COVID-19 pandemic has significantly impacted every sphere of life. Health care workers, including eye care professionals, are at a higher risk of contracting infection directly or indirectly. To mitigate the risk of cross-infection among these front-line workers, it is vital to follow appropriate safety protocols. On the other hand, childhood eye conditions lead to permanent vision loss unless these are identified and treated early. School eye health programs are the best option to reach a large childhood population for early detection and treatment of vision-threatening eye conditions. While several clinical safety guidelines have been developed for ophthalmic practice, no such guidelines are available for carrying out school eye health programs. This article aims to set out COVID-19 safety guidelines for conducting school eye health programs in India.

Key words: COVID-19 safety protocol, school eye health programs, vision screening

School eye health program (SEHP) is an essential part of combating childhood blindness and offers a “unique opportunity” to provide comprehensive eye care and eye health education to a large number of children. The aim of SEHP is to provide high-quality eye care to school children through early identification of eye conditions and treatment, including refractive correction, prescription of medication, and appropriate referrals for secondary and tertiary care services close to their location. However, COVID-19 has impacted every sphere of life, including schools and children. With most of the teaching happening online, there is a huge impact on children’s health, including eye health. If online education continues longer and schools do not reopen soon, the myopia epidemic is likely to accelerate. Online teaching also increased the prevalence of computer vision syndrome, in addition to myopia and reduced compliance to use of glasses. All these factors have an impact on the social and psychological well-being of children. Hence, school screening programs are of utmost importance and should commence as soon as children return to schools. There are several published articles on COVID-19 safety protocols for ophthalmic practice in general. However, there are hardly any COVID-19 safety guidelines for SEHP in India. This document aims to lay out COVID-19 safety guidelines for the safety of both children and health care staff when conducting a SEHP. The SEHP protocols are developed based on the evidence from and commonly agreed COVID-19 general safety guidelines.

SEHP safety guidelines for implementation at different stages of the program are listed below:
1. Program planning
2. Implementation
3. Monitoring and evaluation

Program Planning

The program should be customized based on active infection rate (percent positive number), recovery rate, and vaccination coverage in the location. For example, in areas where the active infection rate is high or vaccination coverage is low, the program should be postponed to a later date. It is also necessary to be vigilant about the number of active COVID-19 cases in the area where the program is being conducted. The program must be withheld immediately if there is an increase in infection rates. Program planning will include the following activities:
a. Situational analysis
b. Obtaining permission from the local governmental authorities for conducting SEHP
c. Mobilization of resources
d. Staff training
e. School staff and volunteer training
f. Preparation of the screening venue
g. Stakeholder education and involvement

Situational analysis

At this stage, it is important to carry out a COVID-19 situational analysis in the area where the program is being planned. This must include the following information:

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a. Data on the number of people affected by COVID-19 and vaccination coverage in the proposed area. This could be collected from the records of primary health care centers, regional secondary or tertiary health care centers, and also from local health officials. To begin with, government-owned/approved statistical web pages could be of great help.\[34\]

b. Details of current standard operating protocols (SOP) in the school setting, availability of resources, and COVID-19 safety protocols and policies followed by the schools with regard to COVID-19 can be collected from the school administration.

c. Information on the vaccination status of staff, including teachers, administrative staff, and volunteers, also must be collected from the school.

d. General readiness assessment of the venue should be carried out to identify infrastructure availability, such as rooms for conducting eye examination (usually at least 3 meter x 3 meter) and waiting area with adequate ventilation.

e. Information on the number of children with immediate need for eye care could be collected by the class teachers to prioritize these children for the screening program. The schoolteachers have to be trained in advance to identify common vision or eye-related complaints and symptoms reported by the children.

The readiness assessment should follow the guidelines suggested by the Center for Disease Control (CDC)\[13\]. Analyzing the current situation of the pandemic in the proposed area will help in taking appropriate precautionary measures for that particular school/area.

Permission

After the situational analysis of the area where the school is located, written permission should be obtained from the local District Education Office (DEO), Women and Child Welfare Office, and the school authorities.

Resource mobilization

While mobilizing resources for screening, it is important to procure supplies that are necessary for infection prevention control measures for COVID-19 as per WHO recommendation.\[16\]

Items that are mandatory for mitigating the risk of infection during the screening include a symptom questionnaire, personal protective equipment (PPE), housekeeping supplies, and vision care supplies as detailed below. It is also important to make sure that all the staff are vaccinated.

1. COVID-19 symptom screening questionnaire: The screening questionnaire must be administered by the triage team prior to the screening. Children presenting with any symptom pertaining to COVID-19 should be encouraged to stay at home and the parents/caregivers should be advised to seek medical attention. The questionnaire should include information about exposure or close contact with anyone infected with COVID-19, and presence of symptoms such as fever or chills, cough, shortness of breath or difficulty breathing, fatigue, body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, and diarrhea.\[15\]

2. Vaccination: The staff in the school, including teachers, housekeeping staff, volunteers, and administrative staff, should be encouraged to get vaccinated prior to the screening program. The school management must be urged to contact local health authorities for organizing vaccination drives for their staff prior to the program if possible.

3. Non-contact infrared thermometer: Every staff member and child entering the school premises must be tested for body temperature prior to the screening.

4. Disinfectant solutions: Surface disinfectants as per the United States Environmental Protection Agency (US-EPA) or Ministry of Health and Family Welfare, India guidelines must be used for cleaning the screening rooms, surfaces that are frequently touched, and for cleaning equipment such as occluders, vision charts, retinoscopes, trial frames, and lenses. For disinfecting areas where bleaching agents are not suitable, phenolic disinfectants or 1% sodium hypochlorite could be used for surfaces and 70% alcohol for equipment.\[16,19\]

5. Demarcation stickers: Markings should be done for physical distancing to maintain at least 2 meter distance between individuals in places such as waiting areas and washrooms.

6. Hand sanitizers: As recommended by CDC and FDA, hand sanitizers for regular use must contain at least 60% alcohol.\[20\] However, washing hands with soap and water for 40–60 second is the best method to get rid of germs on the hand.\[21\] Posters explaining hand rub techniques must be displayed in the common areas at the screening venue. Sanitizers must be administered by a trained volunteer and children must be supervised while using sanitizer. Younger children could be encouraged to wash their hands and avoid using sanitizers.

7. Face masks: These are mandatory for everyone involved in the screening process, including teachers, volunteers, children, screeners, parents/caregivers, housekeeping staff, and transportation staff. Children and volunteers can wear double-layered cloth masks that cover the nose and the side of the face.\[20\] However, it is advisable for the staff to use N95 or FFP2 or such equivalent standard masks as these are efficient in preventing infection.\[16\] If the screener prefers to use a respiratory mask, it could be used as per the individual’s convenience.

8. Face shields: Although face covering is not an absolute necessity for the examiner,\[15\] it will certainly add an extra layer of protection for those who are at risk of splash from respiratory fluid. Hence, the screener as well as the staff should wear a face shield during the screening.

9. Protective goggles: It is advisable for the screener to use protective goggles; however, it may not be necessary if the face shield is already being used.

10. Hand gloves: These are necessary especially for protection from fomite contamination. While disinfecting frequently touched surfaces or cleaning the equipment, it is advisable to use disposable gloves.

11. Vision screening supply: It is better to avoid procedures such as refraction at the screening site as much as possible. Disposable occluders could be used for testing visual acuity. If disposable occluders are not available, there must be a provision for more number of occluders that could be used while the other one is being disinfected. Near-vision charts, retinoscopes with transparent safety barriers, trial frames, and trial lens sets would be useful for testing children with disabilities, who have difficulty visiting referral centers.

Staff training and preparation

It is vital to train the SEHP team before implementation of the program. Adequate number of staff should be recruited for a proper staff-to-patient/child ratio before the training.\[16\] The SEHP team should include a triage team, screening team, housekeeping team, and monitoring and evaluation team, and they should be trained in their respective area. The screening
team must be vaccinated prior to the program. All teams should be trained in every aspect of the COVID-19 protocol, which includes physical distancing, hand and personal hygiene, administration of symptom questionnaire, recognizing children with symptoms related to COVID-19, safe disposal of waste, and cleaning the equipment and surroundings. Each staff member must be provided with PPE kit for their personal use.

Considering the risk of community transmission due to overcrowding, it is advisable to limit the number of children to be screened on any given day. The number of children to be screened each day could be decided based on the availability of screening team members and volunteers. Although there are no set guidelines on the number of children that could be screened per day, this could be worked out based on the staff-to-child ratio. For example, 10–15 children per member of the screening staff would add up to 50–75 children per day for a team with five screening staff members, for a comprehensive eye health screening program. This number could be more in a program that is focused only on screening for visual impairment (VI) and referral services.

School staff and volunteer training
It is important to encourage school management to restrict access to the school for the general public as much as possible. Limiting the number of staff involved will ensure appropriate social distancing norms as well as mitigate the risk of community transmission. School teachers and volunteers must be trained in general safety guidelines pertaining to COVID-19. It is vital that the staff and volunteers undergo this training that can be conducted virtually prior to the program. A hands-on training session for the staff and volunteers and preparation of the venue should be done one day prior to the actual program.

Screening venue preparation
Preparation of the venue includes identification of examination rooms, waiting area, hand wash area, and waste disposal area, as well as demarcating positions at specified distances to maintain social distancing. The examination room should be well ventilated and spacious, preferably having a separate entry and exit if possible. Number of examination stations could be decided based on the size of the room available. The recommended size of the room is a minimum of 3 meter (preferably more) long and 3 meter wide to ensure accurate measurement of visual acuity and also for adequate social distancing. It would be appropriate to have more examination rooms rather than using a single room for many children. The identified rooms must be cleaned with surface disinfectants, and a hand sanitizer should be made available.

Surface disinfectant and alcohol spray should be available at all times for disinfecting equipment such as oculcures, trial frames, trial lenses, near visual acuity charts, and chairs. The examination rooms should be disinfected at regular intervals. A cleaning schedule could be prepared well in advance and shared with the housekeeping staff. Identifying areas that are frequently touched, training housekeeping and other staff involved in cleaning and disinfecting surfaces, and ensuring adequate stock of cleaning agents are a vital part of venue preparation. The screening rooms must have proper ventilation so that children and the staff do not inhale the toxic fumes after cleaning. The spot where the child and the examiner will be positioned should be demarcated with marking stickers to maintain social distancing.

Waiting areas and washrooms for children and their parents should be clean and disinfected at scheduled intervals as per the suggested guidelines. Seating arrangements should be made as per the social distancing norms (6 feet distance) suggested by CDC. Hand sanitizers should be made available in the waiting areas. Posters with public health messages, reiterating safety guidelines could be displayed in waiting areas.

It is necessary to have a contract with a local health care provider for emergency services and care. Although these services may not be utilized on a regular basis, it is important to identify and establish a system of handling any unforeseen emergencies during the program.

Stakeholder involvement
Educating parents, teachers, and children on COVID-19 safety guidelines is key to their safety and for controlling community transmission. This could be done through virtual platforms as well as digital media messages. In addition, educating the parents/caregivers and teachers on the importance of eye screening (common symptoms indicating vision problems and eye conditions) through online forums prior to the program could help in reducing the risk of infection. This will help parents and teachers to understand and identify children who require immediate eye exam, thereby reducing overcrowding and exposure risk. Displaying the safety protocols, including the appropriate way of wearing the face mask, hand washing techniques, and social distancing, as pictures and images in the screening venue will help the children to understand and follow these guidelines.

Program Implementation
The school management must instruct parents in advance to keep their children at home if they are sick, show any symptoms, or had contact with COVID-19 infected individuals. At the school, a COVID-19 TRIAGE team should administer a COVID-19 symptom assessment questionnaire to identify children with any symptoms before the screening. This could be done through virtual platforms or on-site at the screening venue. Although there are no clear guidelines on the number of children to be screened on any given day, this could be worked out based on the staff-to-child ratio. For example, 10–15 children per member of the screening staff would add up to 50–75 children per day for a team with five screening staff members, for a comprehensive eye health screening program. This number could be more in a program that is focused only on screening for visual impairment (VI) and referral services.

It is advisable for the screening team to arrive ahead of the scheduled time on the day of screening to ensure that the venue is ready and prepared as per the plan. The triage team and volunteers should also come ahead of time. Volunteers will monitor social distancing and the use of hand sanitizers by the children and will ensure that a minimum number of students are present at the screening area at a given time. A quick huddle session should be held before the start of the screening activity for all the staff and volunteers involved in the program.

During the screening process, the number of children should be limited to the minimum in the screening area. Assessment of visual acuity using Snellen’s optotype 6/12 would save time and reduce contact time while allowing assessment of children with vision impairment for distance. Near visual acuity could be tested using near chart where indicated; however, it is not mandatory and could be avoided. It is important to sanitize the oculcures (if reusable) and near acuity chart between every examination. Provision for multiple oculcures or disposable oculcures could help in preventing fomite contamination. Although performing refraction with appropriate safety measures is possible (safety barrier sheet for the retinoscopes), it is better to refer those who require refractive correction to the referral center for cycloplegic refraction. Tests for color vision deficiency, measuring stereo acuity, and intraocular pressure could also be avoided to minimize close contact and risk of cross-infection.

Availibility of internet facility, although not mandatory, could help in paper-free data collection, thereby reducing multiple handling. This could be carried out using a simple google spreadsheet that could be shared via email with the school management if necessary. In this situation, tablets or computers that are used must also be cleaned regularly as per the manufacturer guidelines.
Referrals should be prioritized, and only those children with significant vision impairment or eye conditions who require immediate treatment should be considered for referral services.

**Waste disposal**

Although biomedical waste collected during the screening program may not include highly infectious materials such as human tissues, body fluids, syringes, and needles, it is important to consider safe disposal of PPE items. Items such as used masks, gowns, gloves, face shields, tissue papers, cotton rolls, and buds should be considered as biomedical waste. These wastes should be disposed of as per the Central Pollution Control Board (CPCB) guidelines. It is advisable to keep double-layered color-coded (yellow) bins for biomedical waste disposal in common areas. Children, as well as the staff, must be sensitized to use these bins for discarding used biomedical items and must be monitored. The collected items must be finally disposed of as per the CPCB guidelines.

**Monitoring and Evaluation**

Monitoring and evaluation (M and E) should be a daily routine before, during, and after the program. There should be a designated person or team to monitor and evaluate adherence to the COVID-19 safety precautions and SOP by the staff, volunteers, and the children; and the availability of safety supplies pertaining to the pandemic.

Preparation of an M and E checklist prior to the program is vital. While monitoring, the checklist on SOP should be diligently completed by the respective team member, which must be reviewed by the program lead on a regular basis. (Refer Annexure 1 for a sample checklist which can be used as a baseline reference). The checklist should include availability of safety supplies, frequency of room cleaning, use of hand sanitizers and other safety equipment, social distancing norms, and transportation of staff as well as children requiring referral. Identifying and referring children with eye problems must be recorded and followed up to make sure they access the required referral services and treatment. This will have a positive impact on the program. Reports from the M and E of each program should be assessed, and the lessons learned will help in the decision-making and planning of future screening programs.

During the course of the program, if any individual involved in the screening develops COVID-19 symptoms, he/she must be...
quarantined and should receive immediate medical attention for confirmation of diagnosis. Second, all the individuals who might have had contact with the infected individual should be traced through the register and should be strictly advised to go for immediate isolation and monitor their symptoms.

**Conclusion**

SEHP is an effective strategy in combating childhood VI and blindness, through early detection and treatment. With appropriate safety protocols and planning, a successful and safe SEHP can be held even during an ongoing pandemic. Public awareness that includes educating school teachers, volunteers, children, and parents, in addition to implementation of safety guidelines discussed above, could help in preventing the spread of pandemic as well as conducting safe eye screening programs in schools. This will facilitate the availability and accessibility of eye care services for all children in need and ensure that they receive timely treatment even during the pandemic.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**