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Telemedicine in emergency responses: reflections from a critical care telemedicine programme between Uzbekistani and German clinicians during COVID-19

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Telemedicine emerged as a tool to support prevention, diagnosis, treatment and management of infectious diseases in remote and low-income settings with underserved populations[1] while the pandemic of COVID-19 has accelerated its adoption.[2] Different telemedical models exist in the context of acute care. One peer-to-peer approach involving an interdisciplinary team of healthcare professionals, called the 'hub-and-spoke model,' facilitates live audio–video interaction at the bedside from a tertiary hospital to remote care providers to assist remote-site physicians in treating challenging cases.[3] The 'hub-and-spoke model' is a multiprofessional peer-to-peer approach involving an interdisciplinary team of doctors, nurses and allied healthcare professionals under the hybrid model, which combines teleconsultations with training and educational activities. It also enables the delivery of telemedical services across national borders,[4] which offers solutions to clinical questions and promotes the exchange of knowledge and experience about the novel infectious disease between healthcare professionals on a global level. Thus, telemedical support has emerged as a potential surge capability not only for the ongoing pandemic but also for future emergencies.[5]

In March 2021, the Republican Research Centre for Emergency Medicine (RRCEM) in Tashkent, Uzbekistan, connected to a telemedical 'hub' at the university hospital Charité in Berlin, Germany, to strengthen critical care capacity for patients with severe cases of COVID-19 in Tashkent. The RRCEM received a specialised telemedical cart and launched a telemedical intensive care unit, joining a hub-and-spoke network of hospitals. Now, partners in Uzbekistan and Germany conduct regular joint telemedical rounds to discuss pre-selected cases. The doctors participate in telemedical rounds at agreed times 3 days a week. Between March 2021 and December 2022, the RRCEM and Charité conducted over 500 joint telemedical rounds involving nearly 200 patients. Several structural patient management improvements have occurred in the RRCEM. These include an antibiotic stewardship programme, a guideline-based approach to delirium management and mechanical ventilation strategies. As a team of clinicians and global health professionals, we identify five lessons that may aid the implementation of similar projects elsewhere, which we summarise in table 1.

During the pandemic of COVID-19, the need for remote consultations between patients and doctors and among healthcare professionals increased significantly. With this, many old challenges to the implementation of telemedical initiatives became more evident. Surges made it necessary to treat patients in field-type or small and medium-sized hospitals with varying degrees of experience in treating critically ill patients with acute respiratory distress syndrome and with different levels of readiness to adopt telemedicine. However, facing a public health emergency, patients and clinicians have become more comfortable with digital technologies to deliver healthcare services. They are more likely to appreciate their benefits, including more efficient use of resources

Table 1 Summary of the lessons learnt

1. Minimum technological infrastructure	Adequate digital infrastructure with robust internet connection; appropriate hardware and software	This includes a robust and reliable broadband internet connection. Maintaining stable bandwidth and network speed can be challenging in rural areas and must be secured before implementing telemedicine. appropriate hardware and software are other critical components. Telemedicine hardware pieces must be mobile and easy to operate in a clinical setting. the software must be well integrated with the existing and future platforms, not interrupting the workflow, and secure future interoperability as the number of telemedical programmes using electronic medical record systems grows. governments, particularly in low and middle income countries (LMICs), must account for the license and maintenance fees to make telemedicine sustainable.
2. Local champions	Enthusiastic medical staff promoting the adoption of telemedical technology	Local champions need to possess sufficient knowledge of the adopted technology, an understanding of the implementing organisation and the ability to establish credibility among peers[7 8]. An integrative review of champions in healthcare found them among critical factors in project implementation success[9]. In our case, a small group of committed English-speaking doctors at the RRCEM operated as local champions. They ran the programme on the Uzbekistani side, participated in regular ward rounds with German counterparts, served as multiplicators for education and training, and promoted and legitimised the new approach.
3. Trust among partners	Trust and commitment among clinical partners engaged in joint telemedical activities	In cross-border telemedical networks, mutual understanding of respective healthcare systems and sociocultural aspects of care between the 'hub' and the 'spoke' are crucial and achieved through dedication and regular communication. In our case, we followed what a hybrid model of care mixing on-site missions with virtual care. Initially, German doctors stayed at Tashkent hospital to support the treatment of critically ill patients. On return, project coordinators in Germany organised a weekly online course on the fundamentals of intensive care medicine between the Charité and RRCEM before the launch of the tele-ICU. The colleagues from both hospitals learnt the specifics of the respective clinical environments by discussing clinical cases and protocols. This combination of on-site and online meetings helped building rapport and prepared colleagues for long-term telemedical work.
4. Human resources	Training programmes to create a sustainable telemedical workforce	Not all staff members may be ready to adopt telemedical technology. Greater engagement with young healthcare professionals is necessary to address this, given their enthusiasm to use new technologies.[10] Another hindrance is a high workload at the hospital, which could hamper clinicians' ability to learn using novel devices and limit the time for telemedicine. During teleconsultations, recurring technological issues can decrease their effectiveness and impede the willingness to engage with telemedical technology.[11] Combining a blended learning concept with an e-learning part and on-site visits is an efficient way to promote staff training.
5. Governance and leadership	Commitment, support and encouragement of the leadership in the implementation of telemedical projects	Decision-makers, such as the Ministries of Health, must prioritise digital health and promote the use of digital technologies to create more equitable healthcare. Leadership must ensure an appropriate legal framework for conducting joint telemedical rounds, including the matter of licence to practice. Our project received full support from the hospital management, and the Ministries in both countries endorsed it. An international consultancy agreement clarified the making of treatment decisions between two teams.

RRCEM, Republican Research Centre for Emergency Medicine; tele-ICU, telemedical intensive care unit.

and time, better availability, and improved contact possibilities.[6]

Once healthcare systems begin to recover, countries should build on the momentum to strengthen the position of telemedical technology and practice. Building on what we know, long-standing challenges to the implementation of telemedicine must be addressed systematically through governance, processes, technological infrastructure, and a clear focus on creating a sustainable telemedical workforce. Given the limited resources, it holds relevance for countries with underserved populations. Our project has demonstrated outstanding potential for telemedical programmes in international settings, crossing the borders of healthcare systems when its hard (technology) and soft (training, team building, motivation) components are well considered in the planning phase. With the right approach and commitment, the national government and its international partners in the health sector could use the advances Uzbekistan made in telemedicine during the pandemic to expand the network to the regions to deliver high-quality, affordable healthcare.

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