THE GROWING THREAT OF CHOLERA AND OTHER DISEASES IN THE MIDDLE EAST

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INTRODUCTION

The escalating conflict in the Middle East, particularly in Syria and Iraq has been associated with a rapid collapse of the existing healthcare system resulting in a subsequent Public health catastrophe[1]. The devastation resulting from the escalating Civil War in these countries has introduced alarming epidemics that have spread rapidly within the region and have the potential to spread globally creating a Public health emergency.

The unrelenting war has created the appropriate environment for the spread of these epidemics through widespread contamination of the water and food supplies, poor sanitation, and massive displacement of a large segment of the population resulting in overcrowding of refugees[1-3]. Furthermore, the concurrent collapse of the public health and healthcare system has perpetuated the regional spread of these epidemics prohibiting the implementation of any effective infection control measures.

There are several factors that have contributed to the collapse of the healthcare system. These include but are not limited to wide destruction of healthcare facilities, shortage of healthcare personnel associated with a large scale immigration of healthcare workers and at times their physical elimination or injury, lack of access to essential drugs and medical supplies, and lack of secure routes and transportation[1, 4].

Hence, as well described by Dr. Souha Kanj (Chief of the division of Infectious Diseases at the American University of Beirut) the escalating war in these countries included a war on the healthcare system[1].

According to a report by the World Health Organization [WHO], 40% of the ambulances in Syria were destroyed and 57% of Public hospitals were severely damaged leaving the remaining 37% out of service[5]. Another report indicated that at least 160 physicians have been killed in Syria alone while hundreds others were jailed or kidnapped resulting in the massive immigration of more than 80,000 physicians[4]. In addition, prior to the war 90% of pharmaceutical needs are locally produced which was reduced to only 10% at the current time with extreme shortage of pharmaceutical supplies coming from outside the country because of lack of safety of transportation and the imposed boycott[2].

Below is a brief description of several outbreaks that occurred in the Middle East and that were perpetuated by a deteriorating healthcare system associated with local and regional conflict.

I. INFECTIOUS DISEASES IN THE MIDDLE EAST

1) Cholera:

Cholera is caused by the toxin producing strains of gram negative bacteria known as Vibrio cholerae leading to an acute diarrheal illness. This infection is often associated with massive fluid and electrolyte losses in the stools and the development of hypovolemic shock that can occur within 24 hours from the initial onset of the illness.

Cholera outbreaks occur in the settings of poor sanitation and inadequate access to clean drinking water[6]. This setting has been the hallmark of the raging civil wars in Iraq and Syria. Whereby water and sanitation management and infrastructure has been damaged by the current escalating conflict. For example, the 2015 cholera outbreak in Iraq has been thought to be related the low water levels in the Euphrates as well as the winter flooding that was thought to have contaminated the Euphrates River and shallow wells with sewage water[7].

Between September to November 2015, the World Health Organization reported a cholera outbreak in Iraq with more than 5,000 confirmed cases and several deaths. The outbreak was distributed in 15 out of the 18 country governorates. It involved the Baghdad county and several other counties in Iraq[8]. However, based on our recent contact with physicians from Baghdad, the number of confirmed infected cases is an underestimate of the total number of patients who contracted the disease. This is based on the fact that only around 10% of symptomatic patients obtain a stool culture that confirms cholera and only 20% of patients who contract cholera are usually symptomatic[9]. Hence, this puts the estimated total number of cholera cases in 2015 above 250,000 and the number of deaths, according to our contacts in Baghdad, in the hundreds.

Some reports indicate that this cholera outbreak has spread to neighboring Syria, Kuwait, and Bahrain with a risk of turning into a region-wide epidemic[7, 8]. The concern related to a region-wide epidemic relates to the fact that the areas where large number of cholera cases were detected includes the Shiite shrine cities of Najaf and Karbala where annually millions of Shiite Muslims come on religious pilgrimage to these holy shrines[7]. Furthermore, cholera is unique among waterborne bacterial infectious diseases in its potential to cause global pandemics. Over the last two centuries, we have witnessed seven pandemics of cholera and now we are in the period of the second and the third wave of the seventh pandemic cholera attributed to the Vibrio cholerae O1 el Tor[10]. It is to note that the second wave of the seventh pandemic was associated with the acquisition of additional antibiotic resistance and the third current wave is associated with the acquisition of a cholera toxin variant, both of which are of major concern and could reflect a global public health emergency[9].

2) Poliomyelitis:

In 2014, WHO estimated that over 7,600 Syrians were infected with poliomyelitis with subsequent spread of the infection to Iraq[11]. This occurred after 15 years of eradication of poliomyelitis in Syria[12]. Most of the cases reported occurred in the northern eastern province of Deir El Zur which was the epicenter of the outbreak[13]. However there were other several cases that were reported in rural areas of Damascus, Aleppo and other regions.

Poliomyelitis is a virus that lives in sewage contaminated water and food. Hence, several war related factors have contributed to this poliomyelitis outbreak. The first factor is the fact that, particularly during the war, the raw sewage was being pumped directly to the Euphrates River which provided drinking and washing water to many villages with simultaneous discontinuation of chlorination of that necessary water[14]. The second factor is related to the fact that poliomyelitis is a vaccine preventable disease and the vaccination coverage in Syria has dropped from around 91% in 2010 to as low as 45% by 2013[3]. The third factor is the overcrowding of tens of thousands of displaced and refugee population inside and outside Syria[1].

What is of great concern also is the fact that the strain of poliomyelitis in Syria has been linked to a wild type from Pakistan which is suspected to have been introduced to Syria by a jihadist fighter who came from Pakistan[15, 16]. This spread of the virus within the region was also noted in the fact that there were reported cases in Lebanon, Jordan, as well as Iraq[17]. Hence, polio in Syria has been declared as a public health emergency that requires international efforts and solidarity to prevent a possible global epidemic.

3) Measles:

Measles is a highly contagious viral illness that, with high efficiency of airborne transmission, but is vaccine preventable. Measles epidemic was reported in Syria during this unrest period, particularly in the northern regions such as Aleppo, with more than 7,000 confirmed cases[18]. The epidemic spread to the neighboring countries whereby Jordan reported 24 cases in 2012 and more than 200 cases in 2013[19]. In addition, Lebanon reported 9 cases in 2012 which increased to 1,760 in 2013[20].

Although immunization campaigns continued to deliver vaccinations for poliomyelitis and measles to tens of thousands of adults and children in Syria and the surrounding countries, the current conflict has restricted access to vaccination campaigns in large areas of Syria and surrounding countries, particularly the area under the control of ISIL and other northern areas of Syria and Iraq[1].

4) Cutaneous Leishmaniasis:

For decades, cutaneous leishmaniasis has been recognized as a skin deforming infection that is transmitted by a sand fly and which has been endemic in northern Syria, particularly Aleppo[1].

However, with the recent conflict in Syria leading to vast population displacement, an epidemic was reported in 2012 that involved more than 52,000 confirmed cases[21]. Subsequently, epidemics were reported among Syrian refugees were reported in neighboring countries, particularly Lebanon.
Before 2008, there were no cases of cutaneous leishmaniasis in Lebanon. However, by 2013, 1,033 cases were confirmed whereby 97% of them were among Syrian refugees[20]. The Lebanese ministry of public health, with WHO, launched a coordinated campaign to contain the spread of this infection which includes spraying pesticides to kill the vector, providing free treatment and diagnosis for newly diagnosed cases[1]. However, controlling the source of this infection, in northern Syria particularly in around Aleppo, has not been possible because of the escalating conflict in that area.

5) Middle East Respiratory Syndrome Corona Virus (MERS-CoV):
MERS-CoV is a severe respiratory illness caused by a Corona virus that was first reported in Saudi Arabia in 2012[22]. The MERS-CoV epidemic spread to the Arabian Gulf and other areas in the Middle East involving Qatar, United Arab Emirates, and Jordan[23]. However, this epidemic has not been associated with the conflict in the Middle East and there were no documented cases reported in Syria or Iraq. It is possible that such cases could have occurred in areas of conflict but not reported, including the country of Yemen[24]. Furthermore, cases have also been reported on a global basis in the Far East and other areas of Asia as well as Europe, North Africa and North America. In 2015, a large outbreak was reported in South Korea between May and early July with the index case travelling from the Arabic Peninsula[25]. In addition, a large outbreak was reported in a hospital in Riyadh in Saudi Arabia in the summer of 2015[26].
Bats are thought to be the reservoir with camels serving as a host for this virus[27, 28]. However, studies do strongly suggest that a human-to-human form of transmission also occurrs[29, 30].
The global spread of this virus, is associated high mortality rate of around 36%[31], the absence of ineffective treatment for this viral infection, as well as the absence of an effective preventive vaccine have all raised global concerns and made MERS-CoV a global health emergency.

6) Hepatitis C (Genotype 4):
Over the last several decades, Egypt has witnessed the largest epidemic of Hepatitis C virus worldwide. Egypt has the highest prevalence of Hepatitis C worldwide with an estimated 14.7% of the population having acquired the Hepatitis C virus, whereas according to WHO standards a prevalence above 4% is considered high[32]. Not only Egypt has the highest prevalence of Hepatitis C worldwide, but a relatively recent study confirms an ongoing hyper epidemic transmission with more than 500,000 new HCV infections per year[33]. It is to note that up to 85% of patient who acquire Hepatitis C would develop a chronic infection leading to either liver cirrhosis and failure or hepatocellular carcinoma[34, 35]. Although this epidemic has not been directly associated with the recent conflict in the Middle East, however, after the January 25 revolution in 2011 and the subsequent deterioration in the economic and healthcare conditions, efforts to control the spread of this viral infection have been hampered. The major concern related to the spread of this virus in Egypt is the iatrogenic form of the transmission where many segments of the healthcare system have been associated with perpetuating the transmission of this virus. Recent studies indicate that 18% of dental instruments have been contaminated with Hepatitis C while up to 90% of hemodialysis patients have developed this viral infection with up to 85% of healthcare workers with needle stick injuries and other injuries acquiring Hepatitis C[36, 37]. Furthermore, records show that 10-55% of transfusion recipients in Egypt have acquired Hepatitis C[37]. Egypt, like many countries in the Middle East and North Africa, suffer from high rates of unnecessary use of medical injections and transfusions as well as high rates of reusing needles and syringes[33]. Furthermore, Egypt and many Middle Eastern countries have among the

highest rates of needle stick injuries among healthcare workers worldwide[38, 39]. All of these factors have contributed to the spread of the Hepatitis C virus that yields high alarming rates. During my recent visit to Egypt in February 2016, it was reported to me that around 70% of blood transfusions are not adequately screened and tested for Hepatitis C. Hence, the concern that the healthcare system has become a major source for the transmission of Hepatitis C in Egypt, given the fact that this viral infection is mainly transmitted through blood transfusions and injections.

With the availability of novel effective antiviral therapy for Hepatitis C, Prof. Wahid Doss (Head of the National Committee for Control of Viral Hepatitis in Egypt) negotiated a deal with pharmaceutical companies such as Gilead to provide these novel agents at a very low affordable cost to the Egyptian population. Furthermore, the CDC under Dr. John Ward has worked with CDC Namro and the USAID branches in Cairo, Egypt to support Dr. Doss and the national committee in their efforts to control Hepatitis C in Egypt. However, the infection prevention policy devised by the CDC has not been funded yet, nor implemented.

7) Hepatitis A and B:
Clusters of Hepatitis A outbreaks have been reported during the Syrian conflict over the last two years particularly among the Syrian displaced population.
On the other hand, Hepatitis B is highly endemic and spread in Mauritania (North Africa). During my visit in February 2016 to Mauritania, I had the pleasure of meeting with the current Minister of Health and the President of Mauritania as well as the Head of the Hepatic Center. It is evident that the country has a problem with the spread of Hepatitis B at a large scale that needs to be addressed. Similar to Egypt, the CDC has been working through the embassy and with the officials there regarding this problem. HOME was invited to participate in that effort and was recognized as an NGO in Mauritania consisting of Arab-American healthcare workers who are interested in helping in the effort of controlling Hepatitis B in that country.

8) Other Infectious Diseases:
Other infectious diseases, such as Typhoid fever as well as multidrug resistant Tuberculosis, have been reported particularly in association with the Syrian crisis. Typhoid has been particularly reported among Syrian refugees as well as the Yarmouk refugee camp which exists in a suburb of Damascus[40]. This camp which has been controlled by the Islamic State and has been under siege by the government forces. The HOME teams working in the Al Noor chest disease sanatorium in northern Jordan have reported high rates of Tuberculosis, including multidrug resistant Tuberculosis, among Syrian refugees that are seen in the outpatient clinics of that chest diseases hospital.

II) WHAT HOME IS DOING

Health Outreach to the Middle East (HOME) is a 501(c)(3) charitable organization registered in the US since 1990 and consisting of largely Arab-American healthcare professionals who are committed to reaching the suffering in the Middle East. HOME has been highly active over the last two decades in various Arab countries undergoing conflict, including Iraq, Syria, Lebanon, Jordan, Egypt, South Sudan and more recently the West Bank and areas in North Africa. HOME members and leaders have chapters in many US cities and in all of these countries mentioned above. The members of HOME are healthcare workers and collectively they view themselves as medical ambassadors of peace, reconciliation and healing. In addition, HOME in the US view themselves as bridge builders between the USA and the Arab world, reflecting the shining, beautiful and healing face of America in the Middle East.

In addition, over the last two decades, HOME has supported more than 18 clinics including field and mobile clinics and more than 8 charity hospitals in the Middle East, launching the largest network of mobile clinics in Iraq, Lebanon, Kurdistan, Egypt, South Sudan, and Mauritania.
Since its inception, HOME has insisted on providing humanitarian medical relief in a charitable, peaceful non-partisan and non-discriminatory manner to all the suffering people in the Middle East, irrespective of their race, religion, ethnicity, etc. In addition, HOME has worked with a large number of 501(c) organizations working in the area, including (but not limited to) Samaritan's Purse (SP), World Vision, American Lebanese Medical Association (ALMA), National Arab American Medical Association (NAAMA), American College of Chest Physicians, and Medical Bridges. Below is a brief summary of what HOME has been doing in each country:

1. Iraq: HOME started a stationary clinic in Baghdad in 2005 that has been active and has recently reported of the early suspected cases of Cholera during the recent outbreak. The clinic is in the green area and in 2012 initiated a mobile medical clinic in the Baghdad district which is attached to the stationary clinic. In addition, in 2013 HOME became active Kurdistan, particularly Erbil and Dahuk. HOME is now an approved NGO in that country providing medical relief to the large number of refugees. Currently, HOME is initiating a mobile medical unit service in Kurdistan.
2. Egypt: HOME has had various activities in Egypt including a mobile medical unit in Upper Egypt (Sohaq - Assuit) as well as several nursing and medical training programs. HOME has supported several charitable hospitals including Harpur Memorial Hospital in Manuf. In 2016, HOME will be initiating a large campaign for Hepatitis C and other infection prevention programs with emphasis on holding the transmission of Hepatitis C particularly within the healthcare system.
3. Jordan: After the Gulf War (in the early nineties), HOME has supported the Hope Iraqi Refugee Clinic in Amman, Jordan and the Al Noor chest disease/TB sanatorium in Mafraq, northern Jordan. HOME has sent physicians and nurses to help Al Noor hospital that sees a large number of patients with Tuberculosis and multidrug resistant Tuberculosis from the whole area, particularly more recently from Syria and previously from Iraq. In addition, HOME has supported a clinic in Zarka which has been reaching out to thousands of Syrian refugees on a monthly basis.
4. Lebanon: HOME has supported several charity clinics after the cessation of the Lebanese conflict in the early nineties. In 2006, HOME launched a mobile medical unit that went to all rural areas and became highly active with the influx of the large number of Syrian refugees to Lebanon from 2012 up to this day. Furthermore, in 2013 HOME initiated (supported by a grant from the South Korean government) the HOME Elpis Clinic in Beirut to reach out to a larger number of Syrian refugees.
5. Mauritania: Through its director Dr. Amanda Beatsy, HOME has been supporting the fraternity hospital in Chinguetti (northern Mauritania). More recently, HOME has been recognized as an NGO in Mauritania and Dr. Amanda was asked to direct that hospital. This humanitarian effort has been largely supported the US ambassador in Mauritania, Mr. Larry André Jr. Furthermore, HOME will be collaborating with the current Mauritanian Minister of Health and officials in Mauritania on controlling the spread of Hepatitis B in that country.
6. South Sudan: HOME is official in South Sudan and has a clinic in Juba as well as a mobile clinic. Both clinics were active particularly recently during the difficult events that South Sudan has been going through.
7. Syria: HOME has supported for more than a decade the Tabaleh Clinic in a suburb of Damascus under Dr. Edward Awabdeh. This polyclinic has been highly active particularly during the recent crisis with receiving between 1,500 to 2,000 patients a month, people from all background, particularly those who have been displaced within Syria itself.
8. West Bank: HOME has had mobile medical activity in the West Bank through the help of local Palestinian physicians.

III) WHAT NEEDS TO BE DONE

Given the catastrophic implications of these infectious disease epidemics in the Middle East both at the regional and the global level, a concerted collaborative effort needs to be initiated that joins governmental agencies (such as USAID, CDC and Peace Corps) on one side with NGOs that include Middle Eastern-American groups that are working in the area. We, therefore, suggest that a special campaign that aims at controlling these infectious diseases should be initiated through the following mechanisms of action.

1. Meeting of All Relevant Congressional Committee Chairs: We believe that these infectious outbreaks in the Middle East (including the emergence of polio and multidrug resistant tuberculosis) require immediate action. We suggest that the chair of this subcommittee convene a meeting of all relevant committee chairs (including the Health Subcommittee) to devise a policy and plan of action. These outbreaks should be dealt with in a similar serious manner like the Ebola outbreak in West Africa in 2014-2015.
2. USAID: NGOs, particularly those working in the area and having a Middle Eastern-American identity, should be encouraged to work with USAID and be given special eligibility status for grants as long as these NGOs are willing to maintain a neutral nonpartisan position and adhere to the US guidelines in a nondiscriminatory distribution of resources.
3. CDC: The CDC is to be encouraged, supported and funded to help deal, in coordination with USAID and the NGOS, with many of these outbreaks. The efforts of the CDC in controlling Hepatitis C in Egypt and its current efforts to control Hepatitis B in Mauritania are to be continued to be supported with encouragement to work with local Middle Eastern-American NGOs working in all of the areas outlined above.
4. Peace Corps: In 2011, the Peace Corps has launched a campaign to control malaria that grow out of the malaria prevention programs in Senegal. This campaign now includes volunteers working in 24 African countries. Something similar should occur to control infectious diseases in the Middle East. The Peace Corps are to be encouraged to work with the Middle Eastern-American NGOs serving in the area and closely collaborate with them as the "medical peace ambassadors" to the Middle East.

The campaign to control these infectious outbreaks should stand on these two foundations of the governmental agencies working closely and providing grant opportunities to the NGOs particularly the Middle Eastern-American medical health NGOs in coordination with WHO with emphasis on the following:

1. Refugee medicine training for the local community healthcare workers
2. Early detection of infectious disease through special kits and also training of the local healthcare workers
3. Community health and water decontamination and sanitation
4. Hygiene education
5. Vaccination campaigns
6. Appropriate use of antimicrobial therapy training, particularly for the local community physicians

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