

Diabetes care in times of armed conflict

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Abstract

Recent events in Ukraine emphasise the danger and uncertainty faced by people who are caught in armed conflict. Those living with diabetes face an additional crisis: the complexity of diabetes management during war. This editorial describes the challenges of caring for people with diabetes in this scenario, including the impact on healthcare systems, mass displacement, refocused priorities of wider healthcare, fiscal challenges, and disruption to supply lines, storage of medicines and communications. We consider the effects on people living with diabetes and suggest some strategies for healthcare workers providing care during conflict, including equipping healthcare providers to deal with diabetes emergencies, and adaptation of technological innovations.

Introduction

The experience of United Kingdom (UK) military personnel deployed overseas during the past 20 years has demonstrated a sustained demand for internal medicine, including during times of conflict.¹ According to a World Health Organization (WHO) report, non-communicable conditions like diabetes now represent a leading cause of death in the context of humanitarian crises or war.² The number of adults with diabetes has almost doubled in the last 30 years, with two in three of these patients now living in low- and middle-income countries (LMICs). This figure is projected to rise by a further 140 million people by 2045.³ Since armed conflicts frequently impact LMICs, wars have grave implications for people with diabetes, compounding the 'unseen humanitarian emergency' represented by the global impact of diabetes itself.⁴ This editorial aims to identify and set in context the additional challenges of providing and supporting care to people with diabetes during times of armed conflict.

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Table 1 Factors predisposing to deterioration in diabetes care in conflict settings

- Mass displacement of vulnerable populations
- Re-prioritisation of the healthcare workforce towards trauma care
- Financial challenges and disrupted healthcare supply lines
- Constraints on storage of medicines
- Disrupted communication between patients and care teams

Care for people with diabetes in areas vulnerable to armed conflict

Routine diabetes care relies on continued availability of key medicines including insulin, the ability to administer hypoglycaemic agents safely (i.e. storage, injection devices and monitoring) and healthcare expertise to support self-management. Ukraine, ranking as a middle to lower-middle income state according to Gross National Income (GNI) per capita, has historically provided government-funded glucose monitoring and reimbursement for diabetes medications,⁵ but was subject to healthcare inequalities and notable gaps in overall provision even before the present conflict. In countries at the lower end of the GNI distribution, healthcare systems may struggle to deliver effective services in any domain of chronic disease care. For example, 7% of hospitals in Northern Mali⁶ and 12.8% in Afghanistan⁷ held only half the core items for diabetes management when surveyed in relative peacetime.

Healthcare system impacts with the outbreak of violence

These relatively disadvantaged care systems may deteriorate dramatically with the onset of armed conflict. Predisposing factors associated with war, summarised in Table 1, generate net effects that undermine chronic disease care and increase the likelihood of both acute and longer-term complications of diabetes in the general population.⁸

Mass displacement of vulnerable populations

Mass displacement, as has been seen recently within Ukraine and neighbouring countries, can rapidly and substantially increase the size of the local populations that depend upon any one hospital or healthcare system. Sudden international displacement is likely to exacerbate this challenge by introducing language barriers, discontinuity in healthcare systems and potential rationing of care as displaced persons add to the demand on existing arrangements for local nationals.

Re-prioritisation of the healthcare workforce towards trauma care and emergency public health interventions

In areas that are affected directly by conflict, healthcare systems will redirect drugs, equipment and people towards the immediate prevention of loss of life. Trauma, or acute management of outbreaks like cholera and measles, will take precedence over diabetes and other chronic diseases.

Financial challenges and disrupted healthcare supply lines

Supply and logistics are always challenging during times of conflict, since all commodities (not just medical supplies) contend for limited delivery capacity. Within healthcare settings, the prioritisation of blood, fluids and antimicrobials may mean that insulin and other essential treatments for diabetes become unavailable. Moreover, as has been reported in Ukraine, unpredictable supply of food increases the risk of hypoglycaemia when access to carbohydrates is unreliable.⁹ In order to meet the medical needs of the greatest number of patients, suppliers will reduce the number of items available (the 'formulary') to provide the safest, most practical and economically viable solution.

When austere conditions stand to impair the efficacy of the medication, this adds greatly to the decision-making burden on clinicians and increases patients' overall exposure to risk. Insulin requires refrigeration, which adds a further layer of difficulty to suppliers, and to patients who are homeless or experiencing power cuts. Frequently, safe conditions will not be met, so that the use of medications that do arrive will fall outside licencing requirements. Despite well-established supply chains and dedicated logistics specialists, sudden changes in delivery routes could lead to temperature variation. Heat exposure is relatively predictable and may denature insulin if severe. Conversely, freezing during transport is often overlooked but causes clumping of particles resulting in crystal damage and a de-homogenised solution, which cannot be used safely.¹⁰

Constraints on storage of medicines

As with the transportation of medicines into and through a war-zone, an understanding of the facilities on offer can enable healthcare workers to appreciate whether storage conditions at logistics hubs meet manufacturers' recommendations. At distal distribution sites (such as local pharmacies) and in peoples' own homes, workplaces and in shelters or transit accommodation, conditions of storage may show extreme variation in relation to existing resources, changes in accessibility, fluctuating or absent power supplies (e.g. for refrigeration) and the capacity to store or carry adequate supplies in a static environment, or on the move.

Disrupted communication between patients and care teams

Conflicts inevitably disrupt communication at many levels, which will impact healthcare worker-patient relationships. Disrupted communication with people with diabetes is likely to present a significant challenge to hospitals that are already working at capacity to manage trauma and disease outbreaks. Healthcare

Figure 1. Improvised labelling for medication used when language presents a barrier within a conflict zone. The sun and moon symbols denote the times of day when the medication is to be taken



workers need to receive specialist advice, e.g. about the management of diabetes emergencies in resource constrained environments, yet this can be fraught with difficulty in a field care environment. Ensuring that patients understand their treatment is important and has natural challenges when operating in different languages. Often translation services struggle with medical terms and full understanding of the terminology.

Sometimes a simple and visual method can offer advantages (Figure 1). This has been proven in deployments to countries such as Iraq and Afghanistan, where civilian casualties may meet eligibility criteria for military care based upon the Geneva Convention or bespoke local arrangements. In any setting, be it peacetime or a 'non-permissive' environment, access to the Apple or Google App Stores allows healthcare staff to download innovative resources such as CardMedic (www.cardmedic.com), which was used by critical care staff evacuating children from recent events in Ukraine. CardMedic hosts an A-Z library of free-to-use pre-written scripts replicating conversations around common healthcare topics, plus sign language videos, easy read with pictures, read-aloud and an integrated speech-to-text translation tool to allow for further conversations beyond the scope of the scripts. Although diabetes-specific themes are presently accessed by paid subscription, institutional access or concessionary terms of use (e.g. in low-income or resource poor settings) reflect the founders' aim of reducing health inequalities in a global health context.

Direct effects on people living with diabetes during conflict

For people living with diabetes the unavailability of medicine, monitoring or hospital support can be devastating, leading to ketoacidosis (which may be fatal). Rationing of insulin is widely reported in LMICs, where insulin remains widely unavailable and unaffordable today (100 years after its patent was sold by Bant-

ing, Best and Collip for \$1 each).^{4,11} Conflicts negatively affect the most vulnerable, including people living with diabetes, leading to a deeper humanitarian crisis.¹² They also carry an immeasurable impact on the mental health of people with diabetes, for whom the prevalence of anxiety, depression and suicide is already far higher than that of the general population.¹³

The limited 'formulary' available in times of conflict frequently presents a challenge to clinicians working in the austere or constrained environments that result, especially when they may be better practised at operating in multifaceted state-of-the-art healthcare systems. The aim of treatment will be to achieve the best level of blood glucose that is practicable, and both clinicians and patients may need to accept a substantial relaxation in glycaemic control. Treatment options will likely be relatively rudimentary, depending on which medications are able to navigate through the supply chain. Clinicians should be prepared to adapt practice at short notice, for example basing treatment on a single quick-acting insulin given multiple times per day. If basal insulin is not available, this may lead to suboptimal care since multiple injections of short-acting insulin increase the risk of hypoglycaemia. Risks associated with suboptimal strategies like this, where stacking of insulin could predispose to severe hypoglycaemia, must be understood by care providers and people with diabetes alike.

Some diabetes medications have the potential to cause harm in a field environment, for example SGLT2 inhibitor use may exacerbate dehydration during high physical activity levels or periods of restricted water intake, as well as increasing the tendency to diabetic ketoacidosis in line with decreasing insulin availability and increasing physical and pathophysiological stress (e.g. fleeing conflict zones, wounding and super-added infections). Some people with diabetes could also be forced to compromise their dietary intake, as with increasing carbohydrate consumption from eating high-energy food aid and military rations.¹⁴

Provision of care by healthcare workers during conflicts

Healthcare workers in conflict zones need to be equipped to manage acute diabetes emergencies. Experience from Mali highlighted that essential medicines (and training) for diabetes in a war zone include rapid-acting insulin and insulin syringes antibiotics and dressings for foot infection; blood glucose meters; urine test strips; and IV fluids.⁶ We might add a long-acting insulin, to avoid the need for realigning carbohydrate given the uncertainty of food supplies; and a capillary ketone meter, which has a light footprint when combined with a glucometer. Furthermore, online reach-back services, comprising volunteer diabetologists and nurse specialists, could aid frontline healthcare workers with timely advice.

War often accelerates innovation, and new approaches to overcoming challenges to diabetes management in recent years include cheaper systems for insulin storage (such as 3D-printed, battery-operated nanostructured coolers),¹⁵ and transport (such as insulin delivery by drone).¹⁶ Inevitably, conflict and its aftermath will stretch to capacity healthcare workers' physical and cognitive resources, akin to the present pandemic and recovery

phases, which themselves should be considered an additional stressor on staff and systems.

Contribution to diabetes care from beyond the civilian healthcare sector

Supportive efforts from both peer-led groups of people affected by diabetes and formally established charities, aimed at securing and distributing donations of insulin, have been well documented among countries neighbouring¹⁴ and more remote from Ukraine.¹⁷ Online consultations, offered by volunteer generalists such as primary healthcare providers as well as diabetes and mental health specialists, may contribute to addressing the inevitable shortfalls in care that arise as a consequence of military warfare.

In any country affected by war, it may be tempting to think that foreign military organisations could offer in-country healthcare support, either by embedding medical staff into host facilities and teams or by providing direct capability in the form of field hospitals staffed entirely by military professionals. While either option may be achievable, political as well as purely health-facing constraints need to be considered carefully. The latter incorporates considerations around the character of medical support to modern militaries, which focuses on providing emergency care to typically young, non-morbid and physically fit Service populations. This important difference is reflected in light and limited scaling of diabetes medications with little room for duplication (e.g. small volumes of rapid-acting insulin and metformin, but not gliclazide) and limited diagnostics (e.g. blood ketone measurement being absent from perhaps a majority of treatment facilities supporting a given operational theatre).

Across recent conflicts, many military medical organisations have served as exemplars for innovation in their parent organisations. Novel technologies to support people with diabetes and healthcare workers with medication, equipment and expertise may be useful in a range of ways. The military, as well as 'non-state' actors such as non-governmental organisations, may play important roles in bringing this kind of support to people with diabetes who are affected by war. But, as is often the case in times of conflict, the greater priority is for governments to engage with other governments, for example in negotiating safe transport corridors for people and material to exit the warzone.

As has been borne out during recent disturbances around the globe, mitigating the 'emergency within an emergency' war brings for people living with diabetes is highly challenging. Those involved will require an appreciation and tolerance of a high degree of complexity, which may surpass the complexity of even this most complex of diseases.

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