ADDIS ABABA UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF RADIOLOGY

Prospective survey on the impact of COVID-19 pandemic on radiology resident teaching in AAU, SPMMC, Gondor University, Bahirdar University and Mekelle University tertiary hospitals, Ethiopia

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ACRONYMS

- AAU- Addis Ababa University
- SPMMC- St. Paul's memorial medical college
- TASH- Tikur Anbessa specialized referral hospital
- IT- information technology
- CDC- center for disease control
- Covid-19- coronavirus disease 2019

ABSTRACT

Introduction; An unprecedented outbreak of pneumonia of unknown etiology in Wuhan City, Hubei province in China emerged in December of 2019. A novel coronavirus was identified as the causative agent and was subsequently termed COVID-19 by the World Health Organization (WHO).Radiology practices are facing unprecedented challenges not only in how they are providing care to patients but also in how to continue to educate the next generation of radiologists. Although the priority is on providing timely and high-quality imaging to patients, especially those infected with coronavirus disease 2019 (COVID- 19), there is still a need to maintain our educational mission.

This survey is mainly trying to analyses the impact of COVID 19 on radiology residency in Ethiopian tertiary level hospitals and also look into alternative innovative options that radiology departments are using in order to continue the residency program.

Objective; to assess the impact of COVID-19 pandemic on radiology resident teaching-learning activity of Ethiopia.

Methodology; an online survey was distributed through a social media platform to radiology resident trainees. It will have sections that deal with demography, year of residency, learning and teaching activities before and after COVID 19 pandemic, access to internet service at home, and infection prevention methods they are practicing in their department.

Result: Of the total 211 radiology residents who are training radiology residency in Ethiopia 119 residents fulfilled the inclusion criteria, Of which 93 (78.2%) are males and 26 (21.8%) are female residents. Nearly half 52(43.3%) of residents are in their third year, while 45(37.5%), are in their second year of training and the rest 21(17.5%) in their first year of training. Seminar and daily image viewing sessions are the most common ways of radiology teaching activities each accounting for 93.3% and 91.6% respectively. Regarding the current teaching-learning activity, more than half (50.4%) of respondents state that the activities are compromised with some activities replaced by alternative models. using open source video conferencing (74.4%) is the most commonly used alternative method followed by using social media groups for case discussion (57%). More than half (53.4%) of the residents have internet access outside their institution which enables them to use alternative methods.regarding the continuation of resident teaching-learning activities more than 3/4th voted to continue with alternative models.

Conclusion and Recommendation: The Coronavirus Disease 2019 (COVID-19) has widely disrupted professional life, including that of medical students and radiology trainees. The normal way of radiology residency teaching and learning activities are compromised, but replaced with alternative models like, remote open video conferencing, using social media platform for case discussion and supplying residents with online teaching material. But this is a challenge especially for residents outside the capital city Addis Ababa, as the majority has no internet access outside their institution. With fast and stable internet access for residents outside their institutions, the radiology residency can safely proceed with alternative models, especially in difficult times like this covid-19 pandemic and other serious disasters that can compromise normal way of teaching-learning activity.

CHAPTER 1. INTRODUCTION

Background

An unprecedented outbreak of pneumonia of unknown etiology in Wuhan City, Hubei province in China emerged in December of 2019. coronavirus was found as the causative agent and World Health Organization (WHO) named it COVID-19 on 11 February 2020 [1].

The coronavirus disease 2019 (COVID-19) outbreak has rapidly transmitted into Europe, America, and the African continent and transitioned into a worldwide pandemic. This development has had serious implications for public institutions and raises particular questions for medical schools[1].

The effect might be devastating in the case of Africa because there are already complex challenges in the continent such as rapid population growth and increased movement of people; existing endemic diseases, and increasing incidence of non-communicable diseases[2].

Ethiopia, a developing country from East Africa with a very low health care workforce density of about 0.96 for every 1000 population.There is also a shortage of hospitals, shortage of transportation, lack of personal protective equipment for health care providers, which are among the major driving factors making Ethiopia one of the challenged developing countries in facing this unprecedented COVID-19 spread[3].

Schools in Ethiopia also suffered a great impact from COVID 19 pandemic closed due to fear of transmission of the disease, following the declaration of the virus as a pandemic by the World Health Organization on 12 March 2020. As a result, around 25 million pre-primary, primary, secondary, and tertiary-level students are unable to attend school and are staying at home.

Radiology practices are facing unprecedented challenges not only in how they are providing care to patients but also in how to continue to educate the next generation of radiologists[4]. It is clear that the priority is on providing timely and high-quality imaging to patients, especially those infected with coronavirus disease in 2019, but there is still a need to maintain our educational mission.

This survey is mainly trying to analyses the impact of COVID 19 on radiology residency in Ethiopian tertiary level hospitals and also look into alternative innovative options that higher radiology departments are using to continue the residency program.

Statement of the problem

In the era of coronavirus (COVID-19) pandemic, it is crystal clear to all, that the transmission routes, pathogenesis, and widespread health consequences associated with the virus should be studies in this era of COVID 19 pandemic. At the same time, the impact of COVID-19 on medical education is less well known. Already, faculty, medical students,and residents are impacted by COVID 19 pandemic and are forced to reschedule their normal working activities. As not much is known regarding the long-lasting impact of COVID-19 on medical education, it is therefore also necessary to study theimpact of the pandemic on education in general[5].

One of the changes introduced as a result of this pandemic includes canceling of in-person medical classes, with replacement by recorded lectures or live-videoconferencing. As a result of the cancellation of classes, there will bea loss of collaborative experiences that have the potential to negatively affect education and is worth studying[5].

For a variety of reasons, many schools and faculty have also canceled clinical clerkships. One reason is to decrease the risk of exposure for medical students, which is an understandable concern, although many students are willing to put themselves at risk and as such can be frustrated by these decisions[5].

COVID-19 pandemic has affected medical education in the canceling of medical conferences. These conferences, and presentations that medical students give, are very important to building up medical student's resumes and applications for residency.

The radiology residency program is also not immune from this pandemic. Even though many teaching and learning activities like, seminars, interdepartmental joint sessions, and daily image viewing sessions are also severely compromised, the true impact of this pandemic on radiology residents is not known. Therefore this survey will try to analyze the impact of COVID 19 on radiology residents as well as how radiology departments are using innovative alternative ideas in order to continue the residency program.

CHAPTER 2. LITERATURE REVIEW

The Coronavirus Disease 2019 (COVID-19) pandemic is transmitting rapidly in the United States,negatively impacting personal and professional life, without exempting that of radiology trainees. On March 27, 2020, Matthew D. Alvin states that Social distancing measures have circumvented the traditional trainee-faculty memberworkstation teaching, which is especially disadvantageous for residents who may be rotating on aservice for the first or second time in their training[6]. They further mention, Trainees, many with medical school debt and limited earnings and savings, are especially vulnerable to the economic consequences of this pandemic[6]. Radiology departments and practices are scaling down elective imaging and procedures, resulting in lost revenue that is unlikely to be fully recovered[6]. Should this pandemic-induced recession be prolonged, many will lose their health insurance, decreasing the number of patients seeking radiology services[6].

Alice Chong MD and his colleges mentioned in their study published in April 2020, at Virginia Mason Medical Center in Seattle, the radiology program directors have made adjustments to resident schedules reducing unnecessary risk to those individuals with less experience, allowing experienced clinicians toprovide the most expeditious care, and the conservation of PPE, which has an impact on the education of junior radiology residents[7].The adjustments, is not only for radiologyresident involvement in procedures, but also for other learners in the department (suchas internal medicine residents the department to learn image-guided procedures by rotation.)These rotations have been deferred until the crisis abates to adhere to the organizational guidingprinciples[7].

A study done by Joseph J and his colleagues fromYale Department of Radiology, Yale-New Haven Hospital states that followingThe American College of Radiology (ACR) endorsed guidance from the Center for DiseaseControl and Prevention (CDC) to reschedule non-urgent outpatient visits[8]. There was a significant impact on screening services (mammography9, lung cancer screening[8]. Among the service given, Outpatient imaging has suffered the most precipitous decrease, butemergency and inpatient settings have also encounter lower imaging volumes which will affect allradiology practices including radiology residency[8].

CHAPTER 3. OBJECTIVES

General objective

- To assess the impact of COVID-19 pandemic on radiology resident teaching at AAUSPMMC, Mekelle University, Gondar University, and Bahir Dar University.

Specific objectives

- To assess the impact of COVID 19 on radiology resident teaching and learning activity.
- To assess alternative methods that are being used to maintain the teaching-learning activity.
- To assess the number of cases residents interpret before and after COVID 19 pandemic.
- To assess infection prevention methods that are being practiced in the radiology department after COVID-19 pandemic.

CHAPTER 4. METHODS AND MATERIAL

STUDY AREA

The study will be conducted in TASH, College of health science, Addis Ababa University, Addis Ababa Ethiopia.An online survey was distributed through a social media platform between Apriland May 2020 to radiology resident trainees in the country's tertiary level hospital under AAU, SPMMC, Gondor University, Bahirdar University, and Mekelle University. TASH, located in the nation's capital Addis Ababa, is the largest referral as well as a main teaching hospital. The hospital provides a tertiary level referral treatment with over 900 beds and is open 24hrs for emergency services.

STUDY DESIGN AND PERIOD

The study will be conducted from May 1, 2020– June 30, 2020 G.C

A prospective survey study will be conducted to address the specific objectives.

POPULATION

SOURCE POPULATION

All radiology resident trainees in AAU, SPMMC, Gondor University, Bahirdar University, and Mekelle University.

STUDY POPULATION

All radiology resident trainees in AAU, SPMMC, Gondor University, Bahirdar University, and Mekelle University.

INCLUSION AND EXCLUSION CRITERIA

INCLUSION CRITERIA

All radiology resident trainee in AAU, SPMMC, Gondor University, Bahirdar University and Mekelle University who are on training during the study period.

EXCLUSION CRITERIA

All radiology resident trainee in AAU, SPMMC, Gondor University, Bahirdar University, and Mekelle University who are NOT on training during the study period FOR ANY REASON.

SAMPLING TECHNIQUE AND SAMPLE SIZE DETERMINATION

Non-probability sampling technique will be used and all radiology resident trainees in AAU, SPMMC, Gondor University, Bahirdar University, and Mekelle Universitywho have responded to the online structured questionnaire during the study period will be included.

DATA COLLECTION TECHNIQUE

An online survey was distributed through a social media platform to radiology resident trainees. It will have sections that deal with demography, year of residency, learning and teaching activities before and after COVID 19 pandemic, access to internet service at home, and infection prevention methods they are practicing in their department.

DATA QUALITY CONTROL

Several articles and journals will be reviewed. The data from each questionnaire will be checked for its completeness, clarity, consistency, and accuracy.

Data will be collected by the principal investigator from the online platform with the help from AAU IT technician.

DATA ENTRY AND ANALYSIS

The collected data will be processed and analyzed using IBM SPSS statistics software version 25. Data cleaning will be performed to check for frequencies, accuracy, and consistencies and missed values and variables.

STUDY VARIABLES

INDEPENDENT VARIABLES

- sex
- institution of residency training
- year of residency
- internet availability outside institutions

DEPENDENT VARIABLES

- current teaching-learning activities
- alternative methods being used to maintain the teaching-learning activity
- opinion of residents regarding the continuation of resident teaching-learning activities
- Infection prevention practices of respective radiology departments

ETHICAL CONSIDERATION

Data collection will be started after getting permission from the ethical review committee of the Department of Radiology, TASH, and Addis Ababa University. Any piece of information will be kept confidential.

The results of the study will be presented to the research week which will be organized by the Department Research Committee. Depending on the result of the study, it will be presented to those who need this result and accordingly will advocate for those who can implement it. It will also be submitted to a medical journal for publication.

CHAPTER 5. RESULT

Of total 211 radiology residents who are training radiology in Ethiopia (63 in SPMMC, 58 in AAU, 34 in Mekelle, 30 in Gondor and 26 in Bahirdar) and invited to the online questionnaire, 131 radiology residents have responded to the online survey and 12 residents (9.1%) are excluded from the study due to very limited data they provided and 119 residents fulfilled the inclusion criteria and included in this study. Of those 119 residents, 93 (78.2%) are males and 26 (21.8%) are female resident.

The majority (42.5%) of radiology residents are currently assigned to AAU while the rest are assigned to SPMMC (18.3%), Bahirdar University (16.7%), Mekelle University (11.7%), and Gondar University (10%).

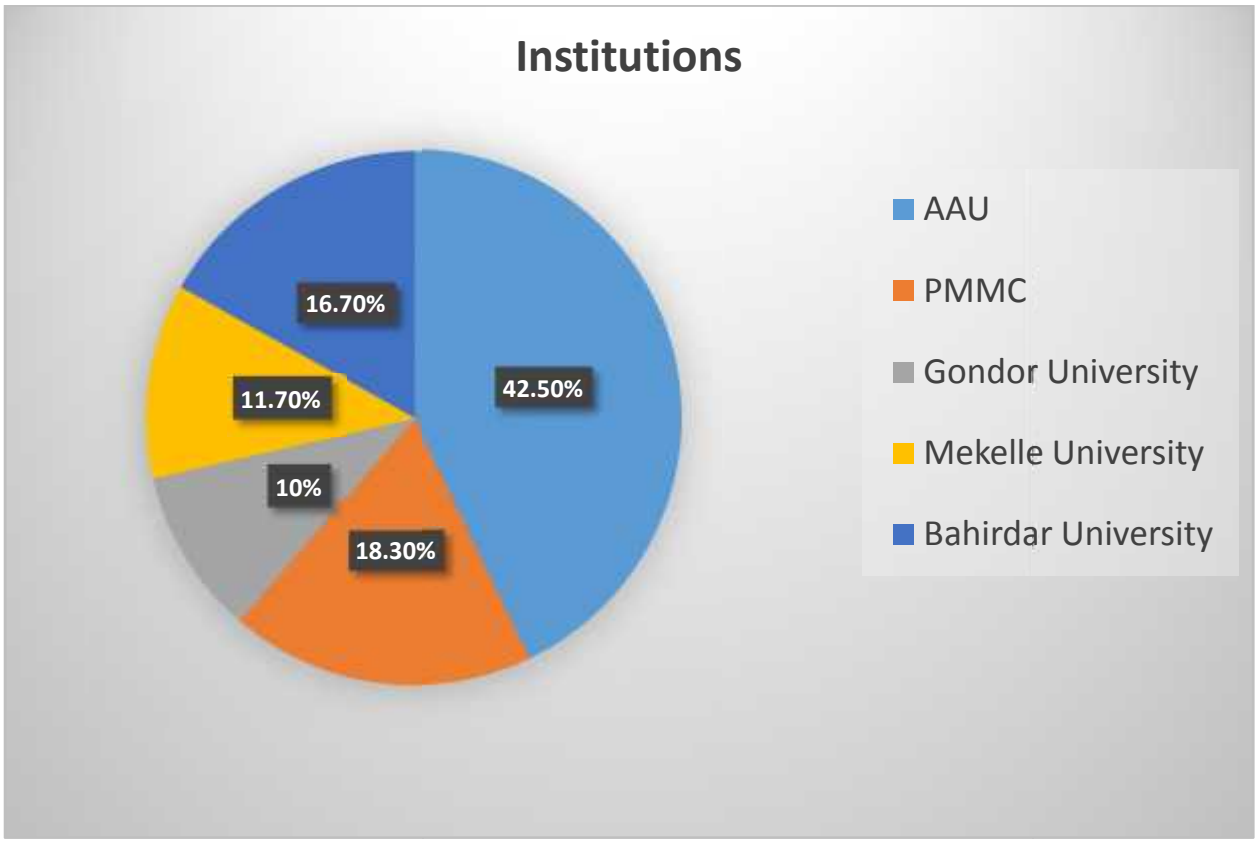

***Figure 1**: institutions in which residents are training residency program*

In terms of year of residency training, nearly half 52(43.3%) of residents are in their third year, while 45(37.5%), are in their second year of training and the rest 21(17.5%) in their first year of training.

Seminar and daily image viewing sessions are the most common ways of radiology teaching activities each accounting for 93.3% and 91.6% respectively. The next common way is small group discussion (71.4%) interdepartmental joint session (67.2%) and case review which is practiced in 63.9% of the time. Journal club is the least way of teaching activity which only practiced in 2.5% of the time.

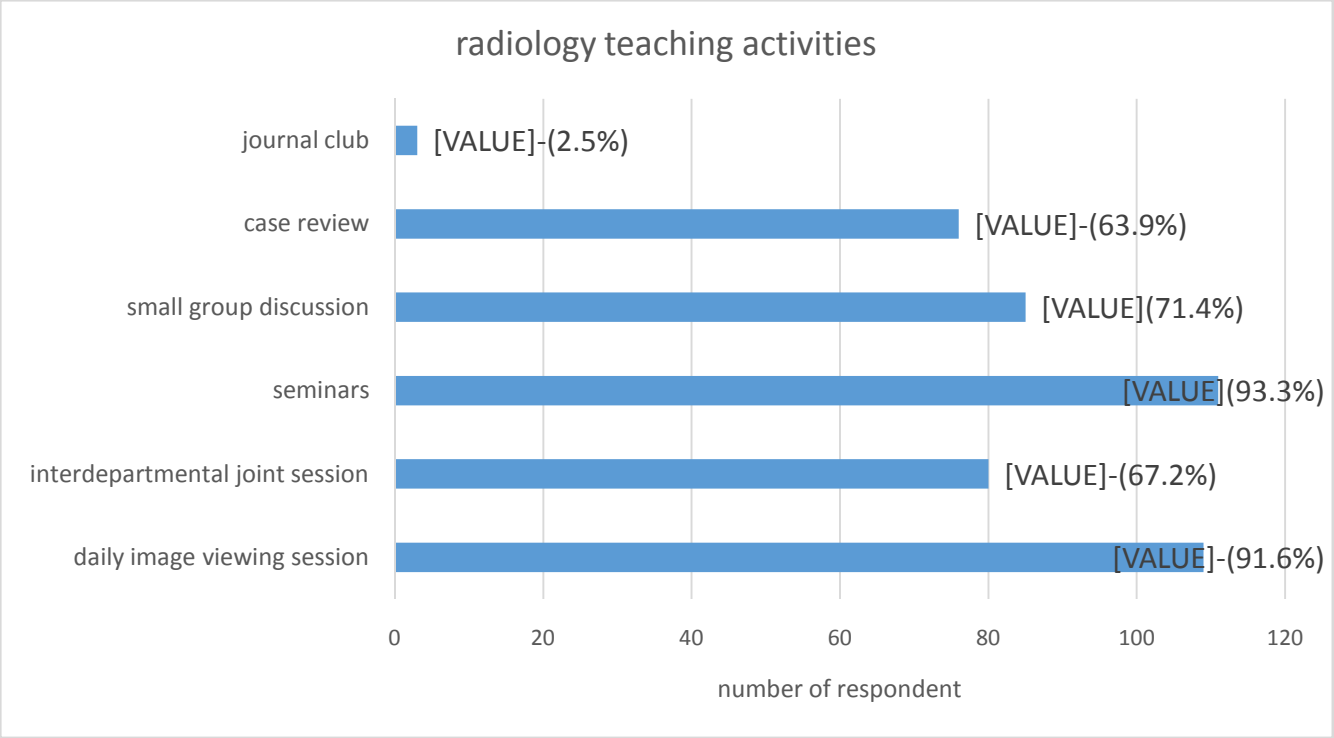

Figure 2; *Bar graph showing radiology teaching activities before covid-19 pandemic*

Regarding the current teaching-learning activity, more than half (50.4%) of respondents state that the activities are compromised with some activities replaced by alternative models. While about 1/3(35.3%) of the respondents say the activities are completely interrupted (teaching-learning activity completely stopped).13.7% of the residents state activities are Compromised (still there, but noalternative models used).

Under the above category if we see the residents from capital city Addis Ababa (those training in AAU and SPMMC), around 2/3(65.8%) of the residents answer that the activities are compromised with some activities replaced by alternative models, and 23.3% of residents answer the activities are completely interrupted (teaching-learning activity completely stopped). Only 9.6% of residents state activities are Compromised (still there, but noalternative models used).

But those residents outside capital city Addis Ababa(those training in Mekelle University, Gondor university, and Bahirdar university), more than half(54.3%) of the residents respond that the activities are completely interrupted (teaching-learning activity completely stopped), while 26.1% of the residents respond, activities are compromised with some activities replaced by alternative models, and the rest of residents(19.6%) states activities are Compromised (still there, but noalternative models used).

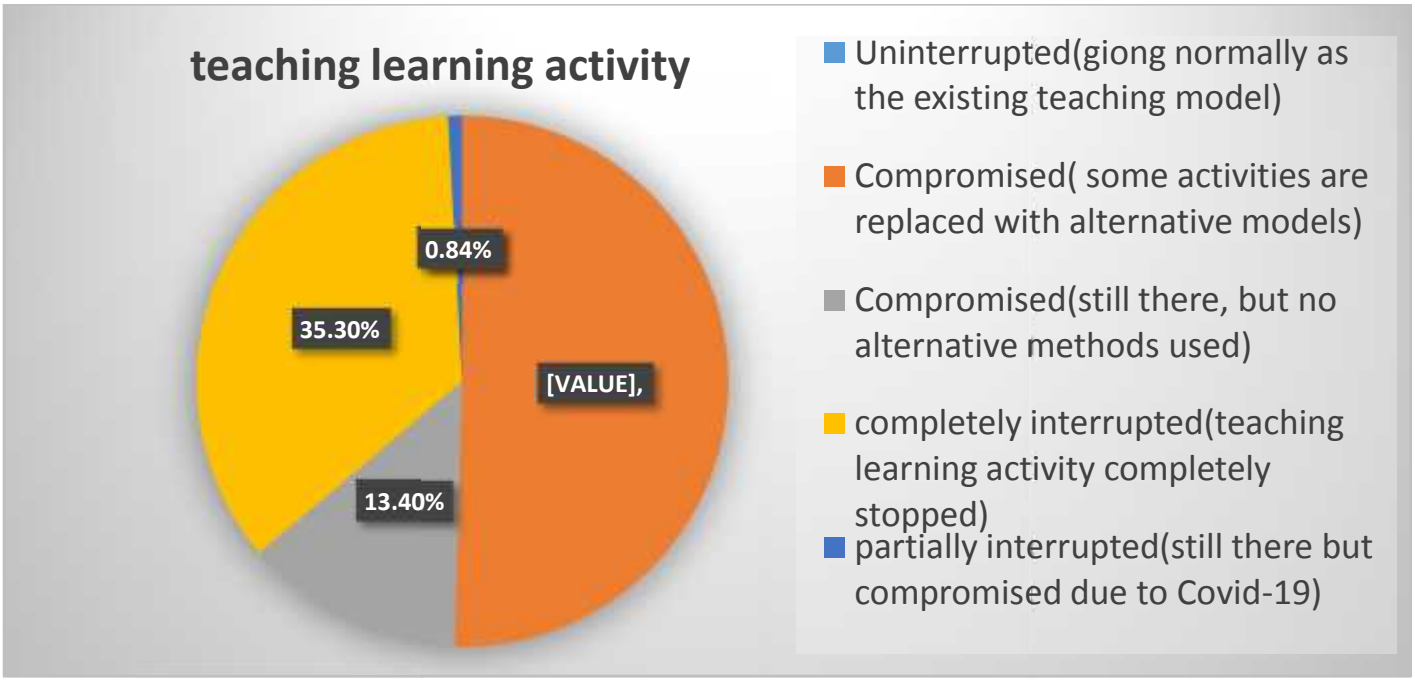

Figure 3; *PIE char assessing current teaching-learning activities.*

More than half (53.4%) of the residents have internet access outside their institution which enables them to use the above alternative methods (103 residents have responded). More than half (54.2%) of residents in the capital city, Addis Ababa have internet access outside their institution, while 70.5% of residents outside Addis Ababa have no internet access outside their institutions.

When we see alternative methods that are being used to maintain the teaching-learning activity, 79 residents have responded and they indicate that using open source video conferencing (74.4%) is the most commonly used alternative method followed by using social media groups for case discussion (57%). Continuing activities with smallgroups and Supply residents with onlineteaching material are third common alternative methods each being used in 44% of the time.

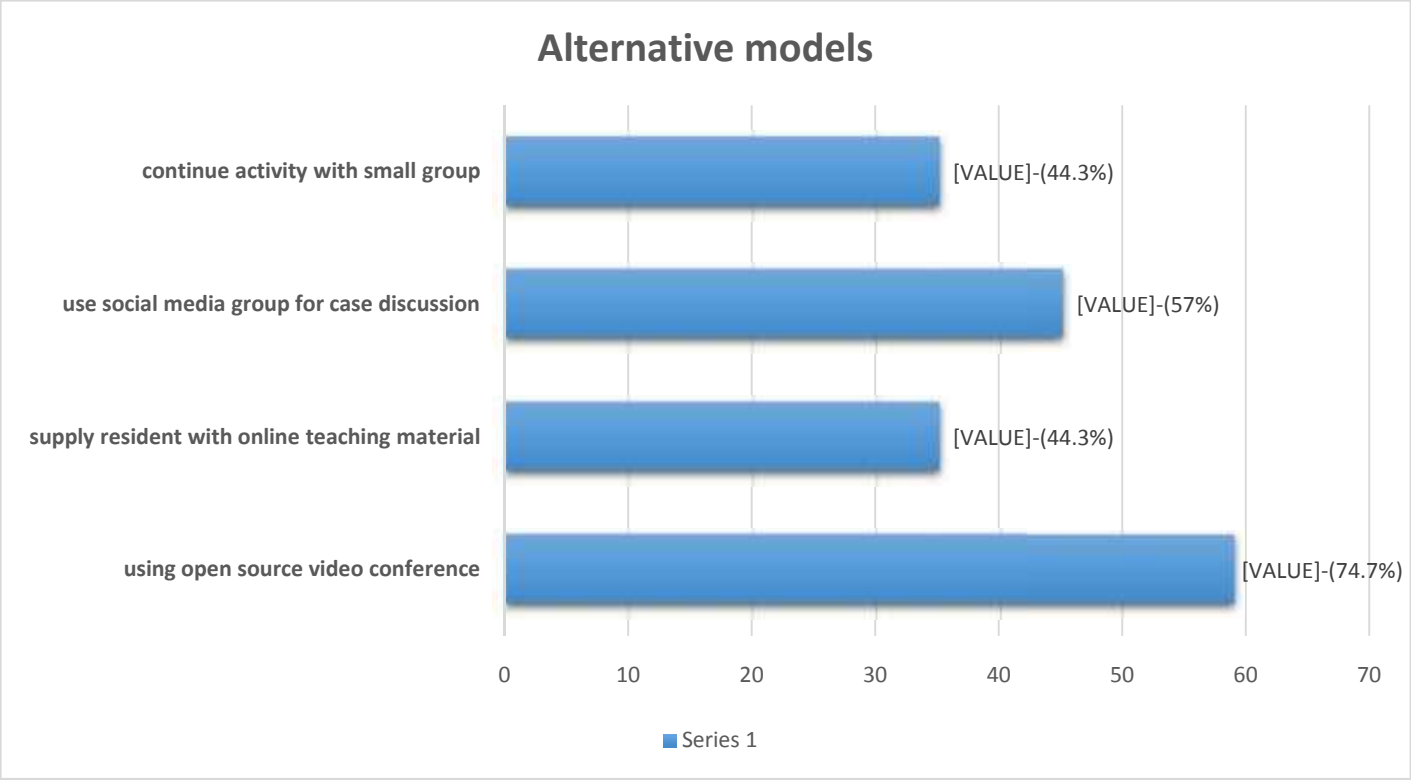

Figure 4*; Bar graph showing alternative models being used to continue teaching-learning activities.*

When we compare the number of radiological examinations that are undertaken and interpreted by radiology residents there is a significant difference before and after the covid-19 pandemic. The mean number of x-ray interpreted/performed or observed in a week is 156 cases(SD 150, range; 0 to 700 cases) before covid-19 with 91 resident response(75.8%) and mean of 48 cases (SD 70 cases, range; 0 to 320 cases) after covid-19pandemic with 67 resident response(55.8%) .

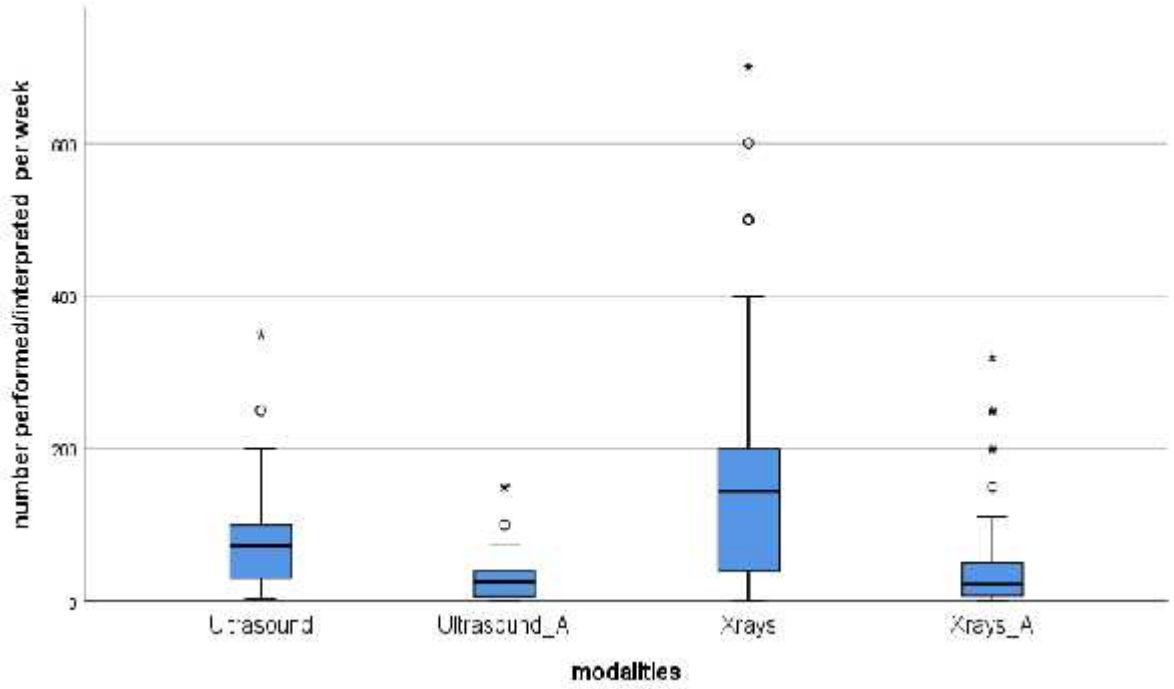

Figure 5*; Boxplot comparing the number of ultrasound performed before and after covid-19 pandemic per week. Ultrasound (ultrasound before covid-19, Ultrasound_A (ultrasound after covid-19), X-ray (X-ray before covid19), Xray_A(X-ray after covid-19).*
**= Extreme outliner numbers.*
O *=Outliners.*

Similarly, the mean number of ultrasound performed/observed before COVID-19 is 72.8 cases (SD 52 cases; range; 3 to 350). With 96 resident response (80.7%) and mean of 28.7(SD 29.3, range; 0 to 150) after covid-19 with 70 resident response (58.8%).

When we compare the number of CT scan interpreted/performed or observed, the mean is 22 cases (SD 20, range; 0 to 80) with 90 resident response(75.6%) before covid-19 and mean of 9.5 cases (SD 11.5 cases, range; 0 to 50 cases) after covid-19 with 65 resident response(54.6%).

Before covid-19 the mean MRI interpreted/performed/observed is 8 cases (SD 18 cases, range; 0 to 80 cases) and 67 residents have responded while the mean after covid-19 is 5.4 cases (SD 8.5 cases, range; 0 to 40 cases) with 48 resident response.

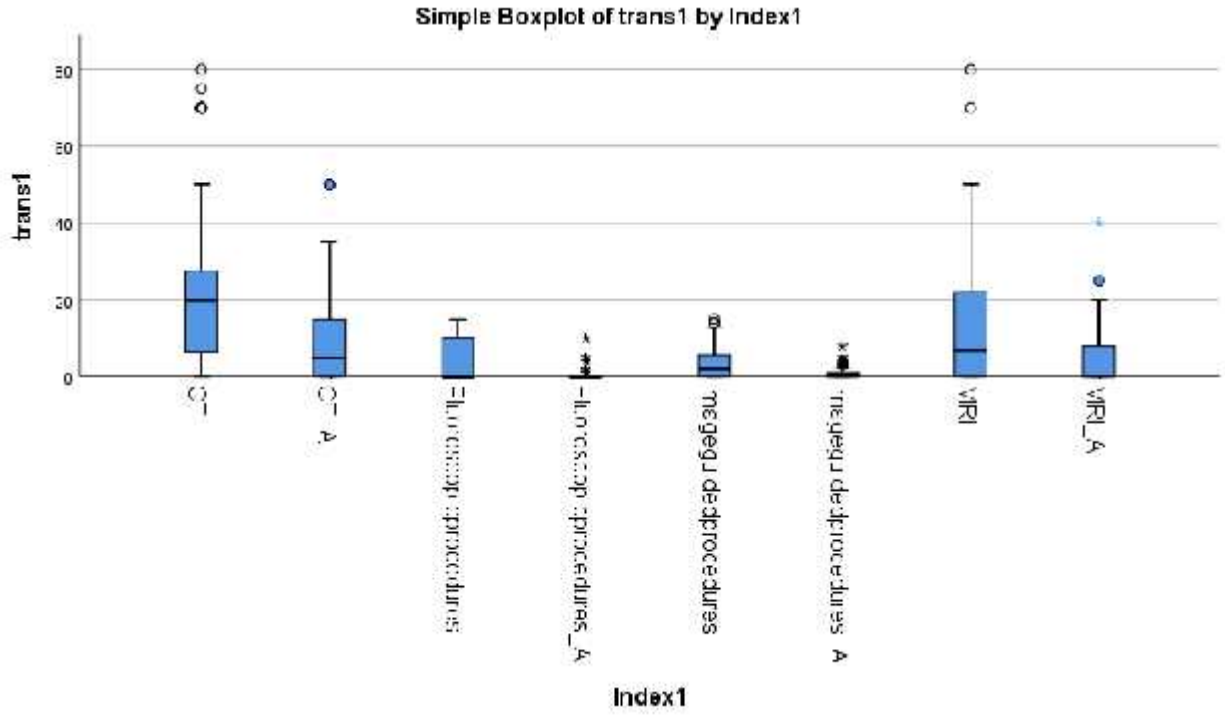

Figure 6; *Boxplot comparing the number of CT, MRI, fluoroscopy, and procedures performed before and after covid-19 pandemic per week. CT(CT before covid-19), CT_A(CT after covid-19), Fluoroscopies(Fluoroscopies before covid-19), Fluoroscopy_A(Fluoroscopy after covid-19), Image-guided procedures(Image-guided procedures before covid-19), Image-guided procedures_A (Image-guided procedures after covid-19), MRI(MRI before covid-19), MRI_A(MRI after covid-19).*

**= Extreme outliner numbers.*

O =*Outliners.*

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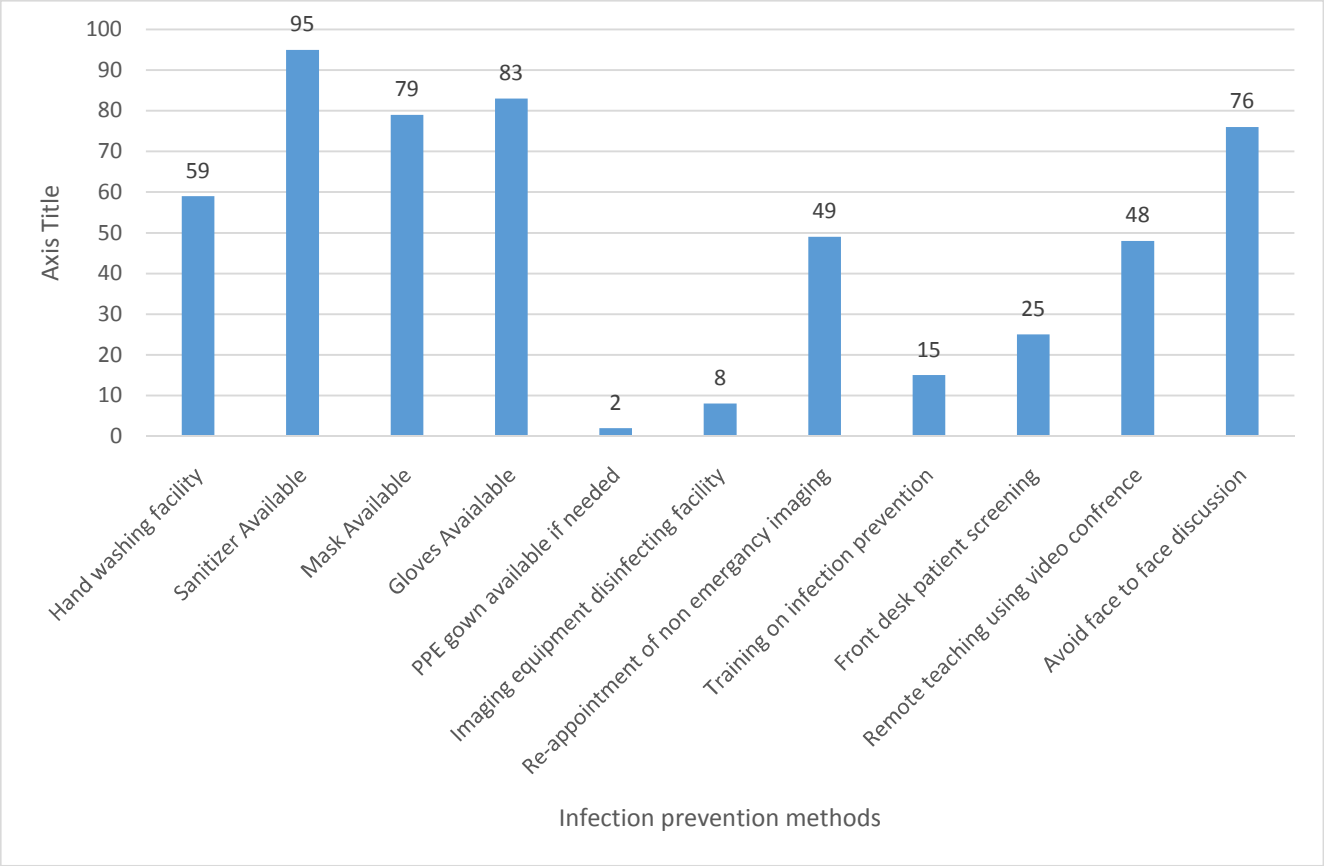

Figure 7*; Column showing infection prevention methods being used in radiology departments.*

When we see the mean fluoroscopic interpreted/performed/observed before covid-19, the mean is 4 (SD 5.5 cases, range; 0 to 15 cases) and 70 residents (58.8%) have responded. But after the covid-19 pandemic, the mean is 0.6 cases (SD 1.7 cases. Range; 0 to 10 cases) and 53 residents (44.5%) have responded.

Image-guided procedures performed/observed before covid-19, the mean is 3.5 cases (SD 4.2 cases, range; 0 to 15 cases) with 64 resident response and after covid-19 the mean is 0.7cases (SD 1.5 cases, range; 0 to 8) cases and 44 residents have responded.

Regarding infection prevention activities that are being practiced in the radiology department after COVID pandemic 111 residents have responded and 95(85.6%) of the residents have sanitizer available, 83(74.8%) residents have gloves available, and 79(71.2%) residents have face mask available. As an infection prevention method, nearly half 49(44.1%) and 48(43.2%) of residents practice Reappointment of non-emergency imaging and remote teaching using video conferences

respectively. Training on infection prevention and control, Imaging equipment disinfecting facility available, and PP-Gowns available if needed are among the least available infection prevention methods that are only available/practiced by 15(13.5%), 8(7.2%) and 2(1.8%) radiology residents respectively.

112 residents have responded regarding infection prevention practices of their respective departments after the covid-19 pandemic. Nearly 1/3rd of the residents perceive their overall infection prevention methods as good while another 1/3rd perceive it as satisfactory. Another nearly 1/3rd residents perceive it as poor. Only five residents(4.4%) perceive it as excellent.

Among 112 residents who responded regarding the continuation of resident teaching-learning activities more than 3/4th voted to continue with alternative models.

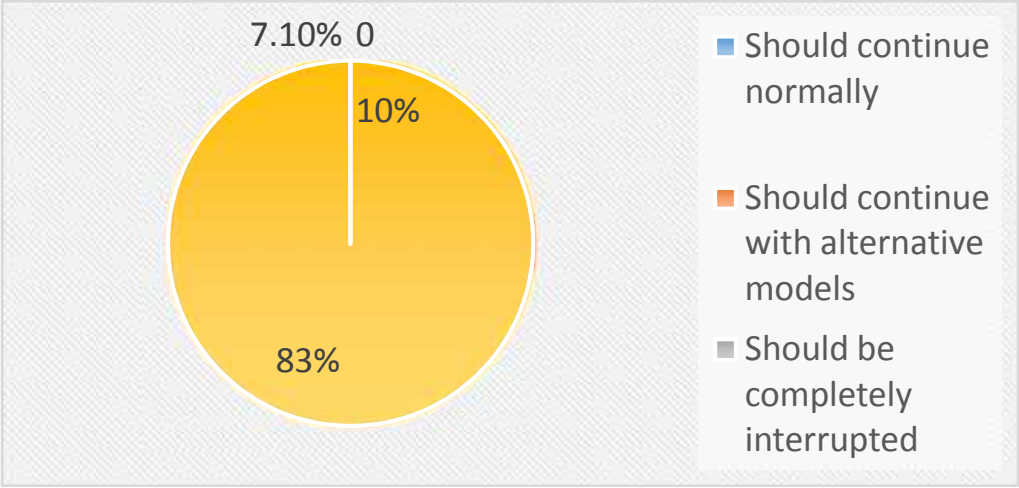

***Figure 8**; Pie chart showing resident's opinion regarding the continuation of resident teaching-learning activities.*

If teaching-learning activity is completely interrupted, more than half (53.6%) of residents answered that reason is due to covid-19 and its impact. Another 26.8% of residents states that it is due to poor motivation from the department while rest(19.5%) said it is due to the inability to use alternative models due to lack of internet access outside institutions.

CHAPTER 6. DISCUSSION

The Coronavirus Disease 2019 (COVID-19) pandemic is evolving rapidly all over the world widely disrupting personal and professional life, including that of medical students and radiology trainees. Even if some postgraduate programs have continued, primary and secondary schools as well as higher education institutes including universities closed due to the covid-19 pandemic in Ethiopia.

This study revealed that Radiology teaching-learning activity is compromised in all radiology teaching schools of the country. It also showed Radiology departments are trying to implement alternative teaching methods to replace the face to face teaching model, which were uniformly used in all schools.

This study showed that more than half (57.3%) of radiology trainees are in the capital city of Ethiopia Addis Ababa training in AAU and SPMMC. This likely due to the comprehensive and specialized nature of these institutes with multiple subspecialty services they provide. Besides, AAU is one of the pioneer universities in Ethiopia with an experience of more than a century.

Since the disclosure of the first case of COVID-19, there is a more than50% reduction in cased load due to various reason, one of which is appointing non-emergent cases. The reduction in radiology case load will have a significant impact in individual exposure during their training period and Almost 50% of residents considered the training to be partially or completely interrupted.

In radiology teaching of Ethiopia, almost all models of teachings; daily image viewing sessions, interdepartmental joint sessions, seminars, small group discussions and case reviews were made face to face either in small group or large group teaching. Among these teaching models, Daily image viewing sessions and Seminars are the most common ways of radiology teaching activities each accounting for 91.6% and 93.3% respectively. These teaching methods are practiced almost in all of the institutions currently training radiology residency. Unless there is introduction of alternative methods which can potentially replace the mentioned activities and avoid face to face activities which was made possible in 50 % of the institutions, radiology trainings will markedly be affected. Even if all the activities cannot be replaced with alternative methods due to the nature of the discipline, face to face activities was avoided by using open source video conferencing, creating social media groups for sharing teaching materials and case discussions in 74.4%, 44.3% and 57% of the cases. Even if tele-radiology and video conferencing are practiced worldwide in most continents and is being used

for remote service delivery and teaching[9-11], for institutions which have never practiced this model of teaching, this is encouraging. Despite the availability of alternative methods of teaching, some activities should continue with face to face activities which was practiced in small groups in 44.3% of the time.

Due to nature of most of radiology teaching model which need gathering of residents and staffs in conference rooms and face to face discussions as well as need of physical contact during teaching of procedural skills, using alternative methods of discussing cases is mandatory to maintain the model, which was practiced in only 50% of the institutions. Almost all of the institutions which have already made a shift from the traditional teaching model involving face to face teaching-learning to alternative methods were in the capital city (AAU and SPMMC) due to accessibility to the internet.

Even if using alternative methods of teaching is introduced in some institutions, only 53.4% of residents reported to have internet access outside the institutions which they are enrolled forcing them to stay in the institutions to participate in the activities and staying in the institution in need of internet access imposes additional mental stress to residents.

Even though face mask, gloves and sanitizers are available to majority of residents, the absence of adequate, PP-gowns and equipment disinfecting facility in radiology departments especially in areas where there is direct contact with patients, like ultrasound examinations and image guided procedures, will impose additional mental stress to residents which may have an impact on the teaching learning.

Even though the teaching-learning activity is compromised, and some residents continued the activity with alternative models, the majority of the residents want to continue the residency program with the alternative method. In the author's opinion, COVID-19 is not only be a treat to the radiology training but is also an opportunity to introduce additional teaching models which they have never been practicing before. Some of the alternative methods were used by most radiology teaching schools as one of the models even before COVI-19 pandemic.

CHAPTER 7. CONCLUSION AND RECOMMENDATION

The Coronavirus Disease 2019 (COVID-19) has widely disrupted professional life, including that of medical students and radiology trainees. Even if the radiology training is compromised due to COVID-19 pandemic, it is encouraging that institutions shift to alternative methods with encouraging speed. Institutions should try to avail internet access to residents and temporary solutions for residents to have access to the internet in their living compound. In addition optimal infection prevention strategies should be implemented in the radiology departments to boost resident's confidence and avoid stress during practicing and learning.

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ANNEX I. DATA COLLECTION FORMAT (QUESTIONNAIRE)

1,which institution are u currently assigned for the residency training

A, AAU
B, SPMMC
C, Mekelle University
D, Gondar University
E, Bahirdar University

2, Sex

A, Male B, Female

3,Year of residency

A, Year I B, Year II C, Year III

4,what were the radiology teaching activities in your department before the COVID-19 pandemic?

A, Daily image viewing sessions
B, Interdepartmental joint sessions
C, Seminars
D, Small group discussions
E, Case reviews
F, Journal clubs

5, how do you assess the current teaching-learning activities?

A, Uninterrupted (going normally based on the existing teaching model used before COVID-19 pandemic model)
B, Compromised (some activities are replaced with alternative models)
C, Compromised (still there but no alternative models used)
D, completely interrupted (teaching-learning activity completely stopped)

6, If teaching-learning activities are going normally or partially interrupted, what alternative methods are being used to maintain the teaching-learning activity

A, Using open source video conferencing
B, Supply residents with online teaching materials
C, Use social media groups for case discussions
D, Continue activities with small groups.

7, Do you have internet access outside your institution which enables you to use the above alternative methods?

A, Yes B, No

8, when you are assigned to a specific unit/modality before the COVID-19 pandemic, how many studies you were interpreting / performing / observing in a week

A, Ultrasound…….
B, x-ray…….
C, CT……..
D, MRI……..
E, Fluoroscopic procedures……..
F, Image-guided procedure…….

9, when you are assigned to a specific unit/modality after the COVID-19 pandemic, how many studies you were interpreting / performing / observing in a week

A, Ultrasound…….
B, x-ray…….
C, CT……..
D, MRI……..
E, Fluoroscopic procedures……..
F, Image-guided procedure…….

10, If teaching-learning activity is completely interrupted, what do you think is the reason (please specify briefly)

…….
……..

11, how do your perception on the infection prevention practices of your respective department after COVID-19 pandemic

A, Excellent
B, Good
C, Satisfactory
D, Poor

12, what infection prevention activities are being practiced in your department after COVID PANDEMIC?

A, Handwashing facilities available
B, Sanitizer available
C, Mask available
D, Gloves available
E, PP-Gowns available if needed
F, imaging equipment disinfecting facility available
G, Reappointment of non-emergency imaging
H, Training on infection prevention and control
I, Front desk patient screening

J, Remote teaching using video conferencing (like zoom conference or other means)
K, Avoid face to face discussions

13, Based on your experience in the last one month, what is your opinion regarding the continuation of resident teaching-learning activities?

A, Should continue normally
B, Should continue with alternative models
C, Should be completely interrupted