

Impact and Challenges to the Neurology Residency Training in The Medical City During the COVID-19 Pandemic

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ABSTRACT

Introduction. The COVID-19 pandemic presented an extraordinary challenge to the operations of private hospitals involved in neurological residency training. Numerous adaptations were made to restructure the hospital, including the special units and diagnostic centers. Teaching and training activities were swiftly transitioned to online platforms and research activities were streamlined. Manpower allocation into teams with active duties followed by mandatory quarantine periods became the norm.

Objective. To evaluate the effect of the COVID-19 pandemic on the neurology training program by comparing two periods: pre-pandemic and pandemic periods.

Methods. We reviewed the changes implemented by the hospital in response to the pandemic. We also looked into our residency training program pre-pandemic and the subsequent changes instituted to adapt to the pandemic.

Results. Due to the community quarantine imposed by the government, there was a drastic drop by as much as 70.5% in the out-patient census, 38.4% in the in-patient census, and 46.9% in neurodiagnostic (electroencephalography and electrodiagnostic medicine). The residents were reorganized into three teams of 4 residents, further divided into COVID and non-COVID rotations for 5 days straight duty. Consultants were also stratified into high-risk (on-call for emergency referrals in a work-from-home scheme) and non-high-risk (COVID patient rounds). Teleconsultation was likewise utilized. Academic activities were shifted to blended online learning.

Conclusion. There was a need to reorganize resident staffing brought about by the hospital changes as well, to ensure safety during the pandemic. The pandemic has forced us to shift to alternative methods of teaching and examination, such as teleneurology. Regular assessments and adjustments to the training program will need to be done to adapt to an evolving situation.

Key Words: neurology, residency training, COVID-19, pandemic, restructuring training program

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has placed extraordinary stress on the global healthcare system since its outbreak in Wuhan, China in December 2019. This has since affected 218 countries and territories as of December 2020, with over 78 million cases worldwide.¹ The Philippines had its first confirmed COVID-19 case on January 25, 2020; a Chinese national with a travel history from Wuhan, China, was admitted at the national infectious disease referral hospital in Manila.¹ The first local transmission was reported on March 7, 2020, and this was

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followed by a steady increase of new cases daily. To contain the situation, the National Capital Region (NCR) of the Philippines was placed on enhanced community quarantine on March 15, 2020.² During this time, local and international flights were banned, and civilians were not allowed to enter or exit the NCR. Despite having over 3,000 new cases daily, the NCR was downgraded to a less rigid general community quarantine on June 1, 2020; and remains so as of September 2020.^{1,3} Public transportation was resumed at a reduced capacity and select businesses were allowed to operate at 50% of their regular capacity and depending on their industry.

The Medical City (TMC), one of the biggest private hospitals in the NCR, was established over 50 years ago and has an 800-bed capacity.⁴ It serves some 50,000 in-patients and 500,000 out-patients a year.⁴ TMC was one of the first hospitals to experience a surge in COVID cases last March 2020, hence, there was an urgent need to implement an emergency restructuring of hospital services, including training; with the primary aim of minimizing exposure to COVID-19 among the resident and consultant workforce, as well as the hospital staff. This paper aimed to describe and report the experience and the adjustments made by the adult neurology residency training program of our hospital and the ensuing impact on the trainees, attending neurologists, and other ancillary neurodiagnostic services. The findings may provide suggestions to other neurological training institutions regarding the change in the learning conditions of the residents and the restructuring of their program to adapt during the pandemic.

METHODS

We reviewed our current training program manual and looked into the residents’ rotations, clinical exposure, patient load, subspecialty requirements, as well as supervision of attending neurologists and described the adjustments made since March 2020 where handling the surge of COVID patients was the priority, as well as the difficulties and logistical dilemmas encountered when the NCR was placed on extended community quarantine. To evaluate the effect of the COVID-19 pandemic on the patient census in neurology training programs, we divided the comparison period into two periods: pre-pandemic and pandemic periods. The data was collected during the pre-pandemic from January to June 2019. The pandemic period in our study was defined as spanning from January to December 2020.

RESULTS

Neurology residency training pre-pandemic

The TMC neurology residency training program is one of the 10 accredited training programs for adult neurology of the Philippine Neurological Association (PNA).⁵ It has 15 residents for its 4-year training program. Each neurology resident has an assigned monthly rotation both in-hospital

and in other institutions, designed to enhance and complete their training competency. During office hours, they are assigned to the clinical wards, outpatient department, neurophysiology laboratory, or neurocritical care units.

After office hours, the duty team, consisting of a junior and a senior resident respond to new admissions/ referrals, manages in-patients, and serves as the core of the Brain Attack Team (BAT) service for neurologic emergencies, with duties rotating every three days.

For neurodiagnostic services, an average of 1,267/year of electroencephalograms was performed in the last 5 years while an average of 2,362/year of electromyography/nerve conduction studies were performed during the same period. The average number of in-patients seen was 1,798/year in the last 5 years (Figure 1).

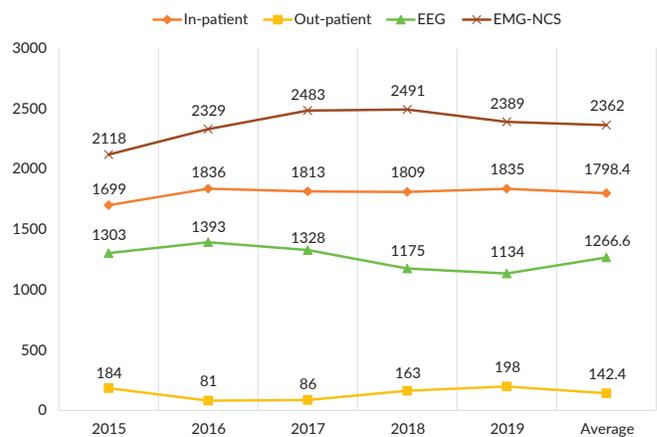
For a closer comparison of pre- and pandemic changes, the most dramatic change was the drop in the neurodiagnostic and in-patients censuses.

A decline of 57.8% in the electroencephalography (EEG) census started when quarantine was declared in March 2020, such that by April 2020, there was no procedure done. In the first 6 months of 2020, there was an overall decline of 42% compared to 2019 (Figure 2).

There was a drop of 66.2% in the EMG-NCS census in March 2020, compared to the same period in 2019 (Figure 3). As with the EEG, there was no procedure done in April 2020. Overall, there was a drop of 49.4% in the first 6 months of 2020, compared to the same period in 2019.

The biggest decline in the in-patient census was seen in April 2020 (68.8%) compared to April 2019 (Figure 4). There was an overall decline of 38.4% in the in-patient census for the first 6 months of 2020 compared to the same period in 2019.

There was an overall decline of 70.5% in the first 6 months of 2020 for the out-patient census (Figure 5).



EEG, electroencephalogram
EMG-NCS, electromyography-nerve conduction study

Figure 1. Census of selected services of the department, 2015-2019.

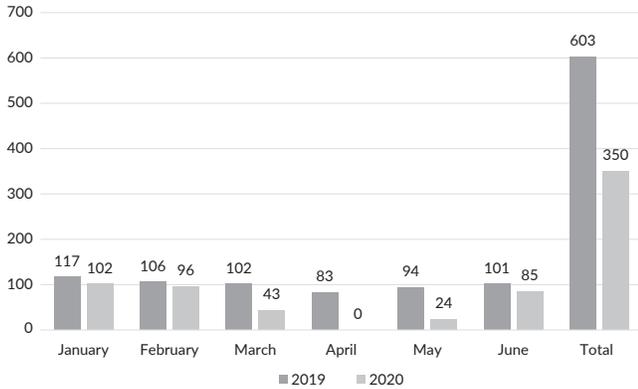


Figure 2. EEG census January to June 2019 and January to June 2020.

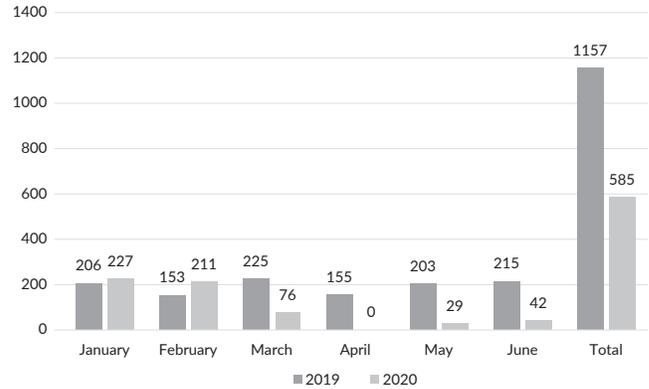


Figure 3. EMG-NCS census January to June 2019 and January to June 2020.

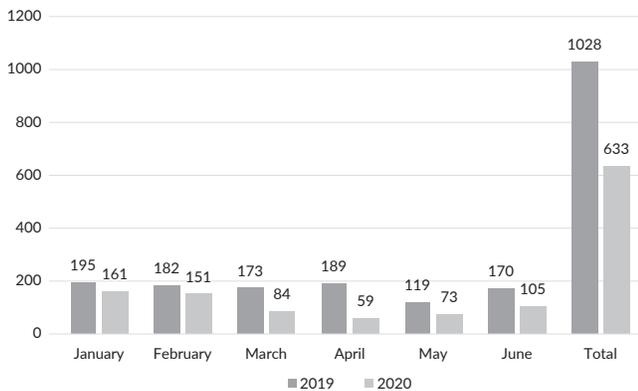


Figure 4. In-patient census January to June 2019 and January to June 2020.

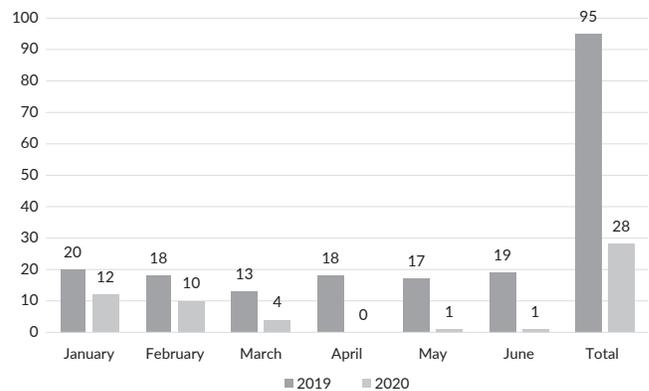


Figure 5. Out-patient census January to June 2019 and January to June 2020.

Conferences consisted of weekly grand rounds, admitting conferences, and subspecialty conferences (Neurochemistry, Neuroradiology, Neuropathology). Trainees are also required to attend the annual conventions of the Philippine Neurological Association (PNA) and the other subspecialty societies (Alzheimer’s Disease Association of the Philippines, Stroke Society of the Philippines, Philippine League Against Epilepsy, Brain RESCUE: Responders and Educators to Strengthen Care for Neurologic Emergency/ Critically-ill, Movement Disorder Society of the Philippines). The Adult Neurology Specialty Board of the PNA also holds an annual Residency In Training Examinations for all the neurology residents from all the training institutions. The residents are also expected to produce research outputs yearly for presentation in the TMC research contest, the PNA annual convention research contest and subsequently publish the said research.

TMC changes

The COVID-19 pandemic has disrupted the hospital routine. Almost all hospitals responded to the crisis by temporarily closing all or some parts of routine non-emergent

services; shifting the existing resource and personnel available for managing patients with COVID-19.

The Institute of Neurological Sciences and the TMC administration agreed on arrangements regarding the physical restructuring of the special units. The Acute Stroke and Neurocritical Unit (8 beds) were temporarily converted to a general intensive care unit to accommodate more critically ill patients with COVID-19. Dedicated rooms in the isolation ward were transformed into telemetry units to extend the bed capacity of the COVID ICU. Ward units were transformed into quarantine facilities for healthcare workers, consequently reducing available beds for neurological patients.

Adequate provision of personal protective equipment was ensured so the hospital staff is protected. Securing personal protective equipment for the staff was initially a challenge given the sudden surge of covid-19 patients but this was addressed promptly by the efforts of the hospital to procure supplies and augmented by generous donations from the private sector and medical associations including the PNA.

TMC implemented a 2-in-1 hospital setting with separate zones for COVID and non-COVID areas. The hospital allotted 4 wards with a 102 bed-capacity for COVID patients. Some nursing staff was re-assigned to screen all persons entering the premises. Some facilities were shifted into staff quarters to accommodate the employees staying in the hospital.

Restructuring the training program: The new normal in the residency training program

The resident trainees and the training program were confronted with substantial changes forcing them to adapt to the demands and challenges of the pandemic (Table 1). These changes were implemented after consultative meetings

were initiated with the neurology consultants, the training officer, and the residents.

Due to the quarantine imposed by the government and the need for social distancing, the outpatient clinics were closed.

A new neurology resident and consultant team-based scheme was adopted. Designations of COVID and non-COVID areas were made in consideration of individual risks and co-morbidities and also to avoid cross-contamination. The duty schedule was likewise revised, to allow for enough rest and maintain a healthy workforce. The specialty and outside rotations of the residents were put on hold temporarily. Learning was maximized with the available cases and their corresponding neurodiagnostic from admission to

Table 1. Challenges and adaptations are done for the Neurology training program in The Medical City

Challenges	Adaptations
Significant reduction of manpower as medical interns were pulled out from their posts; residents and health care workers became symptomatic or were quarantined due to exposure to COVID cases	<ul style="list-style-type: none"> • Reorganization into 3 teams of 4 residents, going for 5 days straight duty; wherein the active-duty team is responsible for admissions, referrals, and in-patient care • Teams of residents were further divided into non-COVID and COVID posts to avoid cross-contamination • Adequate provision of personal protective equipment was prioritized to ensure the safety of all residents • Mandatory swabs were done for residents with symptoms or prolonged exposure to COVID
A limited number of consultants were able to supervise and handle patients as some had significant co-morbidities and were at high-risk for COVID infection	<ul style="list-style-type: none"> • Stratification of consultants as to non-high-risk and high-risk, with the latter being those with advanced age or multiple co-morbidities • Non-high risk consultants were assigned to either COVID or non-COVID cases • High-risk consultants were on-call neurologists with a work-from-home scheme
Significant reduction in the number of cases seen, limiting clinic-based learning opportunities. Neurophysiological diagnostics were rescheduled or canceled	<ul style="list-style-type: none"> • Teleconsultation, in compliance with the Philippine Medical Association guidelines, via different medical practice management software was advocated for non-urgent cases • EEG and EMG-NCS were performed with adequate protection for the patient and hospital personnel alike
Time-sensitive neurologic emergencies such as stroke were compromised due to inevitable delays mainly in proper donning of personal protective equipment and the need for adequate disinfection of neuroimaging facilities	<ul style="list-style-type: none"> • Residents were instructed to make careful decisions and calculated actions so as not to rush into compromising scenarios • Residents were made to do a targeted neurological examination to minimize clinician-patient exposure
Elective rotations for neuro subspecialties were all postponed indefinitely as the manpower priority shifted to handling the influx of COVID patients	<ul style="list-style-type: none"> • The resident assigned to each patient provided comprehensive patient care by handling all subspecialty procedures completed during the entire admission to maximize learning exposure
All didactics, journal clubs, conferences, examinations were postponed indefinitely.	<ul style="list-style-type: none"> • Academic activities were shifted to blended online learning and presentations after 8 weeks, to ensure continuity of resident education • Residents were encouraged to access local and international webinars and conventions
Interruption of individual research projects due to logistical limitations	<ul style="list-style-type: none"> • Prioritization of topics related to neurologic symptoms and COVID-19 • Participation in the PNA-sponsored nationwide study on neurological manifestations of COVID-19 in the Philippines (NCT 04386083)
Regular patients (seizure, movement disorder, etc.) seen in the out-patient department for regular prescription refills may pose risk for exposure for both the patient and the trainee.	<ul style="list-style-type: none"> • Providing e-prescriptions to avoid further exposure as well as screening patients before a clinic visit
Residents evaluation via an oral exam requiring face to face patient interaction and direct observation of 3 consultants were postponed indefinitely due to safety concerns	<ul style="list-style-type: none"> • Hybrid oral examinations were held wherein the resident-examinee and the patient (while wearing appropriate PPE) were allowed 40 minutes of face to face interaction for history, physical and neurological examination; with one consultant in attendance and 2 other consultants jointly observing using a videoconferencing platform. Discussions on localization, diagnostics, and therapeutics were continued in a larger room with the resident-examinee, consultant, and the other 2 consultants via videoconference

discharge. Regular discussion with the consultant staff was strengthened. Due to problems with transportation, some trainees were given temporary living arrangements inside the hospital.

The hospital's Medical Training Office tapped the Department of Psychiatry to address the trainee's mental health concerns and hone mindfulness. The department also strengthened the 'buddy' system, where each resident was partnered with a consultant, who was tasked to mentor and give moral support to the assigned resident, for both workload and personal issues.

Regular conferences were resumed by May 2020 using an online platform. The residents were also encouraged to attend the webinars offered by different societies, both local and international to augment their learning. The trainees' evaluation via oral and written examinations shall push through, with plans to combine traditional and online platforms.

The residents are still encouraged to complete their researches as well as participate in the COVID-19 study spearheaded by PNA [The Philippine COVID-19 Outcomes: a Retrospective study Of Neurological manifestations and Associated symptoms (The Philippine CORONA Study)].⁶

DISCUSSION

The COVID-19 pandemic has forced everyone to adopt teleneurology in various settings due to the need for social distancing.^{7,8} Even when restrictions were downgraded, patients and family members were afraid to visit the hospital. Thus, everyone was forced to shift to telemedicine. However, there are limitations associated with its use: a) limited physical and neurological examination performance, b) patients not familiar with technology, c) insufficient training of physicians with teleneurology platforms and electronic medical records, d) access to the internet and internet bandwidth.⁹⁻¹¹ In some cases, a bridging therapy may be offered, while awaiting face to face consultations, such as those done in movement disorders.¹²

Corollary to teleneurology and teleconsultation, the government has allowed the use of electronic prescriptions, where a PDF/JPEG file of the prescription may be used by the patient when buying their medicines.¹³ This proved helpful for patients for which continuity of medications are essential such as those with epilepsy, dystonia, stroke, dementia, and Parkinson's disease.

With this pandemic unlikely to end soon, the training committee and the rest of the consultants are adapting to the changes to ensure that the residents can gain the competencies required of them.¹⁴ The training committee and the department continue to follow neurology specialty board requirements. However, one has to realize that this was a pre-pandemic requirement. With the forced changes brought about by the pandemic, as neurology consultants, one wonders if the changes in the conduct of training we

were forced to adapt are enough to make a good neurologist out of these residents. One has to remember that there are limitations in the number and variety of cases, including limited neurodiagnostic as evidenced by the hospital census.

Evaluating the residents during their training is also a challenge in this pandemic. Neurology training warrants observation of physical interaction during history taking and the neurological examination proper itself. The theoretical aspect can easily be transitioned to online examinations, online evaluation sheets, and virtual platforms for discussion. This has advantages in terms of convenience; with more attending physicians being able to share their expert opinion and a potential for increased interactive exchange among the trainees. However, the performance of an online neurologic exam will not be a worthy substitute for an actual neurologic examination. It is hoped that the specialty board and even the hospital training committee will take these and more into account in their evaluation of the year level competencies of the neurology residents.

However, the clinical aspect, as well as the actual physician-patient relationship is an art that will be lost without the proper adjustments. The training committee, together with the specialty board of the country should find a way to standardize the evaluation of neurology residents sans pen and paper; shifting to a possible hybrid setup where a physical measure of evaluation is maintained, like a one-on-one or a small group mentorship - respecting social distancing and proper hygiene, with the rest of the experts observing and sharing their thoughts in a virtual platform. In this "hybrid" form of evaluation, we continue to take advantage of the convenience and safety of an online setup, as well as continue to mold the clinician's skill and humanity, to foster them in providing empathy, rapport, and well-being to the patients that they serve. In all these, however, we all have to make sure that adherence to the requirement of the local specialty board is done.

The pandemic may have caused the residents a few missed clinical opportunities, but the unique experience allowed the trainees to cultivate values on unity, adaptability, and resilience. All the novel ordeals encountered and lessons learned during this pandemic will leave a mark on the education of the residents and inevitably impact the future of neurology training. Learning and training opportunities are abundant for positive and resilient trainees, more so in a pandemic where new and uncharted challenges arise daily, over and beyond the call of duty.

There are limitations to this paper. We were not able to collect the number of teleconsultations done by the residents at the start of the pandemic. Also, this was a review in only one private tertiary hospital in NCR. The situation will be different for other private hospitals, more so the government hospitals or residency training programs. Nevertheless, with the above limitations in mind, this review provided insight into the necessity of adopting alternative methods of residency training.

CONCLUSION

We outlined the changes and impact brought about by the pandemic of our neurology residency training program. The department and the residency training officers need to reorganize resident staffing to ensure safety during the pandemic.

Neurology residents have a high risk of contracting COVID-19 as they manage COVID-19 cases. Their physical and mental well-being must be regularly monitored. These residents are also aware of the need to obtain the necessary learning and skills required to graduate in an accredited neurology residency training program.

The pandemic has forced us to embrace the necessity of innovative and alternative methods of teaching. Alternative teaching methods and blended learning may substitute for the former face to face teaching to continue with the needed didactic, clinical, and research activities. Regular assessments and adjustments to the residency training programs will need to be done to adapt to the evolving situation, and other methods of adaptive learning would have to be employed. The residency training officers must also work closely with the hospital medical training office as well as the accrediting body to lessen the impact of COVID-19 on the accreditation process.

Statement of Authorship

All authors participated in data collection and analysis, and approved the final version submitted.

Author Disclosure

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REFERENCES

1. World Health Organization, Coronavirus disease 2019 (COVID-19) situation report [Internet]. 2020 [cited 2020 Dec]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>.
2. Presidential Communications Operations Office, Gov't imposes community quarantine in Metro Manila to contain coronavirus [Internet]. 2020 [cited 2020 Sep]. Available from: https://pcoo.gov.ph/news_releases/govt-imposes-community-quarantine-in-metro-manila-to-contain-coronavirus/.
3. Presidential Communications Operations Office, President Duterte extends restriction in Metro Manila, Central Luzon, other areas until May 15 [Internet]. 2020 [cited 2020 Sep]. Available from: https://pcoo.gov.ph/news_releases/president-duterte-extends-restriction-in-metro-manila-central-luzon-other-areas-until-may-15/.
4. The Medical City, About us [Internet]. 2020 [cited 2020 Sep]. Available from: <https://www.themedicalcity.com/>.
5. Philippine Neurological Association, PNA Fellows [Internet]. 2020 [cited 2020 Sep]. Available from: <https://www.philippine-neurologicalassociation.com/pna-fellows>.
6. Espiritu AI, Sy MC, Anlacan VM, Jamora RD. The Philippine COVID-19 Outcomes: a Retrospective study Of Neurological manifestations and Associated symptoms (The Philippine CORONA Study): a protocol study. *BMJ Open*. 2020;10:e040944.
7. Roy B, Nowak RJ, Roda R, Khokhar B, Patwa HS, Lloyd T, et al. Teleneurology during the COVID-19 pandemic: a step forward in modernizing medical care. *J Neurol Sci*. 2020;414:116930.
8. Department of Health - National Privacy Commission (DOHNPC), Joint Memorandum Circular No. 2020-0001 Guidelines on the Use of Telemedicine in COVID-19 Response. [Internet]. 2020 [cited 2020 Sep]. Available from <https://www.covid19.gov.ph/wp-content/uploads/2020/04/DOH-mc2020-0016.pdf>.
9. Wechsler LR, Tsao JW, Levine SR, Swain-Eng RJ, Adams RJ, Demaerschalk BM, et al. Teleneurology applications: report of the Telemedicine Work Group of the American Academy of Neurology. *Neurology*. 2013;80(7):670-676.
10. Wechsler LR. Advantages and limitations of teleneurology. *JAMA Neurol*. 2015;72(3):349.
11. Akamai, Akamai's state of the internet: Q1 2017 executive summary [Internet]. 2017 [cited 2020 Dec]. Available from: <https://www.akamai.com/us/en/multimedia/documents/state-of-the-internet/q1-2017-stateof-the-internet-connectivity-executive-summary.pdf>.
12. Pajo AT, Espiritu AI, Jamora RD. Impact and challenges of the COVID-19 pandemic on patients requiring botulinum toxin treatment. *J Mov Disord*. 2021;14(1):29-33.
13. Food and Drugs Authority, FDA Circular No. 2020-007 Guidelines in the implementation of the use of electronic means of prescription for drugs for the benefit of individuals vulnerable to COVID-19 [Internet]. 2020 [cited 2020 Sep]. Available from: <https://www.fda.gov.ph/wp-content/uploads/2020/03/FDA-Circular-No.-2020-007.pdf>.
14. Tolu LB, Feyissa GT, Ezech A, Gudu W. Managing resident workforce and resident workforce and residency training during COVID-19 pandemic: scoping review of adaptive approaches. *Adv Med Educ Pract*. 2020;11:527-35.