

The Impact of Covid-19 Pandemic on Obstetrics and Gynecology Residency Programs and Perspectives on Adaptive Ways of Training in Ethiopia

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Abstract

Background: The impact of Covid-19 on healthcare system and trainings has been tremendous and unpredictable. In addition to service re-organization, teaching institutions will have to devise adaptive mechanisms to cope up with the disruption in medical education and residency training. Objectives: to assess the effect of Covid-19 pandemic on obstetrics and gynecology residency program and explore residents' & program directors' perspectives on alternative academic approaches in Ethiopia.

Methods: This is a cross sectional mixed method study which was conducted at 12 institutions engaged in obstetrics and gynecology residency training in Ethiopia from May to June 2020. Quantitative data were collected from 240 residents employing an online platform (Google Forms) and focus group discussion was conducted using the ZOOM video-conferencing platform with eleven chief residents and eight program directors. Quantitative data analysis was performed using Stata 15 statistical software while thematic synthesis approach was used for the qualitative data analysis assisted by Atlas's 7 for windows. Ethical clearance was obtained from IRB of Saint Paul's Hospital Millennium Medical College.

Results: All levels of residents from all residency sites were represented. The level of residents' engagement in various routine clinical services vary depending on the type of service during COVID-19 pandemic period. Residents' involvement in routine ANC, high risk clinics are "slightly" reduced while in Gynecology OPDs, the reduction was "severe". There was no effort made to address the psychological impact of the pandemic on residents. The level of reduction in didactic and clinical teaching (rounds, case presentations, seminars, management sessions ranged from "some" to "complete interruption" for most of the residents at different years of training. Although the reduction in obstetric practical exposure (normal delivery, cesarean delivery) was "slight", there was "sever" reduction to "complete suppression" (>80%) in major gynecologic surgeries primarily affecting final year residents. Research activities are completely halted in most of the institutions. Generally, adaptive methods to sustain the residency training were implemented in very few of the institutions.

Conclusions: There was significant disruption in all domains of the residency training following the report of the first case of COVID-19 in Ethiopia. The preparedness and response of the programs was very poor and there was limited effort in implementing adaptive teaching methods in almost all of the institutions.

Keywords: Covid-19, Residency, Obstetrics Gynecology, Training, Adaptive, Ethiopia

Background

The WHO has declared the novel Corona virus as a pandemic on March 11, 2020. So far it has infected around 7million people worldwide with more than 400, 000 deaths [1]. Ethiopia has recorded its first case in March and currently the number of infected people has escalated to more than 2000 [1]. The anticipated duration and impact of Covid-19 on the global population and international healthcare is swift, evolving, and unpredictable [2].

In this unprecedented scenario, healthcare systems had to rapidly reshape their organization to cope with the emergency, aiming to optimize resources and minimize a further spread of the infection [3]. The daily responsibilities attributed to a resident demand a commitment to proper time management and the ability to prioritize tasks. Under the best of circumstances, there is a balance between clinical work, surgical training, didactics, and research [2].

The addition of a global catastrophe, such as the novel coronavirus/ COVID-19 pandemic, disrupts this balance. Maintaining a healthy resident workforce is critically important to patient care, but it is difficult for residents and other healthcare workers to minimize interpersonal contact and comply with 'social distancing' principle [2]. In addition, many clinicians had to dedicate part, if not all, of their practice to the management of COVID-19 patients [3].

Residency training programs and program directors need to develop a specific plan in response to the COVID-19 pandemic to ensure the safety and wellness of their trainees and ensure the implementation of alternative learning strategies, as much as possible [4-6]. In this regard, an increased use of telemedicine, as well as of simulation and smart learning educational programs, including tele-mentoring of surgical procedures, might be the key to reach these goals. [3, 6, 7]

The emerging Covid-19 pandemic has significantly disrupted clinical service provision in the already strained health care system of Ethiopia. These include decreasing contact of health professionals with patients; limiting OPD visits to emergency and semi-emergencies; temporary suspension of minor and major elective surgeries. This will have significant impact on the residency trainings of many teaching institutions. But, so far, the true impact of the Covid-19 pandemic on residency trainings is not reported in any of the programs in Ethiopia. It is not known also about the institutional adaptive mechanisms put in place to cope up with the status quo. Hence the objective of this study was to assess the impact of COVID-19 on Obstetrics and gynecology residency trainings through survey questionnaire targeted to all residents in the twelve sites in Ethiopia and explore residents'/program directors' perspectives on adaptive training methods.

Methods and Subjects

Study Setting and Design

A cross sectional design with an explanatory sequential mixed-methods study was employed. In this case the qualitative data was gathered in order to interpret quantitative results. We assessed the effect of COVID-19 pandemics on the teaching learning and clinical service delivery in the 12 institutions engaged in Obstetrics and gynecology residency trainings in Ethiopia from May to June 2021 in Ethiopia.

Population

The study subjects of the quantitative study were all residents at different levels of residency training in the 12 institutions who were willing to participate. For the qualitative study, chief residents & program directors were included.

Quantitate Data Collection

Data collection for the quantitative study was conducted using an online Google Form web-based questionnaire which comprised all the necessary information including: demographic data; level of residency; degree of engagement in different outpatient and in-patient clinical activities including gender-based violence, compre-

hensive abortion care and infertility services and engagement in teaching/learning activities. Email list of all residents was obtained from respective program directors of all the twelve institutions in order to send the Google Form link containing the questions.

Quantitative Data Analysis

We conducted descriptive analyses to examine the impacts of COVID-19 pandemic on the teaching learning and clinical service delivery and analysis was performed by years of training in most cases. We then examined bivariate between level of reduction in various clinical services and gynecologic procedures and teaching learning activities and year of training of residents. Pearson's chi-squared test used to assess how likely that the observed differences occur by chance. The reduction in each of clinical and teaching activities was rated out of 100%. Reductions of 0-40% was classified as slight, while reductions of 40-80% as severe and 80-100% as complete suppression (This was based on a study in Italy which assessed the impact of COVID-19 on urology residency training).

Qualitative Data Collection

we conducted two focus group discussions (involving eleven chief residents and eight program directors) to explore factors which might not be captured with the quantitative survey. The focus group participants were selected purposely, based on their in the program and expertise in the area of teaching learning and clinical services as residents. Chief residents from each institution were selected by the respective program directors. We involved program directors to have perspectives regarding the impact COVID-19 pandemic on the functioning of the overall residency program and teaching learning and clinical services involving residents. Because of restrictions to travel and gathering, it was not feasible to conduct face to face discussions. We conduct a virtual focus group discussion using the Zoom video conferencing platform. Zoom is a collaborative, cloud-based videoconferencing service offering features including online meetings, group messaging services, and secure recording of sessions [8]. The focus group discussion was moderated by a senior obstetrician and gynecologist who is well versed with the objectives of the study using a focus group discussion guide prepared for this purpose. The meeting was conducted in Amharic (the national language) to enable participants express their feelings freely. The discussion was recorded with Zoom video conference platform. The recoded discussion was transcribed and translated to English by a qualitative research expert.

Qualitative Data Analysis

Thematic analysis approach was used to analyze the qualitative data. Atlas's 7 for Windows (Gumby, Berlin) was used to assist the qualitative data analysis. Such analysis methods are suitable to assess resident's and program directors' perspectives, opinions, knowledge, experiences. We used inductive (bottom-up) thematic analysis approach and followed the generic steps of data familiarization, coding, generating themes (families), reviewing themes, defining and naming themes. We entered the focus group discussion transcripts into Atlas's and a member of the research team coded the text (quotations) and sorted similar codes together to

identify common themes that emerge from the data. We then developed a report in text format and interpretation and triangulations was done with the quantitative findings.

Results

General Characteristics of Study Participants

overall, 240 obstetrics and gynecology residents from the twelve higher learning institutions and from different years of training responded to the questions sent out via Google Forms. Of the re-

spondents, 85.8% were males and residents from all years of training are represented and the percentage residents included from each year of study are comparable (Table 1). Nearly 75% of the respondents were from five institutions; namely, St. Paul’s Hospital Millennium Medical College, Hawassa University, Addis Abeeba University (Tikor Aneesa Hospital), Gondar University and Jima University. These institutions also enroll most of the residents in Ethiopia.

Table 1: General Characteristics of Obstetrics and Gynecology Residents in Ethiopiaments

Variables (n=240)	No.	%
Gender		
Male	206	85.8
Female	34	14.2
Name of Your Institution		
St. Paul's Hospital Millennium Medical College	51	21.3
Hawassa University	43	17.9
AAU (tikor Aneesa Hospital)	38	15.8
Gondar University	26	10.8
Jima University	25	10.4
Acela University	12	5.0
Mekelle University	11	4.6
Hiromasa University	10	4.2
Olaitan Sodo University	10	4.2
Bahir Dar University	6	2.5
Adamma Hospital Medical College	4	1.7
Wolli University	4	1.7
Residency Year		
1st year	59	24.6
2nd year	64	26.7
3rd year	61	25.4
4th year	56	23.3

Eleven chief residents and eight Obstetrics and gynecology residency program directors were involved in the two the focus group discussion. Additional focus group was not required as there was repetition of ideas, perspectives during the two focus group discussions.

Immediate Impact of Covid-19 on Clinical Service Delivery and Teaching Learning

It is known that obstetrics and gynecology residents are involved routine clinical services in the respective training hospitals. Regarding their engagement in routine OPD services during

COVID-19 pandemic, regular ANC and high-risk clinics are “slightly” reduced in most cases; however, the percent reduction in gynecology OPD and family planning services is much higher (*Figure 1a*). Their involvement in emergency OPD activities remained unaffected during the study period. The level of involvement was not statistically significant by year of training as well ($p>0.5$) (data not shown). When we look at the family planning services, there was a “slight” to “severe” reduction in the residents’ involvement in both emergency and non-emergency contraception provision (*Figure 1b*).

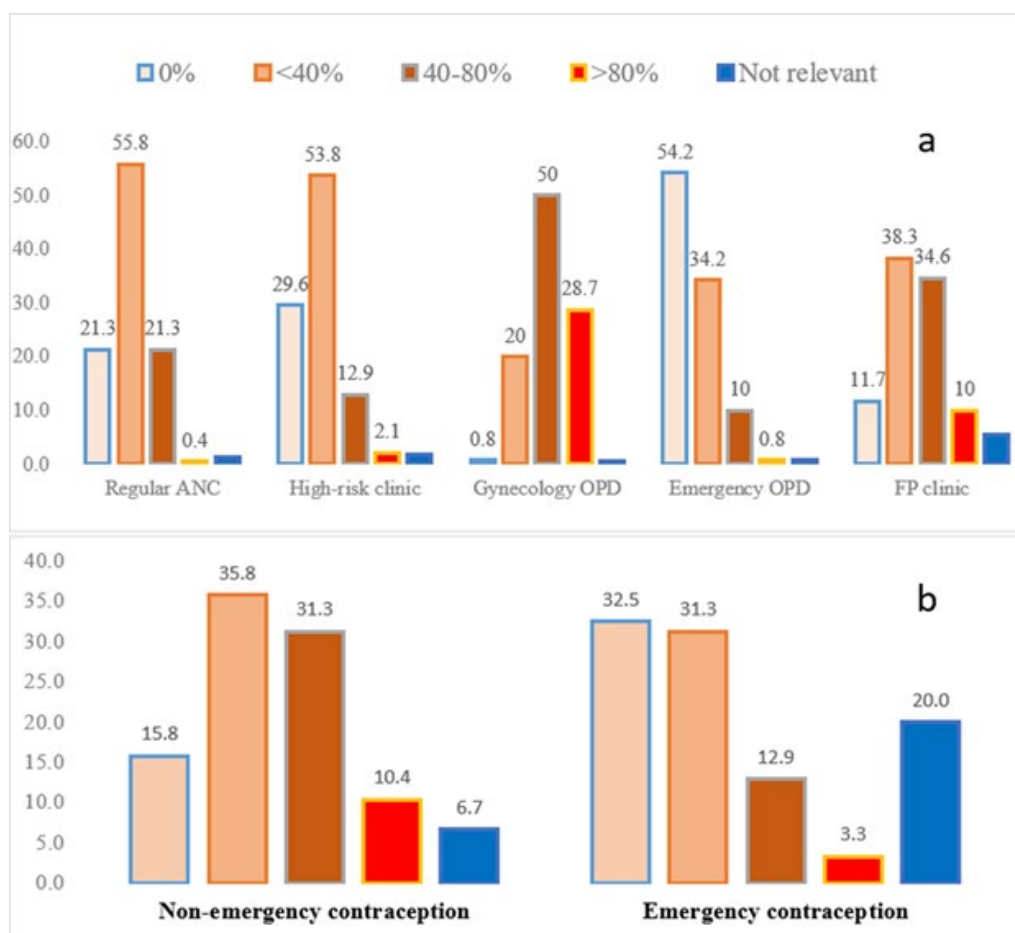


Figure 1: Percent of reduction in the OBSTETRICS AND GYNECOLOGY residents' engagement/ involvement in (a) OPD routines (b) family planning methods provision during the COVID-19 pandemic in the 12 teaching institutions in Ethiopia. (0%= not affected at all; <40%= "slightly reduced"; 40-80%= "severely reduced"; >80%= "complete suppression"). Judgment was made based on exposure to the number of various OPD services and family planning methods provision in a week during April 2020 compared to pre-COVID-19 pandemic.

The obstetrics and gynecology residents' engagement in routine labor and delivery (both spontaneous vaginal and cesarean deliveries) activities remained unaffected for the majority of the residents during the COVID-19 period and it was not statistically different by year of training (*Table 2*).

Table 2: Status of Reduction in The Obstetrics and Gynecology Residents' Engagement/Involvement on Labor and Delivery Services During the Covid-19 Pandemic in the 12 Teaching Institutions in Ethiopia

Labor And Delivery Services	No.	%
Attending Spontaneous Deliveries		
Not affected at all	162	67.5
Slightly reduced (< 40%)	67	27.9
Severely reduced (~ 40-80%)	11	4.6
Instrumental Vaginal Deliveries		
Not affected at all	173	72.1
Slightly reduced (<40%)	56	23.3
Severely reduced (~ 40-80%)	5	2.1
Complete suppression (>80%)	2	0.8
Not relevant	4	1.7

Cesarean Deliveries		
Not affected at all	172	71.7
Severely reduced (~ 40-80%)	9	3.8
Slightly reduced (<40%)	58	24.2
Not relevant	1	0.4
*Judgment was made based on exposure to the number of various labor and delivery services in a week during April 2020 compared to pre-COVID-19 pandemic.		

During April and May of the COVID-19 pandemic period; it was reported that there was a “slight” reduction in residents’ involvement in the diagnostic procedures and the pattern of involvement did not change by year of training. The reduction in their involve-

ment in minor gynecologic procedures and gynecologic screening activities ranges from “slight” to “severe” (Table 3). The reduction in the engagement on minor diagnostic and therapeutic procedures was not significantly different ($p>0.05$).

Table 3: The status of the reduction in OBSTETRICS AND GYNECOLOGY residents’ engagement/involvement on minor procedures (diagnostic and therapeutic) during the COVID-19 pandemic compared to the pre-COVID-19 period in the 12 teaching institutions in Ethiopia

Factor	1st year (n=59)	2nd year (n=64)	3rd year (n=61)	4th year (n=56)	p-value
Engagement in the Diagnostic Procedure					
Not affected at all	20 (34%)	17 (27%)	16 (26%)	24 (43%)	0.28
Slightly reduced (<40%)	25 (42%)	27 (42%)	32 (52%)	24 (43%)	
Severely reduced (~ 40-80%)	9 (15%)	15 (23%)	12 (20%)	7 (13%)	
Complete suppression (>80%)	1 (2%)	2 (3%)	1 (2%)	1 (2%)	
Not relevant	4 (7%)	3 (5%)	0 (0%)	0 (0%)	
Minor Procedures					
Not affected at all	16 (27%)	11 (17%)	11 (18%)	8 (14%)	0.72
Slightly reduced (< 40%)	22 (37%)	25 (39%)	26 (43%)	20 (36%)	
Severely reduced (~ 40-80%)	17 (29%)	24 (38%)	22 (36%)	23 (41%)	
Complete suppression (>80%)	4 (7%)	4 (6%)	2 (3%)	4 (7%)	
Not relevant	0 (0%)	0 (0%)	0 (0%)	1 (2%)	
Gynecologic Cancer Screening Activities					
Not affected at all	6 (10%)	2 (3%)	4 (7%)	2 (4%)	0.16
Slightly reduced (< 40%)	15 (25%)	14 (22%)	15 (25%)	12 (21%)	
Severely reduced (~ 40-80%)	26 (44%)	24 (38%)	18 (30%)	28 (50%)	
Complete suppression (>80%)	9 (15%)	22 (34%)	18 (30%)	9 (16%)	
Not relevant	3 (5%)	2 (3%)	6 (10%)	5 (9%)	
* Judgment was made based on exposure to the number of various procedures (diagnostic and therapeutic) performed in a week during April 2020 compared to pre-COVID-19 pandemic.					

Engagement of the obstetrics and gynecology residents in emergency procedures remained unaffected. Majority of the residents in all years of training reported that gynecologic emergency service provision remained the same compared to the pre-COVID-19 period (Table 4). However, their exposure to benign gynecolog-

ic conditions was reduced across the different years of training. Overall, the level of exposure to major benign gynecologic and oncologic surgeries reached to severe reduction to complete suppression for the majority of the residents without statistically significant difference among residents in different years of training.

Table 4: The status of the reduction in OBSTETRICS AND GYNECOLOGY residents' engagement on gynecologic major surgeries during the COVID-19 pandemic period in the 12 teaching institutions in Ethiopia

Factor	1st year (n=59)	2nd year (n=64)	3rd year (n=61)	4th year (n=56)	p-value
Gynecologic Emergency Surgeries					
Not affected at all	41 (69%)	46 (72%)	39 (64%)	39 (70%)	0.31
Slightly reduced (< 40%)	14 (24%)	15 (23%)	16 (26%)	10 (18%)	
Severely reduced (~ 40-80%)	2 (3%)	3 (5%)	4 (7%)	6 (11%)	
Complete suppression (>80%)	0 (0%)	0 (0%)	2 (3%)	1 (2%)	
Not relevant	2 (3%)	0 (0%)	0 (0%)	0 (0%)	
Major Benign Gynecologic Procedures					
Not affected at all	1 (2%)	1 (2%)	3 (5%)	0 (0%)	0.062
Slightly reduced (< 40%)	8 (14%)	14 (22%)	6 (10%)	8 (14%)	
Severely reduced (~ 40-80%)	27 (46%)	14 (22%)	19 (31%)	15 (27%)	
Complete suppression (>80%)	21 (36%)	34 (53%)	33 (54%)	33 (59%)	
Not relevant	2 (3%)	1 (2%)	0 (0%)	0 (0%)	
Major Oncologic Surgeries					
Not affected at all	3 (5%)	4 (6%)	6 (10%)	5 (9%)	0.25
Slightly reduced (< 40%)	12 (20%)	7 (11%)	5 (8%)	7 (13%)	
Severely reduced (~ 40-80%)	24 (41%)	15 (23%)	15 (25%)	15 (27%)	
Complete suppression (>80%)	18 (31%)	36 (56%)	32 (52%)	28 (50%)	
Not relevant	2 (3%)	2 (3%)	3 (5%)	1 (2%)	
* Judgment was made based on exposure to the number of various gynecologic major surgeries performed in a week during April 2020 compared to pre-COVID-19 pandemic.					

The level of residents' exposure (involvement) to the care of people experienced gender-based violence and provision of comprehensive abortion care ranged from no change ("not affected at all") to "slight" reduction (Table 5). However, near to 14% of them reported that they were not involved ("not relevant") in the care

of victims of gender-based violence. However, there was "severe reduction" to "complete suppression" in terms of exposure to infertility service provision for the majority of the obstetrics and gynecology residents in Ethiopia during the COVID-19 period.

Table 5: Status of the reduction in your engagement on gender-based violence, comprehensive abortion care and infertility services during the COVID-19 pandemic in the 12 teaching institutions in Ethiopia

	No.	%
Sexual Assault Victims Care		
Not affected at all	107	44.6
Slightly reduced (< 40%)	73	30.4
Severely reduced (~ 40-80%)	22	9.2
Complete suppression (>80%)	5	2.1
Not relevant	33	13.8
Comprehensive Abortion Care Service		
Not affected at all	89	37.1
Slightly reduced (< 40%)	98	40.8
Severely reduced (~ 40-80%)	37	15.4
Complete suppression (>80%)	10	4.2
Not relevant	6	2.5

Infertility Services		
Not affected at all	6	2.5
Slightly reduced (<40%)	32	13.3
Severely reduced (~ 40-80%)	67	27.9
Complete suppression (>80%)	119	49.6
Not relevant	16	6.7
*Judgment was made based on sexual assault victims care, CAC, and infertility services related cases in one month during April 2020 compared to pre-COVID-19		

On top of learning through service provision, the obstetrics and gynecology residents were expected to have other teaching learning activities and they were asked about the level of reduction in the specific teaching learning experiences. In general, there was “some” to “complete interruption” in the various teaching learning activities for the significant majority of the residents in all the

training institutions. “Complete interruption” was reported in didactic lectures, demonstration of medical procedures and surgical techniques, management sessions and seminars and in teaching rounds in all the institutions by 67.1%, 59.2%, 71.3%, and 64.2% of residents respectively (*Table 6*).

Table 6: The status of OBSTETRICS AND GYNECOLOGY residents’ teaching learning during the COVID-19 pandemic in the 12 training institutions in Ethiopia

Teaching Learning Methods	No.	%
Didactic Lectures		
Being conducted regularly	8	3.3
There is some interruption	63	26.3
Completely interrupted	161	67.1
Not relevant	8	3.3
Demonstrate Medical Procedures and Surgical Techniques		
Being conducted regularly	17	7.08
There is some interruption	71	29.58
Completely interrupted	142	59.17
Not relevant	10	4.17
Morning Sessions		
Being conducted regularly	79	32.9
There is some interruption	95	39.6
Completely interrupted	66	27.5
Management Sessions/Seminars		
Being conducted regularly	12	5.0
There is some interruption	57	23.8
Completely interrupted	171	71.3
Teaching Rounds		
Being conducted regularly	6	2.5
There is some interruption	79	32.9
Completely interrupted	154	64.2
Not relevant	1	0.4
Resident Research Activities		
Being conducted regularly	48	20.0
There is some interruption	89	37.1
Completely interrupted	64	26.7
Not relevant	39	16.3

After COVID-19 was reported in Ethiopia, the immediate changes in the teaching hospitals included decrease over all case load (patients avoided coming to the hospital for fear of exposure) but at the same time the number of emergency case (both obstetric and gynecologic) increased as many of the district hospitals almost stopped providing services (many are designated as COVID-19 treatment centers). Moreover, the flow of labor and delivery cases either remained unaffected or increased in most instances in this period. Besides, institutions have experienced delayed presentation of laboring mothers with complications such as ruptured uterus, obstructed labor and eclampsia with a magnitude never seen same time before. The focus group participants expressed that home deliveries were increasing even if it is not supported by data.

"By the way, we experienced increased number of deliveries and emergency CS during the last months as the nearby health centers and one of other general hospital had interrupted services. The only nearby general hospital was designated as COVID-19 treatment center." (CR7)

The number of antenatal and post-natal care case remained unaffected with the same reason of lack of services in other centers. As a result of increased number of cases, institutions offered prolonged appointment for low-risk mothers or back referrals to other facilities providing the service.

Residents' exposure to skill training was reduced as a result of the decrease in number of patient visits and cessation of service provision to benign conditions (cold cases) by the hospitals. Didactic teaching learning, morning sessions, seminars, case presentation, management session were interrupted for fear of exposure and to limit the spread of the virus within the institutions. Both minor and major gynecologic procedures such as laparoscopy, urn-gynecology were not performed during the COVID-19 period in many of the hospitals for fear of spreading the virus. The impacts of such measures were maximal for senior residents as they are expected to perform major procedures before graduation. Rotations at other departments and community services which were an essential element of the residency training were interrupted during this period which specifically has a bearing on specialized skill training for senior residents.

"OPD's are closed; some procedures are not done especially; oncology, urogynecology surgeries are interrupted and similar procedures are not done whose impact is maximal on the final year ones (residents) as they need essential surgical skills in these areas. There is no plan up to now as to how to make up for the lost time for the final year residents" (CR2)

As part of the resident training, final year residents are expected to carry out independent research which is hampered by the COVID-19 pandemic. Residents expressed difficulty of getting cases in the hospital to have interviews and conducting prospective studies is becoming unrealistic.

Alternative Approaches Adopted for Teaching Learning and Clinical Services

To avoid gathering of people in one room, many of the traditional teaching such as face-to-face discussions, seminars, lectures are avoided during this period. Hence, institutions should resort to new ways of continuing the teaching learning. Residents and program directors expressed the need to maximize the utilization of various technologies. Despite the interest to use various platforms, zoom video conferencing and Telegram application are the commonly mentioned platforms used to hold discussions, make presentations, and conduct management sessions and exchange documents among residents. However, very few institutions use these platforms and there is a wide variation in the application. In some institutions, the senior faculty (consultants) send assignments via telegram which is found to be convenient as there is a possibility to share bigger files compared to others platforms.

"We use Zoom application to have a biweekly case presentation, weekly intern case presentation, and we just started management session today and it was a good experience; many were able to participate, slides can be shared easily. We are also using telegram group for all residents at different level to share articles to just continue the teaching learning aspect..." (CR9)

Other adaptive methods used include having more frequent morning sessions using smaller group of residents and seniors so that everyone has the chance to take part. Assigning some residents to various centers not far from the teaching hospital minimized overcrowding and disease transmission and as the same time increased changes of practicing during this period. Moreover, assigning smaller number of residents at a time on major operation days limit the exposure to the disease.

Some hospitals were considering admitting limited number of elective (cold) cases for the purpose of continuing the skill training especially for the final year students but in the end, there was a need to have bigger number of elective operations in the form of a campaign to address the backlog. The recent (toward the end of April, 2020) reduction in the number of reported cases prompted this action according to some of the focus group participants. Making use of the gynecology wards which are less occupied for post-natal mothers also provided opportunities for more physical distancing.

"We decided limited elective surgeries to be performed to increase the skill exposure for residents- mainly for the teaching purpose starting from last week. We are also planning to continue the skill training for the final year residents by admitting more gynecologic patients..." (CR1)

Institutional Readiness to Fulfil Their Training Mandate in Times of Covid-19 Pandemic

The COVID-19 pandemic has exposed the training hospitals capacity to balance between continuing the training of health professionals while minimizing the risk of being hotspots for the disease

spread and transmission. The reality on the ground showed that the hospitals did not position themselves to address the above two at the same time. One of the program directors explained that many of the important requirements for the hospitals to be centers for resident training were not fulfilled. A month or so after the first case of COVID-19 is reported in Ethiopia, institutions lack guidance on how to continue the teaching learning especially on skill training aspect. One hundred three (42.4%) of the residents believe that the impact of COVID-19 on their training was “severe” (data not shown).

“We have witnessed that we could acquire sophisticated equipment and made institutional arrangements within a very short period of time in response to COVID-19 pandemic. If we had fulfilled the standards of our own hospitals to be teaching centers from the outset, many of such materials and arrangements would have been in place already....” (DP8)

Training on personal protection was provided to 44.9% of the residents, but the personal protection equipment (PPE) was availed for only 26.3% of them. Residents and other staff members in hospitals were provided with limited trainings on COVID-19 but the focus was mainly on infection prevention and basic skills in application of PPE and how to support on another in applying those PPEs. Not many institutions provided training in the care of mothers in labor and delivery in the context of COVID-19 pandemic. Tailored training was not provided for almost 80% percent of the residents in all the institutions.

The focus group participants also expressed concerns about measures taken to prevent exposure of health personnel to COVID-19 which were mostly inadequate. Among others, reducing the number of residents in morning meetings (only duty residents and seniors) and those assigned in the wards; working in shifts, conducting rounds away from the patient, avoiding more than one attendant for an admitted patient, reducing the number of clinicians in the wards at a given time, and availing more space in the wards for admitted patients were some of the measures taken. However, lack of personal protection equipment was a common problem expressed by almost all participants in all institution which made the other preventive measures futile.

“...If an infected (obstetric) case is coming to our hospital most of the residents are at risk of exposure due to the lack of PPE. Maternity, labor ward and ORs are connected and a single case of COVID-19 could infect many in the areas as they are brought to the wards straight from the ambulance...” (CR1)

An increased number of obstetric cases were also observed in referral teaching hospitals as many of the district hospitals have been designated as COVID-19 treatment centers which by itself strained the hospitals struggling to avoid exposure of health personnel and other patients to COVID-19. There was a strong need to have isolation centers for suspected cases coming to the hospitals before admitting them to the general wards. Moreover, those

working in the emergency areas were not provided with appropriate PPE. Residents and other health personnel provided labor and delivery services without appropriate personnel protection despite the increasing number of laboring mothers visiting these hospitals during COVID-19 period.

On the other side, the institutions’ capacity to utilize the available technologies such as e-learning platforms, video conferencing to deliver lectures, conduct seminar presentation, management session and even virtual simulation was challenged by the poor internet connection or networking infrastructure as expressed by residents and program directors in many of the teaching hospitals.

Residents needed also to be provided psychological support in the process as many might have worries and confusions as to how to go about the next steps in their career as obstetricians and gynecologists if the required skills were not acquired during their training period and as the same time, they are reluctant to accept the need to push back the training program.

“I wouldn’t agree in the pushing back of the program without testing the effectiveness of some adaptive measures we are thinking of doing. We don’t know when this (COVID-19) ends and I wouldn’t agree to push back the program for another one year if the situation stays like this for the next one year. We have to evaluate those measures before making the decision...” (CR5).

Discussion

This is the first study to document the impact of COVID-19 pandemic on the obstetrics and gynecology residency training in Ethiopia. The level of reduction residents’ involvement in routine gynecologic outpatient services, minor and major elective gynecologic procedures are “severe”; while, most of the emergency and labor and delivery services remained unaffected. We found that there was “some” to “complete interruption” in the various teaching learning experiences by the majority of the residents in all training institutions. Moreover, institutions took very limited adaptive measures to fulfil their organizational mandates during COVID-19 pandemic in Ethiopia.

Residents Safety

The response in terms ensuring residents safety has been poor as training on personal protection, was given only for 44.9% of the residents and personal protective equipment (PPE) was availed for only 26.3 %. There has been also no attempt by any of the institution to address the psychological impact of COVID-19 on residents. Moreover, none of the residency programs have adopted well organized mechanism to manage residents’ rotation so as to decrease residents’ exposure to COVID-19. Hand in hand with ensuring adequate supply of PPEs, residency programs in the US divided resident task force into two groups and arranged resident rotations every fifteen days. One group will be engaged in clinical activity and the second group will stay at home but will be involved in virtual teaching activities & consultations [9, 10]. Naser et al reported experience of restructuring of general surgery res-

idents during pandemics into three exclusive groups (inpatient, operative, and clinic) rotating weekly to practice appropriate physical distancing and reduce the possibility of transmission among residents [11].

Didactic Teaching

The reduction in didactic teaching for the junior residents has been severe in all institutions. At the time of the study, there were no any considerations on alternative ways of delivering the didactic session.

Experience from response to the COVID-19 pandemic residency programs overseas showed that virtual lectures, flipped virtual classrooms, and teleconferences are viable alternatives for continuing resident's didactic education [9, 12]. It is time that institutions engaged in residency trainings devise and cooperate on how to implement feasible adaptive teaching approaches. Clinical teaching activities.

Although there were some efforts to continue clinical teaching activities in limited (only 2) institutions (like zoom, telegram), generally there was no any adaptive teaching methods implemented in all of the institutions. This is a reflection of the degree of preparedness and response of the residency programs. In the Italian study, a severe reduction (>40%) or complete suppression (>80%) of clinical teaching/activities was reported [3]. The fact that obstetric and emergency OPD visits were not as such affected is expected as some of the nearby health facilities may not provide routine ANC/emergency services which was also a point of concern for the ministry of health. One of the interesting findings from the study was the fact that there was no as such marked reduction in engagement of residents in family planning, gender-based violence and comprehensive abortion care. This might be related with increased referral of clients from designated centers and lower health facilities which in normal circumstances provide the services.

In order to cope up with the disruption, there have been different adaptive ways of maintaining in clinical teaching in different residency programs overseas. These include virtual morning sessions, virtual academic conference, case-based conferences and journal club webinar, email-based clinical vignettes with associated questions and clinical images [9, 13, 14].

Surgical Education

The significant reduction in surgical exposure is concerning to all residency programs. This is particularly important for final year residents who, in most of the programs, have very limited time before graduation. This is reflected in previous Italian study which assessed the impact of COVID-19 on urology residency training that showed sever reduction surgical activities which was even more pronounced for residents attending the final year of training [3]. Since the progress of the pandemic has been unpredictable, institutions should come up with a dynamic solution to address the disruption to surgical training.

Although some innovative virtual surgical skills training methods have been tried in limited surgical residency disciplines, their effectiveness is not well examined. These include surgical video databases and 3D atlases, cadaver and web-based simulations, which can be used as alternative hands-on training for residents during COVID-19 pandemics [14, 15].

Research

The disruption to research undertakings is moderate to severe. No Institutional response has been put in place to sustain research activities in any of the residency sites. This has been also reflected in different residency programs in the US which suspended research activities. But Some residency programs are using adaptive means of maintaining residency research undertakings notably through Video enabled virtual research meetings and encouraging residents working from home (nonclinical resident) [9, 13, 14, 16]. This might give also an important opportunity for residents to conduct studies COVID-19.

The COVID-19 pandemic has exposed the training hospitals capacity to balance between continuing the medical education while minimizing the risk of being hotbeds for the disease spread and transmission. The reality on the ground shows that the hospitals did not position themselves to address the above two at the same time.

Conclusions

There was significant disruption in all domains of academic activities in the residency training following the COVID-19 pandemic. The preparedness and response of the institutions in terms of ensuring resident's safety and implementing adaptive training methods is inadequate. Hence residency programs should address these gaps through coordinated efforts at institutional and national level and come up with feasible alternative training approaches

Abbreviations

ANC: antenatal care, CS: Cesarean Section; FGD Focus Group Discussion; SPH: Saint Paul's Hospital; SPHMMC: Saint Paul's Hospital Millennium Medical College; SPSS: Statistical Software for Social Sciences; WHO: World Health Organization.

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