EVALUATION OF THE IMPACT OF LARGE STUDENT-TO-INSTRUCTOR RATIOS ON CLINICAL COMPETENCE DEVELOPMENT AMONG RADIOGRAPHY STUDENTS IN NIGERIA

BY

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CERTIFICATION

This is to certify that I, DEBORAH OKON ETOK with the matriculation number Bms2101813 carried out this research on EVALUATION OF THE IMPACT OF LARGE STUDENTS- TO- INSTRUCTOR RATIO ON CLINICAL COMPETENCE DEVELOPMENT in Nigeria and it has been examined and approved for the award of Bachelor of Radiography in the Department of Radiography, School of Basic Medical Sciences, University of Benin, Benin city.

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DEDICATION

This project is dedicated to my parents for their financial, emotional and physical support through out this journey of my life. May God Almighty bless and keep them alive in JESUS NAME AMEN.

ACKNOWLEDGEMENT

I want to use this medium to appreciate God Almighty for his unweaving love, goodness, kindness and protection throughout my journey in school. Many of my course mates that started this journey with me are not here today it's not because I'm holy but his grace is sufficient to me.

A very big thank you to my parents Mr. Okon Etok and Mrs. Veronica Ubeng for their support through prayers, finances and physical support may God protect them and also answer all their secret prayers in Jesus Name, Amen. A special thanks to my sister Mfon Obong Etok for her sisterly love and advice you are greatly loved by me.

To my friends and well-wishers that has being there for me through thick and thin you are all seen and appreciated.

Finally, I want to appreciate myself for believing and doing all this work without quitting, for always coming through for myself even when things seem bad and not promising. Deborah you have come a long way and would achieve greater things in life in Jesus name Amen.

ABSTRACT

The attainment of clinical competence is a pivotal requirement in radiography education, fundamentally relying on intensive supervision and tailored practical instruction.

This investigation systematically assesses the detrimental influence exerted by elevated student-to-instructor ratios on the clinical proficiency developed by radiography students within the Nigerian context. Due to burgeoning institutional enrolments, juxtaposed with a scarcity of qualified clinical instructors, many students experience a demonstrable restriction in opportunities for essential hands-on training and individualized evaluative feedback.

Employing a rigorous mixed-methods research design, which integrates quantitative surveys and qualitative interviews with both students and faculty members across accredited radiography institutions, the study delineates critical operational challenges. The principal findings confirm major obstacles, including insufficient direct clinical supervision, curtailed practical exposure, and a resultant compromise in the acquisition of specialized skills.

Consequently, the study advocates for strategic reforms encompassing the augmentation of instructor staffing, the implementation of highly structured clinical rotation protocols, and necessary policy adjustments. These measures are crucial for the amelioration of radiographic training standards and for guaranteeing the production of competent and workforce-ready practitioners in the future.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Radiography is a skill-based discipline and as such, the development of clinical competence is a core objective in the training of radiography students, as it equips them with the key skills to safely and professionally perform diagnostic imaging procedures (Chiegwu et al., 2022) Clinical competence involves the integration of theoretical knowledge, practical skills, decision-making abilities, and ethical behaviour within real- life hospital environments. In grooming competent radiographers, clinical training is not just a supplement to classroom instruction but a fundamental component that ensures students are adequately prepared for the demands of professional practice. As stated by Ohagwu et al. (2016), this competence involves close supervision to achieve it mentorship, feedback and experience. The core of all these is highly affected by the student-instructor ratio in clinical practice, and are generally undermined whenever there is overcrowding of students.

In many universities and teaching hospitals in Nigeria, radiography programs face growing challenges due to increasing student enrolment without a corresponding increase in the number of qualified clinical instructors and equipment. This has contributed to high proportions of students to instructors in case of clinical postings, when one of the instructors is in charge of overseeing overrepresented number of students. This normally comes along with ineptitude in learning, Slow feedback, less practical training, and general decreased quality of clinical training (Ogbu, 2008). Such issues are especially problematic in a technical and very important field as radiography that involves the use of ionizing radiation and insufficient clinical competence may socially jeopardize patient safety, diagnostic accuracy and professional confidence of graduates. It has been shown that effective clinical supervision is highly correlated with research all over the world enhances learning results,

professional growth and student satisfaction. It has been demonstrated in nursing and the allied health sciences again and again that smaller student to instructor ratios are better, it encourages more significant learner interaction, stronger learning, and clinical competence. Nevertheless, even though the significance of this issue is increasing, it still lacks a thorough research which specifically addresses the issue of radiography training in Nigeria. The literature available is likely to be imprecise, in terms of emphasizing the health sciences as a whole or the theoretical teaching substantial gap in knowing the effects of the arrangement of clinical education on radiography. With the growing need of well-trained radiographers in the healthcare system of Nigeria, it is imperative to look at the role of learning and structural aspects in training programs that impact student outcomes. In this regard, this research paper aims at determining the effects of high student-to instructor ratios on clinical competence development among radiography students in Nigeria. Through the experiences and perceptions of students and instructors and also by analyzing the real results related to various levels of supervision, this study will seek to deliver evidence-based suggestions, which will enhance the policies that regulate clinical training in radiography education.

1.2 Statement of Problem

Clinical training is a very crucial aspect of radiography training, since it offers students with the access to gain the most vital practical skills in real-life healthcare facilities. However, the number of radiography students in most universities in Nigeria has not been corresponding to the number of teeming students in the universities fair increase in clinical faculty and equipment. This has contributed to high student to instructor ratios, which could affect the quality of clinical training and impede the ability to achieve clinical competency. This highlights the importance of this study in assessing the level of the issue.

1.3 General Objectives of the Study

To measure how having high student to instructor ratios affects the evolution of clinical undergraduate radiography students' skills in Nigeria.

1.3.1 Specific Objectives of the Study

1. To determine the effect of high numbers of students on the self-reported clinical competence of students.
2. To find out the issues related to large student to instructor ratios in the clinical training.
3. To determine the potential initiatives to enhance the development of clinical competence.

1.4 Significance of study

1. This research will provide evidence and useful insights that will inform the findings of the research.
2. It would provide regulatory authorities and policy makers on the way to make clinical education strategies better and improve the radiography training in Nigeria.
3. The information collected in this research will also be used as a guide in further researches in radiography education and training.

1.5 Scope of Study

This study will be limited to students currently in 300 to 500-level (clinical years) and have undergone or are actively involved in clinical training within accredited Nigerian universities.

1.6 Duration of Study

This study will be conducted from April to September 2025.

1.7 Operational Definition of Terms

1. **Student-to-Instructor Ratio:** This refers to the number of student radiographers assigned to a single clinical instructor during a clinical posting period.
2. **Clinical Competence**: This is the ability of students under clinical training to apply theoretical knowledge gained in class, as well as practical skills, to efficiently execute professional duties in hospital-based settings.
3. **Radiography Students**: These are individuals currently enrolled in a university and are currently undergoing training that would result in the award of a professional qualification in medical radiography.
4. **Clinical Instructor**: An already trained and qualified radiographer in charge of supervising, mentoring, and training trainee radiographers during clinical postings.

   Clinical Posting: A structured period of university training where student radiographers gain hands-on practical training in a hospital as part of their curriculum.
5. **Overcrowding:** A condition where the number of clinical radiographers among the student is excessively high. Training environment is greater than that of the instructors or the training facilities available.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

Student to instructor ratio is one of the concepts that are the focus in knowing how clinical education is learned and the success or failure of students in the acquisition of required skills, especially in areas like radiography, in which practical competence is critical (Koc & Celik, 2015). A student-to-instructor ratio is the number of students that a given Instructor is allocated to within a given time. In the best learning conditions, the ratio should be smaller in order to have individualized attention, better interaction, and direct supervision, which are all needed by the students in acquiring a hands-on ability in clinical practices. Conversely, high student to instructor ratio means that there is one clinical educator who is supposed to teach a big number of students and this may undermine the quality of teaching and limit the practical opportunities. Clinical competence with respect to radiography relates to the ability of a student to combine both theoretical knowledge that he or she has learned in the classroom and practical skills to carry out diagnostic imaging in a safe and accurate manner. It entails technical expertise, critical thinking, communicational skills and adherence to professional standards (Ugwu & Agwu, 2010). The development of this competence is a gradual process, which takes place through supervision, clinical experience and mentoring. This development process is very much effective depending on access of students to the presence of experienced instructors able to actively tutor, correct, and assess them.

The conceptual connection between the student to instructor ratio and the development is strongly related to clinical competence. In cases where the instructors have a large number of students, they might not be in a position to offer feedback in time or closely observe the performance of the students. This may result in poor practice in clinical practice, lack of adequate skills acquisition, and low confidence. In contrast, a more equal ratio allows the

meaningful interactions, increased supervision and better learning outcomes. The radiography programs in the Nigerian language are normally constrained by factors like the effect of large student to instructor ratios on overcrowding and ineffective infrastructure, this makes development of competence a critical issue.

The student to instructor ratio is a conceptualized independent variable in this study, which has an effect in the dependent variable; the clinical competence of radiography students. The interaction and the relationship between these variables is determined by other contextual factors like the access to training equipment, the clinical curriculum structure and institutional support systems. This relationship is important in understanding the areas of possible intervention which can be identified and improved in radiography training in Nigeria

2.2 Empirical Review

Numerous studies have been done to investigate how student-to-instructor ratios affect clinical learning. The few outcomes in health science education have focused on limited students of radiography in Nigeria. Studies have been carried out in other countries like Australia and the United Kingdom, and the United States continually demonstrates that high student to instructor ratios have negative effects, influences clinical supervision and the acquisition of skills. As an example, a research by Ludwick and Baughman, In the sphere of nursing education, (2022) discovered that in the cases when instructors had too many students at the same time, there was a deterioration in the level of supervision and students also complained of decreased levels of possibilities of practical experience and feedback. Similarly, Delany and Molloy (2009) cited that, overpopulated clinical groups resulted in the disengagement of the learners and shallowness of clinical exposure, which touched their competence and confidence. Like in the case of sub-Saharan Africa including Nigeria, same concerns have also been reported in the different medical and allied health programs. The works of Ohagwu et al. (2016), and others Ugwu and Agwu (2010) discovered that clinical

learning is impeded by the presence of large student groups in Nigerian radiography programmes because the instructors are tired and the accessibility to clinical equipment is limited. These implications of the findings are of particular importance to radiography education, where the complex diagnostic equipment must be supervised closely to achieve the technical precision as well as patient safety. A recent study by Chiegwu et al. (2022) documented that radiography students in universities in Nigeria often stated that they feel unprepared to handle clinical duties because of overcrowding training conditions and lack of presence of instructor. These findings provide evidence of a relationship though between availability of instructors and clinical competence, there are empirical studies which specifically concentrate on the situation with radiography in Nigeria is sparse, which means that there is a lack of local studies.

The overall tendency of the literature is towards an agreement that the successful preparation of clinical training presupposes sufficient supply of instructors. The fewer the students who are in the same instructor, time and attention per student, which also has a detrimental effect on the competence development in practical skills. Nevertheless, empirical studies are still in demand which can prove not only it's relationship within the particular setting of radiography training in Nigeria but also measure the effect of it in terms of the measurable variables such as clinical assessment scores, and instructor ratings.

2.3 Theoretical Framework

Various researchers have determined that learning is a central element of the development in human beings. Particularly, social constructivist theory of Vygotsky focuses on the fact that learning is a social process (Negi, 2020). In medical education, e.g. medical radiography, the interaction between students and their instructors is crucial to facilitating student knowledge and learning of the applicable patient-centered skills. In case of high student to instructor ratio, clinical education objective can be jeopardized and the intensity and frequency of such

interactions made it difficult, and curtailed opportunities of facilitated learning, professional growth and evaluation. The Experiential Learning Theory Kolb, in 1984, puts an added emphasis on the significance of learning by direct experience, reflection, conceptualization and experimentation. Clinical education is a practical subject by nature, and compels students to practice classroom learning in a practical diagnostic environment. One of the main steps in this process is the opportunity of performing procedures, contemplate results, and get feedback. Hands on with too many students per instructor opportunities are not as numerous, and personalized feedback is usually not in time or available enough, therefore breaking the experience learning process (Healey and Jenkins, 2000). In addition to this, the Cognitive Load Theory created by Sweller provides another layer in its emphasis on the restrictions of the human cognitive processing ability in learning. In the clinical setting, the two students and teachers are subjected to complicated exercises. In cases where an instructor is overworked with an excessive number of students, their learning capacity to handle and react to individual learning requirements reduces. This may complicate extraneous cognitive load on students leading to confusion and less learning efficiency (van Merrienboer and Sweller, 2005). A combination of these three theories assists in framing the realizing that a comfortable student-instructor ratio is not merely reasonable, but also a must. They underline the role of individualized supervision, group work and organized. All of them are crucial in the development of clinical competence through experiential learning. This study uses theoretical perspectives as a basis because it dwells on the aspects of how the structure of Nigerian radiography programmes in clinical training affect the effectiveness of students in terms of efficiency in carrying out medical imaging procedure.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Setting

The research was carried out in some of the accredited institutions in Nigeria that provide the Bachelor degree programs in Radiography

3.2 Study Design

This research adopted a descriptive cross-sectional survey design to evaluate the impact of large student-to-instructor ratios on the development of clinical competence among radiography students in Nigeria.

3.3 Target Population

The target population is 202 students and it was done with radiography students in their third to fifth year in accredited universities across Nigeria, as they are in their clinical year, with exposure to practical training in hospital settings, making them well-positioned to provide relevant insights on how large student-to-instructor ratios has impacted the development of clinical competence.

3.4 Sample Size

The sample size for this study will be calculated using the Taro Yamane formula with a 95% confidence level.

$$n = \frac{N}{1 + Ne^2}$$

Where;

n= sample size**.**

N = population size

e = sampling error assumed as 0.05

Assuming an estimated population (N) of 202 radiography students in clinical year across selected universities in Nigeria, the sample size (n) of 134 will be used:

$n = 202/1+202(0.05)^2$

$n \cong 134$

3.5 Sampling Technique

This study adopted a simple random sampling method to select participants from the target population of 3rd to 5th year radiography students across the selected institutions.

3.6 Inclusion Criteria

i. Participant are undergraduate radiography student currently enrolled in an accredited Nigerian university.
ii. They are in their clinical years (3rd to 5th year), actively engaged in clinical rotations.
iii. Students who are willing to provide informed consent and participate in the study.

3.7 Exclusion Criteria

i. Radiography students who are not in clinical year during the data collection period.
ii. Non-consenting students and those who are inaccessible during the data collection period.
iii. Postgraduate students and students undergoing clinical training outside Nigeria, because their experience may vary significantly from the study setting.

3.8 Method of Data Collection

This data was collected using a structured questionnaire designed to gather information on the impact of student-to-instructor ratios on clinical competence development among radiography students. It includes closed-ended and Likert-scale questions to measure students' perceptions, experiences, and challenges related to clinical training. The questionnaire was distributed both physically and electronically by sharing the survey link via WhatsApp and email to maximize reach.

3.9 Method of Data Analysis

This data was analysed using the Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics such as mean, percentage, and standard deviation will be used to present the data.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 DATA PRESENTATION

4.1.1 Introduction

This chapter presents the results of the analysis of the data collected from 202 Clinical level radiography students at the University of Benin, Edo state. We chose, reviewed, and presented the questionnaire answers that were most relevant to getting accurate study results.

The analysis is organized in accordance with the objectives of the study as stated below:

1. To assess the impact of large student groups on students' self-reported clinical competence.
2. To identify the challenges associated with large student-to-instructor ratios during clinical training.
3. To identify possible strategies for improving clinical competence development.

4.1.2 Demographic Information of Respondents

Table 4.1 shows the demographic description of the 202 people who took part in the research. The gender ratio is almost equal with 100 males (49.5) and 102 females (50.5), which means that there was no imbalanced gender participation among the final-year radiography students surveyed. Ages-wise, most of the respondents (141; 69.8) were aged between 20 and 25 years, the rest (47; 23.3) were below 20 years old and only 14 respondents (6.9) were aged between 26 and 30 years.

Table 4.1: Demographic Information of Respondents (N=202)

Variable	Category	Frequency	Percentage (%)
Sex	Male	100	49.5
	Female	102	50.5
Age	Below 20	47	23.3
	20-25 years	141	69.8
	26-30 years	14	6.9
	Above 30 years	0	0.0
Level of study	300L	55	27.3
	400L	54	26.7
	500L	93	46.0
Training Duration	1-2 times per week	113	55.9
	3-5 times per week	51	25.3
	others	38	18.8
Hopsital/ centre attended	Private Center	3	1.5
	State Hospital	5	2.5
	Federal Hospital	194	96.0

None of the respondents was over 30 years. This trend is characterized by the average age range of the students of radiography, as the majority of them are in their early twenties. On level of study, 93 respondents (46.0%), 55 (27.3%), and 54 (26.7%), were in 500 level, 300 level, and 400 level, respectively. This implies that the majority of the participants were in the final phase of their program and therefore, they were in the appropriate position to give informed responses on career pathway options. During the training period, the majority of students (113; 55.9) attended clinical training 1-2 times each week, 51 (25.3) 3-5 times each week and 38 (18.8) other training frequencies. This difference implies that some of the respondents have had different levels of clinical exposure. After all, the analysis of the clinical training centers attended reveals that the vast majority (194; 96.0) of those who were trained in Federal Hospitals, with 5 (2.5) in State Hospitals and only 3 (1.5) in Private Centers. This illustrates that a majority of the students attain their clinical experience in the federal institutions which are likely to offer the most comprehensive facilities and exposure to cases in the practice of radiology.

4.1.3 Impact of Large Student Groups on Self-Reported Clinical Competence.

Table 4.2 shows the responses and the mean scores of 202 radiography students on their perceptions of the impact of large student groups on their clinical competence. The data reveal that the students tend to believe that large group sizes are the barrier to effective clinical learning and skill acquisition. Most of the respondents strongly believed that large groups of students reduce chances of practicing radiographic procedures (Mean = 4.42) and quality of feedback given by instructors (Mean = 4.40). On the same note, the majority of students were highly confident in their clinical skills regardless of the group size (Mean = 4.36), indicating that they felt strong or self-motivated as learners to study under the limited conditions of learning.

Table 4.2: Responses and Mean Scores on the Impact of Large Student Groups on Self-Reported Clinical Competence. (Likert Scale 1–5) (N=202)

Questions	SA	A	N	D	SD	Mean score	Remark
Large student groups limit my opportunity to practice radiographic procedures.	117	64	11	8	2	4.42	Strongly agree
I feel confident in my clinical skills despite being in a large student group.	105	73	16	7	1	4.36	Strongly agree
Large student-to-instructor ratios reduce the quality of feedback I receive.	115	64	12	11	0	4.40	Strongly agree
My ability to develop critical thinking skills in clinical practice is hindered by large group sizes.	97	59	22	21	3	4.12	Agree
Being in a large group affects my confidence in independently performing radiographic procedures.	87	80	10	21	4	4.11	Agree
I believe large student groups negatively impact the development of my clinical competence.	90	71	21	16	4	4.12	Agree
Despite large groups, I am satisfied with my overall clinical learning experience.	28	35	24	60	55	2.61	Disagree

In addition, the respondents were in agreement that large group sizes prevent the acquisition of critical thinking skills in clinical practice (Mean = 4.12) and influence their confidence in their ability to execute radiographic procedures on their own (Mean = 4.11). The second one

was also that large groups have a detrimental effect on the overall development of clinical competence (Mean = 4.12).

Nevertheless, students did not agree that large groups did not satisfy them with their total clinical learning experience (Mean = 2.61). It means that students could still have confidence in their personal abilities, but they are not satisfied with the quality and the level of their clinical exposure in overpopulated training environments.

The findings, on the whole, indicate that the student-to-instructor ratios might be too high in radiography training settings, making practical learning opportunities, as well as individual, feedback, and satisfaction with clinical training, restricted. Regardless, the students seem to have moderate self-confidence in their skills, which is probably due to adaptive coping skills and learning experience. The insights indicate that the student-instructor ratios and smaller and more interactive clinical groups can be used to optimize learning and competence in skills levels among radiography students.

4.1.4 Challenges of Large Student-to-Instructor Ratios.

Table 4.3: Responses on Challenges of Large Student-to-Instructor Ratios. (N=202)

Questions	Responses (Frequency %)		
	Yes	No	Maybe
Do large groups cause delays in having access to equipment during clinical training?	169 (83.7%)	15 (7.4%)	18 (8.9%)
Have you ever missed the opportunity to perform a procedure because of group size?	162 (80.2%)	25 (12.4%)	15 (7.4%)

Does the limited number of instructors make it difficult to get individual supervision?	147 (72.8%)	36 (17.8%)	19 (9.4%)
Do you find it challenging to ask questions or seek clarification in large groups?	117 (57.9%)	62 (30.7%)	23 (11.4%)
Does overcrowding during clinical training reduce your ability to observe procedures clearly?	152 (75.3%)	36 (17.8%)	14 (6.9%)
Have you experienced difficulty in receiving timely feedback due to large group sizes?	151 (74.8%)	37 (18.3%)	14 (6.9%)

Table 4.3 shows the answers of students regarding the difficulties they face due to high student-to-instructor ratios when training in the clinic. The statistics show that congestion in clinical settings has a great impact on access to learning opportunities, supervision, and feedback by the students. Many respondents (169; 83.7) indicated that they thought large groups led to delays in accessing radiographic equipment, whereas 162 (80.2) said that they had missed a chance to operate because of the size of the group. On the same note, 147 students (72.8) reported that due to the low number of instructors, they could not easily have sufficient individual supervision. Moreover, 117 participants (57.9) were difficult to ask or seek clarification in large groups, which implies that overcrowding will not allow active participation and interaction during clinical sessions. Furthermore, 152 students (75.3) stated that overcrowding diminished their capacity to view procedures easily and 151 (74.8) gave responses that large-size classes led to time wastage in getting prompt feedbacks with their

instructors. In general, the results indicate that high student-to-instructor ratios have a negative effect on the quality of radiography clinical training.

4.1.5 Strategies for Improving Clinical Competence Development

Table 4.4 is a summary of the students regarding their answers on measures that may improve the development of clinical competence in radiography training. The results indicate that there is a high agreement between the respondents on some strategies that can alleviate the challenges of large numbers of students and low instructor supervision.

A huge percentage of respondents (172; 85.2) expressed the view that their clinical learning would be greatly enhanced in case of the reduction of the student group. Similarly, 178 students (88.1%), were of the opinion that the use of more clinical instructors would lead to a high competence among students by providing them with a closer supervision and personal feedback.

Table 4.4: Responses on Strategies for Improving Clinical Competence Development (N=202).

Questions	Responses (Frequency %)		
	Yes	**No**	**Maybe**
Would reducing student group sizes improve your clinical learning?	172 (85.2%)	6 (3.0%)	24 (11.8%)
Do you think assigning more clinical instructors would enhance student competence?	178 (88.1%)	3 (1.5%)	21 (10.4%)
Should clinical training be extended to	185	8	9

allow more individual practice?	(91.6%)	(4.0%)	(4.4%)
Would the use of clinical simulation labs help complement limited instructor availability?	179 (88.6%)	4 (2.0%)	19 (9.4%)
Should institutions collaborate with more hospitals to reduce overcrowding in clinical sites?	176 (87.1%)	4 (2.0%)	22 (10.9%)
Do you believe peer-assisted learning could improve competence in large groups?	180 (89.1%)	4 (2.0%)	18 (8.9%)
Would structured mentorship programs help address the challenges of large student-to-instructor ratios?	176 (87.1%)	5 (2.5%)	21 (10.4%)

A further larger percentage, 185 respondents (91.6%), proposed increasing the clinical training time so as to have a greater clinical hands-on practice and skills development. Moreover, 179 students (88.6) supported the use of clinical simulation laboratory to supplement the lack of instructors, and 176 (87.1) students suggested institutional cooperation with more hospitals to eliminate overcrowding in clinical sites.

Besides, 180 respondents (89.1%) acknowledged peer-assisted learning as an effective practice to enhance shared learning and strengthen competence in large groupings. In the same breath, 176 (87.1) respondents indicated that structured mentorship programmes would be useful in dealing with problems linked to high student to instructor ratio.

Overall, the findings suggest that a multifaceted strategy to the development of clinical competence, such as the reduction of the size of the group and the number of instructors, the duration of training, better simulation-based practice, and mentorship, is highly preferred by radiography students.

4.2 DISCUSSION

The results of this study suggest that high student-to-instructor ratios and clinical exposure have a strong effect on the perceived value of the training to radiography students, and can be used to explain the trends in career pathway choices. Large student groups were overwhelmingly reported by the respondents to restrict the opportunity to apply radiographic procedures (mean = 4.42) and decrease the quality of feedback provided (mean = 4.40). These replies underline a discrepancy between the requirements of the training environment and the demands of the development of clinical competency.

In this regard, previous research highlights that simulation-based education (SBE) has a potential solution to the clinical placement strain: a scoping review of the education in medical radiation science suggests that simulation enables students to learn their skills in a safe setting, but the authors prompt that it should be used in addition to clinical placement but not instead (Chau et al., 2023). In fact, learners of one simulation program said that they developed the skills, gained comfort, and communicated better at any level of placement (Turner et al., 2022). These results justify the student recommendations in this research that simulation laboratories would be able to counter the adverse impacts of oversized clinical teams.

Further, this research found that student participants of this study valued personal interest (80.5%) and financial rewards (71.9%) when choosing career pathways. This is congruent with the recent studies on the motivation of radiography students: a survey of UAE students revealed that the interest in imaging technology, career opportunities, and career

advancement were major factors (Peterson et al., 2025). Personal interest was not as important in that study compared to extrinsic variables like job availability and opportunities of specialization. Therefore, the trend that a great number of the people we interviewed selected clinical pathways like Diagnostic Radiography (69.5%) and MRI/CT (57.8%) indicates that perceived opportunity and specialization might prevail over exposure to non-clinical paths like administration (19.5%).

Surprisingly, the students were sure of their clinical ability even in large groups (mean = 4.36), but low in satisfaction of the clinical training experience (mean = 2.61). In this paradox, the levels of confidence can be intrinsically motivated or learned, as opposed to optimal learning conditions. Theoretically, these trends are consistent with the self-determination theory: students can retain self-efficacy in demanding environments, but still feel that the learning environment has weaknesses (Deci and Ryan, 2017).

It is also striking that the choice of administration and academic/research has been low. A recent global survey of academic career opportunities in radiography found that there is a significant inconsistency in promotion criteria and perceived barriers that could be discouraging to students not in clinical careers (Zanardo et al., 2023). The current findings indicate that a deficiency of exposure, mentorship or definite ways of entering the field of leadership or academics can narrow interest in those fields. In fact, 55.1% of the respondents stated that they had a mentor or a role model, although the thematic analysis indicated that only 22.8% used formal mentorship programs as a method of clinical competence development. This gap highlights the need to further develop mentoring outside the technical training to encompass career awareness.

When it comes to training quality, the vast majority of the students supported the following strategies of the training reduction of group size (85.2%), addition of more instructors (88.1%), more clinical training (91.6%), and peer-assisted learning (89.1%). Such preferences

are reflective of literature suggestions: e.g., one study on placement experience in Australia and Ethiopia concluded that the sense of relatedness and belonging of a student during practicum was a significant effect on clinical performance (Coleman et al., 2024). Smaller groups, supportive supervision and mentoring consequently increase student engagement and competence.

There are two implications of these findings. In the first place, the curriculum designers and clinical training coordinators ought to focus on the organization of clinical settings that support the individual practice, feedback, and mentorship in a timely manner. This may involve re-balancing student to instructor ratios, scaling up of simulation facilities and institutionalization of peer learning models. Second, career guidance programmes must be active and proactive to expose the students to the entire range of radiography career pathways early, in particular administrative, academic, and leadership. In the absence of such exposure and mentoring, students can revert to clinically familiar specialization prompted by immediate interest or perceived opportunity which will have the effect of limiting the talent pipeline to non-clinical positions.

CHAPTER FIVE

CONCLUSION, RECOMMENDATIONS, LIMITATIONS AND SUGGESTIONS FOR FUTURE STUDIES

5.1 CONCLUSION

This study assessed how high student-instructor ratios influenced the acquisition of clinical competence in the students of radiography in Nigeria. The results showed that congested clinical environments were a major obstacle to students achieving practical learning, supervision and feedbacks in a one-on-one arrangement, which are essential aspects of clinical education. Most students showed a lower level of satisfaction with their clinical training experiences despite their confidence in their abilities. The findings highlight why educational establishments need to lower the number of students to instructors, increase the length of clinical training, and incorporate learning simulations to supplement the scarce clinical exposure. It is also necessary to strengthen mentorship programs, encourage peer-assisted learning, and increase the number of collaborations with additional clinical centers. Through such challenges, radiography training programs in Nigeria will be able to create a more favorable learning experience that will result in competence, confidence, and professional preparedness among future radiographers.

5.2 RECOMMENDATIONS

1. Academic programs in Radiography ought to focus on ensuring that they have a smaller number of students during their clinical placements. This will allow more personalized supervision, regular feedback, and sufficient opportunities given to each student so that they can carry out radiographic procedures.
2. The lack of qualified clinical instructors is an acute problem. Teaching hospitals and universities are to hire more radiographers as tutors in the clinical setting and provide them with periodic pedagogical education to improve their teaching abilities.

3. The clinical training schedules are to be restructured to reduce congestions. The institutions could swap students between several recognized hospitals or diagnosis centers to spread training burdens and exposure as much as possible.
4. Limited clinical opportunities can be supplemented with the inclusion of simulation laboratories and the use of virtual radiography tools. The simulated sessions will allow the students to rehearse the fundamental skills in a secure environment and with repetition, prior to executing actual operations.

5.3 LIMITATIONS

1. The researcher only conducted the study in few radiography training institutions in Nigeria. The results, therefore, might not be a complete reflection of the experiences of all radiography students in the nation or other fields of health care.
2. The collection of the data was performed at a single point in time that only reflected the perceptions at the moment. This design will be unable to measure the impact of a big group exposure on the development of clinical competence throughout the training period.
3. Self-administered questionnaires might have caused a bias in the answers since the respondents were not measured based on their competence but only on subjective views of the competence.

5.4 SUGGESTIONS FOR FUTURE STUDIES

1. To be able to compare regions and to get more generalizable results, it is recommended to use more diverse universities and Nigerian or West African-based clinical centers in future studies.
2. Following the radiography students during their clinical training would be useful in establishing the effect of exposure to different student-instructor ratios on skill growth with time.

3. The researchers were able to experimentally determine the effectiveness of interventions including simulation training, mentorship, or peer-assisted learning to reduce the impact of large classes.
4. The roles of accreditation standards, funding policies and institutional management practices in the development of student-to-instructor ratios and clinical learning outcomes could be examined in the future.

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