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Perspective

How COVID-19 highlighted the need for infection prevention and control measures to become central to the global conversation: experience from the conflict settings of the Middle East ☆,☆☆,★

Roula El Mouallem [a,b], Krystel Moussally [b,c,*], Anita Williams [b,d], Ernestina Repetto [a,b,e], Marilyne Menassa [f,g], Chiara Martino [a], Ghassan Abu Sittah [f]

[a] Medical Department, Operational Centre Brussels, Médecins Sans Frontières, Brussels, Belgium
[b] Middle East Medical Unit (MEMU), Lebanon Branch Office, Médecins Sans Frontières, Beirut, Lebanon
[c] Operations Department, Operational Centre Brussels, Médecins Sans Frontières, Brussels, Belgium
[d] Luxembourg Operational Research (LuxOR) Unit, Médecins Sans Frontières, Luxembourg, Luxembourg
[e] Infection Diseases Services, Saint-Jean Hospital, Brussels, Belgium
[f] Conflict Medicine Program, Global Health Institute, American University of Beirut, Beirut, Lebanon
[g] Institute of Social and Preventive Medicine, University of Bern, Bern, Switzerland

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ABSTRACT

Within just a few months, the coronavirus disease 2019 (COVID-19) pandemic managed to bring to the foreground the conversation that infection prevention and control (IPC) experts have been pushing for decades regarding the control of the spread of infections. Implementing the basics of IPC has been a challenge for all affected countries battling with an exponential COVID-19 curve of infection. Preventing nosocomial transmission of the disease has been difficult in highly resourced and stable contexts, but even more so in the conflict context of the Middle East. COVID-19 has added further challenges to the long list of existing ones, hindering the implementation of the optimal IPC measures that are necessary to break the chain of infection of both respiratory and non-respiratory infections in those settings. This paper outlines and gives examples of the challenges faced across the Middle East conflict setting and serves as a call for action for IPC to be prioritized, given the resources needed, and fed with contextualized evidence.

Within just a few months, the coronavirus disease 2019 (COVID-19) pandemic managed to bring to the foreground the conversation that infection prevention and control (IPC) experts have been pushing for decades regarding the control of the spread of infections: wash your hands, clean touch surfaces, maximize ventilation, and apply precautions to break the chain of transmission (Allegranzi et al., 2017).

Implementing the basics of IPC has been a challenge for all affected countries battling with an exponential COVID-19 curve of infection. Preventing nosocomial transmission of the disease has been difficult in highly resourced and stable contexts, but even more so in the conflict context of the Middle East. COVID-19 has added further challenges to the long list of existing ones, hindering the implementation of the optimal IPC measures that are necessary to break the chain of infection of both respiratory and non-respiratory infections in those settings.

In conflict and highly insecure contexts, such as those of Iraq, Syria, Yemen, and Gaza, saving lives is the first priority. While implementing, maintaining, and following good quality IPC standards should remain a priority to avoid spreading infections, it might not be possible practically. In these contexts, saving lives might take place in partially collapsed, ill-equipped facilities or buildings, makeshift camps, temporary set-ups, or even in caves, all of which

☆ Running heads:
☆☆ Recto: COVID-19 and the need to make IPC central
★ Verso: R. El Mouallem et al.

* Corresponding author: Krystel Moussally, MSF Lebanon, Domtex Building, Floor 5, Hamra Main Street, Beirut, Lebanon. Tel: +961 81 313073
E-mail address: krystel.Moussally@msf.org (K. Moussally).

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do not allow for optimal IPC standards, despite best efforts. In such situations, transmission-based precautions and the isolation of patients are often not possible, and sterile conditions cannot be achieved (Médecins Sans Frontières, 2017). For instance, during the 2017 offensive on Mosul, Iraq, Médecins Sans Frontières (MSF) set up a mobile surgical trailer to perform emergency surgical interventions, which made implementing IPC extremely demanding. The narrow space in the trailer did not allow an optimal aseptic field to be maintained in the operating room. These conditions created a challenge for the surgeons to operate without touching non-sterile areas, which is necessary to prevent potential cross-contamination. In Yemen, MSF operates in a tented field hospital in one of the projects in Taiz, making it impossible to install a proper ventilation system, and a less than optimal method of air-conditioning is used. While these kinds of situations have not changed with the COVID-19 pandemic, the centrality of the IPC message in reducing transmission and deaths from infections has come to the forefront.

Even when the implementation of transmission-based precautions is possible, it may come at an unattainably high cost, forcing alternative, less ideal options to be sought. For example, reusable personal protective equipment (PPE) is cheaper than disposable PPE and provides adequate protection to patients, care-takers, and healthcare workers, but is not best practice and can impact the risk of transmission if not handled properly. However, it is sometimes the only affordable option (Kilinc Balci, 2016). For MSF, one of the only ways to sustain IPC activities at a certain level in Mosul was the use of reusable face shields and coveralls by the treating teams. The increased demand on IPC supplies with the emergence of COVID-19 has heightened this challenge. For MSF, one of the only ways to sustain IPC activities at a certain level in Mosul was the use of reusable face shields and coverall by the treating teams. In Mosul, MSF started early enough in the response to ensure local manufacture of PPE and face shields. In Syria, an increase of up to 5000% in the cost of PPE and hand sanitizer was reported by April 2020 (United Nations Office for the Coordination of Humanitarian Affairs and World Health Organization, 2020).

In addition to high costs, restrictions on supply and tight regulations on importation, coupled with potentially suboptimal quality of available items in conflict settings impedes IPC; the IPC materials needed are often deprioritized against medicines and other lifesaving items. In Gaza, disinfection material such as chlorine, needed for adequate decontamination of water, is subject to heavy restrictions by the Israeli government from entering the country (Israel Ministry of Defense, 2013). With the COVID-19 pandemic, getting these supplies into Gaza has been even more problematic, with few alternatives available. In Yemen, afflicted by a prolonged conflict, a recent aerial attack on a hospital run by MSF hit the supply warehouse where IPC consumables were stored, exacerbating the situation of an already limited supply chain in the country (Médecins Sans Frontières, 2019).

The lack of sufficient water is also a concern for IPC measures, and the reality is that in some conflict contexts even the basics of clean water are not available. In Gaza, the water supply system has a level of microbiological contamination with total and faecal coliforms or other organisms as high as 76%, depending on the area and the type of water sample analysed (Abuzerr et al., 2019). This situation becomes even worse in active conflict settings where people's houses or private facilities can turn into 'hospitals', where insufficient disinfection of the effluent contaminated water can enter the public water supply system, potentially contributing to an increased risk of infection. To address this, in a hospital in Gaza, MSF performs chlorination of water with regular testing at the facility level to monitor the quality. In other projects, such as in Yemen, water pumps and reverse osmosis systems are used for sterilization to mitigate the lack of clean water. The use of such equipment might not be possible in other local structures due to a lack of resources.

The supply of electricity is also essential for running sterilization equipment and water pumps. In conflict settings, the shortage of electricity is frequent and alternatives such as generators or solar panels might not be available, or they might have been destroyed. The resulting power interruptions or complete lack of electricity seriously challenge attempts at IPC.

In addition to the contextual challenges of conflict settings, the loss of skilled health professionals creates a vacuum in expertise and an increased urgency to train existing professionals with the needed skills. In Syria, since the beginning of the conflict in 2011, hundreds of health professionals have been killed, imprisoned, or tortured, or they have emigrated (Tsurkov and Jukhadar, 2020). In this situation, finding well-trained IPC professionals becomes a constant struggle. Furthermore, the knowledge and practices of IPC professionals must adapt to the shifting ecology of war and this is not always possible. Training and building the capacities of non-IPC experts to lead IPC responses becomes crucial.

The COVID-19 pandemic has severely exacerbated the situation and there have been urgent calls for support for IPC implementation across all health facilities in conflict settings. IPC-related inquiries from the teams operating at the frontline have been increasing continuously, which has resulted in a myriad of training initiatives on IPC procedures and guidelines based on the evolving evidence to ensure that quality IPC measures are effectively put in place in these settings (Médecins Sans Frontières, 2020). This reflects the urgent need for the development of quality remote IPC training for local staff specifically tailored for conflict contexts at a time when importing international experts for direct field support will not be possible in the foreseeable future.

Furthermore, the nature of war injuries creates serious challenges for IPC. The weapons used in recent warfare cause massive tissue destruction, increasing the likelihood of infection (Moriscot et al., 2021); multidrug-resistant (MDR) organisms (or 'superbugs') are far more frequently found in these wounds. These superbugs, in the presence of suboptimal IPC practices, can easily be transmitted to others in the hospital and into the community (Bazzi et al., 2020; Fily et al., 2019). Between December 2018 and May 2021, more than 60% (74/117) of positive bone biopsies cultured from patients admitted to the MSF-supported hospital in Gaza with war wounds were MDR infections, with the most prevalent being *Staphylococcus aureus* and MDR *Enterobacteriaceae* infections. In Mosul, 80% of the patients admitted to the MSF tertiary orthopaedic centre between April 2018 and December 2019 had an MDR infection, with *S. aureus* being the most commonly isolated pathogen in bone and tissue samples. This highlights the critical need for quality IPC measures to prevent cross-contamination and infection transmission outside the hospital ward.

The chaos of conflict settings severely limits the implementation of IPC, and the standard IPC protocols and guidelines available today are not appropriate for these contexts. There is a need to tailor the guidelines to prevent the healthcare teams from making ill-informed IPC decisions that could potentially cause harm to patients and themselves. Over the years, MSF has been able to develop specific strategies for implementing IPC practices in contexts where access to health care is difficult and health systems have collapsed due to humanitarian emergencies. However, the uncontrollable conditions of war provide an opportunity for organizations to create a cultural shift in the mind-set towards IPC at the local level. Gaza is a recent example where, through MSF support provided to Al-Awda Hospital, simple IPC measures, such as investing in sinks at the point of care, have improved hand hygiene at the patient bed level. In Al-Khateeb Hospital in Baghdad, where MSF has been supporting IPC in the response to the COVID-19 emergency, the provision of extensive training to medi-

cal and non-medical staff increased the IPC compliance in isolation wards, mainly in relation to hand hygiene, safe handling of needles and sharps, and the proper treatment of reusable medical devices, more than two-fold between March and April 2020. While this is promising, it is still below the minimum target of 80% and hence there is a lot of room for improvement. Implementing IPC practices relies on huge efforts in training, building capabilities, increasing awareness among health staff and patients, and regular monitoring of IPC activities.

Implementing high quality IPC measures in conflict-affected settings in the Middle East has been a neglected priority for many years. With the COVID-19 pandemic, acting quickly and effectively has never been more critical. This is a call for action for local authorities, the private and public health sectors, academics, donors, and non-health experts such as environmentalists and anthropologists to join efforts to fight healthcare-associated infections through quality IPC, specifically tailored for conflict and highly insecure settings. This will rely on a multidisciplinary approach involving all of these stakeholders. IPC measures need to be contextualized and adapted to the realities and harsh conditions created by conflicts. They need to be adaptable and simple enough to allow implementation in difficult and emergency conditions accounting for all of the limitations created by conflicts.

Conflict-associated IPC requires building evidence on the topic, which in itself is challenging in these circumstances and will require an adapted research framework, as well as the strengthening of research capacities of field workers through targeted programmes (El Achi et al., 2019). Adapted training packages are needed to allow the build-up of local IPC skills with minimal supervision. Innovative and more affordable equipment suitable to conflict contexts is essential. Some examples might be designing alternatives to cleaning and disinfection of surgical equipment when automated sterilizers are not available or when power cuts do not support their use; or innovative alternatives for ventilation when patients are operated on in a tent or in a dismantled building where heating, ventilation, and air conditioning (HVAC) systems are destroyed. IPC also needs to be given higher priority in the medical education curriculum so that no health professional is qualified for practice without at least a basic understanding of IPC principles.

The rapid spread of COVID-19 with its severe morbidity and mortality has suddenly vaulted simple IPC measures to top priority everywhere in the world. The question is, will this heightened awareness last beyond the pandemic or will we go back to having IPC pushed down the priority list after it has passed? With the Eastern Mediterranean region having, as of June 2020, the highest case fatality rate from COVID-19 infections in healthcare workers, with increasing numbers (Bandyopadhyay et al., 2020), it is highly likely that dozens of deaths might have been prevented in Iraq, Egypt, and Yemen had we been more successful in establishing good quality baseline and emergency preparedness IPC before we were hit by this emergency.

We call for IPC to be prioritized, given the attention needed, and supported by contextualized evidence to improve targeted responses and support contextual training, specifically important in conflict settings where basic resources are lacking; for IPC to become a core component of the medical curriculum, which is not the case in many conflict settings in the Middle East; and for IPC to be allocated the necessary resources. Only then will we be able to respect our promise to our patients to 'do no harm' and prevent avoidable morbidity and mortality in contexts where the weight of pain and suffering is high.

Author contributions

Roula El Mouallem (RM), Krystel Moussally (KM), and Anita Williams (AW) wrote the original draft of the article. Ghassan Abu-Sittah (GAS), Ernestina Repetto (ER), and KM conceived the idea. GAS overviewed the work. All authors discussed, reviewed, and edited the manuscript and agreed with the final content.

Author queries

[Note: The text has undergone minor rephrasing throughout.]

Sentence has been rephrased – is this correct? Please advise of any changes required.

"…fed with contextualized evidence…"

Should this be "supported by contextualized evidence"?

"This challenged operating without the surgeons touching non-sterile areas in the aim of preventing potential cross-contamination."

Clarification required. Please advise.

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