical teaching so that the students can receive the best attachment experience (Participant 3).

Given the above, all participants suggested the establishment of a clinical supervision preparatory training by the HEIs offering radiography training programmes.

- **Sub-theme 4: lack of support from external institutions**

The HEIs and RSZ were the two external institutions identified in supporting clinical supervisors. Participants complained about the poor communication between the HEIs and clinical departments. There was a lack of communication about what radiography students had covered in class and about students with learning difficulties.

There is a lack of communication on theory covered in classroom with clinical departments (Participant 6).

We are usually not informed when the students are arriving that this person has this type of problem. So, you may think that the person is just a slow learner; meanwhile, it's because of a certain learning disability (Participant 5).

Participants also reported the failure of HEIs to provide an updated curriculum.

The tutors do not provide us with the school curriculum. This is a challenge to me as I was in school several years ago when the curriculum was different. It is a challenge to teach because a lot of things have changed since I was in school (Participant 2).

Participants also complained about the RSZ's lack of support in the provision of continuing professional development (CPD) related to the facilitation of practice-based learning.

The other challenge is a lack of CPDs on the clinical supervision of radiography students from the RSZ (Participant 10).

Because of the above, participants suggested the appointment of a designated clinical supervisor in each clinical department to be responsible for communicating and obtaining updates from the HEIs. Participants also suggested the provision of CPDs to keep clinical supervisors up to date with new developments in clinical education.

- **Sub-theme 5: lack of support from hospital management**

Most participants were dissatisfied with the support from their hospital management. The main complaints were inadequate consumables and a lack of incentives.

The hospital lacks consumables such as X-ray films, contrast media, ultrasound gel, and cleaning materials (Participant 10).

Regarding incentives, participants pointed out that there is a need to reward clinical supervisors for the extra work they do in the facilitation of students' learning.

There is a lack of incentives. I hear the schools pay something to the hos-

pital, that amount is not supposed to be for the hospital, but to help radiographers for the extra work they do as clinical supervisors of students (Participant 4).

To motivate radiographers to do their best when supervising students, the hospitals should offer incentives. The incentives could either be in monetary form or could include scholarships for further studies (Participant 9).

Participants reported inadequate consumables and a lack of incentives as a negative experience in the clinical training of radiography students.

DISCUSSION

Reliance on X-ray equipment in the facilitation of practice-based learning is fundamental in the training of radiography students. The clinical departments do have X-ray equipment, but there is a need for more units because of the increased number of students in clinical training. A study conducted by Ohagwu et al^[20] found a shortage of X-ray equipment to be an inhibiting factor in the clinical training of radiography students in Nigeria. Our study also found out-dated X-ray equipment to be a negative experience in terms of clinical training of radiography students due to frequent faults and breakdowns of the equipment. This finding correlates with the National Health Strategic Plan of 2017-2021 report, which revealed that 60% of the X-ray machines in Zambia are old and obsolete.^[21] To overcome this challenge, the ministry of health has started replacing analogue X-ray machines with digital radiography (DR) imaging system. There is also a need to implement routine maintenance and servicing programmes as this helps to keep the X-ray equipment performing efficiently.^[22]

The scarcity of medical supplies was reported to negatively impact the experiences of nursing clinical supervisors. Neshuku and Justus^[23] found that nursing clinical supervisors reported a lack of medical supplies to use in the demonstration of procedures as a challenge in effectively teaching students. Our findings are in keeping with those of the nursing study. Our findings showed that the role of the availability of imaging consumables plays a role in eliciting positive or negative experiences amongst clinical supervisors. This is a significant finding because

X-ray films and other supplies are critical to effective clinical training in Zambia, without which clinical supervisors cannot effectively facilitate students' learning. The upgrade to DR which, has started in Zambia, would help to solve the problem of the shortage of X-ray films and result in less disruption to radiology services and training of students.

The availability of a professional code of conduct issued by the RSZ was a factor in terms of the positive experience of clinical supervisors in the clinical training of radiography students. A code sets out the standards of conduct, performance, and ethics that a member of that profession must adhere to throughout their work.^[24,25] It is a hallmark of a profession because it signifies high principles of professional behaviour and willingness by the profession to control its conduct.^[24] A code of conduct encourages professionals to behave with integrity and it also increases productivity.^[24,26] Therefore, a code of conduct is a useful resource for teaching professionalism to radiography students.

The availability of standardised clinical competence assessment tools played a role in promoting a sense of positivity towards clinical training. This finding is, however, in contrast with what was reported by Kilgour^[4] who found a variation between clinical departments in how radiography students were assessed in Australia. This variation confused clinical supervisors who were charged with assessing radiography students from more than one university but practising in the same clinical site. The situation in Zambia, regarding differences in assessment tools, was not a source of conflict because of the few HEIs offering radiography and the similarity of the assessment tools.

Students are critical players in clinical education, and their response can positively or negatively affect the experiences of clinical supervisors.^[23,27] In this study, clinical supervisors reported that radiography students had a positive attitude towards learning. This finding is different from that which is reported in the nursing literature. Clinical supervisors of nursing students complained that students lack respect and exhibit unprofessional behaviour. In a study conducted in South Africa by Setati and Nkosi^[28] clinical supervisors reported that nursing students were disrespectful to staff and absent from the workplace. Similarly, Lapeña-Moñux et

al^[29] reported that nursing students lacked respect for hospital staff, and this led to a poor working relationship.

Being knowledgeable and experienced in radiography was found to be a positive experience in the clinical training of students. However, the clinical supervisors reported that they felt they had insufficient knowledge of basic educational principles. Overseeing and assessing a student's clinical competency was heavily influenced by their own personal experiences. This finding was also a source of concern in nursing. A lack of knowledge in basic educational principles amongst nursing clinical supervisors was identified in studies by Neshuku and Justus,^[23] and Bvumbwe et al^[27] as a negative experience in students' facilitation of learning. Therefore, there is a necessity to develop a clinical supervision training programme in Zambia to enable clinical supervisors to acquire appropriate knowledge and skills.

A passion for promoting the radiography profession amongst clinical supervisors was identified as essential for the development of the next generation of radiographers. The word 'passion' features regularly in students' descriptions of their best clinical supervisors.^[30,31] Supporting students with learning difficulties is one of the tasks of a clinical supervisor.^[3,32] Our study also found that supporting students was identified as one of the positive characteristics of clinical supervisors which positively impacts the clinical training of students. The other positive characteristic of clinical supervisors identified in this study was the sharing of responsibilities. This minimised the workload and stress involved with the facilitation of practice-based learning. Our study is in keeping with that of McIntosh et al^[33] who stated that support from colleagues can provide an encouraging and inspiring learning environment.

In our study, clinical supervisors were dissatisfied with the increased number of students. In a study conducted by Ohagwu et al^[20] congested X-ray rooms were found to be one of the factors which contributed to the challenges of clinical training amongst students in Nigeria. An increased ratio of students to clinical supervisors reduces the assistance given to students and opportunity for hands-on practice.^[27] In our study this problem was exacerbated due to a shortage of clinical supervisors which resulted in an increased workload and

reduced time to be with students. Therefore, HEIs should enrol students to match the available resources and this should be monitored by the HPCZ.

The HEIs, RSZ, and hospital management were identified in our study as the key stakeholders for supporting clinical supervisors. Clinical supervisors reported a lack of communication as well as the absence of an updated curriculum provided by the HEIs to be unhelpful. This finding is in keeping with nursing studies that identified a lack of support from the faculty as a hindrance to clinical training.^[23,28] Clinical supervisors were also dissatisfied with the support from RSZ due to a lack of CPD related to clinical education. It should be noted that RSZ, a professional body for the radiography workforce in Zambia, has the responsibility of providing CPD related to radiography and the facilitation of learning.^[25] Lastly, our study revealed that clinical supervisors were dissatisfied with the lack of support from their hospital management. The chief complaint was a lack of incentives. This finding is similar to that of Oluchina and Gitonga^[34] where most nursing clinical supervisors complained about a lack of reward for their involvement in the clinical training of students.

LIMITATION AND RECOMMENDATION

The main limitation of this study was the exclusion of radiography students. It is, therefore, recommended that future research on this topic should include both radiography students and clinical supervisors to have a comprehensive understanding.

CONCLUSION

This study has provided knowledge on the experiences of clinical supervisors of radiography students and the significance of the contribution it makes to the profession. The findings have provided an understanding of the positive and negative experiences faced by clinical supervisors. A commitment is required by all stakeholders to recognise the importance of clinical education in the radiography programmes and to support clinical supervisors.

CONFLICT OF INTEREST

None to declare.

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CONTRIBUTIONS OF AUTHORS

OB (MRHT) conceptualised and carried out the research. JMS (UNZA) supported the researcher and assisted in the preparation of the manuscript for publication.

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