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Impact of armed conflict on health professionals' education and training in Syria: a systematic review

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ABSTRACT

Objectives To provide an overview of the holistic impact of the armed conflict on medical education and health professionals' training (MEHPT) in Syria.

Setting Syria is a country which underwent an armed conflict for 10 years and suffered from the weaponisation of health.

Methods A mixed-methods systematic review including quantitative, qualitative, mixed-methods and textual literature between 2011 and 2021 including papers on the Syrian MEHPT undergraduate and postgraduate education and training personnel (including medicine, dentistry, pharmacy, nursing, midwifery and allied health professionals). The electronic search was conducted in October 2018 in Embase, Global Health, Medline, PsycINFO, Web of Science, PubMed, Scopus, CINAHL and grey literature. And an update to the search was conducted in August 2021 in PubMed, Google Scholar and Trip database.

Outcomes The impact of conflict on the MEHPT system, personnel, experiences, challenges and channels of support.

Results Of the 5710 citations screened, 70 met the inclusion criteria (34 quantitative, 3 qualitative, 1 mixed-method, and 32 reports and opinion papers). The two major cross-cutting themes were attacks on MEHPT and innovations (present in 41% and 44% of the papers, respectively), followed by challenges facing the MEHPT sector and attitudes and knowledge of trainees and students, and lastly health system and policy issues, and narrating experiences.

Conclusion Conflict in Syria has politicised all aspects of MEHPT. Influenced by political control, the MEHPT system has been divided into two distinguished geopolitical contexts; government-controlled areas (GCAs) and non-GCAs (NGCAs), each having its characteristics and level of war impact. International and regional academic institutes collaboration and coordination efforts are needed to formulate educational platforms using innovative approaches (such as online/blended/store-and-forward/peer-training/online tutoring) to strengthen and build the capacity of the health workforce in conflict-affected areas.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Rigorous methodology with systematic search, context-specific selection criteria, and inclusion of grey literature, search update and manual search.
⇒ Potential for missed sources despite efforts to minimise selection bias.
⇒ Limited availability of high-quality studies on medical education in conflict settings.
⇒ Mainly conceptual findings highlight the need for further research in the field.

INTRODUCTION

The Syrian armed conflict has tragically passed its 10th anniversary leaving a devastated health system,[1] with negative ramifications on the medical education and health professionals' training (MEHPT) sector. Healthcare workers (HCWs) have been targeted as part of a strategy to deprive civilians of health and social services.[2] Since March 2011, Physicians for Human Rights has recorded 599 attacks on at least 350 separate facilities and documented the killing of 930 health personnel. The highest percentage killed were doctors (31%), followed by nurses (23%) and paramedics (23%).[3] Half of the 31 000 physicians in Syria have been displaced and by 2013, 70% of the health workforce had left the country, with hundreds more incarcerated or tortured.[3] Both the destruction of the health infrastructure and targeting of HCWs have led to a severe public health crisis, majorly affecting MEHPT.[4 5]

Health systems in Syria have been divided into areas controlled by the Syrian government (Government-controlled areas, GCA) and areas outside the control of the government in north-west (NW) and northeast (NE) Syria (non-GCAs, NGCAs).[4] These areas differ immensely in terms of capacity for service delivery and the number of trained staff.[2] However, little is known about the holistic situation of MEHPT during the Syrian conflict, specifically in the NE and NW areas where the main impact of armed conflict has been most acute. A recent scoping review published in The Lancet—the American University of Beirut Commission on Syria on HCWs in the

Arab Spring identified only 14 papers discussing MEHPT in all Arab Spring countries during the conflict: Bahrain, Egypt, Iraq, Libya, Syria, Tunisia and Yemen. The scoping review flagged a major gap in MEHPT literature in Syria specifically compared with the substantial literature on violence, Syrian refugees and migration.[6]

This study aims to provide a collective insight into the impact the conflict has had on Syria's MEHPT sector, including quantitative, qualitative and mixed-methods literature and draw out implications for practice, research and policy. Therefore, a mixed-methods systematic review methodology has been used to bring together the existing literature.[7 8]

METHODS

In this systematic review, we followed the Joanna Briggs Institute reviewers' manual 2017.[8]

Inclusion criteria

Types of papers: We included quantitative, qualitative, mixed-methods and textual literature.

Types of participants: We considered papers that included the following HCWs: doctors, midwives, nurses, dentists, pharmacists, physiotherapists, paramedics, other emergency response personnel, allied health technicians, medical and allied health students, public health professionals, following the definition of medical personnel, as an equivalent term under International Humanitarian Law. In addition to teaching and academic staff, patients, and local and international non-governmental organisations (NGOs) were also included.

Types of outcome measures

The major outcomes of interest were location and distribution, quality, quantity, curriculum, resources, experiences, innovations and creativity, security and conditions under which education and training activities are delivered.

Secondary outcomes included admission, assessment, support channels, research and training opportunities, attitudes, and self-image (the idea one has of one's abilities, appearance and personality).

There were no limits on location or language; however, to be included in the review, the papers had to have the data collected in or after 2011 because this is the start year of the conflict.

Exclusion criteria

We excluded literature that did not discuss the Syrian conflict specifically or the Syrian MEHPT sector as an impacted population in conflict, including articles that exclusively focused on refugees or the political, security, economic or conflict-related impact of the Syrian crisis with no discussion of MEHPT -related issues.

Search method

An electronic, desktop search was conducted in October 2018 in the following databases: Embase, Global Health, Medline, PsycINFO, Web of Science, PubMed, Scopus and CINAHL. The search strategy terms used, and the exact date of searches are available in (online supplemental table 1). We also subsearched the Lancet commission's library on Syria, in addition to contacting expert authors from the Lancet AUB commission on Syria for unpublished ongoing work such as conference proceedings, thesis and dissertations, and Arabic-language literature. A full search of the databases and grey literature was not feasible to be achieved in 2021 at the end of the writing stage of the study, therefore, the authors conducted a brief update to the search in August 2021

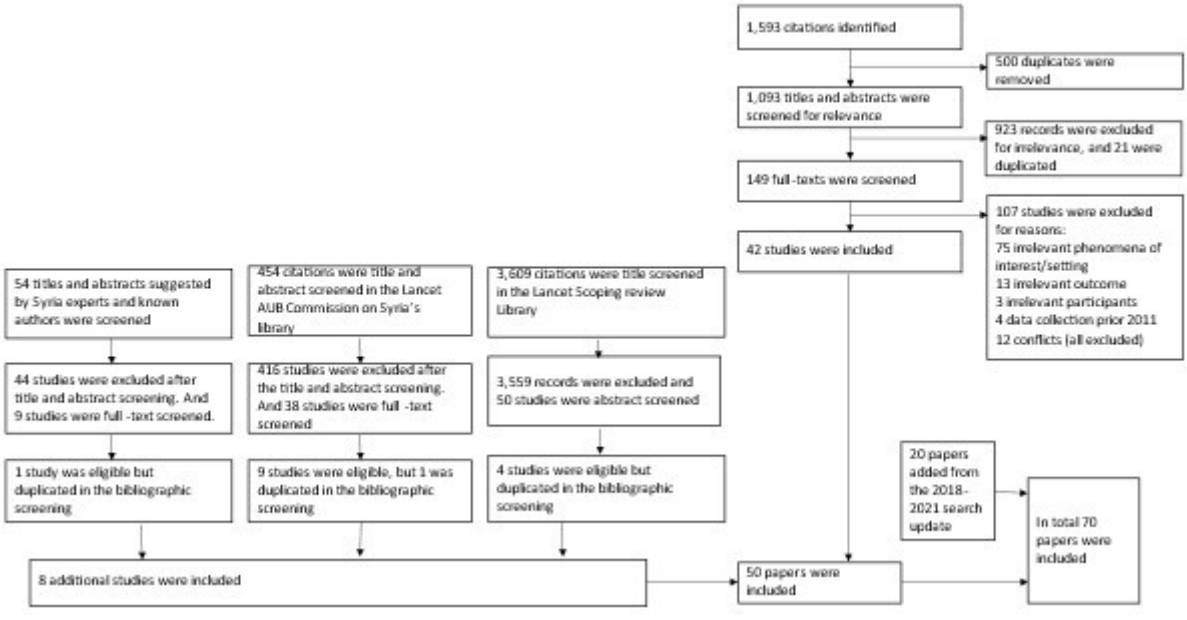

Figure 1 PRISMA flow chart.

targeting three main databases (PubMed, Google Scholar and Trip database) which represented the main targets for new publications in this field to examine whether any new publications may change the findings derived from the original search.

Data collection and analysis: Two reviewers (YB and AS) independently performed the screening, data extraction and methodology assessment, with calibration exercises conducted in each stage and a third reviewer (MG) opinion was involved to resolve any uncertainties. A data extraction form which borrowed some elements from the Lancet Scoping review data abstraction form was used. We assessed all included papers for methodological validity using multiple standardised critical appraisal instruments including (JBI-QARI),[7] (AXIS tool),[9] the Critical Appraisal Skills Programme tool,[10 11] and the Mixed Methods Appraisal Tool.[12]

Data synthesis

Quantitative, qualitative, mixed-methods and textual evidence were integrated and synthesised using configurative analysis according to the JBI methodology for mixed-methods systematic reviews. Where configuration was not possible the findings were presented in a narrative form.

Patient and public involvement statement

This review was conducted as part of a body of work on MEHPT in the R4HSSS project which will be published in separate manuscripts. This work has been informed by a (working group) which was established to include stakeholders representing NGOs, academic bodies, governmental bodies and individuals working on MEHPT in Syria. The members of the working group actively provided input on the design of the review and reviewed the outcomes of the review for relativeness and reflexivity.

RESULTS

The combined number of hits resulting from the bibliographic database searches (completed in October 2018) yielded 1593 search hits. The Lancet Scoping review library on Syria's HCWs (subscreened in January 2019) included 3609 titles. The Lancet AUB Commission on Syria's library (subscreened in January 2019) included 454 titles, and the suggested studies by Syria experts and known authors were 54 titles (figure 1).[13] The updated search (completed in August 2021) yielded 20 additional papers. In total, we included 70 studies, for which we assessed quality, extracted data and included them in the synthesis. These were 34 quantitative, 3 qualitative, 1 mixed-methods, and 32 reports and opinion papers (table 1).

Bibliographic analysis

The number of publications increased gradually from 2012 (3% of the papers) to 2016 when it reached a peak

Table 1 Summarises the included papers and types of evidence and methodology

Type of evidence	Methodology	Papers
34 papers Quantitative (48.5%)	3 Reviews	Fouad 2017,[1] Bou-Karroum 2019,[6] and Bdaiwi 2020[30]
	3 RCTs, 1 trial	Abbas 2018,[52] Alsaid 2016,[43] Alsaid 2016,[69] Alsaid 2020[44]
	14 cross-sectional,	Sayed-Hassan 2012,[47] Sawaf 2018,[57] Mashlah 2012,[70] Al Saadi 2017,[71] Mowafi 2016,[72] Alsaied - 2017,[31] Asaad 2020,[73] Alsuliman 2019,[45] Alhaffar 2019,[74] Alhaffar 2020,[75] Mohamad 2021,[76] Aljarad 2021,[77] Latifeh 2021,[40] Alchallah 2020[78]
	3 Un-controlled Before-After Study	Sabouni 2017,[36] Sabouni 2017,[37] Othman 2018[32]
	1 cohort	Alhalabi 2021[79]
	9 Case reports	Alahdab 2017,[38] Jefee-Bahloul 2016,[14] Masrani 2018,[64] Moughrabieh 2016,[15] IFMSA 2018,[26] Hasanin 2013,[29] Dashash 2016,[80] Kouba 2019,[81] Al-Hadidi 2019[82]
3 Qualitative papers (0.04%)	2 semi-structured interview studies	Bashour 2012,[48] Fardousi 2019[83]
	1 life story	Fakhouri 2017[16]
1 Mixed-methods paper (0.01%)	Cross-sectional questionnaires	Joury 2016[39]
32 Textual papers (45.7%)	Reports and opinion papers	Joury 2014,[84] Sahloul 2016,[85] Cousins 2014,[17] Alahdab 2014,[18] Al Saadi 2018,[27] Alahdab 2017,[38] Arabi 2017,[19] Abbara 2015,[58] Abbara 2015,[20] HeRAMS 2017,[86] Vogel, 2016,[87], Gulland 2013,[21] Heisler 2015,[22] Cousins 2015,[5] Sibbald 2013,[88] Francis 2016,[23] Turk 2016,[28] SAMS 2019,[33] SAMS 2015,[33] Taub 2016,[24] Erickson 2017,[89] Latifeh 2013,[41] Dashash 2016,[80] Lopez 2014,[90] WHO 2014,[91] Ebens 2016,[92] IMC 2017,[93] Ekzayez 2020,[34] Fares 2020,[42] Hoz 2020,[25] Ekzayez 2021,[35] Gillett 2019.[49]

(23% of the papers), to fall until 2018 (5%) and fluctuate between 2019 and 2021 (see online supplemental figures 1 and 2 for the year of publication and countries of the first authors of the included papers). First authors from Syrian universities produced nearly 40% of the papers, followed by authors from the USA and the UK (23%, 13%), however, Arabic-countries-based institutions and other countries produced only (11% and 14%) of the papers, respectively.

The geopolitical settings of the included papers varied between two main distinguished settings; the GC (40%) and NGCAs (36%)and only 24% of the papers involved both areas (the whole of Syria). Seventy per cent of the papers which involved the GCAs focused on conflict-related elements. While 100% of the papers involved the NGCAs and 100% of the papers involved the whole of Syria focused on conflict-related elements (see online supplemental figure 3 for geopolitical settings and conflict focus of the included papers).

Most of the included evidence was quantitative (48.5%) mainly including cross-sectional (20%) and case reports (13%), directly followed by textual evidence (45.7%). While qualitative and mixed-methods evidence only formed (0.05%).

The total number of participants across all included studies was 12 914 (12 144 in 21 quantitative studies, 745 in the mixed-methods study and 25 in 2 qualitative studies). The majority of the papers (45%) focused on HCWs in general including undergraduates, postgraduates and practising professionals, (27%) focused on undergraduate medical students and 5% focused on dental undergraduates (see online supplemental figure 4 for the percentages of the categories of the participants/population in the included papers).

The results of the methodological assessment are presented in online supplemental tables 2-9 with a traffic light system implemented. Most of the primary research papers (including RCTs, cohort, surveys, before-and-after studies, case studies, qualitative, and mixed methods) suffered from concerns on the methodological level which were mainly; the small sample sizes, not high representation of the population, unclear blinding, randomisation and follow-up strategies) which was anticipated given the armed conflict context and the low-resource setting. Therefore, this systematic review extracted limited findings based on this primary research data related to addressing specific subjects and scopes such as the prevalence of burn-out among HCWs, intentions to travel abroad among medical students and status of mental health. However, the secondary sources and textual papers including editorials, experts' opinions, and national and international organisation reports (which formed 45.7% of the included data) deemed to present high-quality evidence in terms of conduction and validity, therefore, these majorly aided the development of the conceptual findings of this study. Statistical pooling was only possible on the response rates of 9 of the included cross-sectional surveys. The mean response rate of the three cross-sectional surveys was (84.17%) (table 2).

Overall, there was a lack of high-quality literature, most of the literature consisted of textual and low-scale surveys, with a lack of rigorous methodology and high-scale primary research conducted. Also, a lack of representation of the target population was noted in most papers, especially with the lack or absence of involvement of the Syrian population who are based or internally displaced to the NGCAs in the literature generated from GCAs and claiming to represent the whole Syrian population.

Thematic analysis

Tmhe results of our review showed that the 10-year conflict in Syria has devastated all aspects of MEHPT but opened the doors for innovation to blossom. Influenced by geopolitical control, the MEHPT system has been divided into two distinguished geopolitical contexts; (GCAs and NGCAs), each has its characteristics and types of war impact, including positive and negative impacts (see table 3).

Table 2 Response rates in the cross-sectional surveys

Survey	Response rate	Sample size	Participants	Males	Females
Sayed-Hassan 2012[47]	100%	400	Patients	42.30%	57.70%
Sawaf 2018[57]	54%	450	Medical students	60%	40%
Mashlah 2012[70]	89.55%	408	Dental students	57%	43%
Assad 2020[73]	87%	2425	Medical students	44%	56%
Alsuliman 2019[45]	97%	1546	Medical students	49%	51%
Alhaffar 2019[74]	87.3%	3350	Resident physicians	55.9%	44.1%
Alhaffar 2020[75]	60.8%	471	Academics	58.9%	41.1%
Mohamad 2021[76]	91.92%	1226	Resident physicians	60.78%	39.22%
Alchallah 2020[78]	90%	269	Medical students	63.6%	36.4%
Response rate					
	N	Minimum	Maximum	Mean	
Response rate	9	54%	100%	84.17%	

Table 3 A narrative summary of the impacts of the conflict on MEHPT from the included evidence

The MEHPT system has been divided into two distinguished geopolitical contexts; (GCAs and NGCAs), each has its characteristics and type of war impacts, including positive (highlighted in green) and negative (highlighted in red) impacts.

Outcome	GCA	NGCAs
Attacks and security	Bombing and missiles, arresting.	Weaponisation of healthcare; facilities are attacked, workers are targeted, medical neutrality is obliterated, and international humanitarian laws are violated, to restrict or prevent access to care as a weapon of war. Reprisal, detention and torture and death of HCWs and students.
Individuals' experiences and quality of training/ education	Interrupted training. Exposure to a wide range of war-related medical conditions. Electricity and water shortage, overcrowded transportation, low quality of hands-on rotations, high-priced studying resources. A deficit in collaborative specialties and subspecialties.	Interrupted training, sieges and forced evacuations. permanent physical disabilities. pressure on junior staff to act beyond their capacities. Shortage in teaching staff. Poor HCW-to-population ratio.
Mind migration and human resources	Exodus of 70% of HCWs, poor HCW-to-population ratio, 40% of the medical students planning to study abroad.	Exodus of 70% of HCWs, poor HCW-to-population ratio.
Facilities	Five public and two private medical faculties still operating. No information on allied HCWs and postgraduate training.	Newly established medical universities; two public and three private universities. Newly established Syrian Board of Medical Specialities and allied HCWs institutes.
Providers and support channels	The Ministry of Higher Education (university/teaching hospitals)—located in four governorates (Damascus, Rural Damascus, Aleppo and Lattakia)—or the MoH (Ministry of Health). WHO support in several courses.	Newly established health directorates. Syria diaspora NGOs and international NGOs. Very limited support from international organisations and academic institutions.
Locations	The campuses were relocated temporarily to safer regions, and medical schools resumed providing the regular curricula with the same procedures as before the war.	Underground healthcare and training facilities, basements, farmhouses, deserted buildings, mosques, churches, factories and even natural caves were used as training facilities which then moved to the newly established universities and institutes.
Mental Health	High prevalence of depression, anxiety and stress was 60.6%, 35.1% and 52.6%, respectively. High levels of burn-out (93.75%) high prevalence of work-place violence.	No information is available.
Research	Scarcity of primary research, absence of funding and governmental support, lack of knowledge and skills, and personal challenges.	Scarcity of primary research, absence of funding and governmental support, lack of knowledge and skills, and personal challenges.
Innovation	Tele-raining Peer-led teaching training the trainers Students'-led initiatives Calls for community-based learning Calls for a conflict-focused curriculum Trials of bilingual teaching approaches.	The foundation of field hospitals and fortification against attacks The establishment of new universities, institutes and postgraduate training programmes. Homemade and locally manufactured training facilities and devices Task-shifting Tele-training Online teaching Store-and-forward counselling, Live online tutoring Peer teaching Training the trainers Conflict-focused curriculum and training. Equal partnerships and effective collaborations between academic institutions and humanitarian actors. Courses in supporting resilience.
Ethics	Lack of patient consent. lack of adherence to the ethical principle of autonomy and patient dignity.	Lack of ethical frames to control situations of task-shifting and acting beyond capabilities.
Challenges	Lack of governmental funding Low quality teaching and training programmes No research funding No health information and record keeping.	Lack of leadership capacities and coordination, insufficient funding, and infrastructure Lack of accreditation Politicisation Attacks on healthcare Lack of English language qualifications to benefit from international training resources.

GCA, government-controlled area; HCW, healthcare worker; MEHPT, medical education and health professionals' training; NGCA, non-GCA; NGOs, non-governmental organisations.

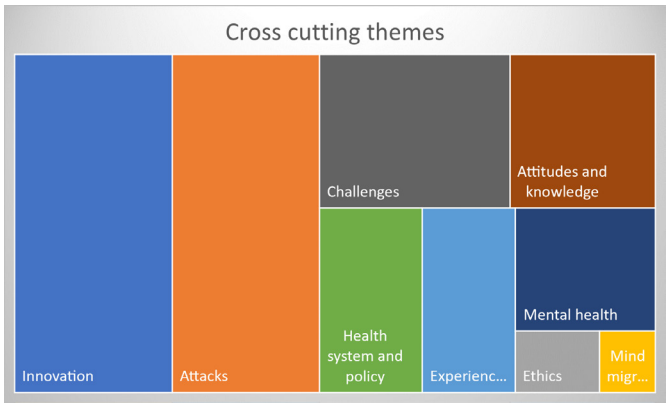

Figure 2 Cross-cutting themes in the included papers.

The two major cross-cutting themes were attacks on MEHPT and innovations (present in 41% and 44% of the papers, respectively), followed by challenges facing the MEHPT sector and attitudes and knowledge of trainees and students (24% and 19%, respectively), and lastly health system and policy issues, narrating experiences and mental health (16%, 14% and 14%, respectively). Mind migration (defined as the fleeing of both the senior and junior health experienced staff) and ethical issues were raised obviously in 7% of the papers (figure 2) (see online supplemental table 10 for a table of key definitions).

First, in terms of attacks against MEHPT as a massively devastating negative impact of the conflict, the strategy of weaponisation of healthcare and MEHPT was reported heavily in the NGCAs,[4 6 14–25] in which healthcare facilities and MEHPT campuses were attacked, workers were targeted, medical neutrality was obliterated, and international humanitarian laws were violated, to restrict or prevent access to care as a weapon of war. However, in the GCAs, the scale of attacks was limited to some bombings, missiles and arrests from within MEHPT campuses.[26–28]

Second, in terms of innovation, in the NGCAs, innovation was prominent in; the foundation of field hospitals[18 29] as campuses for health services and MEHPT, using mosques, churches and even natural caves to shield from the attacks.[1 4] One of the first examples was Al-Bab field hospital which was established 'secretly' by the medical Arab union near the Turkish border and relied heavily on the efforts of medical and relief organisations in the site of crisis and benefited from developing a convenient triaging plan and training nonmedical volunteers to do simple tasks (such as measuring vital signs, administering medications and intraoperative monitoring). With the prolonged armed conflict, the need to new universities, institutes and postgraduate training programmes emerged.[30] The newly established facilities were all focused in the NGCAs and included The Syrian Board of Medical Specialities for postgraduate medical training, three public faculties of medicine and three faculties of pharmacy at the Free Aleppo University, Idlib University and Shahba University and six healthcare institutes, three of which were still operating as of October 2019 (Termanin Institute, The Medical Sciences Academy in Qah and Idlib University Institute) covering nursing and midwifery training, and three were closed after repeated attacks (Kafr Sijneh institute, Birnas Institute and Maarat Alnuman Institute). There are also two private universities. None of thesecurrently have international recognition or accreditation for their degrees where innovative teaching and training strategies, platforms and resources were used, including homemade and locally manufactured training facilities and devices, task-shifting, teletraining, online teaching, store-and-forward counselling, live online tutoring, peer teaching, training the trainers and conflict-focused curriculum.[14 15 19 31–33] A prominent example was the Syria Tele-ICU programme which was launched in December 2012 to manage the care of ICU (Intensive Care Unit) patients by using inexpensive, off-the-shelf video cameras, free social media applications and a volunteer network of Arabic-speaking intensivists in North America and Europe. On a higher coordination level, equal partnerships and effective collaborations between academic institutions and humanitarian actors were implemented.[34 35] These innovations seemed to be majorly supported by local initiatives and Syrian diaspora NGOs, with a very scarce presence of the international society and organisations support such as the WHO and international academic institutes.

In the GCAs, innovation was a key theme which was mainly led by students and trainees. This included trialling small scale initiatives in teletraining, peer-led teaching and training the trainers, which were focused on topics such as EBM and academic writing and BLS courses[27 28 36–38] In addition to calls from the academic staff for community-based learning,[39] conflict-focused curriculum in mental health[40–42] and trials of bilingual teaching approaches in medical schools.[43–45]

Third, in terms of challenges, the conflict has created different types of challenges in the two geopolitical contexts of Syria. In the NGCAs, attacks and weaponisation of healthcare were the major challenges facing the MEHPT, in addition to challenges on three main levels: (1) Organisational (local healthcare leadership and governance, coordination and collaboration between stakeholders, competition between stakeholders and insufficient funding) (2) Programmatic (lack of accreditation or recognition of qualifications, insufficient physical space for teaching, an exodus of faculty affecting teaching and training, prioritisation of physicians over non-physicians, informally trained HCWs.) (3) Healthcare system related (politicisation of healthcare system, changing healthcare needs of the population, ongoing attacks on healthcare.)[30 46]

In the GCAs, the conflict has exaggerated the previously existing challenges, including the lack of governmental funding towards development and research, the low-quality teaching and training programmes, the absence of research funding, and the absence of health information and record keeping data, and the increased costs of learning and studying resources.[27 28 47–49]

DISCUSSION

This review highlights (1) the scarcity of evidence relating to MEHPT in Syria since 2011, (2) the role innovation and improvisation have played in addressing the resource gap related to MEHPT in this setting and (3) significant disconnect in the reality of MEHPT between GCAs and NGCAs of Syria.

First, in terms of research, though the Syrian conflict is considered by some to be the most documented conflict in recent history, there is a documented lack of good quality research evidence on population and health,[50] that we have evidenced is echoed in MEHPT. Primary studies accounted for less than half of the included evidence, mostly discussingad-hoc aspects within a number of MEHPT institutions in Syria, with limited high-quality research, and a lack of investigation of the nursing, midwifery, pharmacy and allied health professionals professional development. The predominance of reports and opinion papers likely reflects the challenges in conducting research in conflict areas,[27 28 51] in addition to the original situation of the absence of research funding by leading Syrian institutes.[52] This also indicates a significant global inattention to the field of MEHPT in Syria. The increased numbers of publications at times of war escalation and attacks and the fluctuating pattern otherwise reflect a reactive publication to violence rather than a proactive and growing research interest. The small sample sizes also reflect the lack of engagement among the academic bodies in conducting research and electronic record keeping.

It is notable that compared with peacetime, MEHPT in Syria before the conflict was not of high quality, with low-pay training incentives, expensive study resources,[53] strict University governance structures,[54] scarce research opportunities, lack of ethical practice,[55] high percentages of perceived education/training-related depression and anxiety symptoms,[56] and subsequent high rates of mind-migration of doctors and other healthcare professionals to the USA and Europe.[28 57 58] This situation has been exacerbated during the conflict in the GCAs. In NGCAs attacks against healthcare have opened the doors for establishing new health and MEHPT facilities which are documented to have improved some aspects of these challenges but still suffer from a significant proportion of similar challenges.[59]

The stagnation in MEHPT seems to be historically unique to the Syrian and current Middle Eastern conflicts, as global narratives on MEHPT show significant development of this field during and post-conflict settings. For example, in World War 2, MEHPT in the UK, USA and Vietnam war, continued at not far short of normal levels, the students were not at any educational disadvantage; indeed, in some respects, they had opportunities which were denied to their predecessors.[60–62]

Second, our review has highlighted the immense role that innovation and improvisation have played in addressing resource gaps in MEHPT in Syria during the conflict. Historically, innovations during wartime are well known to have advanced peacetime medicine.[63] MEHPT in Syria is no exception. Under immense pressure, this review has found several notable innovations which could have widespread and beyond war applications: teleclinical training and teaching have emerged as a relatively easy, fast to implement and cost-effective approach. This includes but is not limited to blended online training, tutoring, live or store-and-forward. Along with using social media platforms, both approaches have created an opportunity to bridge between the diaspora willing to share their health expertise and the learners in all regions of the country, regardless of the political control and the levels of military escalation and humanitarian setting in the areas supported.[14 15 19 64] However, these efforts still need to be formalised, developed and invested in at a larger scale nationally and internationally to meet the need. 'Accelerated medical education' is also an innovative transformation of medical education that can be potentially adapted to Syria, as are other innovations including those in the Ukraine context.[65]

Third and finally, the results of our review echoed the complex political situation on ground[66] and manifested in the division of the literature into two distinct geopolitical contexts, GCAs and NGCAs. This has greatly influenced the presentation and interpretation of the results of the review, as each context has its own characteristics in terms of the political atmosphere, level of war damage, preconflict situation and channels of support received.

It is important to note, however, that though both areas have a high level of distinction in terms of MEHPT, both suffer from a significant degree of 'politicisation': our review results confirm that academics and students regularly suffer from 'political activity and ideological commitments relative to higher education'[67] in addition to the consequences of the turbulent political circumstances.

Several studies in GCA showed what seemed to be an 'active' avoidance of mentioning conflict-related factors, such as the security situation, with around a quarter of studies not mentioning the conflict, compared with all studies in NGCAs mentioning the conflict. This perhaps reflects the significantly lower level of conflict-related damage in these regions, and possibly the existing state of political repression and fear. This is consistent with the reported arrest of medical students from the university campuses,[68] and the flight of highly qualified personnel when expressing their opposing opinions in MEHPT in GCAs.[55] In GCAs, when mentioned, conflict was mentioned as a challenging setting with limited resources, focusing mainly on the economic effects of sanctions. All the other direct effects of the conflict, such as political, societal and ethical received limited mention. Further detailed document analysis to support these findings is warranted.

Therefore, this review recommends addressing the massive need for MEHPT strengthening and capacity building, including the support of production of more rigorous and well-designed primary and process evaluation research, to map and elucidate the priority fields

of intervention and to describe the exact needs of the ground, especially in the massively affected areas within Syria. Policy-makers including international academic institutions, NGOs and actors should prioritise MEHPT in their agenda and fund and should tailor interventions to empower Syrian HCWs capacities. There is also an urgent need for dynamic and accessible psychological services to support HCWs' well-being, which should be addressed along with creating ethical frameworks to regulate the specific needs of the Syrian conflict.

Furthermore, global reforms of legal regulations and interventions to safeguard MEHPT in the ongoing Syrian conflict are needed. This should be parallel to creating enabling international organisations and academic bodies to intervene fairly to save MEHPT in Syria, as current frameworks do not allow actors to engage with non-governmental institutions, causing misdistribution of the support to the highly affected areas in Syria. International and regional academic institutes' collaboration and coordination efforts should be urged to formulate educational platforms using innovative approaches (such as online/blended/store-and-forward/ peer-training/ online tutoring) to reach all areas within Syria.

Strengths and limitations

Despite the challenging context, the review follows a rigorous methodology, including a systematic search strategy, wide study selection criteria, inclusion of grey literature and manual search. While, the personal impact of the conflict on the authors affected the time frame for completing the study, but regular engagement with the research community and literature, as well as updates to the review prior to peer review, helped mitigate the limitations. Also, while efforts were made to minimise selection bias by employing a range of keywords, wide date range, multiple databases, and multiple researchers for screening, it is possible that some sources were missed during the search process. Finally, the availability of high-quality studies specific to medical education in conflict settings may be limited, leading to generation of mainly conceptual findings, highlighting the need for further research in the field.

CONCLUSION

The major conceptual finding of this review is the politicisation of MEHPT, which was manifested in the division of the literature into two geopolitical contexts (GCAs and NGCAs), the loss of the sanctity of MEHPT, the misfunctioning of the IHL and the scarcity and poor distribution of the international support. The lack of primary research evidence on MEHPT reflected the significant global inattention to this field.

The low-quality and lack of resources situation in MEHP before the conflict was exacerbated during the conflict in the GCAs, however, the conflict has devastated the MEHPT system in all other areas, especially the NGCAs, particularly with the massive exodus of HCWs (70% of Syrian HCWs fled the country) including academic staff. The massive stagnation in MEHPT seems to be historically.

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Competing interests None declared.

Patient and public involvement This review was conducted as part of a body of work on medical education and health professionals' training MEHPT in the R4HSSS project which will be published in separate manuscripts. This work has been informed by a (working group) which was established to include stakeholders representing NGOs, academic bodies, governmental bodies and individuals working on MEHPT in Syria. The members of the working group actively provided input on the design of the review and reviewed the outcomes of the review for relativeness and reflexivity.

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