A survey of paediatric anaesthetic practice during the COVID-19 pandemic in India

INTRODUCTION

From the beginning of the coronavirus disease 2019 (COVID-19), in December 2019, it has become increasingly evident that children infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) remain mostly asymptomatic or mildly symptomatic. In the United States of America (USA) (till April 2022), of the 12.9 million infected children, only 0.1-1.5% required hospitalisation, and less than 0.02% had a fatal outcome,[1] suggesting a greater resilience in children as compared to adults (4-370 times higher).[2]

Aerosol transmission, an established mode of spread of the virus, makes anaesthesiologists, particularly vulnerable. Further, long and intense hours of work, increased apprehension, the constant fear of getting infected coupled with the challenges of inadequate resources and poor infrastructure makes the situation more challenging. In the absence of guidelines from India, it is imperative to develop protocols, to ensure the safety of anaesthesiologists, in highly contagious work environments. This study conducted by the Indian Association of Paediatric Anaesthesiologists (IAPA) looked at the impact of the first wave of COVID-19 on the infrastructure, clinical practice and well-being among practising paediatric anaesthesiologists across India.

METHODS

To conduct this cross-sectional survey, a questionnaire, containing 66 semi-open questions on demographic data, workplace information, experience, details of COVID-19-related work, exposure, availability of infrastructure and equipment, sterilisation protocols, impact on teaching and training programmes and psychological health was designed. It was validated by a subset of IAPA members for transparency, simplicity and applicability. Voluntary participation in the survey was taken as implied consent. It was disseminated digitally to 410 IAPA members using Google Forms between 1 June 2020 and 5 November 2020. As an internal quality control measure, the participants’ email addresses were audited to prevent duplication. The data obtained from the responses was tabulated, processed and analysed, confidentially and anonymously.

RESULTS

Of the 166 responses (40% response rate) received, 4 were incomplete and were hence eliminated. Respondents included consultants, teaching faculty, senior residents and freelancing practitioners, mostly females, aged 30-40 years; Majority were senior faculty, and 29.6% provided exclusive paediatric anaesthesia services [Table 1].

71.6% respondents worked in COVID-19 designated hospitals, including 31.4% in intensive care units (ICUs) and 41.9% in wards. Having received special

### Table 1: Personal and workplace details of respondents

| Question                                      | Number (n) of respondents (%) Total n=162 | Question                                      | Number (n) of respondents (%) Total n=162 |
|-----------------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------------------|
| Age (in years)                                |                                          | Currently working at                          |                                          |
| 25-30                                         | 1 (0.62%)                                | Single facility                               | 118 (72.84%)                            |
| 30-40                                         | 71 (43.83%)                              | Multiple attachments                          | 44 (27.16%)                             |
| 40-50                                         | 36 (22.22%)                              | Place of work/Type of practice                |                                          |
| 50-60                                         | 38 (23.33%)                              | Public hospital                               | 75 (46.30%)                             |
| Gender                                        |                                          | Corporate hospital                            | 51 (31.48%)                             |
| Male                                          | 66 (40.74%)                              | Private practice- solo                        | 16 (9.88%)                              |
| Female                                        | 96 (59.26%)                              | Hospital capacity (number of beds)            |                                          |
| Current post                                  |                                          | <50-100                                       | 26 (16.04%)                             |
| Teaching faculty                              |                                          | >100-300                                      | 38 (23.45%)                             |
| Consultant                                    | 69 (42.59%)                              | >300                                          | 94 (58.02%)                             |
| Senior resident                               | 60 (37.03%)                              |                                               |                                          |
| Freelancer                                    | 22 (13.58%)                              |                                               |                                          |
| Post-training experience                      |                                          |                                               |                                          |
| <5 years                                      | 11 (6.79%)                               | Primary population dealt                      | 8 (4.94%)                               |
| 5-15 years                                    | 25 (15.43%)                              | Adult                                         | 48 (29.63%)                             |
| >15 years                                     | 65 (40.12%)                              | Paediatric                                    | 106 (65.43%)                            |
|                                               | 72 (44.44%)                              | Mixed                                         |                                          |
training (70.9%), most (66.05%) were confident working as front-line workers. A sharp decline in paediatric surgeries was noted. From 60.4% respondents doing >30 paediatric cases per week prior to the pandemic, only 8% continued to do so during the pandemic. On the other hand, while 3.7% had reported <10 cases/week before the pandemic, the percentage increased to 47.5% during the pandemic.

According to our survey, thermal screening checks (88.2%) and reverse transcriptase–polymerase chain reaction (RT-PCR) testing (74%) were the commonest screening methods in hospitals. Majority (69.7%) performed preoperative RT-PCR testing for scheduled, paediatric surgeries. However, fewer respondents subjected neonates for tests, more often for elective (52.4%) than emergency surgeries (17.2%). The turnaround time of RT-PCR result (12-hour) also contributed to surgical delay as reported by 67.1%. New workplace policies including rotational shift duties (66.6%), post-exposure quarantine (72.2%), for 7 to 14 days (76.2%) were commonly reported. Few respondents also reported exclusion of senior healthcare workers (HCWs) (33.3%) and HCWs with comorbidities (31.4%), from clinical duties. Around 48.77% respondents had followed hydroxy chloroquine (HCQ) prophylaxis. Personal protective equipment (PPE) was used almost universally (>99%). Although they were freely available in most operating rooms (ORs) (84%), supplies were reported to be limited in preanaesthetic areas. Around 33.9% confirmed being watched over by a trained observer, while donning and doffing PPE.

Majority (88.2%) of respondents reported long turnaround time (30 min-1 hour) in between surgeries. The facility of negative pressure, neutral pressure, 10 or more fresh air exchanges per hour or active scavenging systems in designated COVID-19 ORs were confirmed by 29.6%, 31.4%, 45.6%, 30.2% respondents, respectively. Mandatory switching off of air conditioners both during induction and extubation, despite hot conditions, was followed by 54.3%. Adequate handwashing and disinfectant hand rub facilities were usually available (83.9% responses). Respondents reported curtailing the use of their mobile phones, in COVID-19 OR, with 24.6% of them never using, 12.3% rarely using and 11.1% using them with a bluetooth or a hands-free device.

With respect to changes in paediatric anaesthetic practices, 83% preferred intravenous (IV) over inhalational induction, 83% preferred paediatric circle system over Jackson Rees (JR) circuit, 76% preferred use of video laryngoscopes, 77% performed rapid sequence intubation (RSI), 72% preferred regional anaesthesia (RA) over general anaesthesia (GA) and 42.5% preferred to change sodalime (after each case), wherever feasible. Almost all respondents (99.3%) used heat and moisture exchange (HME) filters in breathing circuits; while 4.23% used one (between the airway device and circuit), 53.4% used two (additional one placed at end of expiratory circuit limb), 13.6% used three, the next additional one placed at machine end of inspiratory limb.

Respondents reported reusing face masks (63%), supraglottic airway devices (49%) and breathing circuits (46%), after washing with soap and water and sterilising with either sodium hypochlorite or glutaraldehyde solution. Surface disinfection (workstations, monitors, etc.) was done using alcohol-based solutions (37.6%) or with chlorhexidine and alcohol (33.9%).

Among the surveyed respondents, of the 76.5% who worked in hospitals with ongoing anaesthesiology training programmes, 88.2% reported an adverse impact of the pandemic.

Majority (86.4%) reported increased anxiety and stress, the major concerns being the fear of getting infected (75%), infecting family members (93%), uncertain future (58%), social isolation (36%) and income reduction (53%). A few reported increased alcohol intake (4.9%) and anxiolytics (0.6%).

**DISCUSSION**

Our target population for this survey were members of IAPA, anaesthesiologists with special training, experience and interest in paediatric anaesthesia. The assumption is that a widespread change in practice is more likely to follow if led by specialist anaesthesiologists. Also, since majority of these respondents worked in designated COVID-19 hospitals, their practices represented the ground reality of dealing with COVID-19 patients. The survey response rate was 40% (of 410 IAPA members).

Our survey results confirm that new policies to protect front-line HCWs were implemented when
the pandemic hit India. It is reassuring to note that adequate availability of PPE kits in ORs, and supervision of proper donning and doffing of PPE were in place. However, availability was limited in some areas of the hospital, such as NORA. Rotational shift duties ensured adequate off-duty time and rest, and exemption of senior HCWs and HCW with comorbidities from clinical duties, protected those at higher risk. Half of the respondents had been on prophylactic HCQ medication, though its usefulness is now being questioned. HCW quarantine policies were also in place to reduce chances of transmission and one attendant/patient was mandated. Hospital screening methods instituted, included thermal screening checks and RT-PCR testing of inpatients (including children) and attendants.

Studies from France, Australia, Singapore, the USA and Canada, too, have described similar institutional policies for containment of spread of the disease as per their government directives. According to the French Society of Anaesthesia and Intensive Care Medicine guidelines, preoperative PCR screening test was advocated, largely due to the asymptomatic nature of paediatric infection. If detected positive, the procedure was rescheduled 15 days later. An Australian review, while recognising the need to rapidly develop policies, with anaesthesiologists in the lead, recognised simulation as an excellent teaching aid. In February 2020, Singapore instituted Disease Outbreak Response System Condition (DORSCON) measures to reduce transmission risk, by imposing restrictions on visitors, cancelling elective surgeries (to free up hospital beds and ORs), creating isolation wards and defining workflow management.

Our survey confirms that elective surgeries saw a sharp decline during the pandemic in India. Also, anaesthesiologists modified anaesthesia techniques to limit generation of aerosols and contamination in COVID-19 patients. These included preference of IV over inhalational induction, RA over GA (despite practical limitations in small children), closed anaesthetic breathing circuits over JR circuit, employing RSI and video laryngoscopy wherever possible. These also had economic and environmental benefits. Designated COVID-19 ORs though available to most, negative pressure ORs were available to only a few. Surveyed respondents reported reuse of face masks, supraglottic airway devices and anaesthetic breathing circuits, though only after thorough washing with soap and water and sterilisation. It is encouraging to note that majority having received training and faced day-to-day challenges with confidence.

Internationally, the management of paediatric patients in the OR and ICU has been modified on similar lines. The Singapore DORSCON Orange measures required all procedures for COVID patients, be done in designated negative pressure ORs, with separate access route, minimal equipment and personnel, while ensuring availability of PPE, senior anaesthesiologists for airway management, disposable equipment, RSI, closed breathing systems, HME filters, closed in-line tracheal suctioning, minimum circuit disconnections and strict disinfection guidelines. Our surveyed respondents confirmed negative impact of COVID-19 on postgraduate training, both in skills acquisition and academic teaching. Earlier studies, have shown similar findings, despite an increase in novel virtual teaching methods (online lectures, tutorials, webinars, etc.) during the pandemic. Further, limited resources, poor infrastructure and technical difficulties serve as significant barriers to virtual medical training.

The psychological impact of the pandemic on anaesthesiologists is worrisome. Surveyed respondents experienced increased anxiety and stress, due to demanding work, fear of getting and transmitting infection to family members, social isolation, uncertainty of the future and financial worries. International studies too have shown a considerable impact on psychological well-being of front-line hospital staff, risk factors being underlying organic illness, female gender and inadequate PPE availability. Adequate knowledge, personal resilience, work recognition, support from the healthcare team, society, community and from the government are the factors identified by front-line HCWs, which protected them from adverse mental health outcomes.

The low response rate (40%) is a limitation of this survey. However, since majority of respondents worked in COVID-19-designated urban hospitals where the clinical impact of the pandemic was most felt, the survey provides an insight into the hospital preparedness in India, during the first COVID-19 wave. The survey was conducted at the time when the population was not vaccinated and uncertainty prevailed with regard to the disease process, and its prevention (e.g., almost half the respondents...
were on hydroxychloroquine prophylaxis, no longer recommended) and its management. A survey two years into the pandemic, in current times and a better response rate may produce different responses.

CONCLUSION

The COVID-19 pandemic brought about a paradigm shift in the routine perioperative functioning of anaesthesiologists with a decline in elective surgeries and increased stress at the workplace. Despite the uncertainties, paediatric anaesthesiologists across India faced these challenges, maintained a positive attitude, adapted and incorporated changes in their anaesthetic practice. The results of the survey can help set benchmarks for safe practices and motivate fellow anaesthesiologists and HCWs to adapt their practice according to their individual circumstances and continue to create a supportive environment for themselves and their co-workers. Anaesthesiologists have certainly stepped up and brought the importance of their role to the forefront.

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Conflicts of interest

There are no conflicts of interest.

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REFERENCES

1. American Academy of Paediatrics. Children and COVID 19: State level-Data report (updated 2022 July 28). Available from: https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/children-and-covid-19-state-level-data-report. [Last accessed on 2021 Dec 09].
2. Centers of Disease control and Prevention. Risk for COVID-19 Infection, Hospitalization, and Death by Age Group (updated 2022 July 29). Available from: https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigationsdiscovery/hospitalization-death-by-age.html. [Last accessed on 2021 Dec 09].
3. Velly L, Gayet A, Quintard H, Weisn E, De Jong A, Cavillon P, et al. Guidelines: Anaesthesia in the context of COVID-19 pandemic. Anaesth Crit Care Pain Med 2020;39:395-415.
4. Lee-Archer P, von Ungern-Sternberg BS. Paediatric anesthetic implications of COVID-19-A review of current literature. Pediatr Anesth 2020;30:136-41.
5. Thampi S, Yap A, Fan L, Ong J. Special considerations for the management of COVID-19 paediatric patients in the operating room and paediatric intensive care unit in a tertiary hospital in Singapore. Pediatr Anesth 2020;30:642-6.
6. Wong J, Goh QY, Tan Z, Lie SA, Tay YC, Ng SY, et al. Preparing for a COVID-19 pandemic: A review of operating room outbreak response measures in a large tertiary hospital in Singapore. Can J Anaesth 2020;67:732-45.
7. TMS Collaborative. The perceived impact of the Covid-19 pandemic on medical student education and training - An international survey. BMC Med Educ 2021;9:21:566.
8. Lakkala P. Barriers in implementing E-learning in Hormozgan University of Medical Sciences. Global J Health Sci 2016;8:83.
9. De Kock JH, Latham HA, Leslie SJ, Grindle M, Munoz SA, Ellis L, et al. A rapid review of the impact of COVID-19 on the mental health of healthcare workers: Implications for supporting psychological well-being. BMC Public Health 2021:21:104.
10. Jain A, Singariya G, Kamal M, Kumar M, Jain A, Solanki RK. COVID-19 pandemic: Psychological impact on anaesthesiologists. Indian J Anaesth 2020;64:774-83.
11. Ambulkar R, Rana PS, Starr N, Moore J. Perioperative health care provider safety and resource availability during the COVID-19 pandemic in India and other low middle-income countries. Indian J Anaesth 2022;66:220-3.

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