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Heart

AT THE HEART OF THE CONFLICT

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Abstract:	Cardiovascular disease (CVD) prevalence and mortality are rapidly increasing globally and this burden, especially in premature CVD death, is disproportionately felt in low-and middle-income countries (LMIC) ¹ . We know, in addition, that most current armed conflicts and resultant population displacement occur in LMICs ² . There is also evidence that factors associated with increased CVD risk, such as tobacco and alcohol use, are heightened as people cope with conflict and the post-conflict environment ^{1,3} . Recent reviews have shown that intense emotion, especially bereavement, may trigger heart attacks, but most of these studies have been conducted in stable settings ⁴ . So, although it may seem logical that CVD morbidity and mortality would increase in armed conflict settings, it is surprising that there is such limited evidence to date in this area.

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5 **Title: At The Heart Of The Conflict**
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3 Cardiovascular disease (CVD) prevalence and mortality are rapidly increasing globally and
4 the burden, especially of premature CVD death, is disproportionately felt in low-and middle-
5 income countries (LMIC)¹. We know, in addition, that most current armed conflicts and
6 resultant population displacement occur in LMICs ². There is also evidence that factors
7 associated with increased CVD risk, such as tobacco and alcohol use, are heightened as
8 people cope with conflict and the post-conflict environment ^{1,3}. Recent reviews have shown
9 that intense emotion, especially bereavement, may trigger heart attacks, but most of these
10 studies have been conducted in stable settings ⁴. So, although it may seem logical that CVD
11 morbidity and mortality would increase in armed conflict settings, it is surprising that there is
12 such limited evidence to date in this area.

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14 This first published systematic review to examine current evidence on the association
15 between armed conflict and cardiovascular disease risk by Jawad et al. is both timely and
16 important ⁵. The authors sought to address the question: "What is the association between
17 armed conflict and CVD risk for civilians in LMICs, compared to civilians with less or no
18 exposure to armed conflict?" They reported on 65 quantitative studies (covering 23 armed
19 conflicts), which included a comparator group or examined outcomes over time. The authors
20 descriptively summarised the studies using harvest diagrams, grouping by risk factor, setting
21 and date of publication. They found evidence that armed conflict is associated with overt
22 illness, including increased coronary heart disease, cerebrovascular, and endocrine diseases;
23 and with an increase in CVD risk factors: blood pressure, lipids, alcohol, and tobacco use. In
24 addition, the added risk may become evident both during periods of active conflict and in the
25 acute and chronic post-conflict period.

26
27 The authors succeeded in clearly summarising the existing research. The main limitations of
28 this review relate to the quality of the evidence itself. Among the papers meeting their
29 inclusion criteria, we highlight the following limitations: basic study design (almost half were
30 cross-sectional), low quality (only 10% were considered high quality), poor measurement of
31 outcomes (for example, over half used self-report or didn't specify how outcomes were
32 measured), lack of exploration of causal pathways (potentially useful to design preventive
33 interventions), and lack of studies including refugees or relevant regions like the Middle East
34 (approximately half of the included studies were derived from just three conflict settings in the
35 Balkans and Colombia). As pointed out by the authors, the important inconsistency in their
36 findings with respect to different outcomes with similar causal pathways (an increase in
37 mortality from chronic ischaemic heart disease but no change in the effect on myocardial
38 infarction, angina pectoris or chronic ischaemic chronic disease) may reflect methodological
39 shortcomings of the included studies.

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41 The authors make sensible recommendations for conducting future, more robust research,
42 which will address some of the limitations of the current evidence base. They suggest we
43 focus on: using better outcome measurement, improving management of confounding, and
44 increasing the use of control arms or quasi-experimental study designs such as interrupted
45 time series.

46
47 This review and a recent review of diabetes care in humanitarian crises both highlight the
48 impact of the increasing global burden of noncommunicable diseases (NCDs) on crisis
49 settings and support advocacy work to bring NCDs, including CVD and the excess crisis-
50 associated risks, squarely onto the agendas of humanitarian and development agencies,
51 funders and the research community ⁶. In addition to better characterising the impact of
52 conflict on CVD risk, it is also vital to conduct high quality research to improve the clinical care
53 and programmatic response for people with CVD in conflict settings. Although the evidence
54 base is growing, there has been limited evidence on effective interventions or guidance for
55 CVD (and NCDs in general) in humanitarian settings⁷. For example, the WHO PEN guide is
56 limited in scope and humanitarian actors, such as MSF, acknowledge that their current
57 guidelines could be adapted and simplified ^{8,9}.

58
59 A research roadmap could be designed around the response of humanitarian organisations to
60 CVD (and other NCDs) in crisis settings. Among the main research priorities we highlight:

1) *Rapid assessment tools*: We do not know the pre-conflict burden of CVD in most crisis

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3 contexts. Therefore, some simple and reliable rapid assessment tools could be valuable for
4 informing humanitarian organisations operations in specific settings. Guidance for NCD care
5 providers on adapting the response by stage and character of humanitarian crisis (acute
6 emergency, stable or unstable protracted conflict or post-conflict) and by the underlying state
7 and resilience of the health system in the conflict-affected area (fragile vs. more mature
8 health system) may also be useful.
9

10 2) *Simple diagnostic tools and approaches*: The diagnosis of CVD requires investigations –
11 involving equipment, personnel and training – that are not widely available, accessible or
12 affordable in low-income settings with fragile health systems. So, we need to develop and test
13 feasible, accurate and *context-adapted* point-of-care diagnostic tools and approaches. Such
14 approaches may assist, for example, in distinguishing CVD-induced chest pain or shortness
15 of breath from sputum negative TB at primary care level in countries with a high TB burden.
16

17 3) *Individual risk stratification*: People with established CVD, or those at high risk, are
18 particularly susceptible to exacerbations or acute events triggered by stress or treatment
19 interruption. A more solid, evidence-based risk stratifying approach could help to target
20 interventions according to risk, for example, prioritising high-risk groups and urgent
21 interventions during the emergency phase of a crisis. This may mean simply investing more
22 in identifying people with diabetes and chronic kidney disease, both groups with elevated
23 CVD risk.
24

25 4) *Appropriate models of care*: We echo the authors' call for the post-conflict (or inter-conflict)
26 reconstruction phase to include low resource, primary level preventive interventions for CVD.
27 Identifying and achieving good blood pressure and glycaemic control among people with
28 hypertension and diabetes, taking a CVD risk management approach and providing good
29 quality CVD secondary prevention care warrant a clear focus. Ideally, NCD interventions in
30 general should be designed using a health systems-based approach, with a person-centred
31 care focus, while applying the learning from humanitarian organisations' decades of work on
32 chronic HIV care. Empowering nurses and other non-medical health worker cadres to
33 diagnose and manage stable patients, empowering patients to self-care, decentralising
34 aspects of care to community level (e.g. monitoring, dispensing or delivery of medications),
35 and utilising fixed dose combination drugs for hypertension and CVD secondary prevention
36 may all play a part in such interventions. Importantly, humanitarian interventions that target
37 CVD should be *integrated* with other chronic conditions, such as diabetes, asthma and HIV;
38 integrated into pre-existing primary care where possible; and integrated across health system
39 levels and sites, which are linked by robust referral pathways. Additionally, it would seem
40 sensible to integrate mental health and psychosocial support with other aspects of care to
41 address some of the stress-related CVD risk associated with conflict. Although the suggested
42 approaches for models of care listed above look promising, we need to conduct robust
43 implementation research (using mixed methods) to better understand what works, for whom,
44 and in which crisis contexts.
45

46 5) *Ensuring availability and affordability of essential medicines and technologies*: An NCD
47 model of care will only work if essential medicines and technologies are available, accessible
48 and affordable. Supply and access are often limited at baseline and worsen in an emergency,
49 when supply chains may be disrupted. In working to address this, from 2017, the Interagency
50 Emergency Health Kit (IEHK), designed to provide for the primary care needs of 10,000
51 people for approximately three months in post-emergency settings, has included medications
52 to treat acute NCD exacerbations. In addition, a specific modular NCD emergency health kit
53 is currently being piloted in Iraq and Syria¹⁰. Further research is needed to document the
54 effectiveness of this strategy and to explore other financing and procurement approaches to
55 ensure availability and affordability in the longer term.
56

57 There are some crosscutting issues to be considered across all the proposed research areas.
58 Firstly, collaboration of key stakeholders is vital. These include: humanitarian and
59 development actors, academics, international agencies, governments, people affected by
60 conflicts and the private sector. Secondly, conducting research in conflict settings involves
ethical and logistical challenges, so we need to develop innovative methodological
approaches to conduct robust research in these settings. Finally, there is a need for more

economic evaluations to ensure the efficiency of responses to NCD needs in humanitarian crises.

To conclude, while calling for improved research in this area, we acknowledge the significant work already underway by humanitarian actors and UN bodies to address the burden of NCDs in crisis settings. We suggest focussing on what works, both by promoting the delivery of proven, cost effective CVD interventions and by supporting governments to address CVD risk factors through community level prevention strategies and through alcohol, tobacco and food policy strengthening. The aim is to minimise the impact of distress and disruption on people with CVD in crises and to build better systems to keep hearts healthy into the future.

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