

ABSTRACT

In the past 20 years or more and until now many outbreaks attacked different areas all over the world. Most of them have occurred in the developing countries. This review aims at highlighting the role of patient guided by epidemiologist and infection preventionist in combating outbreaks and pandemics. A pandemic is an epidemic (outbreak) occurring on a scale which crosses international boundaries, usually affecting a large number of people. –a pandemic is a global outbreak. Influenza, Middle East Respiratory syndrome coronavirus (MERS-CoV), HIV/AIDS, Ebola, Zika, Cholera, Polio are examples of these outbreaks. Wild aquatic birds are the natural hosts for a range of influenza A viruses (e.g., H5N1, H5N8), occasionally, viruses are transmitted from these species to other species, and may then cause outbreaks in domestic poultry and or rarely in humans. Since April 2012, MERS-CoV have been reported in Arabian Gulf countries especially the Kingdom of Saudi Arabia. The role camel is questionable especially if we know that some cases have no history of contact to camel. AIDS is currently a pandemic, with infection rates as high as 25% in southern and eastern Africa. Effective national education about safer sexual practices and blood borne infection precautions training have helped to slow down infection rates in several African countries. Ebola had emerged in three West African Countries namely Guinea, Sierra Leone and Liberia to spread to other neighboring countries. The close contact of patient and his family with the infected vector (fruit bat or monkey), beside the limited infrastructure in healthcare facilities increased the contiguity of the serious illness or even death. On Feb. 1, 2016, the WHO declared "the cluster of microcephaly cases and other neurological disorders a health emergency" and called for concerted efforts to curb the spread of Zika (the mosquito-borne virus Zika). Knowing the hazards and how to protect yourself and your patient is the key to patient safety. Standard precautions (SP) are the most effective means of preventing transmission of outbreaks and some other infections as multidrug resistant bacteria. These include hand hygiene (HH), personal protective equipments (PPEs, as gloves, masks, goggles, caps, and gowns), cough etiquette, environmental cleaning and sharps management. International health authorities such as WHO and national healthcare facilities are now prepared to involve patient / family in IPC measures including HH, PPEs, environmental cleaning, waste disposal, etc. Posters, brushers, YouTube, Facebook and other social media will help in teaching patient the route of transmission, precautions against infection, his right to ask HCWs to wash their hands and/or to wear PPEs. Last but not least patient / family and visitor have an active role in mitigating the spread of these outbreaks in hospital, at home and community during, after or even before their spread. They should be alert and listen carefully to the instruction of their doctor and nurse. They should also recognize that HH is the most effective tool in preventing the spread of most infections and to wear PPEs gloves or mask when in need. Their cooperation in keeping an environment clean and safe will also help preventing outbreaks.

KEY WORDS: Patient, Family, Outbreaks, Influenza, (MERS-CoV), AIDS, Ebola, Zika,

INTRODUCTION

In the past 20 years or more and until now many outbreaks attacked different areas all over the world. Most of them have occurred in the developing countries. This lecture aims at highlighting the role of patient guided by epidemiologist and infection preventionist in combating outbreaks and pandemics. A pandemic is an epidemic (outbreak) occurring on a scale which crosses international boundaries, usually affecting a large number of people. –a pandemic is a global outbreak. Influenza, Middle East Respiratory syndrome coronavirus (MERS-CoV), HIV/AIDS, Ebola, Zika, Cholera, Polio are examples of these outbreaks.

Influenza A viruses (e.g. H1N5): The first Middle Eastern detection of H5N1 was in Turkey in October 2005, in a flock of "backyard" turkeys. Further detections followed in 7 Balkan countries (Bosnia-

Herzegovina, Bulgaria, Croatia, Greece, Romania, Serbia and Montenegro, and Slovenia; November 2005 – March 2006), more broadly in the Middle East (Egypt, Iraq, Iran, Israel, Jordan, Kuwait, Palestinian Territories; November 2005 – March 2006), and the Caucasus (Azerbaijan and Georgia; January – February 2006) by March 2006. The virus was detected in Sudan and Djibouti in April 2006, and in Saudi Arabia in March 2007⁽¹⁾. Countries in the region yet to record cases include the richest (Bahrain, Qatar, United Arab Emirates) and the poorest (Eritrea, Somalia, Yemen)⁽²⁾. According to a global WHO update on 3 March 2015 there have been 88 human cases of influenza A(H5N1), including 26 deaths reported in Egypt in 2015⁽³⁾. Human cases and fatalities due to influenza A (H5N1) virus continue to increase in Egypt, with cases from the country now accounting for the highest number of human cases reported worldwide. Wild birds play important roles in the circulation of avian influenza viruses and are reservoirs for low pathogenicity strains. In general, avian influenza viruses in wild birds can be

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transmitted to and from poultry, and potentially to and from other domestic animals and people⁽⁴⁾. Continuous increase of virus circulation in backyard poultry and exposure to infected poultry are most probably contributing to the increase in human cases. Whenever avian influenza viruses circulate in poultry, sporadic infections and small clusters of human cases are possible in people exposed to infected poultry or contaminated environments. Although Egypt has reported an increased number of animal-to-human infections over the past few (years), the influenza A(H5) viruses do not appear to transmit easily among people, and no sustained human-to-human transmission has been observed. As such, the risk of these viruses spreading in the community remains low. Increased human infectivity of the circulating virus and the protection conferred by the poultry vaccines currently in use should be further investigated⁽³⁾.

Recently, the Central Administration of Preventive Medicine, General Organization of Veterinary Services in Egypt, informed on the current situation of the new strain of the bird flu virus, H5N8, and announced the emergence of 10 new foci, involving 6 domestic breeding, 3 markets and one farm. These were detected in the governorates of Ash Sharqiyah (3 foci), Cairo, Giza, Ismailia, Beheira, Damietta, Minya. The virus is transmitted by migrating wild birds and wind. The disease, one of the most contagious, transmits steadily over poultry farms exposed to the passage of migratory birds, especially in the north region of the delta, said the general manager of active surveillance of the Department of Preventive Medicine, Dr Tarek Zakaria, on [Thu 23 Feb 2017]: "Up until now, 1100 samples have been withdrawn from household owned backyard birds located in a migratory bird path and demonstrated the emergence of 10 positive foci in 7 provinces. The 1st foci appeared in November [2016] in Damietta, and proved to be positive for infection with bird flu, the latest on [Mon 21 Nov 2016] in Minya⁽⁵⁾.

In order to reduce health risks to wildlife, domestic animals and people, it is important to understand all aspects of the circulation of the broad range of avian influenza viruses among susceptible populations: wild animals, domestic animals and humans⁽⁶⁾.

The following instructions are helpful in this regard: Avoid contact with any birds (poultry or wild birds) or other animals that are sick or are found dead and report them to the relevant authorities. Wash hands properly with soap or a suitable disinfectant. Follow good food safety and good food hygiene practices⁽⁷⁾.

Middle East Respiratory syndrome coronavirus (MERS-CoV): Middle East respiratory syndrome coronavirus (MERS-CoV) is a novel coronavirus which was first identified in a patient in Saudi Arabia in September 2012. In a handful of patients, particularly those with chronic underlying health conditions, the virus may cause severe symptoms

which require intensive care in hospital. Common symptoms are acute respiratory illness with fever, cough, shortness of breath and breathing difficulties. Most patients present with viral pneumonia. Many also present with gastrointestinal symptoms, including diarrhoea. In the Eastern Mediterranean Region, a number of countries (Egypt, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia, Tunisia, Qatar, United Arab Emirates and Yemen have so far reported laboratory-confirmed cases of MERS-CoV. The source of human infection, remain unknown. The current scientific evidence, however, suggest that the virus is circulating in dromedary camels but the route of transmission of virus from camels to humans remain unknown although direct and indirect contact with camels is presumed to a risk factor for transmission of virus in humans⁽⁸⁾.

A close link between the virus found in camels and that found in people in the same geographic area. These and other studies have found MERS-CoV antibodies in camels in Africa and the Middle East. The role camel is questionable especially if we know that some cases have no history of contact to camel. The current pattern of disease appears to be the result of repeated introductions of the virus from camels to people, resulting in limited human-to-human transmission, but not in sustained transmission⁽⁹⁾.

General recommendations: Preliminary results from recent studies in Qatar indicate that people handling or working with camels are at increased risk of infection with MERS-CoV compared with people who do not have contact with camels. Until more evidence is gathered, it is prudent for camel farm workers, slaughterhouse workers, market workers, veterinarians and those handling camels at racing facilities to practice good personal hygiene, including frequent hand washing after touching animals. They should wear facial protection where feasible and protective clothing, which should be removed after work and washed daily. Workers should also avoid exposing family members to soiled work clothing, shoes, or other items that may have come into contact with camel excretions. It is therefore recommended that these clothes and items remain at the workplace for daily washing and that workers have access to and use shower facilities at their workplaces before leaving the premises. Camels infected with MERS-CoV may not show any signs of infection. It is therefore not possible to know whether an animal in a farm, market, race track or slaughterhouse is excreting MERS-CoV that can potentially infect humans. However, infected animals may shed MERS-CoV through nasal and eye discharge, faeces, and potentially in their milk and urine. The virus may also be found in the organs and meat of an infected animal. Therefore, until more is known about infection in animals, the best protection is to practice good hygiene and avoid direct contact with all of these. Obviously sick animals

should never be slaughtered for consumption; dead animals should be safely buried or destroyed⁽⁹⁾.

AIDS:

AIDS is currently a pandemic, with infection rates as high as 25% in southern and eastern Africa.

Over 40 million people around the world are infected with HIV. At least 26 million are workers aged 15 to 49, in the prime of their working lives. The effects are felt by enterprises and national economies as well as workers and their families. The epidemic strikes hard at the most vulnerable groups in society including the poorest of the poor, women and children, exacerbating existing problems of inadequate social protection, gender inequalities, and child labour⁽¹⁰⁾.

Effective national education about safer sexual practices and blood borne infection precautions training have helped to slow down infection rates in several African countries.

Ebola:

Ebola had emerged in three West African Countries namely Guinea, Sierra Leone and Liberia to spread to other neighboring countries. The close contact of patient and his family with the infected vector (fruit bat or monkey), beside the limited infrastructure in healthcare facilities increased the contiguity of the serious illness or even death.

Protocol for reducing risks of Ebola transmission at home:

It is strongly recommended that patients and their contacts with symptoms are immediately evacuated to a health-care facility, ideally an Ebola treatment centre. However, in circumstances where admission is not immediately possible, these guidelines provide the minimum procedures required to protect family members and ensure optimal management of a patient at home. It is important to remember that: 1. Ebola virus disease (EVD) is spread from person to person by contact with blood, vomit, stool, urine, sperm, breast milk (and other body fluids) of persons with the disease; 2. Household members should avoid all direct physical contact with the patients and their body fluids; 3. Contact with materials contaminated by a patient's body fluids, such as clothing and bedding, can spread the disease to others⁽¹¹⁾.

To prevent infection: these recommendations should be followed: 1. The patient should restrict movement to one room in the household and avoid direct contact with other family members; 2. The patient should use one toilet that other household members do not use; 3. Only one person should look after the patient; 4. Caregivers should wear gloves or use towels soaked in bleach to avoid direct contact with the patient and their body fluids (blood, vomit, stool, urine); 5. Caregivers should avoid contact with the patient's body fluids by staying behind or beside the patient while giving care, and never facing the patient; 6. Avoid direct contact with the patient's clothes, bedding and other household items the patient has touched; 7. If the patient has vomit, diar-

rhoea or bleeding, a mask or a dry towel wrapped around the face can be used to protect the nose and mouth when touching the patient or items soiled with blood or body fluids. A waterproof gown, eye protection, gloves and rubber boots should also be worn in these circumstances⁽¹¹⁾.

Zika:

On Feb. 1, 2016, the WHO declared "the cluster of microcephaly cases and other neurological disorders a health emergency" and called for concerted efforts to curb the spread of Zika (the mosquito-borne virus Zika⁽¹²⁾). Zika virus is a single-stranded RNA virus of the *Flaviviridae* family, genus *Flavivirus*. Zika virus is transmitted to humans primarily through the bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*). The mosquito vectors typically breed in domestic water-holding containers; they are aggressive daytime biters and feed both indoors and outdoors near dwellings. Nonhuman and human primates are likely the main reservoirs of the virus, and anthroponotic (human-to-vector-to-human) transmission occurs during outbreaks. Perinatal, in utero, and possible sexual and transfusion transmission events have also been reported. Zika virus RNA has been identified in asymptomatic blood donors during an ongoing outbreak⁽¹³⁾.

WHO recommended that for women who are suspected, or confirmed to have Zika virus infection, guidelines will be developed for clinical follow up, including ultrasonography for prenatal diagnosis of potential microcephaly, assessment of birth outcomes, and psychosocial support and counselling. Standardized protocols for screening and diagnosing microcephaly in newborns will also be developed. This will include guidance on screening and management of associated conditions, such as hearing and vision problems, intellectual and physical disabilities and epilepsy for infants with microcephaly. Further, guidance on treatment, follow up of infants, provision of psychosocial support, counselling of families and parents skills training will be developed. The health and social services sectors, must work together to provide a package of support services (counselling, and social protection) for families to care for their children and address the impact of microcephaly, other congenital anomalies and neurological conditions⁽¹²⁾.

Knowing the hazards and how to protect yourself and your patient is the key to patient safety. Standard precautions (SP) are the most effective means of preventing transmission of outbreaks and some other infections as multidrug resistant bacteria. It is one of the duties healthcare workers (HCW), especially IC nurse to teach patients, family and his visitors SP. Details of SP may differ from one category of diseases to another according to the mode of transmission (contact, droplet or air-borne). SP measures include hand hygiene (HH), personal protective equipments (PPEs, as gloves, masks, goggles, caps, gowns), cough etiquette, environmental cleaning and

sharps management. Patients should be informed by his physician by a brief notes about his disease. The role of his nurse is to explain, guide, and follow up the application of SP by her patient. She can consult IC nurse or/ doctor. Patient should know that using SP is for the sake of himself, other patients and Family. Families and visitors should also keep informed by the same instruction. Again, they will be asked not to wonder here and there in the hospital, not touch patient or hospital items unless they are asked to help by HCW. International health authorities such as WHO and national healthcare facilities are now prepared to involve patient / family in IPC measures including HH, PPEs, environmental cleaning, waste disposal, etc. Posters, brushers, YouTube, Facebook and other social media will help in teaching patient the route of transmission, precautions against infection, his right to ask HCWs to wash their hands and/or to wear PPEs. The active role of family members of not touching their patient without PPEs especially after death and the frequent use of HH share in the end Ebola outbreak in West Africa. Another success story is related to the outbreak of Avian Flu in 2005-2006. Both health and agricultural authorities worked together to mitigate the outbreak. They asked farmers to stop breeding birds in the same living room, also not to transfer birds between governorates and to notify for any dead or diseased birds or human cases especially who were in contact with them.

Also, HCWs and social workers paid a lot of efforts in spreading knowledge about the mode of transmission of HIV and to avoid. Patient helped them by seeking medical advice and not giving blood. Again, relatives and visitors followed the instruction especially safe sex and single use of disposable syringe. HIV/AIDS is nowadays less and less than before. Thanks to HH, using mask by patient, relative or visitor which decrease the incidence of MERS-Cove. Zika is still not emerged in most areas of the Arab World. The presence of *Aedes* species mosquito in some areas even without pathological cases needs more collaboration.

CONCLUSION

Last but not least patient / family and visitor have an active role in mitigating the spread of these outbreaks in hospital, at home and community during, after or even before their spread. Patients should seek medical and stop treatment before cure, otherwise they will be a carrier even they are apparently healthy. Family and relative should be keen on not transmit infections to others and themselves. They should be alert and listen carefully to the instruction of their doctor and nurse. They should also recognize that HH is the most effective tool in preventing the spread of most infections and to wear PPEs gloves or mask when in need. Their cooperation in keeping an environment clean and safe will also help preventing outbreaks.

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