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College of Health Sciences

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Challenges Faced by Students, Instructors and Technologists during the Clinical Placement of Radiology Technology Students for clinical Practices.

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Research Thesis submitted to the Department of Health Science Education in Partial Fulfillment of the Masters Degree in Health Science Education

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Abstract

Background: Clinical placements are of paramount importance. It assists students in acquiring the necessary competencies in terms of knowledge, skill and attitude in practical settings so that they meet the requirement for graduation. The main objective of this study was to assess challenges faced by students, instructors and technologists during the clinical placement rotation of Radiology Technology Students at four college of health science affiliated hospitals.

Method: A qualitative approach using focus group discussion and semi structured interview was used to explore the experiences of students, instructors and technologists regarding challenges encountered during the clinical placements of medical radiology technology students. (22) BSc regular Radiology Technology Students in the department of radiography took part in the study from an available pool of seventy three students. Participants were arranged in three groups of 7 and 8 students. In addition, one group of 7 out of the 19 available instructors was interviewed. Two technologists from each affiliated hospitals were selected for face- to – face interviews.
A categorization approach was used to analyze the data with the goal of identifying core themes representing.

Results: The qualitative analysis led to the identification of nine themes from the focus group data and interviews. From the students and instructor's point of view, "love of profession", "transportation services", "clinical supervision", "theory-practice gap", "hand on practice", "imaging modalities", "skill lab", "placement area", and "Curriculum" were considered as important factors in clinical placement experience.

Conclusion: This research showed that there are many challenges encountered by both students and instructors during placement of student radiology technology for clinical practice to different college of health science affiliated hospitals. Those challenges obviously affect the future performances of students or the proper application of appropriate skill during their work experiences.

Contents

1. Background

Clinical placements are paramount educational importance because they assist students in the acquisition of the necessary competencies in terms of knowledge, skill and attitude in practical settings to meet the requirement for graduation. Therefore, clinical placements are a compulsory component of the training program of Radiology Technology at the Department of Radiography, College of Health Sciences Addis Ababa University.

The teaching and learning process at the Department of Radiography involves both a theoretical and practical approach. After completing the theoretical part within classes then as of second year second semester, students are placed in different affiliated hospitals within Addis Ababa to train on different imaging modalities like Radiography, CT, MRI and Ultrasound. The practical attachment continues in parallel with that of the theory class until fourth year second semester. The clinical training starts with conventional radiography during second year second semester for three months then followed by CT, MRI and Ultrasound for duration of three months for each.

Some factors may contribute to better achievement of the required competences. Such as: appropriate orientation given for students regarding the placement area, manageable intake of students joining the program, enough number of affiliated hospitals equipped with the necessary imaging modalities, welcoming attitudes of technologists within the respective hospitals, and adequate supervision by instructors who focus on bridging gaps between theory and practice.

Comprehensive programs produced for the Radiation Therapy Educators at the New Castle Mater Hospital (NMMH) to support undergraduate Medical Radiation Science students have emphasized concepts regarding clinical education, adult learning and preceptor ship in the development of the program. The program involved implementation of an orientation program and department wide preceptors to facilitate learning in the clinical environment. The undergraduate program was adapted specifically to student learning utilizing needs assessments, learning contracts and additional specialized tutorials. This assisted the department in bridging the theory practice gaps in the students' clinical experience [1].

Several challenges have been documented in some countries regarding clinical placements. A study done in Ghana has shown that a number of challenges, some being a lack of training equipment, too many students in a small duty room without monitoring badges, a notable practice and theory gap.

"… Many of the experiences of Radiography Students relating to the impact of clinical placement locations were positive. However, it is imperative to consider carefully where students have their clinical practice and at what point of their studies the different placements should be carried out. Collaboration between the key stakeholders is essential to ensure that students have a good experience at clinical placement"[2].

In a study conducted in Zimbabwe: "...The majority of students expressed many concerns about their supervision. Students being left alone with inadequate supervision"[4].

The radiology Technology program run by Department of Radiography may probably face similar problem; but the fact that no literature exists with regard to clinical placement of radiology technology students in Ethiopia it is difficult to know the existing context specific problems faced by student technologists during clinical placement. That is why this study aimed at assessing problems encountered by students and instructors and technologists during the placement of student technologists for clinical practice in College of Health Sciences affiliated hospitals. The data derived from this study will inform ongoing quality improvement by allowing educators to address accordingly specific problems raised by learners and faculty.

The literatures review analysis, helped this work in showing the importance of clinical placement of students and the challenges they face. It also directed the way in setting questions and identifying problems that may arise when studying the challenges faced by students, instructors and technologists during clinical placement of student radiology technologists.

2. Statement of the Problem

Students develop their knowledge, skills and attitude by way of clinical placement. Competence is acquired in health institutions during clinical placements. Clinical placements are important for both the perceptions and outcomes of the education of health professionals because students will integrate theory into practice as well as understand complexities and challenges of different professions.

If clinical placement is carried out properly it will help achieve the competence level that is required of students. It will also help students develop their skills of communication and help with their socialization into their future working environment; bridging thus the academic and workplace learning gap for students. Clinical placements also help students learn how to act professionally and to build confidence in executing their duties and to become competent professionals.

The Department of Radiography places students in the College of Health Sciences affiliated hospitals around Addis Ababa Ethiopia for clinical practice to train on Radiography, CT, MRI and Ultrasound examination. However, with the increase in number of students, presence of few affiliated hospitals equipped with the necessary imaging modalities may be difficult to attain the expected competence level.

As one of the instructors in the department of Radiography I used to come across students complaining of their working environments. They described the congestion of the imaging area by a crowd of students as impacting their learning and a lack of opportunities for hands on practices. They also noted unwelcoming conditions of the placement area, frequent down of imaging equipment, and an inadequate number of imaging modalities to work on among other complaints. These discrepancies and more are the focus of this current work aiming to study the challenges faced by students, technologists and instructors during clinical placement of Radiology Technology students for clinical practice.

3. Significance of the study

There are no known studies conducted to date in Ethiopia regarding challenges encountered by radiology technology students during clinical practice. This study therefore will have paramount importance in curbing challenges related to the clinical practice experience and make conducive environment to train students.

Moreover, the findings of this study will have an input for college of health sciences and department of radiography to improve the clinical placement environment of radiology technology students. It also will have practical significance in providing information about the environment of clinical rotations useful to educational planners, decision makers and stakeholders. The study also provides base line information for researchers.

4. Literature Review

The study conducted in Ghana revealed challenges faced by radiography students such as the gap between theory and practices, inadequate exposure to certain specialized procedures and time allotted to each treatment room. The study showed that clinical training can be enhanced by providing enough equipment and clinical areas for students in which to work, also films and cassettes must be made available before the date and time of clinical training to support on boarding and orientation of students. Finally, the theory aspects of clinical training must be in tune with the practice to enhance effective learning experience for students.

In this same study, with regard to establishing the theory and practice gap, respondents were asked to report on the relationship between theory taught in class and practice and also provide some suggestions to improving the clinical experience of student Radiographers. There were mixed views on among respondents as the relationship between theory and practice. Some reported that there was no relationship while others reported that there is a relationship. Respondents suggested several ways of improving clinical experience such as using the same lecturers who teach the theory to handle the clinical areas and also theory should be immediately followed by practice. Conducting of continuous professional training was also suggested, improving facilities and time allocation [5].

Students' Perception of Radiographers at Clinical Settings,

The same study done in Ghana showed that respondents reported that during clinical training, they were satisfied with meeting their training objectives, enjoyed their time and worked as a team with very willing and available staff that assisted them in learning and this was revealed by 95.2% of the respondents. However, this research showed that not all training settings (supervisors and duty roaster) are available to provide students with a positive learning environment as reported by 38.1% of learner's respondents [5].

Availability of Resources,

According to the same study majority of the respondents 76.2% reported that cassettes and films were adequate. This revelation is very significant since cassettes are the main raw materials required during the training. Their availability makes clinical training effective, and students are able to have adequate experience. Again, the majority of the respondent (59.6%) is of the opinion

that no monitoring devices are available for the students and they are too crowded in a room, making radiation protection insufficient hence students are not willing to attend training in duty rooms. Clinical training dwells primarily on the availability of resources to make it more efficient and beneficial to the students. Inadequate resources mean that fewer students will benefit from clinical training since the number of students in a particular examination room will far outnumber the equipment available [5].

Imaging Modalities Allocated at the Clinical Settings

The study done in Ghana also showed that practicing areas should be equipped with the necessary imaging modalities for the training of students. The study showed that due to the inadequacy of specialized imaging modalities, the majority of the respondents have been allocated to the general x-ray room in spite of the fact that most request are general in nature, Radiographers are expected to have adequate knowledge and skills on all modalities. In a country like Ghana that the number of radiographers is not enough to cater for all the health centers, Radiographers find themselves performing certain specialized functions in addition to general x-rays. Most radiographers are alone in their districts and this requires that they are trained in all the areas of radiographic imaging. Not having adequate clinical practice in these areas can have enormous effect on the delivery of quality health care to them.

In a similar study done in Nigeria[3], one of the deficiencies identified by students was the feeling of being inadequately prepared for clinical placement. This is an important aspect that was identified by some 22% of students. Student concerns about preparation, confidence and expectations about what they can do or cannot do need examining. Undoubtedly, there is a need to adequately prepare all students for clinical placements.

Time Allocation,

Adequate time should be given for clinical practice. According to the study done in Ghana[5] majority of the respondents (74.4%) did agree and strongly agree that 8day (4weeks) clinical duration was enough for each rotation in a particular duty room. This means each student must have visited each duty room four times in a semester during training.

Thirty-one (66%) of the participants agreed that staff were very supportive during their clinical rotation, but three (6%) strongly disagreed with that. More than half of the students (61.7%) concurred that the clinical assessors were prepared for their role recording response. Sixty-six percent of students consented that the placement were supportive to their profession whereas 68% indicated that the practice experience and supervision offered were appropriate to their level of competence. 53% of the participants also indicated that supervision were adequate. 81% of the participants indicated that staffs were friendly and approachable.

A study conducted in Iran[7], nursing clinical practice showed Improper Treatment. Students encounter some challenges in dealing with the clinical learning environment and in interaction with instructors, patients, and department personnel. Many students stated that they had the most interactions with the instructors and believed that the way an instructor treats a student affects their exposure to clinical learning environment. One student stated the following. . . .to be frank, our instructor did not treat us well. Once, I made a mistake and the instructor reprimanded me right at a patient's bed. Companions of the patient never trusted me again [7].

Adequacy of Knowledge.

Students should have a good understanding of their subject matter to practically apply their knowledge and build a confidence of the patients they serve.

The researcher found many students did not have sufficient knowledge to care at the bedside when dealing with clinical learning environment and providing care to the patients was challenging for them. One of the students said the following. . . . I wanted to give my patient a Pantazol injection; however, I did not know what kind of medication it was. The patient's companion asked what that medication was and to what medication category it belonged. I did not know to what medication category it belonged and did not even know it was used to treat gastric issues. The patient's companion asked me whether it was an antibiotic and I answered I think so [6]. This holds true not only for nursing profession but also for all disciplines, unless someone acquire a good knowledge of what they have learned it will be difficult to apply it and communicate with patients with confidence.

Deficiency in Practical Skills

The same study [6] reviled that Clinical environment is a suitable context for learning skills needed to care for patients. However, some of them are considered basic health care skills and any deficit in them affects the quality of care. In this regard, students had difficulties in performing procedures in some situations, due to the lack of necessary skills. One of the participants said the following. Our professor urged us to care for a patient. However, I did not know how to take his blood pressure. The reason was that I could not recognize the sound. .....Deficiency in practical skills in caring for patients was a concern of many students in the clinical setting. One of the students stated the following. . . .The first time I took the blood pressure machine and intended to take a patient's blood pressure, I had the blood pressure cuff upside down around his elbow. . .it was really my fault. I got embarrassed in front of the patient [6].

Conceptual Framework

This conceptual frame work was developed from the idea of literatures review analysis. This analysis contributed to the current study in helping to setting questions and identifying the likely problems. But there are also some new ideas emerged as result of the current study done on challenges faced by student technologists and instructors during clinical placement of radiology technology students. Whereas some of them were failed to be identified as a problem according to the current study. The revised version of this conceptual framework is presented under the discussion section of this thesis document.

The following are concepts developed from the literatures.

Theory practice gap: this might occur in both ways. Either the student might not find what they have learned in the class not to be applied the way they learned or the students could not practically apply the knowledge they gained theoretically.

Imaging Modalities: Enough imaging modalities should be available in order for the students to have the chance to practice**.**

Hand on Practices: students should have hand on practices to develop their competences

Gesture of technologists: welcoming gesture of the Technologists positively affects students to develop their skill.

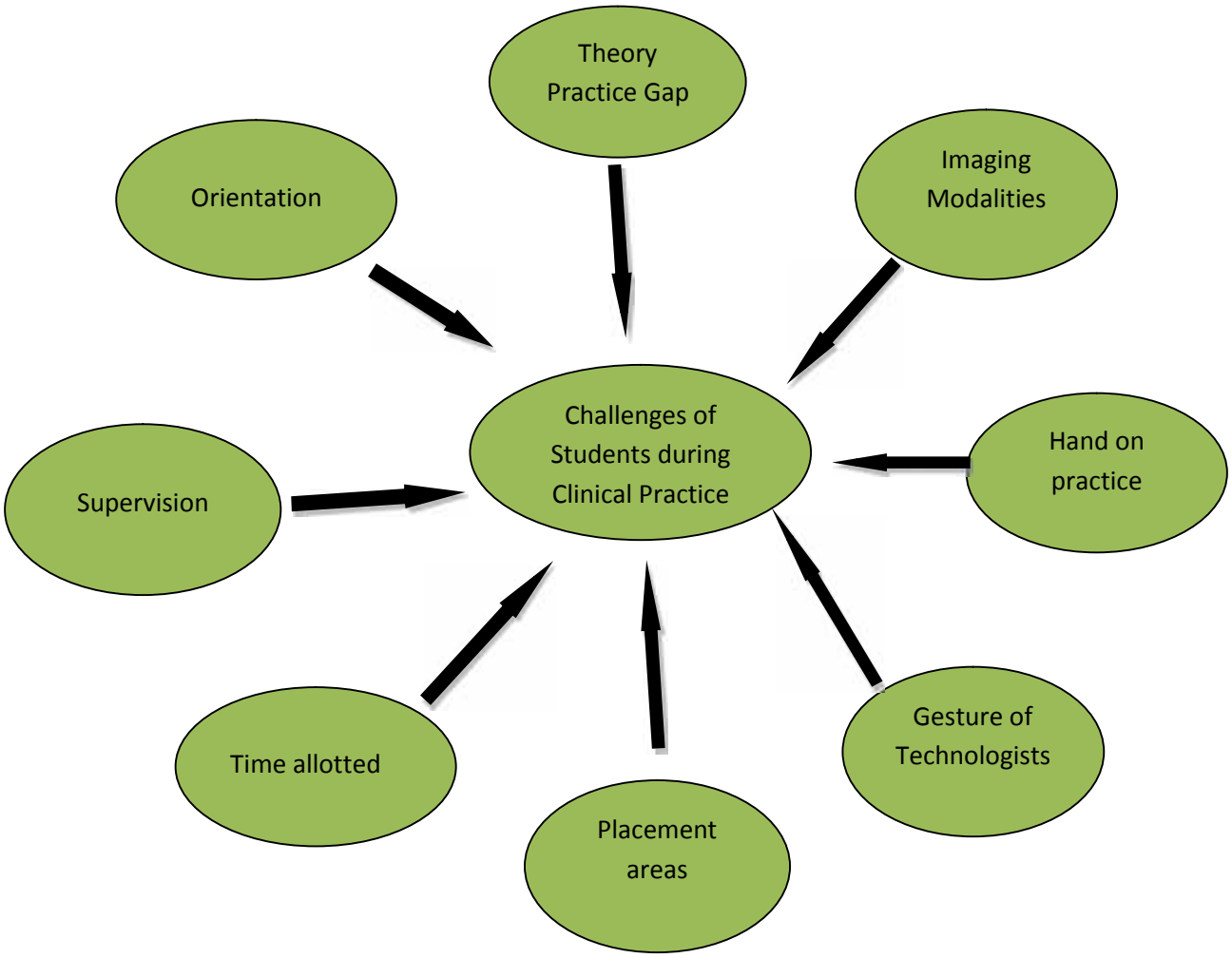
Placement areas: If the number of affiliated hospitals is inadequate to accommodate students it may affect the clinical practices.

Time allotted: inadequate time allotted for practice may affect skill transfer.

Supervision: lack of super vision may cause difficulty of giving feed back for students.

Orientation: orientation about the clinical experiences help students how and where to report for practice and understand the environment of their Clinical placement area.

The conceptual framework of this study illustrated factors that may affect the clinical placement of the students.



5. Research Objectives

5.1. General objective

To assess challenges faced by students, technologists and instructors with clinical placement of Radiology Technology Students.

5.2. Specific Objectives

- To explore challenges encountered by students during their clinical placement.
- To identify challenges faced by instructors during clinical placement of radiology technology students.
- To identify problems encountered by technologists during clinical placement of radiology technology students.

6. Methods and Materials

6.1. Study Area

The study was carried out in College of Health Sciences, School of Medicine Department of Radiography located in the premise of Black Lion Hospital. College of Health Sciences comprises of 4 schools (School of Medicine, School of Public Health, School of Pharmacy and School Of Allied Health Sciences) and many more Departments. One of which is Radiography Department. Radiography Department is one of the old departments founded over fifty five years ago by British expatriate. Currently there are about 103 BSc regular students enrolled in the program of Medical Radiology Technology.

6.2. Study design

A qualitative approach employing focus group discussion and in depth interviews was employed. These methods were selected because they allowed me to gather adequate and in depth information that were emerged out of the discussion regarding challenges faced by students, instructors and technologists with Clinical Placement of Radiology Technology Students. Focus group discussions provided insights into how people think and provided a deeper understanding of the phenomena being studied. Group interaction and non-verbal communication were a primary benefits of focus groups. Focus group discussion gives the ability to capture deeper information more economically than individual interviews [8]. Content analysis was used so as to obtain rich and deep information from the study.

6.3. Study Population

Eligible participants for this study included medical radiology technology students who are above year two and currently engaged in training at the Department of Radiography (48) comprising of year three 22 students, and year four 26 students. Among which the number of female students in each year is 11, and 6 respectively. There were 19 eligible instructors in the Department of Radiography among which 4 are female instructors and 15 male instructors. The third group of participants consisted of technologists working in four governmental hospitals affiliated to College of Health Sciences. In general, 50 technologists work in those hospitals. In Black Lion hospital 12 male and 14 female technologists(26), In Ras Desta Hospital 4 male and 1 female technologists, in St. Paul Hospital 13 male and 4 female Technologists(17), in Yekatit 12 hospital 7 male and no female technologist.

6.4. Sampling procedure

With respect to students, one focus group from each year was arranged. As the clinical practice commences from year two second semester, the study did not include year one students. Year two students were also excluded because they have not yet started practicing during the time this data was collected. Accordingly, both year three and year four students were informed about the objective of the research and told them that participation was purely voluntary. based on this many students were willing to participate in the study therefore, from year three, one focus group was put together consisting of 4 male and 4 female students, from year four, one focus group consisting of 5 male and 2 female students were put together. The representative of students from each year were purposefully included within the group as he or she acts as focal person so as to obtain considerable information for the group discussion.

With respect to instructors, one focus group consisting of 5 male and 2 female instructors was selected by purposive method considering seniority and instructors who are most of the time engaged in supervision of students and informed that the study was purely voluntarily.

With respect to technologists, Two technologists, one department head and the other was the technologist who assumed to be in charge of mentoring students in each department were selected for the face to face interview in their respective departments depending on their willingness to participate in the study.

Generally 6 open ended questions were developed in relation to radiology technology students' clinical practice to stimulate discussion.

The focus group and interview questions were adjusted to follow the flow of the discussion.

The following questions were used to stimulate discussions regarding problems encountered during placement of medical radiology technology students for clinical practice.

With respect to students:

1. What does it mean for you to be a Medical Radiology Technology Student?
2. In your opinion what are the challenges encountered during your clinical practice?
3. What was your expectation of your clinical practice environment?
4. Which clinical experience you found to be to the level of your expectation?
5. How do you think clinical practice experience can be improved?

With respect to Instructors:

1. How do you explain the current experience of placing radiology Technology Students for clinical practice?
2. In your opinion how do you think the clinical placement of radiology technology students by department of radiography can be improved?

With respect to Technologists:

1. How do you explain your experience of teaching skills for Radiology Technology Students?
2. What are problems you encountered during teaching the students?
3. What do you suggest to improve clinical practice?

6.5. Data Collection

After having permission to conduct the study, two focus group discussions from students and one focus group discussion from instructors were put together to generate data in response to the research questions. In addition face- to – face interview with two technologists from each affiliated hospitals were conducted in order to collect data from each affiliated hospital.

In order to collect the data from participants; focus group and interview guide were prepared and used based on reviewed literature. The focus group discussions with students were carried out by the lecturer from other discipline (Mid - wifery) who was well oriented about the study so as to avoid power influence.

For students and instructors the group discussion was held in the department of radiography meeting room which is having good illumination and enough chairs and table for group discussion.

Face – to - face interview with selected technologists was conducted in their respective hospital.

6.6. Data Analysis

The focus group discussion and in-depth interview were conducted in Amharic language and the discussion was digitally recorded and the data was transcribed then translated in to English by the principal investigator. Several measures were employed to ensure that the English transcripts would be comparable to the original Amharic data. For this reason, the translation process was made independently by the principal investigator and involved the senior staff who can speak both languages and who has conducted several researches. Then, the two translated versions were examined by the author, and the recorded discussions were reviewed until it was believed

to be matching. After that the researcher selected the three levels of coding method as appropriate for coding the data.(U.H. Graneheim, B. Lundman).

The following table shows the three levels of codes for one of the theme:

Example of three levels of coding

CODE	CATEGORY	THEME
Interest	Personal feeling about the profession	The profession is interesting and lovely
Interesting profession	Love of the profession	Love of the profession
Not satisfied Hating Limiting	Dissatisfaction related with professional growth	Dissatisfaction as a result of absence of growth ladder or career development

6.7. Ethical consideration

Ethical approval was granted by Research Ethics Committee of college of health sciences, Addis Ababa Ethiopia. Written informed consent of each participant was obtained before data collection.

7. Results

From the students points of view

The qualitative analysis led to the identification of nine themes from the focus group data. "love of profession", " transportation services", "clinical supervision", " theory-practice gap", " hand on practice", " imaging modalities", "skill lab", "placement area", and "Curriculum".

Love of Profession

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

One of the participants said:

I joined this profession on my own interest. It is impressing for me to diagnose patients problem and find out the result by the current imaging modalities. I love it and I am happy that I joined this program.(S8)

However, some students expressed even though they liked the profession, the fact that it has no professional growth ladder or career development they feel that it is limiting and has no track to develop professionally and some students felt also that there a discrimination between professions.

One of the participants said:

I have also the same feeling. I like the profession; I feel that I am helping patients in diagnosing their problem and this gives me satisfaction. But when I learned that this program has no masters program I felt that it is a limiting profession.(S3).

Another participant mentioned:

I like the program, but, it should have its track up to PhD it shouldn't be limited to BSc level. If that is not the case I don't feel happy with the profession.(S4).

Another participant described that, in comparison to other health sciences equal attention was not given to this program. For example there is no equal distribution of resources. but still I like the profession (S6).

Transportation Services

The category transportation services identified by all focus group discussions where every participant in the focus group discussion described they could not show up on time to their placement area because of lack their own transportation services.

One of the participants said:

Our problem is also regarding transportation services. We use one service in common with all students of colleges of health sciences. This service has to go to all areas in order to drop each students; Most of the time we reach to our place late. Therefore, we could not use our time effectively by being late for an hr or more (S7).

Another participant said:

There is also transportation service problem. We do not have our own service; as a result we cannot reach to our placement area on the expected time (S6).

The problem of the transportation service was also mentioned by instructors of the department during a focus group discussion.

One of the participants said:

We are encountering many problems concerning clinical practice. Among other things;---, shortage of transportation services.--- there is also follow up problem on parts of the instructors this is also because of lack of transportation services (Ins3).

Another participant said:

Many of the important points are already raised, but I want to mention some like, transportation service problem---. Then the idea was saturated (Ins5).

Theory practice gap

The category theory practice gap identified by most of the focus group session where most of the participants mentioned that they observed some radiographic techniques is not applied according to the standard they have learned in the class.

One of the participants said:

There is a gap between what we have learned in the class and what we observed during our practice. According to the theory there are body parts which are better visualized when we angle the tube to some degree accordingly. But, technologists do not apply it. I tried to ask but didn't accept and he was not happy about that. He simply said he has many more patients to do before the time is over (St4).

The same participant said:

We do not see what we have learned in the class and we told that it is important. For example we learned that we have to protect both the patient and the relatives from unnecessary radiation dose but, technologists do not apply this. I don't know that because they forgot it or simply being negligent (Stu4).

Clinical Supervision:

This category identified by all of the focus group discussion where every participant in the students 'focus group described in some way or another they are not happy about the supervisory role of the department staff. They even do not know how they are finally evaluated.

One of the participants said:

Our department assigns supervisors from instructors but, they are simply there to deliver letter of permission to the placement area and take attendances and they do not even deliver the letter on time and our department is not strict enough on this issue (Stu6).

Another participant said:

I do not know how I am finally evaluated I am simply told my mark and I have to accept whatever the mark is. This is done by the technologists in the department of the hospital.

Sometimes we are evaluated by a person who has not been with us to teach take responsibility to evaluate us. This creates disappointment on us (Stu4).

Participants also forwarded solution in this regard.

One of them said:

Our supervisors should follow and help us during our practice and during evaluation to avoid unnecessary exercise of power by technologists. The department should communicate with hospitals through our supervisors to tackle any problem arising from hospitals because of our presence (Stu7).

Instructors have also mentioned there is failure in supervising students pointing out as to why they could not carry out supervisory role as needed.

One of the participants said:

---; there is also follow up problem on our parts; this is also because of lack of transportation services to accompany our students (Ins3).

Another participant said also t*he other thing is that instructors role in clinical practice was not clearly known (Ins6).*

Hands - on Practice:

The category hand-on practice identified by all members of one group where each one of them described problem especially regarding US examination in specific area of placement; they are denied hand on practice opportunities. As this area of placement is one of the most important places many cases are seen per day and would been benefited more from this centre.

One of the participants said:

Regarding practicing area some centers do not allow us practice in a way that we achieve our objective especially on US examination. Whereas this centre is very important for us as many cases are seen in this centre were we would have developed our skill very well (Stu8).

The participants in the focus group discussion have also forwarded solution for this.

To my understanding our department should try to work hard to convince this center together with the Dean, and the CEO. Of the college of health sciences to allow us to practice at this important department (Stu5).

Imaging modalities:

The category imaging modalities identified by one of the focus group discussion where most of the participants described either the imaging modalities are rarely available or those availably are down and not got repaired on time.

One of the participants said:

The Special Radiological Procedure is one of the subjects we have learned in class but, there is no any procedure machine like fluoroscopy in any hospital were we are assigned to. Therefore our skill in this regard is highly compromised (Stu1).

Another Participant said:

The machines are not used to their full capacity. In some hospitals the machines do not work properly no one is willing to repair when they are down they simply say the machine is out of order which may last for many months or years to become properly functioning. It seems like no one pays attention neither to give service to patients nor for us to practice (Stu4).

Participants in the focus group of instructors have also mentioned problems regarding imaging modalities.

One of the participants said:

To my understanding modern imaging modalities like CT and MRI are few in number in governmental set up. Therefore it has its own limitation to produce skill full students (Ins4).

Skill Lab/Demonstration Room

The importance of the category skill lab is mentioned in the focus group discussion by some of the students.

One of the participants said:

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

Curriculum:

Almost all of the fourth year participants in the focus group have risen that the time distribution for each subjects and course placement should be rearranged so that the theory part and the practice should be well coordinated.

One participant said:

Generally we practice on four imaging modalities time allotted for X rays, CT and MRI, is more or less enough but, time given to US practice is much less than required. Another problem is that both the subject matter learning and the practices of it are carried out on final year second semester; that means we go for practice before we complete the theory part. In my opinion therefore it is better to revisit the curriculum (Stu8).

Another participant said:

The curriculum should be revised, for example there are obsolete procedures which are not currently in practice. Eg Dark room processing. Instead of this the time should be rearranged for some other necessary topics or subjects (Stu6).

Placement area:

Most of the participants in the focus group discussion raised the in adequacy of the placement area.

One of the participant said.

Most of the hospitals do not accept more than two students to train on one machine because of patients privacy or comfort. Therefore they return the rest of us to our department and the

department tries to solve this problem by placing us to exchange every other day, this means we practice for half of the intended time allocated for practice (Stu4).

The solution forwarded according to one of the same participants was; more practicing areas should be located by our department in order to facilitate to fully practice and get different experiences (Stu4).

From instructors' point of View:

Almost all of the themes similar with that of the focus group discussion of students were identfied also during the focus group discussion with instructors.

One of the instructor participants said:

We are encountering many problems concerning clinical practice. Among other things; mismatch between the number of students we have and the available placement area, absence or shortage of transportation services. The technologists working in hospitals to whom we are sending our students are not that much willing to teach students because of lack of any incentives be monitory wise or issuance of letter of appreciations, students are less interested or not willing to be assigned to some institution, there is also follow up problem on parts of the instructors this also because of lack of transportation services (Ins3).

Another participant said:

Many of the important points are already raised, but I want to mention some like, transportation service problem, lack of demonstration room, lack of interest on students part and lack of supervision among instructors this because of lack transportation services the instructors could not accompany students, the department could not fulfill those important requirements (ins5).

From technologists Point of View

Technologists also mentioned many problems regarding problems encountered during training radiology technology students during interview section.

One of the technologists said:

We have only one MRI machine. On this only machine we do many patients, radiologists also use it for research purpose therefore our intention is more to give service to patients than to teach students and as a result students do not get chance to train well (Tech1).

Another thing is that students are complaining of not having interest in the field because of lack career development.

According our observation students do not have enough theoretical background specially on MRI. This shows that there is theory practice gap. Their attachment time is also not enough to develop thier skill on MRI.

The technologist has also forwarded solution in this regard;

Technologists should be invited to the department to give lecture to equip students with the basic MRI physics

The department should work on to narrow the gap between theory and practice

Students should have enough time, enough knowledge and resources.

The department should work on career development to better serve patients and build confidence(Tech1).

Another technologist said:

Students are not interested to practice they either come late or don not come regularly. When we ask them they complain of lack of transportation services.

There is shortage of machines in our hospitals one machine is out of order currently we are using only one machine. Therefore it is difficult to teach students as well as give services to patient(Tech2).

Another technologists also said:

we do have one old machine on which we can not teach properly, we do have also one CT machine but with this only machine we cannot accept many students at ones because this is the only machine on which we do many patients per day. Therefore it is difficult to serve all patients while as the same time training students because we are in harry to serve patients in order to avoid complaints.

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

8. Discussion

The result of the students views have shown that there are a number of challenges regarding their clinical practice experiences. Nine themes of concern were identified: "love of profession", " transportation services", "clinical supervision", " theory-practice gap", " hand on practice", " imaging modalities", "skill lab", "placement area", and "Curriculum".

The medical radiology technology students and the instructors have clearly identified that there were transportation service problem and as a result they could not report to the placement area on time and there for they could not utilize their time properly.

In adequacy of Clinical supervision is raised by all students as a main theme in this study. According to participants; instructors supervisory role in assisting students is of paramount importance for example facilitating the learning environment, enables smooth communication with the department and avoidance of unnecessary confrontation of students with the technologists in the department finally to involve in evaluation process by so doing it is possible to improve practice experience of the students. The importance of the clinical supervision was similar to the finding in the research done in college of nursing and *midwifery Shiraz University of medical science, Iran [7]. "Clinical nursing supervision is an ongoing systematic process that encourages and supports improved professional practice". Although these are two different disciplines with regard to importance of supervising students believed to be important in both cases to achieve the intended objective through improved professional practice.

The theory- practice gap was evident during clinical practice of student technologists. For example proper use of gonad shield to avoid unnecessary radiation dose to patient were not practiced in many of the hospitals. Further more students have witnessed also radiographic positioning technique was not carried according to the standard the theory allows. For example angling the tube to the required degree so as to get the target of interest accurately was very important concept according to the knowledge learned from the theory part, but this was not applied by technologists.

Hands – on – practice was also one of the theme identified by students radiology technologists. According to them some important affiliated hospitals were not willing to allow them to practice

on some of the imaging modalities specially ultrasound. As long as the objective of the program is concerned students should work towards achieving that goal.

Lack or in adequacy of imaging modalities was also one of the concerns of medical radiology technology students. They noticed that there were lack of modalities in some hospitals and there is but out of order and do not be maintained on time in many of the hospitals. Similar findings were observed in the study done in Ghana by the title “challenges Faced by Radiography students during clinical practices” [5]. The study revealed that there is inadequacy of specialized imaging modalities.

Skill lab was also emerged as a theme by students. Most of them mentioned that the available skill lab helped them much in developing confidence in skill development during their practice on actual patients; but the time allotted for it should be enough and it should involve all imaging modalities as much as possible. According to T.J.Bugaj and C.Nikendei, a research published on JME(Journal for Medical Education) Practical Skill Training in Skills Lab: Theory and Practice. “skills labs”, i.e. specific practical skill training facilities, are a firmly established part of medical education offering the possibility of training clinical procedures in a safe and fault-forging environment prior to real life application at bedside or in the operating room.

Another concern of students emerged as a theme was regarding the content in curriculum. Students were able to identify that there is time allocation and placement problem with in the curriculum and there is a need to revisit the curriculum so as to coordinate the theory with that of the practice.

Conceptual framework as developed in reference to the literature and the newly emerged ones out of the current study. The concepts in the original framework are represented in green colored boxes whereas the newly emerged concepts are represented in light pink boxes

Explanation:

Theory practice gap: this mostly occurred because some technologists do not follow the standard according to the theory learned in the class. As a result students witnessed that the practice did not go with what they have learned in the class regarding some important concepts.

Imaging Modalities: Due to a mismatch between the number of students and the available imaging modalities, students could not have access to all modalities to practice.

Hands on Practices: students should have hands on practice to develop their competences, but few hospitals have not shown their willingness for students for hand on practice.

Placement area: The number of affiliated hospitals were not enough to accommodate students this has affected the clinical practice experiences of the students..

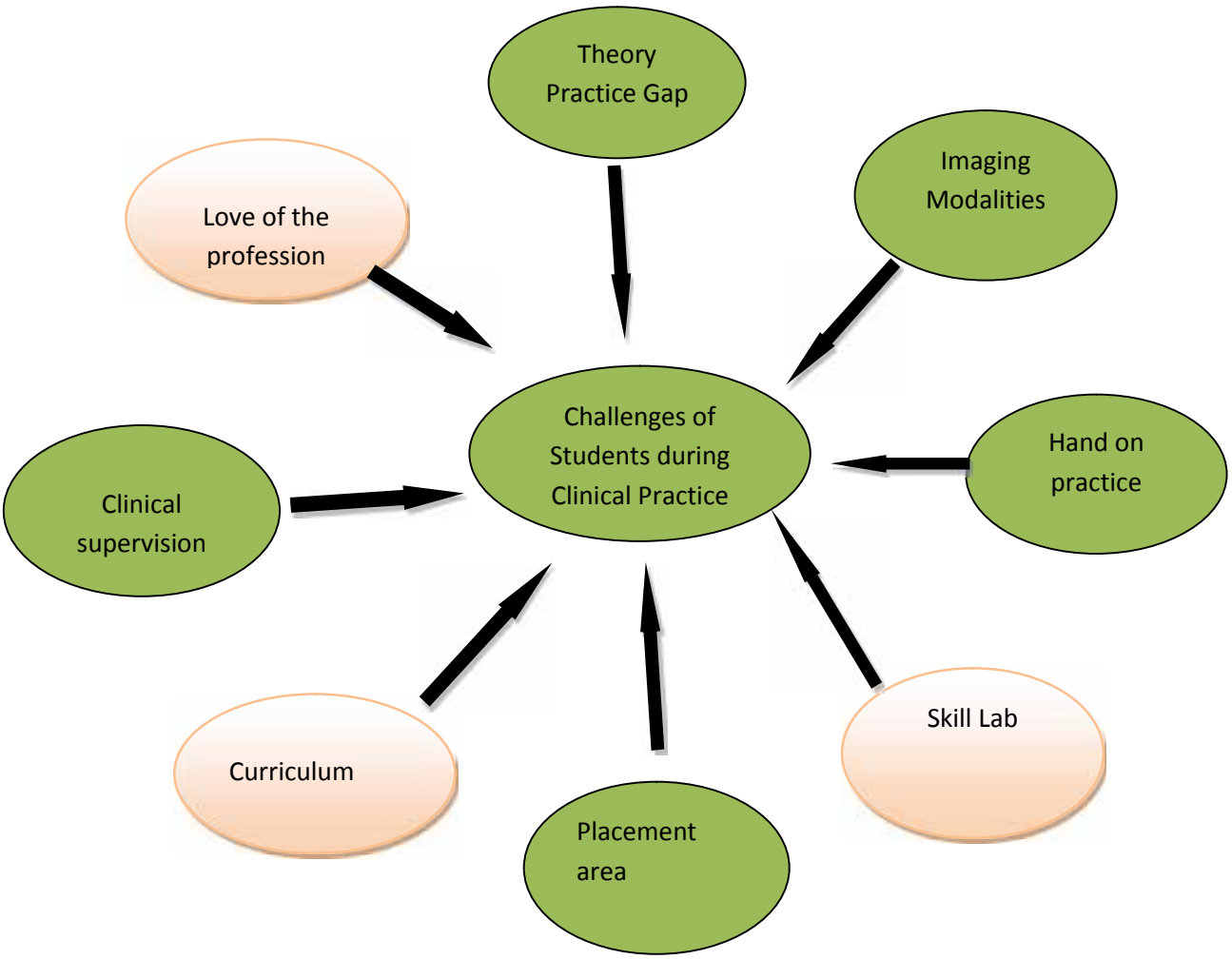
Clinical supervision: lack of proper supervision has caused difficulties of communicating smoothly with the department technologists and administration of the respective hospitals and facilitation of the skill practicing.

Curriculum: Time allotted for some courses and in appropriate placements of some of the subjects in the curriculum were a cause of the problem.

Skill Lab: the absence of skill lab for some of the modalities has caused challenges in preparing students to develop their confidence in skill before they are placed to actual clinical area.

Love of profession: the feeling of the students towards the profession either positively or negatively affects the proper transfer of knowledge.

The conceptual framework of this study illustrated factors that affected the clinical placement of the students. The light pink colored indicates those emerged from the current study whereas those in green were developed from literature analysis and identified by the study.



9. Study Limitation

To the best of the researchers' knowledge this present study is the only research done in Ethiopia that examined the challenges encountered by students, instructors and technologists during clinical rotation of radiology technology students. This shows its significance but, it is a limitation in that it does not allow comparisons of finding with the other study.

The study would have included year two students but, because the study took place a while before the year two students planned to go for practice. Therefore it limits the study in generalizing the finding.

This study included only four formally affiliated hospitals because of time and lack of logistics, therefore, this is the limitation.

10. Conclusion

This research showed that there are many challenges encountered by both students and instructors during placement of student radiology technology for clinical practice to different college of health science affiliated hospitals.

Factors that were identified to affect the clinical training condition of student radiology technologists were: lack of transportation services, inadequate clinical supervision, theory-practice gap, lack of hands on practice, shortage of imaging modalities, inadequacy of skill lab, shortage of placement area, and inappropriate placement of content of the Curriculum".

New themes emerged from focus group discussion of both students and instructors were "Curriculum", "Skill Lab" and "love of the profession" and the idea collected from them through interview play important role in student learning. Both the students and the instructors have raised similar problems. They agreed that these challenges should be tackled so as to make the clinical placement experience conducive for the intended skill development.

The technologists in the hospitals were willing to train students as well as need to be acknowledged and arrange some incentives for their contribution in training the students.

11. Recommendation

The study suggests that there is a need to curb those problems as much as possible in order to facilitate students learning and professional skill development.

This study therefore calls for attention of:

- College of health sciences, to facilitate the clinical placement environment by solving problems regarding inadequacy of placement areas by attracting more affiliated hospitals and create good relationships with the existing ones to make the training process smooth and convenient.
- Department of radiologic technology, to work towards drawing attention of college health sciences to curb challenges encountered by all parties and to improve the role of clinical supervision by instructors and work towards arrangement of incentives for those technologists working in the respective hospitals for their important contribution. The department also should consider the involvement of technologist in the teaching and learning process so that clinical skill and theory be well coordinated. The department should also look into the curriculum contents to make some adjustments and work on skill lab to include all imaging modalities.
- Finally all concerned bodies should play their role in order to improve the clinical skill development experience of student radiology technologists.

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