



Technical Note

Operational aeromedical training during COVID-19 pandemic

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ABSTRACT

The Institute of Aerospace Medicine Indian Air Force regularly conducts Operational Training in Aerospace Medicine (OPTRAM) courses for the fighter, transport, and helicopter pilots, and navigators. The OPTRAM is directly linked with the pilots flying training and operational readiness as well. The COVID-19 pandemic halted training activities globally. Online training was not an option as it is a simulator-based training module. There was an urgent need to continue the course without compromising the safety of our pilots. A standard operating procedure (SOP) was prepared to conduct the course in a safe and timely manner within the available resources of the Institute. This paper intends to bring out the various rationale and considerations that go into formulating an SOP like this which has a huge implication on the operational preparedness of the organization and the operational readiness of our pilots.

Keywords: Indian Air Force, Operational training, Aerospace, Aeromedical, Standard operating procedure

INTRODUCTION

The COVID-19 pandemic has disrupted all walks of life. Usually, training is considered a desirable attribute that can wait until the situation improves and, hence, has got the biggest setback due to the COVID-19 pandemic. All the teaching institutions had to evolve and quickly migrate to the virtual platform to survive and stay relevant. The training in the Armed Forces in general and the Indian Air Force (IAF) in particular is different as it is directly related to the forces' operational readiness. Any delay or deferment may have far-reaching consequences that may not be compensated soon. However, this need must be balanced with the threat of morbidity and mortality due to COVID-19 infection. The training in the IAF has also evolved post-pandemic and the organization has worked on this challenge in the most professional manner. Prompt issue of guidelines from the medical directorate and daily updates on the COVID-19 situation in the Armed Forces and the country was another way to keep our personnel sensitized and motivated to follow the guidelines. This resulted in halting the spread of COVID-19 to some extent, delaying its spread to a large extent and restricting the associated morbidity and mortality to the minimum. In this context, it was a big challenge at the Institute of Aerospace Medicine (IAM) IAF to continue Operational Training in Aerospace Medicine (OPTRAM). Holding the training for long was not an option as it is linked with the flying training and considered critical for the flight safety and operational readiness of our pilots. The online training through virtual/digital platforms was not an option as this course is heavy on simulator training and other aspects have already been curtailed to make it a slim, short-duration course. Since the IAM IAF

is also involved in medical evaluation and certification of the military as well as civilian pilots (who travel from length and breadth of the country), the risk of acquiring COVID-19 infection among the staff through this mobile population was considered significantly high.

The risk of COVID-19 infection to our pilots was real as they might contract it while traveling for the course, staying in hotels for the duration of the course, during participating in the course, and through the instructional staff themselves while undergoing the training. Since the OPTRAM is a short duration course, that is, 5 days for initial training and 3 days for refresher training, such short travel requirements may subject our pilots to an extra risk during the travel. This risk was highlighted in a report from Israel where after the reopening of schools, a large COVID-19 outbreak was reported within 10 days and the attack rate of 13% for students and 17% for the staff was observed which is unacceptably high.^[3] The IAM IAF assessed the risk and decided to formulate a plan of action to conduct the training while keeping the risk of contracting COVID-19 to a minimum. This paper intends to bring out the rationale based on which the standard operating procedure (SOP) was designed to conduct OPTRAM in the time of the COVID-19 pandemic.

MATERIAL AND METHODS

A thorough review of existing policy in the Armed Forces, advisory from original equipment manufacturers for sanitization of the simulators for COVID-19, and guidelines followed by other similar training establishments globally which were available in the open source. The concerns due to COVID-19 were listed-out to address them in the SOP to keep the risk to the minimum. The concerns could be mainly divided into "Pre-course concerns" and "During the course concerns," as shown in [Table 1]. The solution to these concerns were either administrative or medical. Hence, these concerns were subdivided into medical or administrative as the nature of the concern.

A detailed review was carried out on all these concerns and the most practical and effective solution was considered for implementation in the Institute's SOP.

RESULTS

Google Scholar yielded 1,130,000 results on COVID-19 guidelines in just 0.11 s. The COVID-19 pandemic resulted in another epidemic of publications on the subject itself. It was impossible to follow the trend on the subject due to the large number of publications. However, there was a consensus that physical distancing, the use of masks, and frequent washing of hands were key to managing COVID-19 as a public health measure. Selected documents were reviewed to understand the most current recommendation of measures to be taken to

Table 1: Concerns for safe conduct of OPTRAM course during COVID-19 pandemic.

S. No.	Concerns	Nature of the concern
Pre-course concerns		
1.	High-risk or sick individuals may be detailed for the course.	Medical
2.	Individuals may contract the infection during travel from respective units to the IAM IAF	Administrative
During the course concerns		
1.	Trainees may get the infection from the teaching and other staff from the Institute	Medical
2.	Social distancing and sanitization issues during the training	Medical
3.	Effect of disinfectant on the simulator's life	Administrative
4.	Disinfection of simulators during the course	Medical
5.	Added administrative and financial burden to carry-out COVID-19 related activities during the course	Administrative

IAM: Institute of Aerospace Medicine, IAF: Indian air force

continue the training.^[1,2] However, the author could not find any document where simulator training or sanitization were discussed. The author decided to use guidelines for airlines as a template as they were similar to our simulators where people had to operate in a closed confined space.

The SOP was prepared to cover all possible aspects of conducting the OPTRAM in the Institute. The merit of in-person training versus online or distance training was discussed at length. The pilots were provided training material on aeromedical aspects in the form of precis and the squadron doctor regularly conducted structured lectures to refresh that knowledge. However, it was felt that there was no substitute for a contact program at the Institute. The course curriculum was rationalized with more impetus on simulator exposure and less on didactics to reduce the exposure time in the close confined space of a classroom.

The SOP for the OPTRAM

The SOP was formulated for both the trainee pilots reporting for the course as well as for the instructors conducting the course at the Institute.

Instructions for the trainee pilots reporting for the OPTRAM

- a. No sick or high-risk pilot to be routed for the course. The pre-course concerns were addressed by empowering the squadron doc or the base Aerospace Medicine specialist by allowing them not to route any

pilot who was not keeping well or considered high risk due to travel history or contact tracing. “Aarogya Setu” app status was used as one of the tools to assess the contact status.

- b. All pilots to travel through “service” aircraft only and stay in the Institute or any other service Officers’ Mess. This was to avoid exposure to the unregulated civilian population and reduce the risk to the minimum.
- c. As far as possible, the batch should consist of pilots from the same base. This was to avoid mixing up of pilots to prevent the spread of COVID-19 to different bases if any course officer got infected.
- d. The pilots to travel either in the “service transport” or personal transport. No public transport was to be used as far as possible.
- e. On reporting for the course at the Institute, a non-contact thermometer to be used to measure body temperature and the “Aarogya Setu” app for contact status at the main gate itself. Any suspected pilot to be reviewed by the Medical Specialist at the Medical Evaluation Center for further disposal.
- f. To maintain 6 ft distance from each other’s and continue to wear the mask in the classroom all the time.
- g. The pilots to rub their hands with sanitizer after every class and wash their hands with soap for at least 20 minutes every 2 hours.
- h. Etiquette for sneezing and coughing to be observed strictly during the course.
- i. The pilots to bring their flying clothing (gloves and Anti-G suits) for the training.
- j. No unnecessary movement to any other part of the Institute other than the training areas.
- k. Any trainee pilot not feeling well, to inform their course senior or instructors immediately.

Instructions for the instructors conducting the course

- a. No didactic lecture should be more than 30 min
- b. All the instructors to self-screen their body temperature and contact status using the Aarogya Setu app.
- c. Instructors not to be involved in any patient care for at least 2 weeks.
- d. Instructors to avoid participating in any public event or travel for the past 2 weeks before the course.
- e. The instructors to ensure strict implementation of the COVID-19 prevention strategy of “PSM,” ie, physical distancing, use of sanitizers, and masks at all times.
- f. The classrooms to be cleaned properly, and surfaces to be disinfected with 70% alcohol at least twice a day.
- g. The simulators to be cleaned thoroughly twice a day and surfaces to be disinfected after every use by a trainee pilot.
- h. All the pilots to wear gloves and masks throughout the simulator training.

- i. The helmet and mikes to be disinfected with 70% alcohol and the boom mike to be covered with cellophane sheets after every use.
- j. Only two trainee pilots to be allowed to witness training in the simulator room at any time.
- k. The adequate gap to be ensured between the two runs of the simulators to allow the exchange of air inside the cabin and disinfection of the surfaces.
- l. Disinfection of the shoes and soles to be done using “Disinfection Mat” before entering the simulator room.

DISCUSSION

The well-being of a pilot has a direct bearing on the operational preparedness of the IAF. Hence, a well-planned scientific evidence-based SOP was need of the hour to ensure that the OPTRAM continued without any additional risk of contracting COVID-19 infection during the course. The financial cost of the morbidity of a pilot due to the COVID-19 infection is extremely high. However, the OPTRAM has a direct bearing on the flight safety and operational readiness of our pilots. These two requirements were met by a well-devised SOP to conduct the OPTRAM where administrative and medical issues were adequately addressed to keep the risk to our pilots to the minimum. The principles of risk mitigation commonly used in operational flying were aptly applied during this planning as well.

The entire SOP was based on the three well-proven basic principles of preventing the spread of COVID-19, that is, PSM. Physical distancing from each other and any unsafe places like avoiding the use of public transport and public places may reduce the risk significantly. The SOP focussed on the guidelines in three areas – attendance, social distancing and hygiene, and cleaning. The effectiveness of this strategy was highlighted by Melnick *et al.* in the reopening of schools in various countries.^[3]

The SOP was intended to be simple, practical, and implementable within the available resources of the institute. The success of any guideline lies in its simplicity and ease of implementation. The freedom for the Squadron doc and the pilot himself to declare fitness for the course resulted in only healthy and no-risk pilots reporting for the course. This reduced the risk of contracting COVID-19 infection to a very safe level.

The travel restriction was the most reliable way to ensure that our pilots were safe during transit and travel for the course. The IAF was able to keep the COVID-19 infection rate at a very low level as compared to the national average.^[4] Since the infection was spreading very fast, especially in the state of Karnataka where the institute is located, it was considered prudent to avoid exposure to the outside population as far as possible. This was only possible if the travel and accommodation were ensured through the service means. The

financial loss due to the morbidity of a pilot was considered much higher than the expenditure incurred on such measures. However, there was some evidence to suggest that airline travel was extremely safe where one assessment suggested that the risk of catching COVID-19 on an aircraft was even lower than in a shopping center or an office environment.^[5] During off-training hours, aircrew were advised to remain confined to their rooms and follow “COVID appropriate behavior.”

The choice of disinfection was a major concern as the most commonly used sodium hypochlorite solution corrodes metal surfaces. The use of this disinfectant could reduce the life of the simulators drastically. Alcohol-based solutions were considered the best for this application; however, one had to be extremely careful as it is flammable and simulators have lots of electronic components and circuits that generate heat high enough to result in an accidental fire.

The continuation of OPTRAM resulted in many in-house innovations that enhanced safety during the course. One such solution was the disinfection of the “boom mike” for the operators and the simulators. The cellophane sheets were used as a cover for the “boom mikes” to prevent cross-infection and were changed after every change of the trainee and instructor. This solution could be implemented immediately as the cellophane sheet was readily available, cheap, easy to use, and disinfect.

The training of the dedicated cleaning and disinfecting staff for the classrooms and simulators was the most important step in the success of this effort. The team effort shown by everyone in the training team was praiseworthy.

The shoe has been considered a major carrier of the coronavirus and may infect the training areas as well as simulators which are closed cabins.^[6] Disinfecting the shoe could be a major challenge. The use of plastic shoe covers as in the operation theater could be one of the solutions, but the solution was not considered sustainable due to the cost to the environment due to the resulting plastic pollution. The innovation in the form of an easy-to-implement in-house prepared “*Sanitisation- mat*” was the perfect solution to this problem.

The aircrew were followed-up up to 2 weeks after return to their base to rule out any COVID-19 infection. No aircrew reported symptoms suggestive of COVID-19 during the follow-up period.

The institute trained 50 pilots in the COVID-19 era (first wave) without any infection attributed to the course. Even though many staff of the institute got infected during this period, the strict implementation of the SOP allowed us to run the OPTRAM smoothly without any untoward incidence. A similar SOP was followed by the USAF to conduct training during the COVID-19 outbreak.^[7] During this period, only one trainee returned due to a sign of sickness (subsequently confirmed as a viral illness) in the middle of the course.

The SOP stood the test of time and proved its efficacy in preventing COVID-19 spread during the course.

CONCLUSION

An SOP grounded on scientific principles and practicality is much more likely to succeed. The continuation of OPTRAM when all the training activities in the country were stopped, was an operational requirement that could be met by following basic understanding and proven methods to prevent the spread of COVID-19. This also resulted in a few innovations that enhanced the safety of the OPTRAM manifold. This also highlights the importance of a dedicated well-trained team.

Declaration of patient consent

Patient’s consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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