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Implementing and evaluating integrated care models for non-communicable diseases in fragile and humanitarian settings☆

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ABSTRACT

In this commentary, we advocate for the wider implementation of integrated care models for NCDs within humanitarian preparedness, response, and resilience efforts. Since experience and evidence on integrated NCD care in humanitarian settings is limited, we discuss potential benefits, key lessons learned from other settings, and lessons from the integration of other conditions that may be useful for stakeholders considering an integrated model of NCD care. We also introduce our ongoing project in North Lebanon as a case example currently undergoing parallel tracks of program implementation and process evaluation that aims to strengthen the evidence base on implementing an integrated NCD care model in a crisis setting.

The growing need for non-communicable diseases care in humanitarian settings

Non-communicable diseases (NCDs) are life-long, chronic conditions that require regular and timely access to care. Nearly 80 % of global NCD-related deaths occur in low-and-middle-income countries (LMICs) and almost half of these deaths occur prematurely among people younger than 70 years old (World Health Organization 2022). The current funding levels and the scale of NCD services in LMICs are not adequate to meet the global Sustainable Development Goal target (3.4) that is, to reduce by one-third premature mortality from NCDs by 2030 (World Health Organization 2023).

Most humanitarian crises (Box 1) occur in LMICs, and most people displaced as a result of crises are hosted in LMICs, either as internally displaced people (IDPs) or cross-border as refugees in neighbouring countries (Development Initiatives. Global Humanitarian Assistance Report 2022). Crisis-affected populations also include local static populations and those hosting refugees or IDPs, who may be affected by the increased burden or disruption of health and other systems, and by economic crises (Aebischer Perone et al., 2017). The high risk and rates of premature death and illness-related disability, especially among the working aged populations in LMICs, is also connected to, and magnified by humanitarian crisis (Ngaruiya et al., 2022; Huerga et al., 2009; Harris et al., 2022; The World Health Organization 2024). The WHO's Regional Office for the Eastern Mediterranean presents that NCD-related complications such as heart attacks can occur 2–3 times more common in emergencies, compared to in stable settings, and the rate of premature mortality is also slightly higher in comparison of non-emergency setting (25% vs 18 %) (WHO Regional Office for the Eastern Mediterranean 2023) Crisis-affected and displaced populations broadly tend to have a higher risk of NCD diagnosis, and worse associated health outcomes in comparison to general or host populations (Ngaruiya et al., 2022; Harris et al., 2022). Experience of post-traumatic stress disorder and its symptoms can increase the risk of type-2 diabetes (Roberts et al., 2015). Refugee populations also tend to present at health facilities late, that is, after the onset of NCD complications, such as retinopathy, nephropathy and neuropathy (Ngaruiya et al., 2022). About 24–68 % of mortality amongst migrants and refugees from common origin countries with

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Box 1
Definitions

Integrated health services

Health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector, and according to their needs throughout the life course (P World Health Organization 2015).

People-centred

An approach to care that consciously adopts individuals', carers', families', and communities' perspectives as participants in, and beneficiaries of, trusted health systems that respond to their needs and preferences in humane and holistic ways. People-centred care also requires that people have the education and support they need to make decisions and participate in their own care. It is organized around the health needs and expectations of people rather than diseases (P World Health Organization 2015).

Multidisciplinary care and interprofessional collaboration

Mix of health and care professionals from different disciplines or professional backgrounds, who come together to interact, learn together, plan and coordinate people's care in a holistic way (Social Care Institute for Excellence (SCIE) 2023).

Continuity of care

The extent to which there is an ongoing relationship between a person and a clinical team, with and smooth, timely linkage between different aspects of health services, with through access to information- i.e., patient history & records, to inform understanding of their changing needs, preferences, available resource (Ljungholm et al., 2022).

Humanitarian crisis a single event or series of events that threaten the health, safety or well-being of a community or large group of people. They include natural disasters (such as earthquakes), public health emergencies (such as infectious disease outbreaks that exceed the coping capacity of the responsible authorities) and armed conflict and its consequences (such as civil disruption and displacement, which often become protracted or chronic emergencies). Humanitarian crises are increasingly caused or magnified by climate change, such as extreme meteorological events (droughts, flooding etc.) and outbreaks of infectious diseases in non-endemic areas, and well as climate migration or conflicts over water and farmable land resources that have been diminished by climate change. "Humanitarian settings" is an informal term that captures both humanitarian crises and fragile, conflict-affected and vulnerable (FCV) settings. (The World Health Organization 2024)

Humanitarian operations

The relief and assistance provided by humanitarian actors or responders refer to impartial international or national organizations (UN and non-UN) mandated to provide humanitarian action; it does not include donors, militaries or national/local authorities (Inter-Agency Standing Committee 2015).

protracted humanitarian crisis such as Syria, Afghanistan, South Sudan, Myanmar, and Somalia is attributed to NCDs (Gyawali et al., 2021). Failure to sufficiently manage NCDs at local and national levels can impede recovery from crisis in the short term, as well as international efforts to strengthen health systems, national productivity rates and broader economic development in crisis-affected and host countries (Ngaruiya et al., 2022; Huerga et al., 2009).

People living with NCDs (PLWNCDs) require continuous, long-term care across many specialty health service delivery areas and health system levels. PLWNCDs often have multimorbidities, including mental and physical health conditions such as hypertension, diabetes, depression, anxiety, or functional impairments (Aebischer Perone et al., 2017; Stein et al., 2019; Thornicroft et al., 2019). Adequate management of these multimorbidities require continuity of care (Box 1) that meets the multiple and changing needs across a person's life course. This includes timely and regular access to primary healthcare, mental health and psychosocial support (MHPSS), as well as physiotherapy or physical rehabilitation services (Aebischer Perone et al., 2017; Stein et al., 2019; Thornicroft et al., 2019).

In this commentary, we make the case for integrated (Box 1) NCD care in humanitarian settings, by outlining some potential benefits that integrated NCD care may bring in crisis contexts. We focus on implementation of integrated NCD care at program or facility levels rather than a health system level. This can involve the provision of a holistic package of resources spanning prevention and health literacy, access to diagnostic testing and monitoring, non-medical as well as medical treatment, rehabilitative physical and mental health services, assistive technologies, such as walking aids and prostheses, and palliative care to improve clinical outcomes and quality of life (Nolte et al., 2017). We then offer evidence from other contexts and conditions that may inform stakeholders interested in implementing integrated NCD in humanitarian settings. This includes some known challenges, and enabling factors from other settings that can potentially influence the process and outcomes of integrated care for NCDs in humanitarian contexts. We then propose some research needs and recommendations to address knowledge gaps. We end with a call to action: for stakeholders to consider documenting the process and evaluating the outcomes - especially while piloting integrated programs or new models of care. We introduce our ongoing program of integrated NCD care delivered in the humanitarian setting of North Lebanon, to outline how parallel tracks of research and implementation was conceptualized.

Existing barriers to effective and sustainable NCD care in humanitarian settings

Multiple interconnected challenges limit the implementation of continuous, and comprehensive NCD care in humanitarian settings. In the past, NCD care used to be "ad hoc" and "forgotten" in humanitarian operations (Jaung et al., 2021; Ansbro et al., 2022). NCD care in humanitarian crisis and operations has gained increasing attention only over the last decade. Still, there is a lack of a standardized response, and NCD care remains fragmented and poorly coordinated during many crises (Ansbro et al., 2022; Bausch et al., 2021; Kehlenbrink et al., 2023; Slama et al., 2017).

At a country and health systems level in many low resource or crisis-affected countries, NCD care has also historically been underdeveloped, especially at a primary healthcare level. There is often limited

government commitment and public health funding for NCDs, and for primary healthcare in general (Witter et al., 2020). NCD care in these settings has often been predominantly delivered at hospital level with weak or absent referral pathways (including for MHPSS, rehabilitation and palliative care), limiting access and continuity. Health systems are often understaffed to adequately serve the population, under-capacitated to provide NCD care, and face high staff turnover (P Harris et al., 2022; Witter et al., 2020). At primary care levels, financial and supply chain limitations affect the availability of NCD medicines and diagnostic equipment including blood pressure monitors, and blood glucose monitors, as well as life-saving therapies such as insulin (P Harris et al., 2022; Boulle et al., 2019). There are also limited comprehensive health information systems (Garry et al., 2018), with incomplete routine data collection on long-term NCD patient outcomes and service utilization (P Harris et al., 2022).

Financially speaking, dwindling international donor funding and short-term humanitarian funding and implementation cycles also affect the long-term delivery of NCD care in humanitarian operations (Bausch et al., 2021; Witter et al., 2020; Patel et al., 2022; Bertone et al., 2019). Many humanitarian actors and institutions are underfunded, and over-extended with the increasing number and duration of global crises and competing health needs (Kohrt et al., 2019). PLWNCDs in LMIC settings including in fragile and humanitarian settings, often face high out-of-pocket spending on NCD medicines, diagnostic and monitoring tests, specialist consultations, MHPSS and physical therapy - where these are available (Witter et al., 2020). Additionally, low health literacy, coupled with challenges in sustainable access to healthy food, acceptable physical activity options and limited MHPSS-based disease coping strategies in crisis settings further influence their experience of increasing disease severity and complications (Kehlenbrink et al., 2023; Boulle et al., 2019; Rehr et al., 2018; Zablith et al., 2021). Cumulatively, these dynamics constrain the ability to achieve continuous, comprehensive and cost-efficient care for PLWNCDs, and contribute to the rates of preventable NCD-related morbidities and mortality in humanitarian settings (Ansbro et al., 2022; Bausch et al., 2021; Witter et al., 2020; Patel et al., 2022; P Harris et al., 2022).

The potential value of integrated care for NCD management within the existing ecosystem of challenges in humanitarian settings

Within humanitarian settings with the above pre-existing challenges, new models of care must address these resource and capability constraints to successfully improve population NCD outcomes. Integrated care is a potential solution. The concept of integrated care for NCDs has gained increasing attention globally over the last two decades. The World Health Organization (WHO) advocates for integrated care (*definition in Box 1*) especially in low-resource settings, by anchoring health service coordination and delivery at a primary healthcare level (Devi et al., 2020; Pan-American Health Organization 2020; World Health Organization 2020). For example, existing service delivery platforms across health system levels and disease areas i.e., at primary healthcare levels can be leveraged and extended in scope. Within these facilities, HIV, TB, malaria, and sexual and reproductive health services can be extended to include NCD, mental health, and physical rehabilitation. This can be operationalised through a coordinated people-centred approach and needs-based linkage to multidisciplinary, or interprofessional care team and services. (See key definitions in Box 1)

Integrated care can involve the integration or alignment of work processes, communication, patient flow, and information systems within and between different teams or units of operations that may have previously worked independently. In humanitarian organizations, service delivery for NCD care tends to be siloed, that is- organized, delivered and funded through different teams, functions areas, organizational units and budget lines, such as medical, mental health and psychosocial services, social care, physical rehabilitation, water, sanitation, and economic security (Gyawali et al., 2021; Ansbro et al., 2022). Integrated care requires the breaking down of these siloes, and cultivating a culture where programs are jointly coordinated and delivered by an interdisciplinary and intersectoral team. These ways of working also hold the potential be more efficient in the use of scarce organizational resources.

From a health system perspective, integrated care may contribute to the health system strengthening goals of equity and universality of access and coverage, higher quality of care, more efficient use of resources better responsiveness to population needs, global economic and social development goals, and system resilience during crises (P World Health Organization 2015; World Health Organization 2023).

From a people-centred or service-user perspective, integrated NCD services may reduce out-of-pocket costs, and hold the potential to enhance people's capabilities to achieve their highest possible quality of life, and pursue meaningful, and productive lives (Nolte et al., 2017). This can include their ability to function as they deem normal in their daily lives, without health-related disabilities, conduct income generating activities and interact with their social networks within their communities and beyond. Integrated care is particularly relevant to people living with chronic conditions and/or multimorbidity, and to vulnerable populations, who often require complex care involving different healthcare disciplines. Comorbid mental health and chronic physical conditions, for example, work synergistically leading to both poorer physical and mental health outcomes. Therefore, it is important to manage all aspects of multimorbidities. Integration has been proposed to improve person centredness, and reduce adverse patient outcomes and experience, which may result from care fragmentation. Service users or patients have tended to indicate increased satisfaction, perceived quality of care, and easier access to services in international (mostly high-income country) studies on integrated care (Baxter et al., 2018).

Knowledge on the feasibility and (cost)-effectiveness of integrated care within humanitarian settings

Overall, there is inadequate knowledge on the feasibility, effectiveness, and sustainability of many NCD interventions in the context of diverse humanitarian settings (Ngaruiya et al., 2022, Ruby et al., 2015). In terms of implementation feasibility, a coordinated approach to service delivery, such as that required to organize and deliver integrated NCD care, is not new to humanitarian actors. For instance, there is experience in arranging multisectoral integrated service delivery for survivors of intimate partner violence (Greene et al., 2021).

Humanitarian actors, such as Médecins sans Frontières (MSF) have evaluated models of integrated NCD care in several settings. In Kenya, MSF added NCD care to pre-existing HIV program and care model. An evaluation of outcomes in the first three years of implementation found the process and achievement of integration to be feasible, and overall health outcomes such as blood pressure, cholesterol and blood glucose were managed well through an integrated approach (Edwards et al., 2015). In Jordan, MSF integrated MHPSS, physiotherapy, protection, and home visit services within a primary-level NCD program. Integration was found to be feasible and acceptable among stakeholders including service users but was increasingly expensive as the service became more complex. The authors offer that simplification, adapted procurement practices and use of technology may increase the cost-effectiveness, and reduce the overall implementation costs in future applications (Ansbro et al., 2021). Availability of existing infrastructure or resources in the local contexts where programs are conducted can of course influence differences in start-up expenses.

More generally within LMICs, previously vertical health programmes for other chronic conditions, such as HIV, have transitioned to an integrated, and health system strengthening approach. For example, The Global Fund for HIV, TB & Malaria, are now including the integration of mental health, and NCD care in HIV-related programme fundings in the recent 2023 funding cycle (The Global Fund for HIV, TB and Malaria 2023). Several models and cases of integration that build on established

Box 2
Literature informed lessons (enablers and barriers) for the implementation of integrated care for PLWNCs in humanitarian settings.

Enablers

- Co-location of services and facilities is an important element of success, which encourages informal contact, mutual understanding, quick and easy communication, and learning across professional boundaries (Cameron et al., 2014).
- At adoption stages, shared or joint understanding of aims and objective (Cameron et al., 2014). This includes the clear identification and communication, and maintenance of roles and responsibilities. Strategies that support adoption and implementation include co-development of the purpose, introductory and ongoing training.
- Presence of coordination between stakeholders, and of a binding policy mechanism i.e. policy documents (Matanje Mwagomba et al., 2018).
- Identification of clear processes for improvement, establish an interprofessional team with different team members; establish consistent meeting time and commitment, allow the team to choose a leader; quality improvement method is chosen; collaboration, coordination, and networking; clear, concise, and objective communication (Makic and Wald, 2017).

Implementation barriers

- No or lack of early identification and communication of aims and objectives of integrations and the process of agreement of shared purpose (Cameron et al., 2014).
- Unclear identification and communication, and maintenance of roles and responsibilities, i.e. lack of awareness of referral process and eligibility criteria (Cameron et al., 2014).
- Human relations and dynamics - role confusion and protectionism of set routines and connection of role or task with professional identity, with blurring of professional roles in the organization of integrated care (Cameron et al., 2014, Liff and Wikström, 2015).
- Communication & information sharing: lack of supportive IT systems, incompatible systems within/across teams, (Cameron et al., 2014).
- Contextual issues- relationships between agencies (Cameron et al., 2014).
- Financial uncertainties (Cameron et al., 2014).
- Leadership turnover (Kadu and Stolee, 2015).
- Organizational (non) readiness, prioritization, lack of interest, competing priorities (Kadu and Stolee, 2015).

HIV infrastructure in Africa have been discussed over the last few years (Matanje Mwagomba et al., 2018, Njuguna et al., 2018, Venables et al., 2016). Similarly, integrated NCD care in existing tuberculosis programs, have been initiated, with the recognition that people living with TB are also at higher risk of NCDs, such as type-2 diabetes (Marais et al., 2013). There are also examples of NCD care integration into maternal and reproductive health programs and services in low resource settings which point towards the overall feasibility of such a model (Simkovich et al., 2023, Akselrod et al., 2023, Collins et al., 2023).

The available research from low-resource or fragile settings can also offer insights on the cost-effectiveness of integrated approaches to managing multiple conditions. For example, a study on a pilot program on integrated care for HIV, diabetes and hypertension in Tanzania and Uganda found that jointly managing two or more conditions in a person was cheaper for service payers and alleviated household costs for service users, compared to managing multiple conditions separately, without an integrated approach (Shiri et al., 2021). Indeed, early diagnosis and management through integration of NCD screening into other services and through primary and secondary prevention of NCDs can prevent complications, unstable disease, and disability, which may translate into reductions in associated direct costs incurred through hospitalisation, specialist consultations and other resource use (Slama et al., 2017).

Systematic reviews including studies from high-income and stable settings, have shown that integrated care has beneficial effects on some domains such as functional health status, clinical outcomes and quality of life, among others (Nolte et al., 2017). However, because integrated care is considered “a complex intervention” with a polymorphous nature, evaluating its overall “impact” is challenging. Scholars have advised that instead of studying the overall impact of integrated care it might be better to evaluate key elements or activities that compromise ‘integration’ i.e. co-location, joint case management by multidisciplinary teams, which can instead be more helpful in understanding and establishing its effects (Nolte et al., 2017).

Implementation lessons to support integrated care in humanitarian settings: *what can we learn from other settings and disease areas?*

The evidence around implementation of integrated care for NCDs in humanitarian settings is limited. Implementation lessons are particularly important to inform program design to maximize program reach and success in time and resource limited circumstances. As such, we look to other settings and programs to understand enabling factors and barriers that may be relevant and translatable, to inform the design and implementation of integrated NCD care in humanitarian settings (Box 2). For example, human resource related factors can have a strong influence on the implementation and impact achieved from integrated models. For instance, a study on the facilitating factors and challenges of scaling up integrated mental health service delivery in six LMICs at a primary care level, highlights that training of general primary healthcare providers is a crucial component to achieving the desired impact (Petersen et al., 2019).

Additionally, management and other human resource-related factors may impede or enable people-centred care. Management and strong leadership, such as adoption and implementation championing by leaders, a past history of joint work and pre-established relationships, regular team building events and team meetings, adequate resources including human resource remuneration, available replacements during holidays, sustainable and long-term budgets (pooled) have been identified in past research as enabling factors in implementation processes (Kadu and Stolee, 2015). Barriers include fixed traditional practices and structures and stereotypical views in providers (Moore et al., 2017). In well-formed and working teams, staff report less conflict and fewer contradictions (Cameron et al., 2014). Nevertheless, greater dependence on informality or organically formed communication processes could undermine professional practice.

Box 3
Research suggestions for the evaluation of integrated care for PLWNCDs in humanitarian settings.

Research to guide programme design

Use theory of change or logic model approaches for program development or refinement (Kohrt et al., 2019)

Conduct economic evaluations, with sensitivity analyses and costing components that can guide funders and policymakers in prioritizing interventions (Bertone et al., 2019, Makhani et al., 2020).

Research priorities and engagement

Involve PLWNCDs to co-create or refine integrated care programs (The World Health Organization 2024, Al-Oraibi et al., 2022, Rass et al., 2020, Bain et al., 2023).

Prioritize research questions that are relevant for patients, health care providers and that may inform decision makers' practice (Skivington et al., 2021).

Build inter-disciplinary teams including clinicians, statisticians, epidemiologists, social scientists, health economists, and humanitarian workers among others (Gomez, 2022, McGuire et al., 2019).

Research lens

Use a combined gender and intersectionality, disability and migration sensitive lens in design and implementation of research, programs and organizational policies (Hankivsky et al., 2019, Larson et al., 2016, Singh et al., 2021, Whittaker et al., 2021).

Work ethically, with cultural sensitivity to cultivate community acceptance and trust, as well as promote equitable co-production of knowledge between stakeholders (Kohrt et al., 2019, Al-Oraibi et al., 2022, Rass et al., 2020, Singh et al., 2021, Singh et al., 2021, Greene et al., 2017, Bruno and Haar, 2020).

Research methodologies

Use implementation research frameworks or approaches, such as REAIM PRISM that consider a wide range of implementation outcomes, such as adoption, feasibility, fidelity, reach, effectiveness and sustainability (The World Health Organization 2024, Glasgow et al., 2019, Proctor et al., 2011).

Use theory-based approaches to explore the impact of context and mechanisms on the outcomes assessed in different contexts (Skivington et al., 2021, Glasgow et al., 2019, Shelton et al., 2020).

Conduct comprehensive process evaluations and implementation research (The World Health Organization 2024, Limbani et al., 2019).

Use mixed methods and triangulate different data sources for evaluation (Rutherford et al., 2010, Patton, 1999).

Use case study methodologies where comparison sites are not available or suitable to conduct comparative studies (Beecroft et al., 2022, Paparini et al., 2020).

Explore alternative designs to randomised controlled trials (RCT) that might be more feasible in humanitarian settings such as before-after studies, interrupted time series analysis, propensity score analyses, regression discontinuity or stepped-wedge RCT design (Kohrt et al., 2019, Reeves et al., 2017, Aifah et al., 2023).

Conduct economic evaluations, with sensitivity analyses and costing components that can guide funders and policymakers in prioritizing interventions (Bertone et al., 2019, Makhani et al., 2020).

Managing research in humanitarian crises

Minimize the need for research-specific and paper-based data collection and, when possible, use existing data sources and move to digital or electronic based systems such as electronic health records, outcomes databases or regular patient surveys (Perakslis, 2018, Jobanputra et al., 2017).

Be flexible and adaptive with the research methodologies to be responsive to the changing circumstances (Kohrt et al., 2019, Leresche et al., 2020, Guha-Sapir and Scales, 2020).

Research gaps, future research needs and recommendations

A recurring call across studies and evidence reviews of integrated NCD care in all settings is the need for more research and a stronger evidence base. In humanitarian settings, it is especially important to focus on local contextual needs, adaptations, and the effectiveness of integrated care in improving population NCD outcomes. Indeed, the adoption of any new evidence-based health innovation, including complex programs such as integrated NCD care models, requires in-depth understanding of the unique context, resources, actors, institutions, relations and networks, a good knowledge base and knowledge-generating approach (Leonard et al., 2020).

The United Kingdom's Medical Research Council's (MRC) and National Institute for Health and Care Research (NIHR) guidance for the evaluation of complex interventions can be useful to evaluate integrated care approaches in humanitarian settings (Skivington et al., 2021). Implementation research also provides a useful methodological approach to study what factors affect how a complex intervention (such as integrated care for PLWNCDs) can be implemented in volatile, complex humanitarian settings. For example, the use of implementation research frameworks, such as RE-AIM PRISM (Glasgow et al., 2019, Shelton et al., 2020) may be useful for designing, analyzing and reporting on specific outcomes (reach, effectiveness, adoption, implementation, and maintenance) and also consider contextual and explanatory factors (PRISM) that contribute to the implementation process and outcomes (Holtrop et al., 2018, Smith and Harden, 2021).

The evidence generated from any such research endeavors will be able to support uptake, adaptations to program design, widening of the scale or scope of integrated NCD care, and replication in other locations. Research conducted during the early phases of implementation

Box 4
The ongoing research scope and design of the CAJA integrated care model early implementation process

Aim:

To study the implementation process of an integrated model of care for PLWNCDs in a humanitarian setting in northern Lebanon including progress towards achieving program goals in the first year, to learn lessons and support the longer-term maintenance and adaptation of the model.

To inform the MOPH and humanitarian agencies on the process and resources to implement integrated care for PLWNCDs.

Scope and objectives: Using the RE-AIM PRISM framework (Glasgow et al., 2019, Shelton et al., 2020), this research will explore:

Reach: the use by intended user population, and patterns of their multidisciplinary needs, referrals, and clinic attendance.

Effectiveness: achievement of program goals, including improvements of clinical outcomes (i.e., blood pressure and blood sugar control), service delivery of multi-disciplinary, patient-centered care, coordination with information systems, and patients' empowerment and ability to manage their illness through engagement with the integrated services.

Adoption, implementation, and maintenance: the acceptability, experience, and actions of adopting, applying, and maintaining new practices, its fit with existing practice and processes, and the navigation of fidelity and necessary adaptations required in the implementation strategy of the CAJA integrated model.

Explanatory and local contextual factors that influence implementation and effectiveness of the program.

Design: mixed methods study that include primary qualitative data collection through in-depth interviews with ICRC and CAJA staff, external local health system stakeholders, patients and their caregivers, document analysis and short-term observations. Secondary quantitative analysis of routinely collected administrative program data, and patients' clinical outcomes and service utilization at CAJA.

processes, in parallel to program implementation, presents an opportunity for active learning in real-time, to inform responsive adaptations that may also support long-term continuity of the program (Limbani et al., 2019).

Although a comprehensive list of research recommendations is beyond the scope of this article, we outline some suggestions in Box 3 for developing and evaluating integrated care models for PLWNCDs in humanitarian settings.

The CAJA model as an ongoing case example of parallel tracks of program implementation and research

As a case example, we introduce our ongoing academic and humanitarian partnership in the implementation and evaluation of the "CAJA model" of integrated NCD care in Lebanon. The Partnering for Change - chronic care in humanitarian crisis (P4C) initiative is a partnership between the International Committee of the Red Cross (ICRC), Danish Red Cross (DRC), and Novo Nordisk A/S. An interdisciplinary team from London School of Hygiene & Tropical Medicine (LSHTM) serve as the independent academic partner.

In the first phase of the partnership (September 2020 to February 2021), the partners worked on a scoping assessment of the ICRC- and DRC-supported NCD care models in Lebanon and Iraq (Jaung et al., 2021, Ansbro et al., 2022, Schmid et al., 2022). In Lebanon, this formative research identified a lack of continuous, standardised, integrated care for NCDs, which was delivered by multiple disparate actors within a historically pluralistic and highly privatised national health system (Willis et al., 2023). The provision of high quality NCD care required stronger referral pathways and a more people-centred approach that better supported PLWNCD and their families in navigating the ecosystem of available NCD services.

The needs identified in the first phase of work informed the focus in the second phase of the partnership - namely the refinement and implementation of an integrated care model. The ICRC in Lebanon conceptualised a model of integrated NCD care and named it after the CAJA clinic (Chabab Al Ataa Al Jazeel Association) where the model was piloted. Situated in the Bireh District, in Akkar Governorate, this facility has been supported by the ICRC since October 2019. It started as a local non-governmental organization supported private dispensary and has recently become a Ministry of Public Health (MOPH) affiliated primary health clinic. Here, 75 % of the population of 12,000 are registered as refugees from Syria, and overall, the Akkar Governorate hosts about 12 % of the Syrian refugee population in Lebanon (Truppa et al., 2023). The Akkar governorate has the highest burden of NCDs in Lebanon, where close to 50 % of households are affected by NCDs, and has the lowest levels of access to NCD medications (UNHCR 2022). More generally in Lebanon, up to 91 % of deaths are attributed to NCDs (Zablith et al., 2021, Mansour et al., 2020). The prevalence of NCDs and their risk factors has been higher in Syrian refugees than the host population of Lebanon, while their health-seeking, and access to optimal levels of care is lower (Zablith et al., 2021, Mansour et al., 2020, Saleh et al., 2021, Saleh et al., 2022, Lyles et al., 2020). Nevertheless, with rising inflation, outgoing migration of the national health workforce, and other cascading effects of the economic and geopolitical crises, such as the lifting of government subsidies for insulin prices in 2021, health-seeking trends for NCD care in the host population have also been affected, with more Lebanese seeking care through the public health system (Kawa et al., 2022, Das, 2022, Hamadeh et al., 2021).

The opportunity to pilot an integrated care model arose since the ICRC-supported primary health care, physical rehabilitation, and mental health and psychosocial support services were already co-located in the CAJA clinic. However, each team worked independently without much communication on the interdisciplinary care needs of PLWNCD. Through a participatory theory of change exercise with local stakeholders, including the Lebanese MOPH, a comprehensive suite of interventions that centred around the alignment of human resource (HR) processes and capacity, the use of a joint information/data management system and patient empowerment activities was proposed (Truppa et al., 2023). The ICRC are now at mid-level stages of implementing the proposed model of care identified through the theory of change process.

In parallel to the implementation process, there is an ongoing mixed methods study that documents and evaluates the program's implementation process. The aim of the study is to investigate progress towards achieving program goals in the first year, and to learn lessons and support the longer-term maintenance and adaptation of the model. Box 4 provides some details of the research design and scope evaluating the CAJA integrated care model.

Conclusion

In this commentary, we summarize why an integrated care approach for PLWNCDs is sensible but challenging in humanitarian settings. We share some practical recommendations for its implementation.

We also highlight limitations in the current evidence and share research considerations for evaluating integrated care for PLWNCDs. These strategies may support the better understanding of what works, for whom, under what contextual circumstances, and whether integrated care programs are scalable and sustainable in humanitarian settings.

We conclude by sharing a case example- our current evaluation design of the CAJA integrated model. We hope to see future implementation research and discussions that add to the scarce literature on integrated care for PLWNCDs in humanitarian settings.

CRediT authorship contribution statement

Lavanya Vijayasingham: Writing – original draft, Conceptualization. **Éimhín Ansbro:** Writing – review & editing, Conceptualization. **Carla Zmeter:** Writing – review & editing, Conceptualization. **Linda Abou Abbas:** Writing – review & editing, Conceptualization. **Benjamin Schmid:** Writing – review & editing. **Leah Sanga:** Writing – review & editing. **Lars Bruun Larsen:** Writing – review & editing. **Sigiriya Aebischer Perone:** Writing – review & editing, Conceptualization. **Pablo Perel:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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