



The impact of conflict on asthma

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Asthma is a public health problem worldwide, showing high incidence, high prevalence and causing social and economic damage; this condition may be more prevalent in areas of conflict (1). The evidence on asthma in conflict affected areas and recommendations to improve asthma treatment and prevention are talked about in this editorial.

The Global Asthma Network report 2018 estimates there are 339 million asthma patients worldwide (2) a mean prevalence of 14% (3). Asthma is ranked 16th for disability adjusted life years (DALY's) of all causes. This is because asthma can lead to premature death, hospital stays, reduced productivity and quality of life (2).

Asthma is caused by swelling (inflammation) of the breathing tubes that carry air in and out of the lungs; this makes the tubes highly sensitive, so they temporarily narrow. The main symptoms of asthma are wheezing, breathlessness, a tight chest and coughing. These can temporarily worsen and cause an asthma attack. Asthma is a long-term condition and symptoms can be controlled with treatment. However, when asthma is not treated or poorly controlled this can lead to problems, such as feeling tired, stress, anxiety or depression, lung infections and delays in growth or puberty in children. Poorly controlled asthma can also lead to severe asthma attacks which can be life threatening (4).

Asthma can present more severely in some people, this can often be impacted by how well controlled it is. The WHO define severe asthma as “Uncontrolled asthma which can result in risk of frequent severe exacerbations (or death) and/or adverse reactions to medications and/or chronic morbidity (including impaired lung function or reduced lung growth in children)” (5).

Severe asthma includes 3 groups-untreated severe

asthma, difficult-to-treat severe asthma, and treatment-resistant severe asthma. The last group includes asthma for which control is not achieved despite the highest level of recommended treatment and asthma for which control can be maintained only with the highest level of recommended treatment (5).

This paper considers asthma in all its forms, severe and not severe.

Asthma prevalence is monitored by both the Global Asthma Network (GAN) Survey and the European Community Respiratory Health Survey (ECRHS) (1,6), however neither of these investigate the links between asthma and conflict.

Impact of conflict on asthma prevalence and incidence

Conflict has been found to increase asthma and asthma symptoms in both military personnel and civilians in a variety of settings. Szema *et al.* found soldiers deployed in Iraq had much higher asthma prevalence than soldiers serving in the US, 14% showed spirometric abnormalities *vs.* 1.8% in those soldiers not deployed in Iraq (7). Roop *et al.* also found an increase in asthmatic symptoms such as wheezing, night cough, breathlessness and allergy in both military and contractor personnel returning from deployment in Iraq, regardless of their diagnosed asthma status (8). Civilians have also reported higher asthma prevalence following conflict, 70% of Syrians in an outpatient clinic reported their asthma occurred after the start of the war (9).

Asthma is more likely to go undiagnosed in areas affected by conflict and war, studies have shown asthma-

like symptoms prevalent in non-asthmatics in conflict affected areas (8,9), indicating under-diagnosis. A survey of internally displaced people during the Syrian war found that 44% of non-asthmatic civilian shelter dwellers reported episodes of wheezing, coughing and breathlessness at night, again indicating under-diagnosed asthma (1,9).

Primary health care facilities, and perhaps secondary health care facilities in conflict affected areas could lack Peak Expiratory Flow Meters and/or spirometry to confirm asthma diagnosis; in these instances clinical history (recurrent episodes of wheezing, coughing and breathlessness) and therapeutic trial should be relied upon for diagnosis (1,2).

Contributors to higher prevalence of asthma during and after war and conflict

When we review the literature around why asthma and asthma like symptoms are more prevalent during and after war and conflict, three domains are raised: psychological factors, new environmental risk factors/triggers and displacement. These are explored in further detail below.

Psychological factors

During conflicts we notice a higher incidence of stressors, post-traumatic stress disorder (PTSD), and depression (10,11). Stress induced asthma may be explained by epigenetic, immunological and neuro-mediator mechanisms (12-15). Stress has a neuro-immune modulating effect, leading to bronchoconstriction. One study reports half of new onset asthma in war is due to stress, especially PTSD (13). This is plausible as PTSD predisposes a person to long lasting alteration of the immune system, leading to trouble of T Regulators and to lymphocyte IgE secretion profile, generating asthma (14).

The autonomic nervous system (ANS) dysregulation model suggests a link between stress and asthma through an imbalanced ANS response to stress. Depressed subjects expressed a preponderance of vagal over sympathetic reactivity leading to increased airway hyper-responsiveness and bronchospasm (13).

There is a susceptibility gene for asthma in some individuals, which when exposed to PTSD and anxiety is reprogrammed by epigenetic mechanism. PTSD or anxiety in susceptible individuals causes DNA methylation, programming genes for asthma onset (12,13).

PTSD also has long lasting effects after the end of

conflict; it alters the gut microbiome which deregulate and disrupt the inflammatory response and immunity leading to somatic diseases like asthma (16).

Wright *et al.* explored the impact of war-related stressors on asthma in elderly Kuwaitis with experience of the Iraqi invasion. This study found that those reporting highest stress exposure were more than twice as likely to report asthma compared to civilians reporting no stressors (hazard ratio of 2.3). This was more salient when stressors were related to fear of loss of life (11). The study highlighted not only is warfare linked to long lasting psychological disturbance, it also has an impact on health through the detrimental effect of stress on physical and somatic diseases like asthma (11).

Depression is more prevalent during the war and conflict, this has been found to be a risk factor for asthma onset, linked to a 43% increased risk, however further research is required (10,13).

Environmental risk factors

There are a variety of environmental risk factors and triggers in conflict affected areas which may not be present prior to conflict, or less prevalent. Fires, odors of projectiles, environmental tobacco smoke (ETS) of cigarettes or Narghile, odors linked to crowdedness, unusual cooking and heating fuels like plastic/cartons/tyres etc., detergents and other triggers have been identified as present in armed conflict zones. Even odors of unburied war victims were reported by patients as triggers of their asthma attacks (1,9).

Cooking in the same room where the family lives enhances exposure to small particulate matters <2.5 micrometre which is believed to exacerbate asthma (17), this may be more likely to occur in conflict affected areas where overcrowding may be more common due to the effect of conflict on housing and displacement. In overcrowded situations exposure to ETS is more intense, this plays a role in asthma onset and exacerbation (18). Use of detergents such as bleach (sodium hypochlorite) in crowded setting can also exacerbate asthma or lead to asthma-like symptoms (19).

Wildfires are more prevalent in armed conflict zones, smoke from these have been found to contain air pollutants with studies confirming the association between wildfire smoke exposure and exacerbations of asthma, as well as small particulate <2.5 micrometer increase in the atmosphere (20).

Poverty is associated with war and conflict areas due to disruption to infrastructure and displacement (amongst other

factors); poverty leads to more exposure of indoor asthma triggers, more stressors and in turn more asthma (2,9,21).

Chemical weapons are forbidden in the Geneva Protocol, however chemical weapons such as sulfur mustard gas (SM) continue to be used on civilians (22). SM was introduced as masks were developed for previously used chlorine gas. SM is heavy, sticking to the clothes of those exposed and settling in the bottom of trenches. Due to the volatility of the gas a single soldier could contaminate other personnel. Those affected can develop Mustard Lung, described as a phenotype of Chronic Obstructive Pulmonary Disorder. Mustard Lung is due to bronchiolitis obliterans, this is a disease that results in obstruction of the smallest airways of the lungs (bronchioles) due to inflammation. Symptoms include a dry cough, shortness of breath, wheezing and feeling tired. Besides bronchiolitis obliterans, other SM-induced pulmonary complications include laryngitis, tracheobronchitis, bronchopneumonia, COPD, asthma, bronchiectasis and pulmonary fibrosis (23).

Displacement and immigration

The United Nations estimates that there are 1 billion migrants in the world, whilst seeking refuge from conflict situations through migration to other countries may hold a variety of positive benefits to health and wellbeing, such as improved living conditions, there is a higher prevalence of asthma and allergies observed in migrants. Some refugees and migrants may find integration difficult or experience hardship in host countries, may find access to health care difficult and in turn poor access to asthma medications. As a result of this, asthma in refugees and migrants is not only more prevalent but more severe (24).

Internal displacement can also affect asthma. A study of data obtained from healthcare clinics set up at shelters in the US showed that chronic health problems, such as asthma, anemia and deficits in growth and development, were among the top 10 diagnoses for children of displaced families (25).

Difficulties providing and accessing healthcare during the war (implications of war for asthma care)

People living in conflict zones are prevented from accessing good asthma treatment due to scarcity of medications, supplies, health workers, transport and health care facilities (9,26-28).

In countries in war like Syria, beside health facilities destruction or closure, (especially for primary care health centers and first level referral hospitals), there is lack of medical personnel due to immigration of physicians and war victims (29). Even when inhaled corticosteroids (ICS) and long-acting beta₂-agonists (LABA), the usual treatment for asthma, are available in pharmacies, they are expensive to be regularly paid for out of pocket.

Conflict results in a decline in state capacity due to disinvestment, inflation, capital flight, and economic sanctions against these countries in conflict. All of these impact on the availability and affordability of essential technical equipment and medications (28,29). Asthma becomes uncontrolled because of poor use of preventers, especially ICS, leading to more severe attacks.

Non-Governmental Organizations (NGOs) often provide medical assistance in conflict affected areas, for example Médecins Sans Frontières-Operational Centre Amsterdam (MSF-OCA) has provided primary and secondary healthcare for populations in northern Syria (26). However this provision only covers a proportion of the population affected.

Local intelligence in Syria indicates international help for low dose ICS and Short Acting Beta₂ Agonists (SABA) is generous, however not for higher doses of ICS or ICS/LABA. Local guidelines for asthma care should be adapted to these difficulties, it is the duty of national asthma experts and academics to help the Ministry Of Health (MOH) and World Health Organization (WHO) to audit and monitor asthma care and elaborate programs for asthma using local indicators to improve capacities (27).

Global illicit trade of medications like inhalers is another issue in conflict affected areas. Smuggled inhalers for asthma are suspect of trafficking and the content of these and expiry dates are questionable (28,30).

Asthma may be poorly controlled in conflict affected areas not only due to lack of treatment but also non-adherence. Halimi *et al.* (2007) found those patients with less feeling of control (those who had an external Locus of Control) were more often assessed as non-adherent to treatment compared to those who felt they had some personal control over events in their life. Feelings of control may be less prevalent in conflict affected populations due to the conflict and consequences they are experiencing (31).

Unfortunately even when asthma care is accessed in conflict affected countries, stress can reduce bodily response to ICS and beta 2 agonists, thus asthma may be more severe even when treatment is taken (12).

Fortunately, in 2016 WHO added NCD to the Interagency Emergency Health Kit. Asthma was added and the WHO Package of Essential NCD interventions (PEN) protocols were adopted. However, the Kit does not cover the whole population in the country.

Conclusions: whilst asthma is prevalent worldwide, it appears to affect those in conflict affected areas more so, through both increased prevalence and increased severity due to poor control. This increased prevalence is due to a variety of risk factors and triggers that exist in these areas, including psychological factors such as stress, environmental factors such as odors of conflict (fires, projectiles, unusual heating fuels) and factors associated with displacement such as over-crowding. Provision of asthma care is hampered by poor availability of essential medicines and healthcare workers, poor transportation and fewer healthcare facilities. Provision of asthma care is also hampered through likelihood of decreased adherence to treatment when patients feel they have poor control over their lives. Whilst efforts are being made to increase treatment for asthma in conflict-affected areas, through the provision of the WHO IEHK and WHO-PEN, not all those affected would be able to access these, as such there is more to be done. There also appears to be a gap in surveillance of the scale of those affected by asthma and conflict.

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Footnote

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