

ORIGINAL ARTICLE

Orthopaedic Specialty Committee Exit Examination Amidst the COVID-19 Pandemic in Malaysia- Experiences and Reflections from the Candidates

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ABSTRACT

Introduction: The emergence of the COVID-19 pandemic had affected the Orthopaedic Specialty Committee (OSC) Exit Examination candidates. The objective of this study was to evaluate the impact of this pandemic on the candidates' teaching and learning, mental well-being, and personal experience during the examinations. **Methods:** A cross-sectional study was conducted from 1st to 31st January 2021. 103 candidates for the OSC Exit Examination November 2020 were asked to answer a questionnaire. Wilcoxon signed-rank tests were used to compare differences in the frequencies before and during the pandemic. A p-value of less than 0.05 was taken as significant. **Results:** There was a significant reduction in the number of classes (P-value < 0.001) and examination preparatory courses conducted, reduced number and variety of patients attended and limited exposure in the operation theatre. Most candidates had virtual and physical classes, and agreed virtual clinical teaching was less effective. A majority had increased caffeine intake and smoking habits, decreased time spent with family and sports activities and no impact on sleeping hours, alcohol and analgesic usage. During the examinations, most candidates felt disturbed by the COVID-19 safety protocol and worried about the risk of contracting the infections. **Conclusion:** The effect of this pandemic on the post-graduate Orthopaedics students teaching and learning is massive. Virtual teaching programmes or applications that can replace the traditional clinical teaching methods should be explored and developed for the benefit of our education system.

Malaysian Journal of Medicine and Health Sciences (2023) 19(2):130-137. doi:10.47836/mjmhs19.2.20

Keywords: Postgraduate, Orthopaedic, Examinations, COVID 19, Malaysia

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INTRODUCTION

The emergence of novel coronavirus SARS-CoV-2 infection in humans since the first reported case in Wuhan, China in December 2019 is now a pandemic, causing more than 400 million infections and six million deaths worldwide (1,2). COVID-19 pandemic has been affecting the world since its declaration by the World Health Organization (WHO) in March 2020. In Malaysia, the government's implementation of the Movement Control Order (MCO) has had a major impact on various aspects, including the tertiary education sector and the healthcare sector.

Nevertheless, the action is deemed necessary to reduce

disease transmission. To date (28 February 2022), there have been 3.4 million reported cases of Covid 19 infection in Malaysia with 32749 deaths. The emergence of Variants of Concern (VOC) brought waves of uncontrolled infection despite the enforcement of numerous COVID-19 safety measures. These include compulsory use of face masks, social distancing, restriction of interstate travel and public gathering, and closure of public malls, restaurants, recreational centres, and educational institutions. In the universities, undergraduate and post-graduate programs were brought to a halt. Medical post-graduates were also affected. Face-to-face classes, regular clinical teachings, grand ward rounds, and training courses including the annual professional examination preparatory courses were postponed.

With the increased number of COVID-19 patients requiring hospitalization and intensive care in many hospitals, there are major shifts in orthopaedic practices

and services. Elective operation procedures were postponed, the number of orthopaedic patients in the outpatient clinic and ward was reduced to minimal, and the staff was redeployed to COVID-19 wards. The changes and reduction in regular teaching along with the reduction of clinical cases and operations affected the training and overall performance of the postgraduate students.

Modifications of teaching methods and assessment were necessary to adapt to this "New Norm". However, to uphold the quality standards of training, the traditional ways of conducting a final assessment by real patient interaction are still necessary. In Malaysia, orthopaedic postgraduate training is a four-year program with standard professional exit examinations known as Orthopaedic Specialty Committee (OSC) Exit Examination which is conducted twice a year, in May and November respectively, in one examination centre in Malaysia by rotation among the various universities. However, in 2020, the scheduled examination in May was postponed due to the pandemic.

In November 2020, the examination was finally conducted with modifications including allowing multicentre examinations and implementing strict COVID-19 safety protocol. A total of 3 centres were allocated in the whole country to accommodate the interstate travel restriction imposed by The Malaysian National Security Council (NSC). The objective of this study was to evaluate the impact of this pandemic on the orthopaedic postgraduate candidates' teaching and learning, mental well-being, and their personal experience during this modified examination.

MATERIALS AND METHODS

A cross-sectional study involved 103 final year orthopaedic postgraduate candidates in Malaysia conducted from 1st January to 31st January 2021. The inclusion criteria were all orthopaedic postgraduate candidates who sat for the OSC Exit Examination in November 2020, including those whose examinations were postponed from May 2020 to November 2020, and all examination centres were included.

A self-administered electronic questionnaire consisting of five sections with a total of 66 questions was created using Google Form and the link was distributed to the candidates via email. The sections were the demographics, impact on the teaching and learning, impact on mental well-being, experience during the examination, and self-reflection. The questionnaire was formulated based on literature reviews on previous studies and research related to the topic. The responses include multiple choices, checkboxes, linear scales, and short answers. A pilot study was conducted on 10 postgraduate orthopaedic students to assess the time needed to complete this study and the reliability and

validity of the questions.

All responses were collected via email and checked for duplication and analysed using IBM SPSS© 26.0. For descriptive analysis, frequencies and percentages were used for categorical data. Wilcoxon signed-rank tests were used to compare differences in the frequencies of classes before and during the Covid 19 pandemic. A p-value of less than 0.05 was taken as significant. This study has obtained approval from the Ethics Committee for Study involving Human subjects of Universiti Putra Malaysia (JKEUPM-2021-048) with informed consent from participants before the research was conducted.

RESULTS

From the total of 103 candidates who sat for the examination, 85 (82.5%) responses were received. Demographic data were listed in Table I and Fig. 1.

Location of examination centre

Of 85 respondents, 27 (31.8%) candidates sat for the examination in their hometown, while the majority, 58 respondents (68.2%) sat for the examination away from their hometown.

The general impact of the pandemic

Most of the candidates think that they were negatively affected by the COVID-19 pandemic during exam preparation (80%). The uncertainty of the exam schedule and venue contributed to the highest misery among the candidates (67,78.8%), followed by difficulty in adherence to the standard operating protocol (SOP) (37,43.5%), anxiety to contract COVID-19 (33,38.8%), and restriction in traveling (32,37.6%). Other factors arose from family-related issues like having to play multiple roles as a doctor, parent, and teacher (25,29.4%), 21 candidates being involved in a long-distance relationship with family members and partner (24.7%), and 11 candidates had an unconducive household (12.9%). Eight (9.4%) had financial issues involving reduced or loss of household income and had extra expenditure on electronic devices for online classes (Fig. 2).

Impact on teaching and learning for examination preparation

In section two, candidates were asked about their face-to-face teaching schedules compared before and during the pandemic. These include long case and short case teaching, grand ward rounds, seminars, lectures, and journal clubs (Fig. 3). For long case and short case teaching sessions, before the pandemic, the majority of 44 candidates (57.8%) had 1 to 2 classes per week and 38 candidates (44.7%) had 3 to 4 classes per week. During the pandemic, there is a reduction in the frequency of classes, with the majority of 35 candidates (51.8%) having 1 to 2 classes per week and 25 candidates (29.4%) having no class at all. Before the

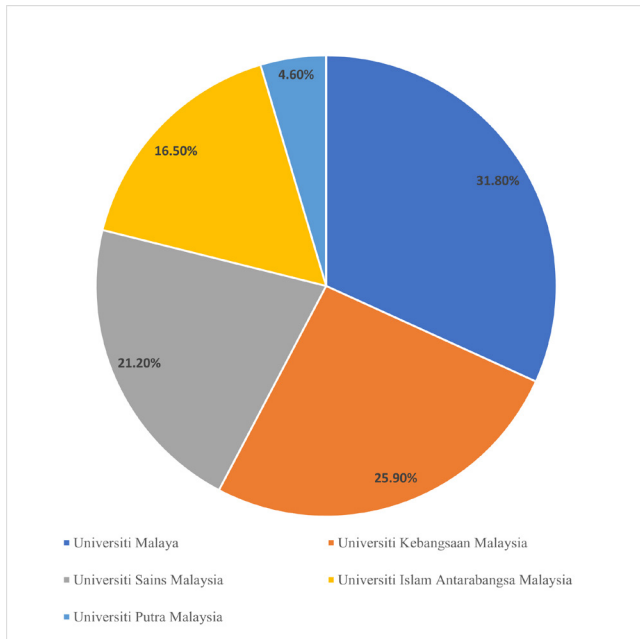


Figure 1: Post-graduate training universities for 85 respondents

Table I: Demographic data of respondents

Demographics	Total, n (%)
Age group	
31 to 35	56 (65.9%)
36 to 40	28 (32.9%)
41 to 45	1 (1.2%)
Gender	
Male	73 (85.9%)
Female	12 (14.1%)
Race	
Malay	39 (45.9%)
Chinese	30 (35.3%)
Indian	15 (17.6%)
Others	1 (1.2%)
Marriage status	
Married	68 (80%)
Single / divorced / widowed	17 (20%)

pandemic, the majority of 66 candidates (77.6%) had 1 to 2 sessions of grand ward rounds per week while most candidates (57,67.1%) had no grand ward round session during the pandemic. For lectures and seminars, before the pandemic, in a week, 30 candidates (35.3%) had 1 to 2 classes. During the pandemic, the majority of 41 candidates (48.2%) had no face-to-face lectures or seminars. For journal presentations, 69 candidates (81.2%) had 1 to 2 classes in a week before the pandemic. During the pandemic, 61 candidates (71.8%) had no journal class at all. Wilcoxon signed-rank tests showed there were significant negative differences in the number of all classes before and during the pandemic

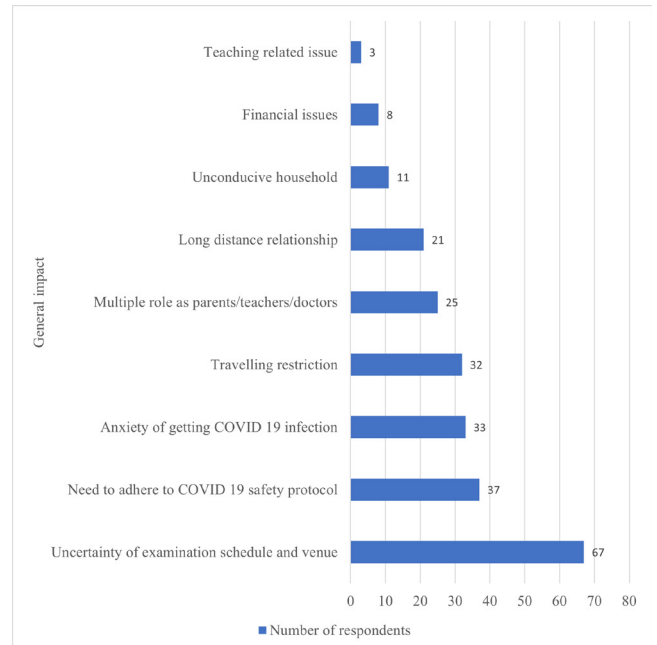


Figure 2: The general impact of COVID 19 pandemic on respondents

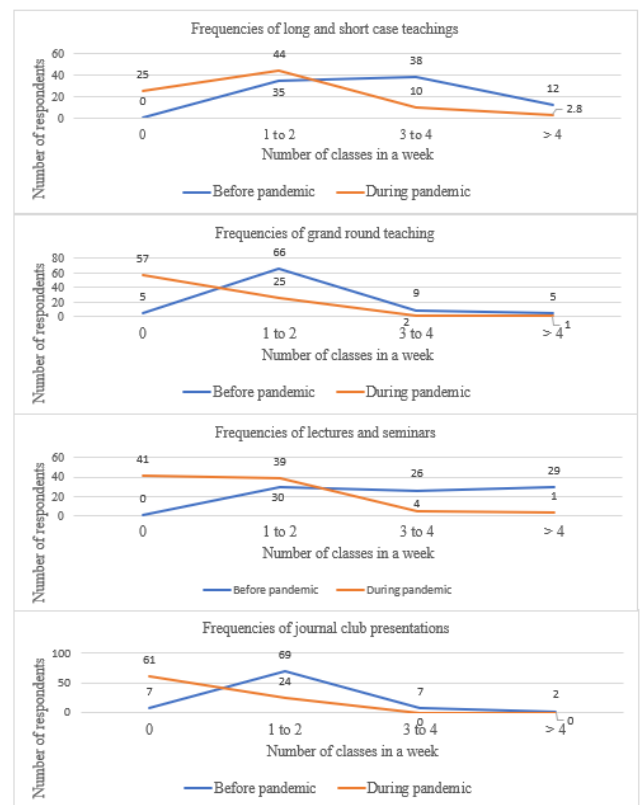


Figure 3: Frequencies of face-to-face classes in a week before and during the COVID 19 pandemic

with a P value of less than 0.001 (Table II).

During this pandemic, 56 candidates (65.9%) had their classes conducted on both physical and virtual platforms. The type of virtual classes being conducted includes seminars or topic presentation (80, 94.1%),

Table II: Wilcoxon signed-rank test for frequencies of all classes before and during a pandemic

Frequencies of face-to-face teaching in a week	Positive differences	Negative differences	Ties	P-value
Long and short case	5	35	45	<0.001
Grand round	3	53	29	
Lectures / seminars	1	49	35	
Journal club	0	55	30	

Wilcoxon signed-rank test showed significant negative differences in the frequencies of all classes before and during a pandemic

clinical teaching for long and short cases (62,72.9%), journal presentation (46,54.1%), and viva voce session (8,9.4%).

54 candidates (63.5%) responded that virtual classes for the case and journal presentation were less effective compared to physical classes. Almost all candidates (77,90.6%) agreed virtual clinical teaching was not as effective as physical classes. Generally, 65 candidates (76.5%) agreed that despite having virtual and physical classes, the number is markedly reduced during the pandemic. 79 candidates (92.9%) felt that there was less number and less variety of patients attending the clinic, in the ward, and during clinical teaching sessions.

With regards to examination preparatory courses, 68 candidates (80%) did not attend any preparatory course, either physically or virtually. For participation in orthopaedic related webinars, before the pandemic, 39 candidates (45.9%) never attended any webinar. During the pandemic, the number of webinar attendance per week among the candidates increased. 35 candidates (41.2%) attended at least 1 webinar per week and only 12 candidates (14.1%) did not attend any webinars during the pandemic. Most of the webinars attended were lectures or presentations on defined topics (74,87.1%), followed by orthopaedic instructional courses (31,36.5%), conferences (22,25.9%), and online live surgeries (4,4.7%). 71 candidates (83.5%) agreed that the webinars helped them in their preparation for examinations.

Apart from the teaching issues, 45 candidates (52.9%) had another work-related issue that negatively affected their preparation. Most of them agreed on having less exposure to operation theatre (40,47.1%). 12 candidates (14.1%) were redeployed to another centre or facility, and 11 candidates (12.9%) had been quarantined after being exposed to the COVID-19 virus. (Fig. 4).

Impact on mental well being

In section three, candidates were asked about their behavioral changes including their caffeine intake, sleeping hours, smoking habit, alcohol intake, time spent with family, analgesics used, and involvement in sports activities. If relevant, 3 answer options were given, which were increased, decreased, or not changed. Heterogeneous responses were received from the candidates. A majority had increased caffeine intake (39,50.6%) and smoking habits (6,75%) and decreased

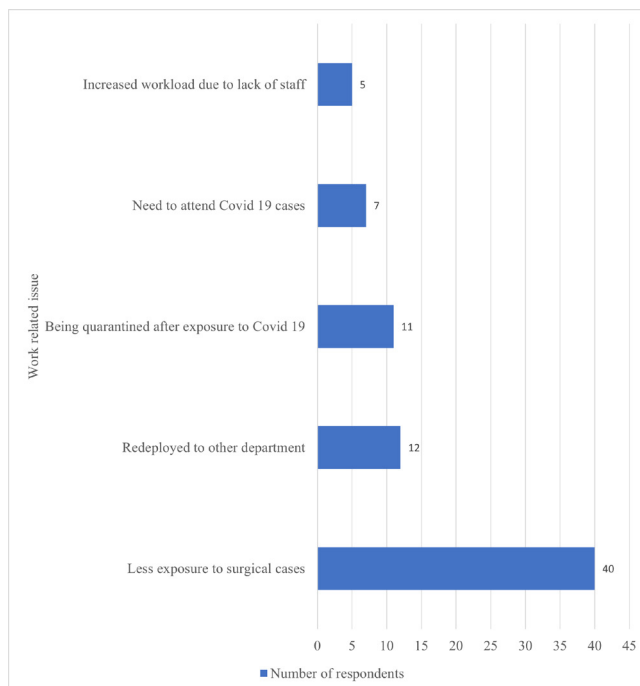


Figure 4: Work-related issues faced by the respondents during the pandemic

time spent with family (46,54.1%) and involvement in sports activities (51,60%). Most of them had similar sleeping hours (42,49.4%), alcohol intake (7,50%), and analgesic usage (16,53.3%) (Table III). Four respondents admitted to taking medications to relieve their stress and insomnia.

Experience during the examination

In section four, their experience in the examination was explored. 72 candidates (84.7%) had their examinations postponed due to the pandemic. Of this number, 45 (62.5%) had 6 months postponements. The remaining candidates had more than 6 months to a 1-year postponement. 43 candidates (59.7%) felt demotivated because of the postponement, 35 (48.6%) felt frustrated, 29 (40.3%) felt anxious, 28 (38.9%) felt depressed meanwhile 23 (31.9%) felt happy about the delay. 84 candidates (98.8%) felt uncertain about the examination date and venue and out of this 48 (57.1%) agreed that the uncertainty affected their overall performance in the examination.

81 candidates (95.3%) sat for the examination in their universities. Out of this, 44 (54.3%) felt that sitting the examination at their universities affects their overall

Table III: Respondents' behavioural changes during the pandemic

	Response received	Increased	Decreased	No changes
Caffeine intake	77	39	2	36
Sleeping hours	85	19	24	42
Smoking habit	8	6	0	2
Alcohol intake	14	4	3	7
Time spent with family	85	27	46	12
Analgesic used	30	12	2	16
Sport activity	85	23	51	11

performance positively while 5 candidates (6.2%) were negatively affected. Among the popular reasons for positive effect was feeling less anxious because of their familiarity with the places and local examiners and required less traveling.

All candidates adhered to the COVID-19 safety protocol e.g., wearing a face mask, face shield, safe 1-meter social distance, and frequent hand washing. 51 candidates (60%) admitted to feeling uncomfortable with the protocol and it affected their overall performance. 49 candidates (57.6%) had a concern about getting the infection from the patients during the examination and out of this, 32 candidates felt uncomfortable and it affected their performance. Most of them (80,94.1%) agreed that the safety measures taken during the examination were adequate. More than 70% of candidates agreed that all patients, examination candidates, examiners, and secretariates should be tested negative for COVID-19 infection before the examination. Finally, candidates were asked about the quality of graduates during this new examination protocol. A majority of 66 candidates (77.6%) agreed that there is no difference in the quality, 11 (12.9%) agreed on having lower quality and the remaining eight (9.4%) agreed on having a higher quality of graduates.

In the final section of the questionnaire, more than 80% of candidates agreed that after this COVID-19 pandemic is over, virtual teaching and learning methods should be continued and explored. If this pandemic continues, among the suggestions given by the candidates was to continue conducting face-to-face teaching sessions and examination preparatory courses with strict adherence to COVID-19 safety protocol. Virtual learning should be explored more with real-time video and interaction for clinical teaching. In terms of the examination itself, COVID-19 testing was suggested to be done before the examination and a good mixture of different examiners from every centre across the country should be made available in each examination centre to avoid bias. Proper planning with a backup plan should be done earlier to avoid the uncertainty of the examination date and venue.

DISCUSSION

From our survey, the impact of the COVID-19 pandemic

on the OSC Exit Examination candidates can be categorized into general impact, impact on teaching and learning, mental wellbeing, and their examination experiences.

The general impact of the pandemic

When MCO first started in March 2020, there were a lot of adjustments and protocols being implemented. Given the rapid rise in the number of infected cases in Malaysia from March to May 2020, the May 2020 examination was postponed and finally conducted in November 2020. Similar situations were observed worldwide. In the UK and Ireland, The Fellowship of the Royal College of Surgeons (FRCS) examination was postponed, causing a delay in the awarding Certificate for Completion of Training (CCT) to the trainees (3,4). This brought unstable emotions, anxiety, and even depression as mental and physical preparation is required before the examination. Stringent SOPs were introduced, and the candidates had difficulties adapting to SOP adherence. For example, routine study groups and clinical examination teaching were prohibited. In addition to academic impact, the social factors were also affected such as family problems due to long-distance relationships secondary to travel restrictions and uncondusive and overcrowding households due to school closure and the introduction of work from home.

Impact on teaching and learning

The significant reduction in the number of face-to-face teachings (long case and short case teaching, grand ward rounds, seminars, lectures, and journal clubs) was being compensated by the introduction of virtual teachings. Unfortunately, most of the candidates agreed that virtual clinical teaching for long and short clinical cases was less effective. This can be attributed to virtual teaching mostly focusing only on the theory part and lack of proper physical examination and inability to assess significant clinical findings. A similar situation is widely reported in postgraduate Orthopaedic training worldwide. A survey in Delhi that involved 143 postgraduate students reported a significantly reduced number of classes during the pandemic, with the rise of virtual classes (89%). Among these, only 27% of the students were satisfied with virtual classes (5). Another survey in the UK demonstrated that 93% of orthopaedic trainees embark on online teaching methods and only 38% found the teaching was useful (6). A bigger European

study on the pandemic impact on 327 orthopaedic and trauma surgery trainees showed faculty-led education including surgical education like preoperative planning was significantly impaired (49.2%) so thus clinical bedside teaching (56%) with increased remote clinical learning (55.3%) (7).

The introduction of virtual learning to replace traditional face-to-face teaching methods since the start of this pandemic has been the key changer in education. Among the advantages of virtual teaching is the ability to attend the classes regardless of physical geographical location, it permits recording so it can be replayed at one's leisure, reduce the time and cost spent for traveling and it allows two ways of communication between the lecturers and students. To improve the effectiveness of clinical long and short case teaching, pre-recorded videos of examination techniques on real patients can be done with strict adherence to safety protocol. Simulated or real patients can also be invited into the virtual clinical teaching to facilitate history clerking in long clinical cases. This concept is similar to telemedicine and video-assisted consultations that have been incorporated into the preclinical undergraduate curriculum in the USA (3,8). Training is needed in professionally utilizing telemedicine and developing doctor-patient relationships resembling face-to-face consultation. Tanaka et al. developed a modified interactive orthopaedic examination technique to allow a better experience in the virtual examination. (3,9) Before the virtual visit, patients will be given a checklist for audio-visual preparation and a video on certain examination techniques. Proper and specific camera positioning will allow thorough inspection of the affected limb. A web-based measuring tool can be used to measure the range of motion and angular deformity. A major disadvantage of virtual examination in orthopaedics is that certain examination techniques cannot be done virtually such as objective assessment of dermatomes, MRC power grading, bony tenderness, and joint laxity. For the post-graduate students, this might affect their skills in establishing the appropriate diagnosis. The ability to appreciate clinical signs with the sense of touch and appropriate physical maneuvers in orthopaedic assessment is still crucial in post-graduate training.

Therefore, the possibility and convenience of real-time clinical teaching must be explored. A student can be placed in a ventilated room with both student and patient wearing proper personal protective equipment (PPE) during a long or short clinical cases examination. Another 2 individuals/assistants will record the session and transmit it to the virtual platform "live" where the other students and lecturers can participate. In this way, history presentation, physical examinations, diagnoses, and management can be discussed as per conventional teaching.

Apart from the faculty-led teaching, the tradition of conducting examination preparation courses was also affected by the pandemic. This might be the prime time for these courses to be done virtually as well. Speakers or lecturers can be invited from all around the country and there will be a major reduction in physical and financial burden in preparing the venue, accommodation, food, and beverages comparing those days when these courses require physical attendance. This may explain the increased number of webinars attendees among the candidates during the pandemic. Most were trying to optimize whatever sources they have to gain knowledge and prepare for the examination.

Another issue that was raised was having less exposure in the operation theatre. Learning a surgical skill is a major component of an orthopaedic program. It involves a discussion of pre-operative planning, intra-operative techniques, and post-operative management. With the closure of the elective operation theatre, exposure in this area is very much depleted. Similar conditions were also reported worldwide. Megaloikonomos et al. reported that in Europe, there was an almost complete disruption of elective surgery with only emergency procedures being performed (7). According to a study by Covidurg Collaborative in May 2020, the overall cancellation rate for elective surgery in Malaysia was 70.9%. These involved surgeries for benign diseases (81.5%), cancer surgery (41%), and obstetric surgeries (26%) (10). To compensate for this matter, teaching using simulated surgical techniques should be explored. It has been proven to reduce intraoperative complications (3,11) and is effective in shoulder and knee arthroscopy training (12,13) and reduction of wrist fracture training (14). Simulated training allows evaluation of skills and can be repeated multiple times without the risk of morbidity in real patients. However, the setting of a simulation laboratory can be costly.

On the contrary, only 14.1% of the candidates were being transferred to other facilities managing COVID-19. This percentage is slightly lower than reported by 2 studies in the UK and Europe where 25% and 20.9% of their trainees were redeployed respectively (6,7). The transfer can lead to less time spent in orthopaedic training and possibly affect their preparation for the examination.

Impact on mental well being

In this section, candidates' behavioural changes were explored. Our findings were similar to the Oaten M and Cheng K study that showed an association between increased smoking habits and reduced duration of physical activities with the examination. (15) On the contrary, the alcohol consumption and sleep pattern were not changed in our study. Another study by Zunhammer M et al found significantly decreased sleep quality and alcohol consumption, increased caffeine consumption, and no changes in nicotine consumption

during the examination. Sleep disturbance was found to be associated with perceived stress and not by the amount of alcohol or caffeine intake (16). The different findings for alcohol consumption in our study can be attributed to the relatively small number of alcohol consumers among the candidates. Being Asians and religious mostly, our candidates might have their spiritual ways to cope with the stress.

Mental well-being is an important health aspect that is often overlooked. The burden of stress that was faced by the candidates is imaginably high during the pandemic when all normal routines changed. Among the steps that could be taken involve providing alternatives to traditional teaching methods, equipping them with necessary education on proper PPE and SOP at work, and offering counselling services for those in need.

Experiences during the examination

In this section, the majority of the candidates had a negative emotional impact because of the uncertainty of the examination date and venue. As the postponement of examination was inevitable, every institute should reach out to their candidates and provide them with adequate information and proper counselling to manage their emotional burden.

A small group of candidates (6.2%) felt negatively affected when sitting for their examinations at their centre. This may be due to concern of bias from the patients or more importantly from the examiners they knew, especially for those who have stressful experiences before with the known examiners.

In general, the new way of conducting the examination in this pandemic including the use of PPE and adherence to safety measures was well accepted by the candidates. Although more than half of the respondents admitted to having an uncomfortable feeling, almost all agreed that the safety measures taken were adequate. However, their concern of contracting COVID-19 from the patients, examiners, and secretariats can be further reduced if all the involved individuals were tested negative for COVID-19 infection before the examination. This step is reasonable not only for the candidates but especially for the patients and examiners who are possibly in high-risk groups or immunocompromised, hence it should be considered for the next examination. A negative test can give reassurance for the patients to participate in the examination and reduce the dropout rate.

A minority of candidates felt the quality of graduates could be lower, probably due to non-centred examinations where there is a lack of variety of examiners cross-examining candidates from other institutions. For those who felt the quality of graduates is higher, it is likely attributed to the major challenges and barriers that were described above and making their self-effort the major contributor to passing the examination.

Finally, suggestions from the respondents should be taken into consideration to improve our examination system in the future. These include continuation and development of virtual teaching and conduct of the yearly examinations preparatory course virtually or with full SOP adherence if physical attendance is possible. A special task force can be formed to explore and master virtual learning for the benefit of our education system.

CONCLUSION

As our national COVID-19 vaccination program is progressing steadily with the recent announcement on the COVID-19 endemic, hopefully we will soon return to our usual traditional education system partly, if not fully. Meanwhile, any available and potential resources or alternatives should be explored and optimized to the best of their efforts.

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