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Health system resilience in the face of crisis: analysing the challenges, strategies and capacities for UNRWA in Syria

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Abstract

Health system resilience reflects the ability to continue service delivery in the face of extraordinary shocks. We examined the case of the United Nations Relief and Works Agency (UNRWA) and its delivery of services to Palestine refugees in Syria during the ongoing crisis to identify factors enabling system resilience. The study is a retrospective qualitative case study utilizing diverse methods. We conducted 35 semi-structured interviews with UNRWA clinical and administrative professionals engaged in health service delivery over the period of the Syria conflict. Through a group model building session with a sub-group of eight of these participants, we then elicited a causal loop diagram of health system functioning over the course of the war, identifying pathways of threat and mitigating resilience strategies. We triangulated analysis with data from UNRWA annual reports and routine health management information. The UNRWA health system generally sustained service provision despite individual, community and system challenges that arose during the conflict. We distinguish absorptive, adaptive and transformative capacities of the system facilitating this resilience. Absorptive capacities enabled immediate crisis response, drawing on available human and organizational resources. Adaptive capacities sustained service delivery through revised logistical arrangements, enhanced collaborative mechanisms and organizational flexibility. Transformative capacity was evidenced by the creation of new services in response to changing community needs. Analysis suggests factors such as staff commitment, organizational flexibility and availability of collaboration mechanisms were important assets in maintaining service continuity and quality. This evidence regarding alternative strategies adopted to sustain service delivery in Syria is of clear relevance to other actors seeking organizational resilience in crisis contexts.

Keywords: UNRWA, health systems, Syria, conflict, Palestinian refugees, resilience, systems dynamics

Introduction

After more than 8 years of war, approximately 55% of Syrians have been forced to leave their homes. In total, 6.6 million Syrians have been internally displaced, over 5 million have sought refuge in neighbouring countries (i.e. Lebanon, Turkey and Jordan; UNHCR, 2018) and a further 1.2 million have sought refuge in Europe (Humanitarian Needs Overview, 2017). The humanitarian crisis has also had a substantial impact on the Palestine refugees registered in Syria (PRS). Prior to the conflict, 80% of PRS lived in the greater Damascus area, and the rest in or around camps close to the major cities (UNRWA, 2014). As a consequence of the war, 58% of PRS

Key Messages
- United Nations Relief and Works Agency (UNRWA) faced a variety of challenges throughout the Syrian conflict, including at individual, community and system levels.
- We use participatory causal loops to document a number of absorptive, adaptive and transformative strategies which UNRWA utilized, allowing it to provide resilient health services.
- Factors such as willingness to devolve decision-making to local levels, staff commitment, community cohesion and collaboration mechanisms were identified as key resources in enabling service continuity and quality.
- Underlying these factors are an organizational culture which prioritizes the community it serves and the staff which work for it, as well as a history of managing chronic crises.

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have become internally displaced, whereas over 50 000 remain trapped in 'hard to reach' areas, often deprived of medical care and food supplies for prolonged durations (UNRWA, 2018). Others have left Syria for neighbouring countries, including Jordan and Lebanon. However, both these countries attempted to limit such movement through the introduction of migration bans in January 2013 (Amnesty International, 2013) and May 2014, respectively (Janmyr, 2016; UNRWA, 2016).

Since 2011, violence has extended to all Palestine refugee camps in Syria. The Yarmouk camp, considered the capital of the Palestinian diaspora, was subjected to prolonged siege and repeated attacks from December 2012. Residents of the camp dwindled from 160 000 PRS to <18 000 by the end of 2013 (Atlantic Council, 2018). As the war intensified, hundreds of PRS died due to starvation, lack of medical care or sniper fire (Amnesty International, 2014). The current PRS population at Yarmouk stands at fewer than 1000 and is subject to recurrent violent clashes (Sanchez, 2018).

The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) provides services to the 5.4 million Palestine refugees living in Lebanon, Syria, Jordan, Gaza and the West Bank. Prior to the Syrian war, UNRWA's Syria field office offered services to 527 000 PRS, utilizing 23 primary healthcare centres. In 2013 alone, the armed conflict led to the destruction of 10 UNRWA health facilities (UNRWA, 2014). This was particularly problematic at a time when insecurity and lack of financial and other essential resources increased PRS reliance on UNRWA (2017b).

In the context of considering the concept of resilience, shocks are sudden and generally negative events possessing substantial impacts affecting the livelihood of people and the functioning of a state or a system (OECD, 2014). In these terms, the war in Syria and the myriad of challenges arising from it clearly constituted a major shock to the UNRWA health system and to the population it serves. Response to shock is a central point of focus for health system resilience and resilience research. Kieny *et al.* (2014) defined health systems' resilience as the ability of health systems to maintain service provision in times of chaos and uncertainty. Thomas *et al.* (2013) emphasized the ability to return to equilibrium or steady-state without inducing any change to structure or function. Others have suggested a health system can be considered resilient when it is able to avoid collapse by adapting and transforming its structures (Leach *et al.*, 2010; Davoudi *et al.*, 2012). Despite differences in emphasis, these definitions share an understanding of resilience as related to a system's capacity to respond adaptively to an external shock that challenges its functioning.

In this article, we consider the resilience of the UNRWA health system in response to the shock of the Syria conflict. We identify the challenges faced by the PRS community and the UNRWA health system and investigate the strategies adopted by UNRWA to enable sustained service delivery throughout the prolonged crisis. Utilizing Blanchet's capacity-oriented resilience framework (Blanchet *et al.*, 2017), we seek to strengthen understanding of processes of health systems resilience and identify supportive strategies for other health systems facing major shocks. Adopting a systems lens, our focus was explicitly on the internal dynamics of response and resilience within UNRWA and the coping mechanisms adopted to address the difficulties faced in such a challenging environment.

Methods

Study design

The study design is a retrospective qualitative case study, utilizing diverse methods. We present the case of the UNRWA-Syria health system in sustaining service delivery to PRS during the Syria war. Informed by a review of the literature that utilizes Blanchet's 'absorptive, adaptive and transformative' resilience framing (Blanchet *et al.*, 2017; Alameddine *et al.*, 2019) and the desire to increase trustworthiness and reliability, the study triangulated data from semi-structured interviews, group model building (GMB) sessions and annual health reports.

Semi-structured interviews

Thirty-five semi-structured key informant interviews were carried out in Syria between February and August 2017. Interviews were conducted at the Syria field office in Damascus and at three clinics representing the diversity of contexts where services were delivered to PRS: Jaramana, City Center Polyclinic and Aleppo. The first two health centres were in a rural and an urban setting, respectively, and were characterized by large enrolment of internally displaced persons. The Aleppo centre faced particularly high levels of violence and insecurity.

Participants, belonging to UNRWA's healthcare cadre in Syria, were purposively sampled to secure representation from different departments, stations and roles. Participants comprised area health managers and health centre staff (physician, pharmacist, clerk, practice nurse, staff nurse, midwife and lab technician). For inclusion, participants must have worked in the designated clinics or associated service for a period of at least 1 year at the time of the interview. Taking into consideration mobility restrictions, insecurity and other challenges during data collection that might have compromised participants' confidentiality and safety, it was judged inappropriate to interview participants belonging to community associations and representatives from the Ministry of Health, as we had done in similar studies in Lebanon and Jordan (Alameddine *et al.*, 2019).

Interviews were pre-scheduled at participants' convenience and took place at the health facility. A field researcher based in Syria carried out all interviews in Arabic, privately with each participant after securing and recording an oral consent. A semi-structured topic guide—previously used during similar studies in Gaza (Ager, 2016), Lebanon and Jordan (Alameddine *et al.*, 2019)—was used to probe direct participant experiences from 2010 (pre-Syria crisis) to the time of the interview. Interviews lasted an average of 25 min.

Recordings of the interviews were transcribed verbatim and translated by the research co-ordinator (ZJ); Arabic native speakers in the research team (FF, MA) verified translations. Transcripts were imported into Dedoose (Lieber, 2018), a web application for qualitative data analysis. Following repeated reads of the transcripts to gain analytic insight of the data (data immersion), these were inductively coded by two researchers (ZJ, KD; inter-rater correlation coefficient 0.78). Codes were iteratively refined and reduced to relevant categories following the constant comparison method (Glaser, 1965; see Supplementary Appendix S1 for coding tree). Emergent themes were refined in research group discussions. The research team grouped, classified and discussed inductively defined themes in light of a theoretical framing of resilience capacities distinguishing absorptive, adaptive and transformative capacities (Blanchet *et al.*, 2017). The analysis also supported the construction of a systems seed model that was reviewed and expanded during the GMB.

Document review

We reviewed UNRWA annual health reports from 2010 to 2017 to document UNRWA health service provision, operations reforms and service coverage before and throughout the Syria crisis.

Group model building

Following interview analysis, researchers convened eight members of the UNRWA-Syria health team (comprising participants from each of the targeted clinics and from the Syria field office in Damascus) for a 2-day GMB workshop in Beirut in August 2017. Drawing on principles of participatory GMB (Hovmand *et al.*, 2011, 2012; Ager *et al.*, 2015a, 2015b; Lembani *et al.*, 2015), a series of participatory 'scripts' were used to elicit rich picture drawings (Armson, 2011), participant perceptions of trends over time and preliminary causal loop diagrams (Armson, 2011; Hovmand *et al.*, 2011, 2012).

Activities culminated in the development of a participant-derived UNRWA-Syria health system model. This was compared with a preliminary seed model developed by researchers based on interview findings. Participants and research team members reviewed both models and developed a unified model structure. Post-workshop, modellers in the research team (KD, ZJ, GL, AA and SW) further refined this model—drawing on information from UNRWA Annual Reports—to clarify linkages, consulting with UNRWA field office staff as appropriate to confirm coherence of understanding and discussing findings at a workshop in UNRWA headquarters in Amman in January 2018 (see sample of concept model in Supplementary Appendix S2; accessed on https://youtu.be/BZTr4NLyKes).

Within each model, arrows were, where appropriate, assigned a (+) or (−) sign to indicate the suggested relationship between the linked variables. Variables that change in the same direction are linked by arrows of positive polarity; e.g. as staff workload increases, staff pressure also increases. Arrows assigned a negative polarity denote an inversely proportional or negative relationship; e.g. as insecurity due to the conflict increases, the security of health facilities decreases.

Loops were further analysed to determine their systems impact and marked as either 'reinforcing' or 'balancing'. 'Reinforcing loops' are those where variable effects are cumulative; 'balancing loops' are those where the net effect of changes in variables is for stabilizing the overarching cycle (Sterman, 2001).

Ethics

We obtained UNRWA HQ authorization to carry out the research and access UNRWA data systems. Ethical approval was secured from relevant institutional review boards of XXX (Queen Margaret University, UK) and YYY (American University of Beirut, Lebanon). All data collection activities were carried out in accordance with the approved IRB protocols of the concerned research institutions in Lebanon and the UK.

Earlier studies and reports have shared incidences of weaponization of healthcare and revealed that health workers were repeatedly and directly victimized by the warring parties in Syria (Fouad *et al.*, 2017; Schlein, 2018). Therefore, we anticipated that potential interviewees might be reluctant to participate in the study or disclose certain information. Potential dangers and security concerns were particularly evident when conducting interviews in Aleppo, where fieldwork was postponed for 3 months due to active hostilities. To mitigate these risks and sensitivities, the research team deemed essential the recruitment of a field researcher who was familiar with both UNRWA processes and the setting in Syria (although not engaged within the health sector). Furthermore, special travel arrangements were made for UNRWA-Syria staff to enable their participation in the GMB workshop in Beirut. Support and assurances from the UNRWA administration towards its staff during the course of data collection—particularly regarding the anonymization of all interview material—was crucial for data integrity and personnel security.

As noted above, we judged interviewing patient representatives from communities to be inappropriate due to security risks, threats to anonymity and concerns that—in the context of prevailing insecurity—interviews by UNRWA Social Service employees would risk being coercive with non-participation likely being perceived to jeopardize receiving aid and/or services. Similar ethical concerns constrained engagement with external stakeholders working with governmental or non-governmental organizations.

Findings

We start by noting the challenges arising at individual and community levels before considering UNRWA system-level challenges and resilience capabilities. Figure 1 displays the pathways of threat (indicated in red) affecting individual, community and health system functioning during the crisis.

Threats to individual and community function

We identified two primary threats to individual and community livelihoods and well-being.

First, the conflict and arising insecurity posed severe threats to people's lives and health (as indicated in several pathways in the upper left of Figure 1). War-related injuries became more common, resulting in long-term disabilities. Displacement and prolonged exposure to dangerous situations (e.g. sieges) exacerbated psychological traumas and depleted the population's ability to cope with stress.

The psychological status of people living at the shelter is pretty bad. I can help those who come to me (. . .). I have 7–8 cases at
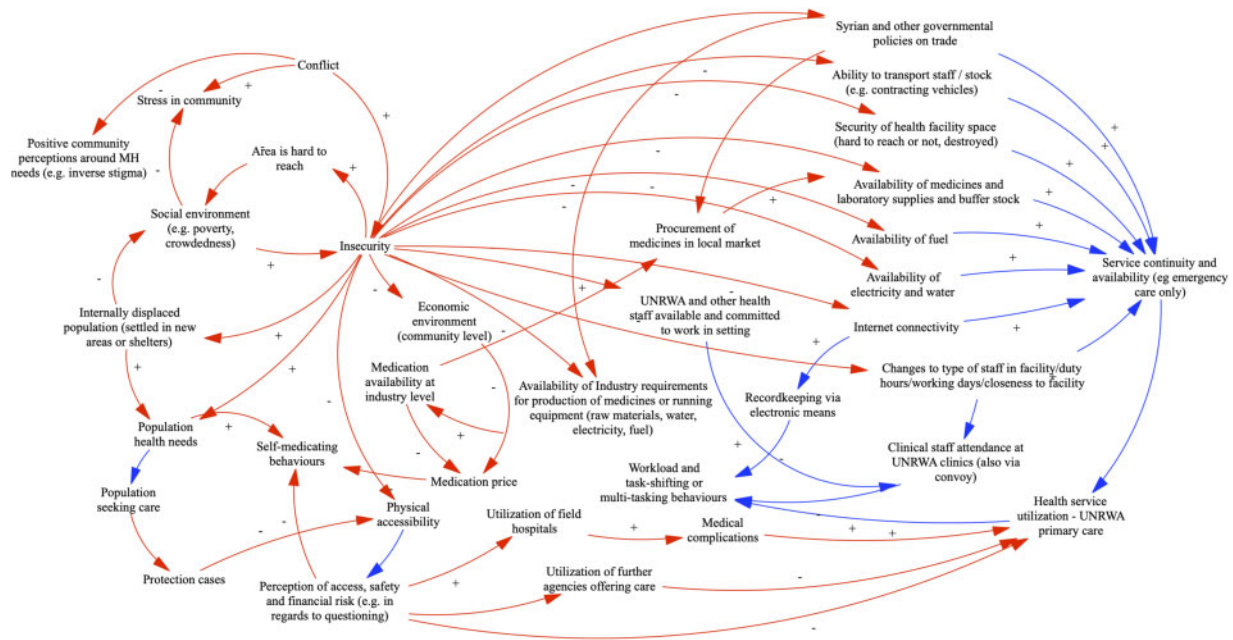
Figure 1 UNRWA Syria systems model showing key pathways of threat arising due the ongoing conflict. Red arrows represent pathways of threat affecting service delivery. Blue arrows represent the usual pathways of action between system components (Refer to the online colored version).

the shelter with various conditions such as: depression, obsessive disorders etc. and they are getting their treatments (Physician).

As insecurity increased, the availability of health services decreased as some clinics were destroyed. For remaining facilities, physical access barriers to health services increased. UNRWA was permitted to work only in government-controlled areas. Government bans to enter camps such as Yarmouk, Qabr Esset, Khan Eshieh, Sbeineh, Husseiniyeh, Dera'a, Latakia and Ein ElTal left created many hard-to-reach areas in Syria. Given severe access barriers, communities increasingly relied on self-medicating behaviours and treatment in field hospitals (informal 'treatment' centres staffed by non-medical personnel). Such practices often resulted in health complications, treatment of which incurred an extra burden on the UNRWA health system.

Secondly, overcrowding in temporary shelters (indicated in an upper lower left of Figure 1) increased. Such overcrowding is known to increase the risk of disease outbreaks and exacerbate population health needs (Connolly *et al.*, 2004).

Interviewees and GMB discussions also highlighted the lack of safe water in shelters.

The water that's being bought for use at the shelter affects the gastrointestinal health because most likely it's not clean water (…) it's a permanent problem because as I told you, there isn't any water supply in Aleppo. Water is supplied every four days and its source is unknown (Physician).

Crowded living conditions additionally give rise to community stress. In addition to potentially losing their home and loved ones, communities also had to cope with sharing limited space and resources.

For those living outside shelters, conditions also dramatically deteriorated as they faced inflated living costs.

The people who are able to live outside the shelters aren't any well-off more than those living inside the shelters (…). Those living outside the shelters need to pay rental fees and the weekly bills for electricity and 2000 Liters of water supply a minimum of 2000 SR and 3000 SR, respectively (Pharmacist).

The conflict also had unanticipated positive impacts on communities. Community perceptions and attitudes towards persons experiencing mental ill-health were reported to have become more positive given the rising prevalence of such conditions (see Figure 1).

Health system challenges
The conflict primarily impacted the health system by compromising its ability to maintain system hardware—i.e. health facilities and associated supplies (e.g. medicines, fuel, water, etc.) and software—i.e. the ability to ensure staff are present and committed to service delivery (represented in the upper right of Figure 1). We distinguish three primary threats to health system functioning.

First, the conflict compromised existing health infrastructure and restricted the availability of medicines and medical supplies, thus disrupting service continuity and availability.

From March-May 2014, the lab and the dentistry were interrupted (…) when people came for vaccination, we told them we don't have. Because there's no power supply, we didn't used to bring vaccines (Clerk).

Interview data suggested that when such amenities were scarce, the quality of services was often compromised and delays ensued.

We don't have electricity at the moment, no fuel oil for the generators and no proper heating at the Facility. Sometimes, we're using the flash light of our mobiles to see. As a clerk, sometimes, I'm doing mistakes when writing the card numbers because I can't see well. I think the most important thing is to provide these logistics. They are the basis of all operations (Clerk).

Service continuity was also affected by the governmental policies that were put in place during the years of the conflict. Amenities such as laboratory consumables, medications and diesel oil required governmental approvals, which were often time-consuming to secure.

We need to get permissions from the government and check whether the area is safe or not. We're facing difficulties in

transporting medications to the clinics because it requires the same permissions. Also, other utilities that help in the daily functioning of the clinic such as diesel oil, stationary etc. All these require permissions to be delivered. This is a timely procedure and many clinics were affected by this new routine (UNRWA Official).

Second, the conflict resulted in dramatic changes of health service utilization. The population's perception of access, safety and financial risk—as well as the increased prevalence of injuries and communicable diseases (among others)—meant that health needs increased but access to care to health facilities was severely impeded. Evidence suggests that insecurity around UNRWA's health centres suppressed utilization of services, as patients were afraid to travel to health facilities; patients relied on self-treatment in such circumstances.

When bombs were all over (next to the clinic), patients wouldn't risk their lives to come to the clinic. During that time, the number of patients would be around 50–60 patients a day (vs. 120–130 a day) (Area Health Officer).

Several interviewees noted that when access to primary healthcare facilities was compromised, PRS prioritized curative over preventive treatments (e.g. vaccination).

[During conflict] people couldn't arrive here to receive their medications or vaccinate their children. (…) when some regions were controlled by militias, they (patients) stopped coming here because the roads were blocked (Assistant Pharmacist).

In contrast, interviews with personnel in health centres located in areas experiencing fewer war hostilities suggested a general increase in patient attendance as refugees migrated to those areas.

Because people were displaced and many clinics closed, the numbers increased in other areas. For instance, over here the clinic is accommodating a huge number of patients that would normally be distributed among other health centers. So we have patients that got displaced from Al-Yarmouk, Khan sheih, Sbeineh, and Douma. They mostly come to this clinic because it's safe at the city center (Nurse).

Both GMB participants and interviewees reported that the conflict added more pressure on the system as the number of refugees reliant on UNRWA services increased.

In 2012, we started noticing an increase in the numbers of patients (…) Many were displaced, others quit their jobs etc. Also, because of the economic inflation, many weren't able to pay for the hospitals or to buy medications on their own. Before the crisis, very few used to come to UNRWA because they can't afford to pay. With the crisis, it became common (Management staff).

By 2015, the number of PRS registered with UNRWA was 604 689, an increase of 34% compared with the year 2007 (unpublished information provided by UNRWA-Syria). UNRWA records show also that PRS accessing UNRWA healthcare services increased by 17% from 2009 to 2014.

Third, the conflict and the resulting insecurity also severely compromised staff capacity. The war has claimed the lives of at least 20 agency staff members, and left many with life-altering injuries; an additional 26 staff are missing, kidnapped or detained (UNRWA, 2017a). For remaining staff, their ability to cope and deliver services is impeded by psychological distress and exposure to violence and adversities at work and on their way to work.

A lot of times, we are faced with aggressive patients. Currently, many of them threaten us with weapons, knowing that many people carry weapons nowadays. It happens sometimes once or twice a day (Nurse).

You have to bear in mind that even if one tries to separate the psychological aspect from the tasks it's hard to do so 100%. For me, my psychological status affected my work (…) in certain days, I try to avoid working or I would take a day-off because I don't want to harm the quality of my work (Dentist).

With staff capacity reduced, those remaining were then faced with offering services to an increased number of refugees (the lower right of Figure 1 maps the consequences of this trend). Staff capacity was also compromised in cases when staff felt under-appreciated whether due to failure of verbal recognition, unequal distribution of workload or lack of appropriate financial compensation.

What mattered was that the administration didn't even thank the staff who worked during emergency situations. We know that it's our duty to come to work but again the staff who worked during emergencies should have worked in a rotation and this also didn't happen. Imagine a physician working during shelling. Normally and as per the UNRWA rules, one should stay at home. Instead, we came to work but there was no word of appreciation. We criticized this matter (Pharmacist).

Resilience capabilities

Figure 2 not only retains the primary threat pathways identified in the previous sections but also adds the mitigation strategies deployed by UNRWA in Syria. We list the principal resilience strategies deployed by UNRWA-Syria with reference to the conceptual framing of absorption, adaptation and transformation (Blanchet et al., 2017). Funds needed for the implementation of mitigation strategies were raised through emergency appeals and utilized according to local priorities by field and area office decision-makers (e.g. to procure medicine, generators, fuel, etc.).

Absorption: coping with increased utilization of services at open clinics

Absorption is defined as a system's ability to respond to population needs using available human resources and organizational processes (Alameddine et al., 2019). Two system behaviours, in particular, reflected UNRWA's absorptive capability.

First, at primary care level, staff covered for each other when needed (i.e. via multi-tasking and task-shifting behaviours) to ensure service delivery; such behaviours assisted in managing high workloads during peak utilization.

We didn't have enough staff, yet all the remaining staff were very cooperative with each other. For instance, you would find me working at NCD, maternal and child care and dentistry at the same time. Same thing applies to the midwife whereby she would multitask at NCD station, dentistry etc. We were able to cover for the lack in human resources (Nurse).

Second, the Security and Safety Division (SSD) within UNRWA, which operates in accordance with the United Nations Department for Safety and Security (UNDSS), was successful in communicating potential threats for staff, thus ensuring both staff and patient safety (UNRWA, 2016).

Many times the Security and Safety Division would circulate memos stating that it's unsafe for people to leave their homes for a day or more because of bombings or other security reasons. We, then, would circulate the safety instructions to our
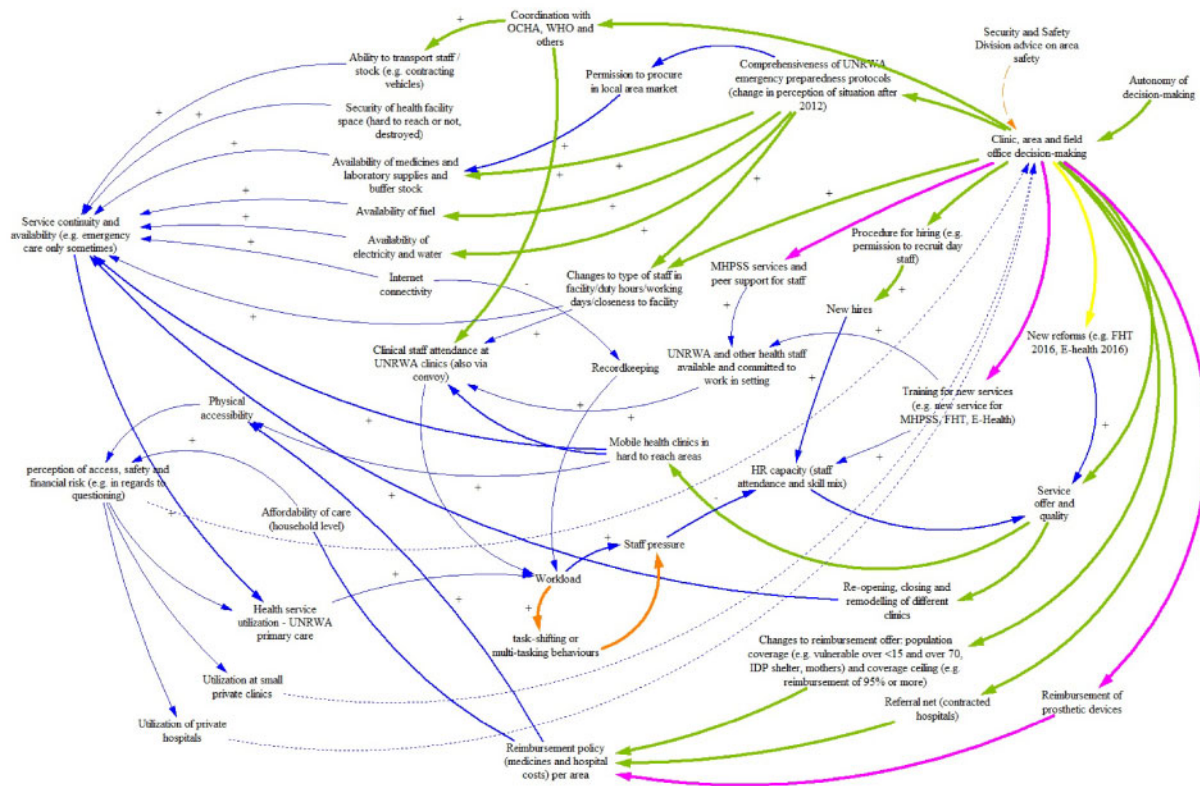
Figure 2 Mitigating strategies deployed by UNRWA Syria in response to challenges. Orange lines represent strategies driven by the system's absorptive capacity; green lines represent strategies driven by the system's adaptive capacity; and pink lines represent strategies driven by the system's transformative capacity. The yellow line depicts the health reforms that were pre-planned before the conflict arose. Dotted lines refer to information flows (with no associated valence). MHPSS, Mental Health and Psychosocial support; FHT, Family Health Team; OCHA, United Nations Office for the Coordination of Humanitarian Affairs; WHO, World Health Organization; HR, Human Resource (Refer to the online colored version).

employees and inform the refugees that it's unsafe to come to our clinics. Thank God, the coordination was excellent between us, the refugees and the Safety and Security Department (Area Health Officer).

Adaptation: adjusting the system's resources to maintain service provision

Adaptation is defined by a system's ability to adjust how its resources operate without changing system structures (Alameddine *et al.*, 2019). We identified three adaptive system behaviours in this context.

First, the revision of emergency preparedness in 2012 (depicted in the upper right of Figure 2) helped secure supplies and mitigate the impact on hard-to-reach areas. For instance, emergency preparedness measures relating to medication availability were insufficient prior to the crisis. Contingency medicine stocks (sometimes double the usual amount disbursed) were put in place in different areas to prevent stock rupture in case of critical situations.

We used to provide medications enough for 3 months whereas during the conflict, we started providing medications enough for 6 months. Half the amount for emergency use and the other half for regular use. The emergency stock is always kept on the side in order to secure the needed amounts in case roads between Aleppo and Damascus were blocked or in case medications couldn't be delivered or purchased for any reason (Area Health Officer).

In response to scarcity in power supply, fuel and water supply, UNRWA responded by digging wells and by renting generators along with their diesel fuel supply for use at the shelters and the health centres.

Second, enhancing existing collaborations was another source of adaptation (reflected in upper section of Figure 2). During GMB discussions, participants noted extending existing UNRWA collaboration mechanisms with governmental, local and international partners.

Such partnership within the UN Health Cluster, which in turn co-ordinated with the Syria government, was helpful in maintaining services in hard-to-reach areas. Throughout the crisis, UNRWA-Syria co-ordinated with the Syria Government only (as opposed to other warring parties) to mobilize medicine, provide health services, humanitarian aid, etc. across the country.

When vaccinations couldn't arrive from the Field Office in Damascus, we started getting vaccines from the Ministry of Health (...) the availability of vaccines and the cooperation between us and the governor of Aleppo was a very strong aspect about our service (Area Health Officer).

Later in the crisis, co-ordination with the government to speed up the process of releasing medicine stock from the port also proved beneficial.

Third, UNRWA altered its service network (mapped in the lower right of Figure 2) in order to serve PRS who have been internally displaced and to compensate for the inactivity of UNRWA health centres located at opposition-controlled areas, such as at Yarmouk camp. It opened mobile clinics and health points in hard-to-reach areas or those areas with significant populations of displaced refugees. In total, UNRWA opened 11 health points throughout the country (UNRWA, 2013).

Those who were displaced from Ein-Eltal (Aleppo) had their own health point established for them immediately so the service they used to get previously became available for them and closer in proximity than before; the physician is technically with them in the same building (UNRWA Official).

Access to hotspot locations was delivered through inter-agency convoy missions that were carried out according to strict security processes set by the SSD at UNRWA which liaised with the Syria government.

Recognizing the need for further referrals and better reimbursement coverage, the referral network was expanded to 27 hospitals across the country (compared with 10 hospitals pre-conflict; UNRWA, 2017a) and UNRWA revised its reimbursement coverage ceiling moving from 75% reimbursement of secondary and tertiary healthcare to 95%.

Transformation: creating new services and systems of operation that did not exist prior to the shock

UNRWA's reflection on current conditions and effectiveness of response to patient and staff needs was a foundation for demonstrating transformative capacity: when needed, the system was able to change its structure and add and maintain new services (reflected in the purple pathways in the upper right of Figure 2).

As the conflict progressed, UNRWA sought to mitigate one of the worst impacts of the war—increased mental health conditions and psychosocial distress—by introducing new services such as Mental Health and Psychosocial Support (MHPSS) to patients and the staff alike in 2016 (UNRWA, 2017a).

Of course, new things were put in place. We were trained on psychosocial support after the crisis (…) specifically on psychological gaps (…) even now, we have psychosocial support staff on board with us at the clinic. That made us capable of offering help to those with psychological conditions. You know, in such a crisis, it's pretty normal to receive such cases. That knowledge was something that we gained during the crisis. Before, I didn't have to deal with such cases but now, since they're becoming common, we got trained to deal with such patients (Senior Medical Officer).

Another example of UNRWA's deployment of transformative capacity was its expansion of reimbursement to include prosthetic devices needed, as of November 2014, to support patients suffering from war-related injuries (UNRWA, 2015a).

Features of UNRWA's health system which enabled resilience

Decisions at UNRWA are normally taken at the Headquarter Office in Jordan; however, in the context of a conflict, field offices are typically given substantial discretion for decision-making. GMB participants confirmed that communication with UNRWA headquarters was severely disrupted due to the direct damage that was inflicted on phone lines and wireless towers; operational decisions relating to health services and their organization were, therefore, devolved to UNRWA field office levels. In turn, the field office also allowed for flexible decision-making at clinic or area levels, when areas became inaccessible due to the conflict (e.g. local procurement of medicines).

Figure 3 shows three 'balancing loops' which serve to restore functioning towards previous levels. All loops were mediated by 'decision-making', underlining its crucial role in enhancing

service utilization (*balancing loop B1*), staff attendance (*balancing loop B2*) and service accessibility (*balancing loop B3*).

Regarding B1, we note that as service utilization increased, exacerbating staff pressure, the area, clinic and field level responded by increasing staff capacity, both through hiring new staff and providing training sessions to available staff at the health centres. Although hiring was reported to be challenging in Syria due to lack of health workers in the job market, the prompt decisions taken at the Syria Field Office informed a new hiring procedure that permitted recruiting daily *per diem* staff. Upon increasing staff capacity, service offer and quality increased, allocation of staff to new health centres and deploying staff to hard-to-reach areas remained possible thus, maintaining service utilization.

Regarding human resources, many of employees travelled outside country or retired and this led to a huge decrease in the number of available staff. At that time, they were replaced by temporary staff (casual posts) up until the beginning of 2017 where they got appointed as permanent staff (Lab Technician).

Regarding loop B2, with the majority of staff being Palestinians, a strong sense of identification with communities was a key dynamic in service provision and continuity throughout the Syria crisis (Alameddine *et al.*, 2019). Combined with organizational flexibility, this was a key driver of resilience. For example, the Syria Field Office reduced clinic and staff duty hours and working days to ensure staff could safely reach their place of work. New operating hours became aligned to times when patients were likely to access the clinic, taking into consideration the severity of the conflict at a certain time. Health staff were given the freedom to report to work at clinics that were closest to their place of residence. Further, when insecurity peaked, UNRWA managed to operate with minimal staff numbers.

At some point in time, when bombings were taking place around the health centers, we decreased the number of staff at the clinics. We created 'emergency groups' that include the minimum number of staff that's capable of providing an acceptable service to the refugees (Area Health Officer).

The support given to UNRWA's staff went beyond seeking to protect their lives to include services that addressed their psychological well-being.

I requested to meet with a therapist because I needed to talk (…) at the end, our psychological state was negatively affected by the crisis so I think, it's a good thing to have such a service (Dentist).

The third balancing loop, B3, was also driven by field office decision-making. Although it is normally contrary to UNRWA Headquarters' policy to reimburse for treatments that take place outside its referral network, in Syria UNRWA flexed procedures to evaluate reimbursement claims for procedures that took place at non-contracted hospitals. This decision by the field office both improved physical accessibility to healthcare and also increased affordability of health services at the household level.

Normally, there are certain things that we don't reimburse but, because of the crisis or because sometimes the patient wasn't able to reach a hospital we contracted with, we still reimburse patients. Although normally, this is against our policy. We evaluate the cases case by case (UNRWA Official).

Therefore, operational decisions on mobilizing and deploying resources within Syria were to a great extent left to the discretion of the Syria Office. However, this devolved decision-making was
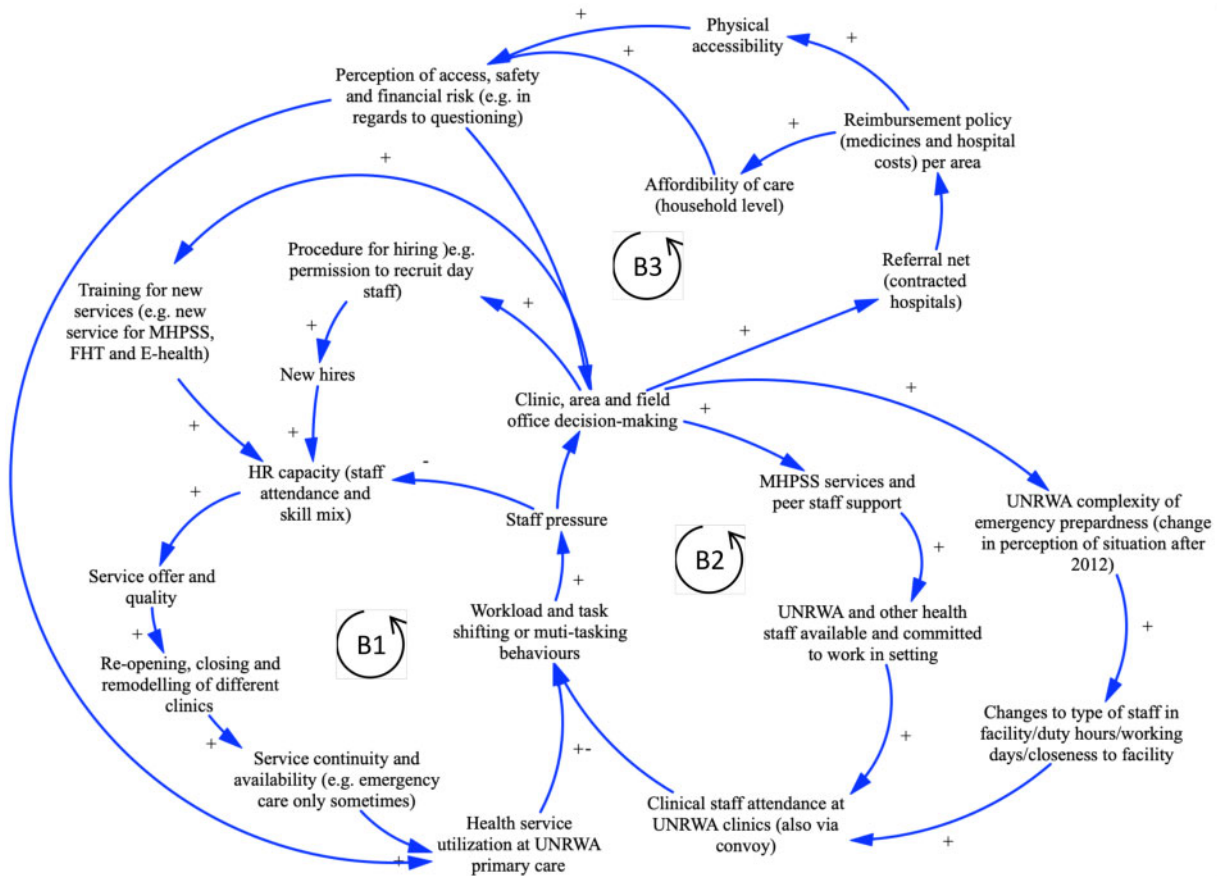
Figure 3 Causal Loop Diagram depicting the influence of clinic, area and field office decision-making.

facilitated with strong support from UNRWA headquarters (e.g. resources deployed in Syria were covered by emergency appeals raised by Headquarters).

Discussion

This study presents the first analysis of the resilience of UNRWA health systems during the Syria crisis. Although key threats to individuals and communities are noted, the core focus challenges to the health system and the absorptive, adaptive and transformative strategies deployed to mitigate these. The study makes innovative use of systems dynamic modelling to identify factors that served to support or block resilience strategies across the health system, highlighting balancing loops which served to stabilize the system in response to shocks. It adds to the very limited literature to date that empirically examines resilience strategies and capacities in health systems and organizations [studies by Ager *et al.* (2015b) in the context of Boko Haram insurgency in northern Nigeria and Gilson *et al.* (2017) regarding 'everyday' resilience demonstrated in African District Health Management Teams being exemplars of emerging approaches]. In a subsequent work, we aim to explore further the potential for modelling to incorporate quantitative data to elaborate on the analysis of resilience presented in this article (Ager *et al.*, 2018).

The shock to the UNRWA health system in Syria was substantial. At the time when individual and community needs were significantly escalating, the UNRWA health system suffered from restricted availability of human resources, supplies and functional infrastructure. UNRWA had contingency and emergency preparedness plans in place prior to the crisis, e.g. to ensure medicine supplies were available in case of stock-outs. However, participants noted that given the scale of the emergency—particularly the destruction of Yarmouk—emergency plans needed major revision (e.g. re-establishing supply of medicines and securing higher buffer stocks). The nature, magnitude, duration and outcomes of conflict pushed UNRWA health programmes out of established patterns of response into innovation.

Decentralized operational decision-making, e.g. was utilized during crisis, as a necessary deviation from the relative rigidity and abidance to standard procedure to ensure service continuity. Other adaptive procedures, such as digging wells and renting generators along with their diesel fuel supply, involved approaches well beyond the parameters of existing contingency planning and represented innovation in the face of acute delivery challenges. Flexibility and adaptation became an existential requirement; without this, services could not have been sustained.

The agency moving from centralized decision-making to a more decentralized model and suspending a hiring freeze to establish more flexible approach to secure its workforce are two prominent exemplars of the strategies adopted.

Several lessons can be drawn from UNRWA's experience in Syria. First, shifting decision-making power from a central decision-making node to operating managers at the area, clinic and/or field office level appeared to be a key facilitator for resilience. Evidence from other studies suggests that, in regards to human resource management, decentralization of decision-making to health managers

improves work performance (Alonso-Garbayo *et al.*, 2017) and can further contribute to the resilience of a health system (Mckenzie *et al.*, 2016; Witter *et al.*, 2017).

Second, empowering staff bolsters their sense of motivation and commitment and supports service delivery when a system's resources become severely constrained. Staff engagement is a powerful resource for organizations facing any type of crisis (Saji, 2014). Findings from interviews and GMB discussions showed that having Palestinian staff on duty created a commonality of purpose with the organization and enhanced the staff's commitment to serve fellow refugees. Providing psychological support to employees and changing models of working (e.g. by allowing staff to work close to home) documented how UNRWA sought to address the well-being of its staff.

Third, we highlight UNRWA's capacity to learn from previous exposure to conflict and resulting emergency preparedness protocols as an enabler of resilience. Two facets are relevant to this: creating buffer stocks of key physical resources and deploying these flexibly, and effective communication both internally in UNRWA and with external partners. Previous research emphasized the importance of resource availability as a strong enabler in organizational resilience (Lembani *et al.*, 2015). When displacement took place and upon the destruction of UNRWA's health centres, UNRWA mobilized its resources by opening 15 health points at temporary shelters, establishing a mobile clinic in hard-to-reach areas, and deploying emergency health teams to areas of active conflict. All of these served to prevent undue service disruption during the crisis. The resources deployed in Syria during the crisis were covered by emergency appeals and were not at the cost of other field offices or activities.

Similarly, research shows information flow enables timely and adequate adaptation to challenges (Ager *et al.*, 2015b; Lapão *et al.*, 2015). UNRWA's liaison with governmental entities, international partners and across the UNRWA-Syria network assisted in the mobilization of resources (e.g. medicine stocks between health centres and in hard-to-reach areas) that are crucial for emergency response.

The history, mandate and culture of UNWRA are likely part of the explanation for the resilience capacities documented here. The agency has been functioning in an environment of chronic uncertainty for about 70 years (UNRWA, 2015b), which may have enabled it to considerably hone its crisis-response strategies. Although UNRWA-Syria represents a field office accustomed to relatively stable operations, response to events such as the destruction of Al-Yarmouk and the associated displacement of PRS could draw upon absorptive, adaptive and transformative capacities demanded in response to previous crises in Gaza, the West Bank and Lebanon. More proximally, the implementation of healthcare reforms across the five fields of UNRWA operations coincided with the Syria crisis. Reforms such as the E-Health system (a bespoke computerized medical records and appointment system) had a modest impact on supporting resilience in Syria as the implementation itself was difficult due to lack of basic amenities. Nonetheless, reforms as well as transformative strategies (e.g. reimbursement policies) became permanent changes unlike adaptive responses (such as opening of shelters) which are typically withdrawn depending on current stressors.

Finally, in terms of work culture, the fact that most of the agency's management and provider staff are refugees themselves creates a very particular sense of community solidarity which potentially serves to mitigate some of the extreme pressures faced during crises. Despite this exceptional context of UNRWA health provision, documenting the role of absorptive, adaptive and

transformative capacities enabling resilience is of clear relevance for health systems operating in other fragile settings.

Conclusion

We used participatory methods, including causal loop modelling, to understand a question of widespread policy relevance: how can complex health systems cope with shocks and continue to function? The UNWRA case study in Syria highlights important lessons for other systems—not just in demonstrating some practical strategies to absorb, adjust to and transform in relation to shocks but also revealing important leverage points and factors that allow these strategies to be pursued. Factors such as staff commitment, organizational flexibility and collaboration and communication mechanisms were identified as key resources in maintaining service continuity. These in turn were supported by an organizational culture committed to staff and to the community served. Although the unique structure and mandate of UNWRA and its experience of managing chronic clearly shaped its approach to the crisis, wider lessons on resilience capacities and the ability of complex systems to absorb, adapt and transform are of clear relevance to other health systems globally.

Supplementary data

Supplementary data are available at *Health Policy and Planning* online.

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