International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

Challenges Faced by Undergraduate Radiography Students in Sokoto Northwest Nigeria, During Long Vacation Clinical Posting

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ABSTRACT

Introduction: Long vacation posting for clinical training and experience forms a major requirement in radiography education in Nigeria and for the award of Bachelor's degree at the Usmanu Danfodiyo University Sokoto. The competence level of a qualified radiography student is ensured by the effectiveness and quality of the clinical training obtained during the teaching-learning process. Therefore identifying the challenges of Radiography students in the clinical learning environment during long vacation posting is imperative to improving the quality of the training.
Aim: Is to highlight major challenges faced by students undergoing undergraduate radiography study during their long vacation clinical posting.
Materials and Methods: A prospective study employing a descriptive survey approach was conducted, targeting 300 and 400 level undergraduate radiography students in the clinical year, 2016/2017 academic session at the Radiography department of Usmanu Danfodiyo University, Sokoto. A 14-item self-completion questionnaire consisting of four sections, designed in line with the aim of the study, was used for data collection.
Result: After data analysis, the study identified the following challenges faced by the students and these included lack of allocation of the students to ward or theatre rooms (84%), and Dental imaging rooms (88%). The allotted time to each of the imaging modality rooms such as Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and Ultrasound had (26%), (24%) and (38%) respectively, before they were rotated and this was grossly inadequate and only a few had hands-on in the radiographic examination of the mandible (4%), or had witness mammographic examination (6%), absence or inadequate number(s) of qualified radiographers, lack of Knowledge update (Seminars/presentations), and distance from accommodation to the hospital had a distribution of 10(20%), 22(44%) and 24(48%) respectively.
Conclusion: The research revealed, that majority (68%) of the students were of the opinion that long vacation clinical posting was very educating regardless of the challenges faced. These challenges include, inadequate allocation of students to different wards (ward radiography), inadequate time allotted to some of the imaging modality rooms, absence or inadequate qualified radiographers, lack of Knowledge update (Seminars/presentations), and distanced to accommodation.
Keywords: Radiography, Clinical posting & training, Challenges, Skills development, Education

INTRODUCTION

Radiography education in Nigeria involves both classroom theory based academic knowledge and clinical training processes. Training in this contest is used to describe the transformation process from

novice to expert radiographer, and this begins in the first year of the radiography education. This includes theoretical learning, simulations in skill laboratories and hospital-based practice under the supervision of clinical tutors. [1]

Clinical training is one of the requirements for the award of Bachelor's degree for every radiography student and it is an important part of the professional Radiography education at the Usmanu Danfodiyo University Sokoto. [2] Therefore long vacation clinical posting is a compulsory component of the clinical year (300 - 500 level) syllabus, which ensures high quality training of a radiography student for optimal delivery of radiographic services and patient care. In order to demonstrate this competency, graduate radiographers most be able to practice in the real word. [3]

During the long vacation clinical posting, students are taught to use, adapt and integrate the theoretical aspect of radiography training within the clinical environment, acquiring skills necessary to become competent radiographers. [1] A qualified Radiographer is responsible for supervising the student during the long vacation clinical posting at the various hospitals, and diagnostic centers where the students are posted to in other to ensure that appropriate clinical skills and knowledge are transferred to the students.

Therefore identifying the challenges faced by Radiography students during long vacation posting at the various sites could improve the quality of the training. Several challenges have been documented in many countries regarding clinical trainings, [4,5] and even in some part of Nigeria. [1] However there is no documentation on the challenge(s) faced by students in Northwestern Nigeria as compared to the well documented challenges in Southeastern Nigeria by Ohagwu et al. [1]

This study attempts to identify, document and to recommend solution(s) to the existing challenges faced by radiography students during long vacation clinical posting.

METHODOLOGY

A prospective study employing a descriptive survey approach was conducted, targeting 300 and 400 level undergraduate radiography students in the clinical year, 2016/2017 academic session at the Radiography department, Usmanu Danfodiyo University Sokoto, who had commenced their long vacation clinical posting. The first and second year radiography undergraduate students were excluded because they are not yet in the clinical year. A total of 50 participants were drawn from the two levels and this formed the sample of the study.

Questionnaires are considered as part of a survey approach [6,7] as it enables the participants to report to the researcher about their perception or experience. [8] In view of this, a 14-item self-completion questionnaire consisting of four sections, designed in line with the aim of the study, was used for data collection. The sections included demographic information, hospital postings (location), student's perception, and available resources. The questionnaire was distributed to all students within the inclusion criteria and consented to participate.

The study was approved by the Research Ethics Committee of the Radiography Department, Usmanu Danfodiyo University Sokoto and also permission to conduct the study was sought and obtained from the head of department of radiography before the study questionnaires were administered to the participants.

RESULT

A total number of 58 questionnaires were distributed, 50 were completed and returned, giving a response rate of 86.2%. 27(54%) of the respondent were in 300 level while 23(46%) were in 400 level. Out of the respondents 46 (92%) were found in the age range of 20-24 years and 8% in the age of 25-32 years. The sample population was dominated by the male students with a ratio of 3:1. Most of the respondent 48(96%)

were single while 2(4%) were married. More so, the ethnicity distribution shows that the Hausa 35(70%) was dominant, followed by the Fulani 4(8%) then the Nupe 3(6%). Other ethnic groups were Ebira 1(2%), Fakkwawa 1(2%), Igala 1(2%), Zabarma 1(2%), Yoruba 1(2%), and Zuru 1(2%). Their religions were either Islam 47(94%) or Christianity 2(4%) as shown in table 1 below.

Table1: Demographic Data of Participants

SEX	FREQUENCY	PERCENTAGES
Male	38	76%
Female	12	24%
Total	50	100%
AGE RANGE (YEARS)		
20-24	46	92%
25-32	4	8%
Total	50	100%
Marital Status		
Single	48	96%
Married	2	4%
Total	50	100%
Ethnicity		
Ebira	1	2%
Fakkwawa	1	2%
Fulani	4	8%
Hausa	35	70%
Igala	1	2%
Nupe	3	6%
Zabarma	1	2%
Yoruba	1	2%
Zuru	1	2%
-	2	4%
Total	50	100%
Religion		
Islam	47	94%
Christianity	2	4%
-	1	2%
Total	50	100%

The long vacation clinical posting of the students cut across a total of 11 states in Nigeria, with Sokoto state having the highest number of students 19(38%) on clinical posting, Kaduna and Zamfara having 5(10%), River, Kwara, and Lagos state had 1(2%) respectively, as shown on fig1 below. The University teaching hospital had the highest intake of student (56%), Federal medical center (30%), State own hospital (12%) and Private medical center had the least intake of (2%) as shown on table 2 below.

Table 2: Distribution of Hospital where participant had long vacation clinical posting

HOSPITAL	NO. STUDENT	PERCENT
Federal Medical Center	15	30%
State Own Hospital	6	12%
University Teaching Hospital	28	56%
Private Medical Center	1	2%

On table 2, majority of the participants attended their clinical posting at a University teaching hospital (30%), whereas only (2%) attended a Private medical center.

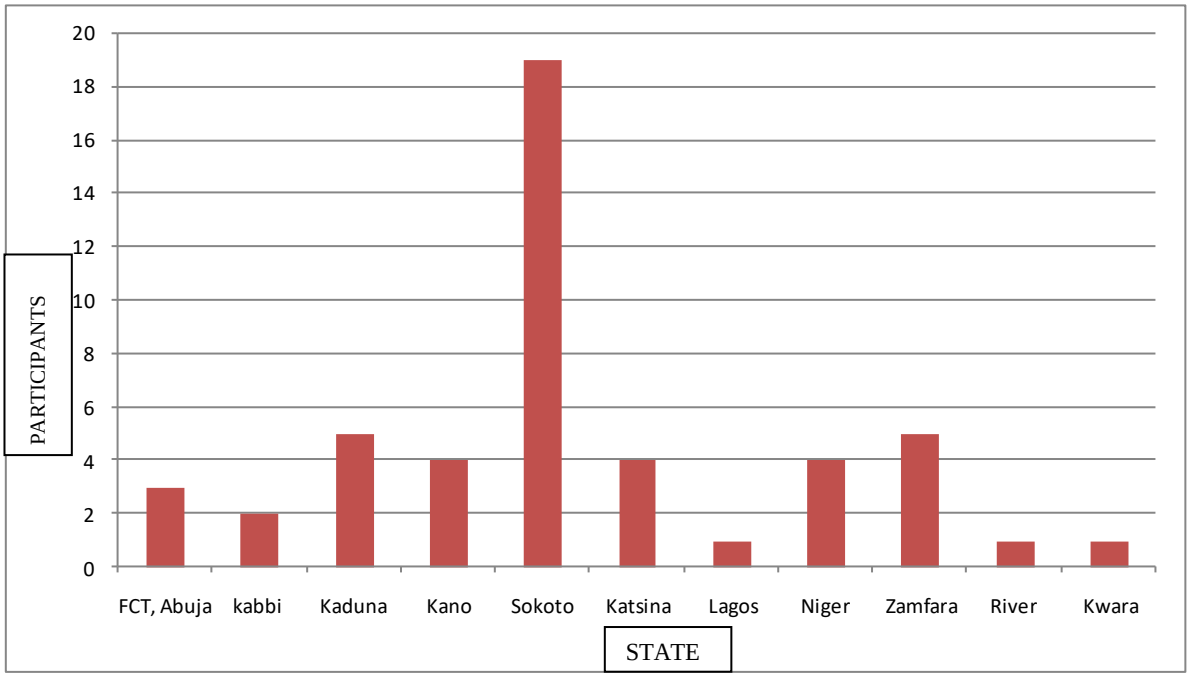

Figure 1: Distribution of states where participant had long vacation clinical posting

Table 3: Distribution of student's perception on Clinical posting settings

PERCEPTION	STRONGLY AGREED	AGREED	DISAGREE	STRONGLY DISAGREE	UNDECIDED
Availability of adequate (Radiographers and Darkroom technicians)	25(50%)	21(42%)	4(8%)	-	-
X-ray rooms with proper wall lead-lining	25(50%)	21(42%)	3(6%)	-	1(2)
Availability of Radiation protection gadgets	5(10%)	37(74%)	6(12%)	2(4%)	2(4%)
Standing behind a lead shield glass before making exposures (radiation protection)	50(100%)	-	-	-	

A total of 92% of the participant agreed that in the aspect of staffing; both radiographers and darkroom technicians were adequate in the various hospitals where they had the clinical posting, where as 8% disagreed. More so, 84% agreed that radiation protection gadgets were used while 16% disagreed.

Table 4: Distributions of student's perception of Radiographer's at clinical posting.

PERCEPTION	STRONGLY AGREED	AGREED	DISAGREE	STRONGLY DISAGREE	UNDECIDED
Was the inculcation for clinical posting at your radiography department useful?	21(42%)	27(54%)	-	-	2(4%)
Did you receive orientation from the supervisors/clinical staff upon arrival?	18(36%)	25(50%)	7(14%)	-	-
Where you expected at your clinical posting room?	13(26%)	31(62%)	5(10%)	-	-
Was the duty roaster available to you in advance?	4(8%)	27(54%)	14(28%)	5(10%)	-
Was the practical experience and supervision offered to you appropriate and up to your expectation?	12(24%)	27(54%)	11(22%)	-	-
The clinical staff's were willing and available to assist learning?	23(46%)	23(46%)	4(8%)	-	-
Did the staff take your errors and mistake into consideration and proffer correction/solution?	18(36%)	30(60%)	1(2%)	1(2%)	-

Table 5a: Distribution of available resources for student radiographers

	X-RAY MACHINE		CASSETTE & FILMS of varying sizes		ANATOMICAL MARKER / LEGENDS		ACTINIC MARKER	
	Available	Not available	Available	Not available	Available	Not available	Available	Not available
FMC	15(30%)	0	15(30%)	0	15(30%)	0	4(8%)	10(20%)
PMC	1(2%)	0	1(2%)	0	1(2%)	0	1(2%)	0
SOH	6(12%)	0	6(12%)	0	6(12%)	0	1(2%)	5(10%)
UTH	28(56%)	0	26(52%)	2(4%)	28(56%)	0	5(10%)	22(44%)
TOTAL	100%	0%	96%	4%	100%	0	22%	74%
Where FMC = Federal Medical Center, PMC = Private medical Center, SOH = State Own Hospital, UTH = University Teaching hospital.								

Table 5b: Distribution of available resources for student radiographers

PERCEPTION	MANUAL PROCESSOR	AUTOMATIC PROCESSOR	BOTH PROCESSOR	NO	YES	CR	DR	UNDECIDED
Availability of manual or automatic processor	12(24%)	8(16%)	29(58%)	-	-			1(2%)
Availability of CR or DR	-	-	2(4%)	-	-	20(40%)	5(10%)	23(46%)
Functioning CR or DR	-	-	-	10(20%)	24(48%)	-	-	16(32%)
Is there a dedicated CT unit in the hospital?	-	-	-	16(32%)	33(66%)	-	-	1(2%)
Is there a dedicated Ultrasound unit in the hospital?	-	-	-	4(8%)	44(88%)	-	-	2(4%)

Table 6: Distribution for imaging rooms to participants and time allotted before rotation

IMAGING ROOMS PARTICIPANTS HAVE BEEN TO				TIME ALLOCATED BEFORE ROTATION				
Imaging modalities	**Yes**	**No**	**Undecided**	**Very Adequate**	**Adequate**	**Inadequate**	**Very Inadequate**	**Undecided**
Conventional x-ray	49(98%)	0(0%)	1(2%)	33(66%)	15(30%)	0(0%)	0(0%)	2(4%)
Fluoroscopy	19(38%)	28(56%)	3(6%)	6(12%)	11(22%)	5(10%)	7(14%)	21(42%)
CT	25(50%)	41(82%)	4(8%)	7(14%)	13(26%)	1(2%)	12(24%)	17(34%)
MRI	7(14%)	39(78%)	4(8%)	6(12%)	4(8%)	0(0%)	12(24%)	28(56%)
Dental	4(8%)	44(88%)	4(8%)	2(4%)	1(2%)	3(6%)	12(24%)	32(64%)
Angio/ DR/CR	6(12%)	40(80%)	4(8%)	4(8%)	3(6%)	3(6%)	13(26%)	27(54%)
Mammography	13(26%)	33(66%)	4(8%)	4(8%)	8(16%)	4(8%)	11(22%)	23(46%)
Ultrasound	28(56%)	19(38%)	3(6%)	9(18%)	9(18%)	10(20%)	9(18%)	13(26%)
Ward/theatre	4(8%)	42(84%)	4(8%)	1(2%)	2(4%)	7(14%)	10(20%)	30(60%)

Table 7: Distribution for radiographic examination participant had hands on, and observed.

Examinations	Pelvis	HIP	Chest	Skull	C/S	TH/S	L/S	PNS	Abdomen	KUB	Mandible	U/L	L/L
Conventional exams	23 (46%)	7 (14%)	43 (86%)	18 (36%)	16 (32%)	15 (30%)	28 (56%)	7 (14%)	17 (34%)	28 (56%)	2 (4%)	50 (100%)	50 (100%)
Ct exams	3 (6%)	-	2 (4%)	17 (34%)	-	-	-	-	19 (38%)	-	-	-	-
MRI exams	-	-	1 (2%)	5 (10%)	-	-	2 (4%)	-	3 (6%)	-	-	-	2(4%)
USS Exams	OBST = 10(20%), GYNE = 1(10%), ABDOMEN = 15(30%), ABD-PELVIS = 5(10%), PELVIS = 6(12%), BREAST = 6(12%), DOPPLER = 13(26%), NEONETAL= 2(4%)												
MAMMO EXAMS = 3(6%)							DENTAL EXAMS = 0(0%)						
CONTRAST EXAMINATIONS													
CONTRAST STUDIES	IVU	HSG	RCUG	MCUG	Ba.ENEMA	Ba.SWALLOW		Ba.MEAL	GENITOGRAM	Ba. FOLLOW THRU			
% Of respondent	35(70%)	34(68%)	25(50%)	11(22%)	11(22%)	5(10%)		8(16%)	3(6%)	3(6%)			
Where C/S = Cervical spine, TH/S = Thoraco-lumbar, L/S = Lumbosacral spine, PNS = Post nasal space, U/L = Upper limb, L/L = Lower limb, Ba = Barium, IVU = Intravenous urography, HSG = Hesterosalpingography, RCUG = Retrograde cystography, MCUG = Micturating cystography, OBST = Obstetrics, GYNE = Gynaecology													

Table 8: Distribution of possible limitation to the success of long vacation clinical posting and comments by participants

POSSIBLE LIMITATION	**YES**	**NO**	**UNDECIDED**
Poor radiographic practice	4(8%)	-	-
Fewer or No patient(s)	4(8%)	-	46(92%)
Too many patients	12(24%)	-	38(76%)
Absence / Inadequate number of qualified Radiographers	10(20%)	-	-
Language barrier	8(16%)	-	-
Distance from accommodation to hospital	24(48%)	-	13(52%)
Inter professional bias	13(26%)	-	37(74%)
Inadequate/Lack of Knowledge update (Seminars/presentations)	22(44%)	-	28(56%)
Was there any form of sexual harassment face during the posting	-	50(100%)	
PARTICIPANT'S COMMENTS			
Very Educative	34(68%)		
Short Duration	2(4%)		
Gain practical experience	33(66%)		
Kept us busy	10(20%)		
Had hands on experience	25(50%)		
Ultrasound operated by Radiographer	2(4%)		
Inadequate modalities	6(12%)		
Radiographer not ready to teach	1(2%)		
Radiologist not ready to teach	1(2%)		
Elderly technicians not ready to teach	1(2%)		
Religious bias	1(2%)		
Non functional modality	2(4%)		
Not efficient	1(2%)		

DISCUSSION

The first step's in improving the quality of radiography training is identifying the challenges that comes as the training progresses. This study was set to identify the challenges faced by undergraduate radiography students in Sokoto northwest Nigeria, during long vacation clinical posting. The findings of these study shows that majority of the participant were male students (76%) compared to female students (24%) with a ratio of 3:1, which could be related to the low level of girl child education in this region. [9] Majority of the participant were in 300 level (54%), while the remaining 46% were in 400 level.

On Student's perception of long vacation clinical posting settings;

The result of the study revealed that students found it to be very educating (68%), gained practical experience (66%) and were satisfied with the staffing within the clinical posting setting; this was revealed by 92% of the participant. Furthermore, it revealed that the walls of the imaging rooms were lead lined, radiation protection gadget were in use and that before any exposure were made, the radiographers and students radiographers were protected by standing behind lead shield glass, as recommended by Johnston et al. and Cletus et al. [10,11] this was revealed by 92%, 84% and 100% respectively.

On Student's perception of Radiographers at clinical posting settings;

It can be deduced from the findings on table 4 above, that 96% of the participant agreed that inculcation of clinical posting at the radiography department in the University was useful. Also 86% of the participant agreed that orientation by the supervisor/clinical staff upon arrival was adequate and 78% agreed that the practical experience and supervision offered were adequate and up to their expectations. With this result, it is obvious that the study had provided the students with the opportunity to reflect critically on the various roles played by their lecturers at the departmental level and the clinical instructors at the long vacation posting site. However, one of the challenges here that was reported by the student (38%) indicates that the duty roaster was not available to them in advance. This could be due to the fact that clinical instructors needs to know the total numbers of student coming in for the posting before preparing the duty roaster.

On Availability of Resources;

Table 5a above, shows the distribution of available resources for student radiographers at the various clinical posting sites, 100% of the participants reported that x-ray machines, anatomical markers and legends were available. The availability of resources in the training and development of student radiographers is very essentials [2] and thus eliminate the challenges pointed out by Adams [12] in the preparation of students into the health profession. However 74% reported that actinic markers were not in use. The in availability of actinic marking in most of the hospital entails that patient identification were done manually.

It was also reported by 24% of the participant that most of the hospital still operates manual processing, while 58% reported the use of both automatic and manual processing. From the data gathered 46% of the participants were undecided on the use of Computed Radiography (CR) or Digital Radiography (DR) by the hospitals. Although, 48% agreed that the CR or DR were functional in the hospital where they had their long vacation clinical posting. More so, majority of the participant 66% reported that there were dedicated Computed tomography (CT) machine and 88% reported that the hospital had Ultrasound machines, and are functional. With the availability of these modalities, more students will benefit from the clinical training in such hospitals and would have better clinical experience to such modalities compared to their counterpart in other hospital without such facilities.

On imaging modality room's participants have been allocated to and the time allocated before rotation.

Majority of the students (98%) were observed to be allocated to the conventional X-ray room as shown on table 6 above, this confirmed the availability of these imaging modality in the entire clinical posting sites. However a total of 84% of the participant reported that they were not allocated to the ward or theatre room, 82% to the CT imaging room, and an overwhelming 88% of the respondents had never been to Dental radiography room, which is similar to that reported by Kyei et al, [4] in Ghana. This could be due to the absence of this specialized dental imaging modality and qualified dental radiographer in these hospitals, which in turn makes training in this area difficult and inadequate.

In addition, the time allocated to each of the imaging modality room before rotation for CT, MRI, and Ultrasound were inadequate as reported by participant 13(26%), 12(24%) and 19(38%) respectively. Inadequate time allocation could result to poor clinical training and poor radiographic service delivery.

The duration of long vacation clinical posting plays a major role and also depends on the time allocated to each modality, however according to Penman and Oliver [13] while students are able to choose the location of their clinical posting, the amount of time and type of experience needed in clinical settings is still subject to debate.

On Radiographic examination participant had hands-on, and observed.

As seen on table 7 above, the most common radiographic examination the participant had hands-on were mostly upper limb (100%), lower limb (100%) and chest x-rays (86%) respectively. However, only a few 2(4%) reported that they had hands-on in radiographic examination of the mandible.

The most of Computed tomography (CT) and Magnetic resonance Imaging (MRI) examinations witnessed by the participants were reported to be Abdominal CT (38%), Brain CT (34%) and MRI Brain (10%) respectively. While only 4% of MRI lumbar spine was witnessed. More so, only 10% of the participant witnessed gynecological Ultrasound examinations, 6% mammographic examination, and 0% dental examination.

Intravenous urography (IVU) was the most reported contrast examination witnessed by 70% of the participant, while Genitogram and Barium follow through were the least reported by the participant of 6%.

Possible limitations to the success of the long vacation clinical posting and comments by participants

From the findings on table 8 above, it is evident that religious bias was less of an issue during the long vacation clinical posting, as only 2% of the total participant did comment on it. Furthermore, it was observed that the ultrasound imaging modalities were operated by other professionals within the clinical settings, as only 4% of the participant reported that radiographers did perform ultrasound scan. It was further reported by the participant that some of the limitation to the success of the clinical posting was due to Absence / inadequate number of qualified radiographers, lack of Knowledge update (Seminars/presentations), and distance from accommodation to the hospital with a distribution of 10(20%), 22(44%) and 24(48%) respectively.

CONCLUSION

The findings of the study conducted revealed that majority of the students found the long vacation clinical posting to be very educating and that they gained practical experience as they had hands-on while in the imaging rooms. However, a number of challenges were revealed and needs to be taking into serious consideration in the training and development of undergraduate radiography students in Sokoto North west Nigeria. Among this challenges were lack of allocation of the students to specialized procedure rooms such as Ward/theater rooms, dental imaging rooms and only a few witnessed mammographic examinations. The absence of a dental unit in most of the hospital is a setback in the clinical training of these students in Dental Radiography. Also the allotted time to each of the imaging modality rooms especially for CT, MRI, and Ultrasound before rotation were grossly inadequate. Furthermore, other limitations to the success of the clinical posting were attributed to the absence or inadequate number of qualified radiographers, lack of Knowledge updates (Seminars/ presentations), and distance from accommodation to the hospital.

Recommendation

From the outcome of these studies, the recommendations that will be proffer are as follow.

First of all, the research recommends that students should be allocated more to the specialized imaging rooms in order for them to acquire the necessary skills required.

Dental unit should be in cooperated into some of the hospitals lacking the modality and Dental radiographers should be employed in order to provide training for students on clinical postings or on the other hand, students should be posted to centers where these modalities are present.

Secondly, it will be suggested to the centers that the allotted time to each of the imaging modality rooms should be increased, especially for the advancing imaging modalities due to the fact that the world is becoming a global village.

Finally, more qualified radiographers should be employed and knowledge update/continuous professional education in the clinical posting site in the form of Seminars or presentations should be encouraged and students should be giving the opportunity to participate in it, as this will go a long way in building self confidence in the students.

More so, student should endeavor to locate accommodations close to the site of their long vacation clinical posting sites. The department could also communicate with the clinical posting sites to sort the issues of accommodation for student posted to states they have not been to before.

Limitations

Limitations of the study were that some of the students in the 300 and 400level did not return the completed copies of the questionnaire.

Secondly, the analysis of the questionnaires were done based on participant response, however, some may not have given sincere response to some of the questions on the questionnaire and as such the certainty could be questioning.

Conflict of Interest: None to be declared by any of the authors.

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How to cite this article: Akpaniwo GM, Sadiq AA, Danfulani M et al. Challenges faced by undergraduate radiography students in Sokoto northwest Nigeria, during long vacation clinical posting. Int J Health Sci Res. 2018; 8(2):29-36.

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