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EDITORIAL

Asthma in Disaster Zones

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Introduction:

The Global Asthma Network (GAN) report issued in 2022 and the Global Initiative for Asthma (GINA) report of 2023 emphasize challenges and difficulties faced by health workers in managing asthma in Low- and Middle-income countries (LMICs). Among the many reasons for these difficulties are insufficient knowledge of health workers of management guidelines, and lack of medical resources especially inhaler medications^{1,2,3}. When available in limited amounts, these resources are prohibitively expensive^{4,5,6}. These reports did not address the impact of disaster on asthma care. In this article, we aim to highlight this issue, hoping that future international asthma reports will take this aspect into consideration.

When disasters such as war and earthquakes occur in LMIC, several aspects of asthma care are negatively impacted. First, challenges in asthma management are compounded by difficulties related to displacement, overcrowding in shelters, immigration of health care workers (HCW), damage to health facilities, limited referral capacity to specialists, and limited availability of expensive inhalers^{4,5,6}. Second, governments face logistical challenges. While the immediate need may be to provide emergency needs,^{6,7} health facilities should secure medications to provide care according to World Health Organization (WHO) guidelines⁷. Third, asthma research and data collection are hampered.⁸ Digital health could be a solution^{9,10}.

It is therefore imperative that we develop suitable asthma management programs applicable to zones in turmoil^{4,11,12}.

We conducted a literature search on challenges in asthma management in zones of turmoil. We used the following search keywords and phrases: asthma and war, asthma and turmoil, asthma and earthquakes, and asthma and disasters. We reviewed all publications that relate to this topic that appeared in the literature between 2014 and 2023. Based on this review and analysis, we list several lessons learned, conclusions and recommendations.

Discussion:

Impact of war on asthma:

Several surveys have confirmed that prevalence of asthma is higher in states of war which are associated with levels of stress, elevated indices of pollution, rise in poverty and management problems related to human displacement^{5,11,13,14}. For example, compared to military personnel who were not deployed, those returning from the Afghanistan and Gulf had significantly higher rates of asthma symptoms¹¹. A recent study from Syria reported the results of a survey on asthma in shelter-dwellers displaced by the civil war in 2017¹³. The investigators found that self-reported incidence of asthma was 8.5%. Among this group, only 4.5% reported taking inhaled corticosteroids (ICS), down from 30% before displacement. A large proportion of the respondents reported using oral corticosteroid as reliever which may have reduced the symptoms in some patients.

Despite that, there was a universal increase in asthma symptoms and reduction in health-related quality of life in self-reported asthma patients.¹³

It is interesting that symptoms of asthma started to appear in individuals who had not been previously diagnosed with this entity. In this group of shelter-dwellers, 44.2% reported episodes of wheezing, coughing and breathlessness at night, suggesting undiagnosed asthma, although new onset asthma could be excluded¹³.

A number of factors may have contributed to these findings. There was a positive correlation with increased exposure to passive smoking of cigarettes and water pipe (Narghileh)¹³. In addition, the dwelling environment included new pollutants linked to the war, such as chemicals of weapons, smoke of fires, and odors of unburied decaying carcasses¹³. Other factors include overcrowding with whole families living, sleeping and cooking in the same room¹³. Finally, the scarcity of resources resulted in the use of new fuels for heating and cooking such as plastics, cardboard, trashes and other residues of open fire¹³. We also should consider the negative impact of post-traumatic-stress-disorder (PTSD) which occurred in 35% of subjects with asthma symptoms compared to 5% in asymptomatic individuals($P<0.05$)¹³.

Syria also participated to the international survey of the Global Asthma Network(GAN) Phase1 in 2019, eight years after the beginning of the ongoing war¹⁴. GAN aimed

to track time changes in the prevalence asthma indicators 15 years after the International Study of Asthma and Allergies in Childhood (ISAAC phase III). Among the interesting findings were that 19.8% incidence of wheezing in the last 12 months, considered as indicator of current asthma, compared to only 5.2% in ISAAC III 2000. Other interesting findings were that 2.5% reported severe asthma symptoms for ISAAC while 12.8% for GAN^{14,15}. And when analyzing the data, this showed to be linked to psychological as well as environmental pollutants during the war¹⁴.

In Syria. Auditing of asthma care during the war showed that among doctors working in primary care health services, the precision of the diagnosis of asthma is far from ideal, varying from 54% underdiagnosis to 34% over-diagnosis^{3,12}.

Findings from other areas of turmoil bear out these observations. For example, pollution is a concern in the ongoing Ukraine war where there has been a significant increase in greenhouse gases produced as military operations release as much carbon dioxide as do whole nations¹⁶.

Asthma Care during Earthquakes

The structural damage that occurs during earthquakes releases inhaled debris which contains dust from collapsed buildings, mixed with harmful chemicals, gas cylinder leakage, and smoke of fires. Chemicals could result from damage of sacks and barrels storing chemicals for personal use in warehouses of the collapsed building^{4, 17}. Chemicals in the

earthquake area could also result from damage to industrial sites, rupture of pipelines and vessels at petroleum installation. Air pollutants from earthquake stay for years not only in the air but equally on water and on the land, which could impact asthma^{4, 17}.

Earthquakes could cause more severe exacerbation of asthma with higher mortality rate and new onset asthma. Poor environmental hygiene in shelters, and overcrowding are risk factors. But also aggravation of asthma by fatigue and stress, and non-availability of inhaled medications⁴.

These symptoms are observed in all disasters and may be aggravated by stress, depression and PTSD¹¹. Rosenberg et al. showed that there is compelling evidence for a link between chronic psychosocial stress and the onset and course of asthma. Alterations in neuroendocrine pathways, as well as immunologic mechanisms, are likely to be involved in these effects, and specific signal transduction pathways through which stress modulates epigenetic and transcriptional activity in asthma relevant cells have been suggested¹⁸.

Asthma care is hampered during disasters as many health care facilities are damaged with loss of healthcare workforce due to immigration. Health authorities and health programs are oriented for emergency care rather than chronic disease management^{5,7}. Also care of asthma is hampered by lack of spirometry to confirm diagnosis, and even of peak expiratory flow meters. These limitations make the diagnosis only clinical^{3,4,12,13}.

Unfortunately, the insufficient health care provider's knowledge on asthma reported in these settings make it more difficult¹².

Essential asthma inhaler medications as listed by (WHO-EML) include ICS with or without long -acting beta 2 agonists (LABA). In stable conditions these supplies may be abundant and distributed at no cost to patients in hospitals and some health centers thanks to international help. However, during disasters, the provision is interrupted from and the quantities do not cover the needs of all^{1,12,13}. While in private pharmacies they are highly priced.

Lessons learned and recommendations:

In disaster zones, there is a need for asthma assessment taking in consideration pollution and stress. In addition, there should be auditing of care for asthma by General Practitioners in health centers and residents in hospitals to ensure compliance with management guidelines. There is also a need to improve training curricula^{1,2,4,12,13,14}, and the development of a multicenter programs, adapted to local resources, to minimize the impact of disasters. This should be a collaborative effort among many entities. WHO, governments and especially health authorities, schools , academics and Non-Governmental Organizations (NGOs) should work together to face asthma underdiagnosis in disaster zones and develop preventive measures in shelters and hot zones for environmental triggers, as well as socio-psychologic support

Some specific recommendations that have been successful include one-on-one teaching,

continuing medical education courses, embedding specialists in teaching hospitals, distribution of audiovisual and printed material and others. Various studies have shown that these strategies improve knowledge and patient outcome³. WHO should establish a program for prevention and diagnosis of asthma in disaster zones. A team should be formed locally to train GPs and nurses on early recognition and good practices for asthma care, including mobile health strategies. Resources should include suitable video exchange with physicians^{3,13}. WHO-package-of-essential-noncommunicable-(pen)-disease-interventions-for-primary-health-care in low resources settings¹⁹ and GINA should be a primary references^{2,19}.

We hope also in the future WHO and Lancet commissions on air pollution would include asthma management in disaster areas²⁰.

Conclusions

The GAN report 2022, and GINA 2023 emphasize the difficulties of asthma management in Low- Middle-income countries (LMICs). However, disaster in war and earthquakes add more difficulties, instability, and exhausting obstacles to asthma care. Difficulties come from displacement and overcrowding in shelters, immigration of health care workers, damage to health facilities, paucity and expense of inhalers and absence of specialty referrals.

Surveys showed asthma to be more prevalent and more severe in war and earthquake zones

possibly related to exposure to pollutants, a major concern in war zones as observed in Syria and the Ukraine.

In earthquakes, inhaled debris contains dust of collapsed buildings, mixed with harmful chemicals. Shelter-dwellers in disaster zones are more exposed to passive smoking of cigarette and water pipe (Narghileh). In addition, overcrowding, with whole family living,-sleeping, and cooking in the same room aggravates symptoms. Cooking on open fire using plastic, cardboard, trash and other residues is particularly harmful.

Asthma prevalence and severity in disaster zones, is linked also to more prevalent depression, and post-traumatic stress disorder.

WHO, governments and especially health authorities, schools , academics and NGOs should work together to face asthma underdiagnosis in disaster zones and develop preventive measures in shelters and hot zones for environmental triggers, as well as socio-psychologic support.

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