HEALTH RISK ASSESSMENT FOR King Abdel Aziz CAMEL FESTIVAL

BACKGROUND

The camel festival also referred to as *King Abdel Aziz festival* was established in the early 2000 to showcase the rich cultural heritage of the Saudis and indeed other Arab camel breeders and to preserve the purebred camel strains in the Kingdom. The annual mass gathering attracts over 300,000 camels from the Gulf (except Oman), and the vast majority of camels (80%) arrive from within the Kingdom. Additionally over 2 million people are expected to attend the nearly one month event, which will be held from 19 March to 15 April 2017, in Riyadh Saudi Arabia. The highlight of the event include cultural displays, camel racing, traditional dances and the highly celebrated camel beauty contest, which will feature about 30,000 camels in different contest categories.

As a mass gathering, there are huge implications for public health, including the potential threats from communicable diseases outbreaks, road traffic accidents and other injuries. For instance, the event was suspended over the last 2 years due to the threat from the outbreak of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in the Kingdom. Similarly, camels aged less than 2 years are exempted from this year's event, since they tend to harbor more MERS-CoV than older camels. Effective risk management which begins with risk assessment will facilitate the identification of hazards that are potential or actual threats to the event, estimate their odds of occurrence and risks to the population and recommend mitigating measures to deal with the risks. To this end, the Ministry of Health (MOH) conducted an emergency health risk assessment for the festival to ensure the safety and wellbeing of participants and livestock and the contacts of participants after the event.

Context

The camel festival will be held within a 37sqm, predominantly uninhabited desert area, situated about 100km southeast of Riyadh. A temporary accommodation is provided for camels, separate from the living area for humans. The living area is made up of make-shift tents and is located about 8km away from the contest area. There is a buffer zone of 300m between the contest area and the spectator area to limit contact between animals and spectators. Food vendors and temporary eateries are located around the contest area within the specified buffer zone.

General capacity assessment

The MOH has designated 2 primary health centers as health clinics to cover the event. These health units are located within contest area. Closer to the main event setting area with proximity to Royal participants assigned area, Additionally a helipad is situated about 1,2 km away from the health clinics and may facilitate the air transfer of critically ill patients to designated hospitals in Riyadh. The closest referral hospital (Ramah hospital) is located about 38 km (23 min / driving) from the health centres. The hospital has emergency, general surgery, pediatrics and obstetrics and gynecology sections. However, Ramah hospital could serve at primary staging hospital to pre identified hospitals as National guards (130 Km), King Fahd medical city hospital (147 Km), other MOH hospitals which all within 150 Km radius could be reached by air ambulance.

Recommendation

1. Increase the number of health units to 4 primary health centers supported by mobile medical teams to be located in crowed accessible intervals not more than 20 min walking distance , covering accommodation, and events areas .
2. Train staff to for emergency response to disease outbreaks and other emergencies.
3. Provide emergence air ambulance for safe evacuation of critically ill patients to designated hospitals
4. Provide referral hospitals for projected cases and mass causality incidence based on pre agreed arrangement for referrals

Environmental Hazards

Environmental hazards, such as sandstorm, heatwave, rain and floods are potential public health threats that could impact on the festival. The estimated average temperature expected during the festival is 30^0c and the weather is expected to be mostly sunny and partly cloudy. It is suggested that severe storms could occur in early April and rainstorms are expected in mid-April. The intensity of these events may determine the risks to participants during the event. Sandstorms may occur during the event, due to its location in the desert area of Riyadh. Severe heat illnesses such as heat exhaustion

and heat stroke may be uncommon; however dehydration and heat cramps could occur due to prolonged sun exposure during the event.

Recommendation

1. Liaise with meteorologist to ensure regular monitoring of weather conditions during the event
2. Incorporate environmental hazard prevention strategies in health education messages and disseminate widely among participants
3. Provide a functional environmental hazard emergency plan as part of the general emergency plan for the event
4. Train healthcare workers with skills for managing heat illnesses, such as dehydration and heat cramps
5. Ensure there is a contingency plan for relocation of camps, if an environmental hazard poses a threat during the games

Middle East Respiratory Syndrome Coronavirus

Since the onset of the outbreak of MERS-CoV in 2012, the Saudi MOH has reported 1555 cases of the disease, including ~ 40% mortality in KSA. Since 2017, 17 cases, including 4 deaths have been reported in the Kingdom, with the majority of cases reported in Buraidah, Qassim Region. MERS-CoV is a zoonotic disease that is potentially transmitted from infected dromedary camels to humans through contact. Infected animals may shed the virus through eye and nasal secretions, faeces, as well as potentially through their dairy products and urine. Adults aged 60 years and above, as well as those with coexisting medical conditions are at risks of severe disease. Nosocomial transmission of MERS-CoV is associated with infection prevention and control protocol in hospital.

The festival potentially provides a medium for contact between camels, their secretions and products and humans. However, the Ministry of Agriculture and the MOH has a surveillance and response plan for MERS-CoV in the Kingdom. There are designated hospitals in Riyadh for the isolation and treatment of suspected cases of MERS-CoV and currently there is no hospital-associated outbreak of the disease in the Kingdom. Due to insufficient information about the epidemiology of the disease and the long incubation period (14days)-potential for asymptomatic carriers to transmit the disease in a mass gathering- , there is a medium risk of a festival-associated outbreak of MERS-CoV.

Recommendation

1. Provide health education messages to highlight good hygiene, use of face mask and limited contact with camels and their dairy products during the event.
2. Screen camels and their handlers before the event, within 2 weeks of commencement of the event and at the end of the event for MERS-CoV. All animal and human asymptomatic carriers of MERS-CoV should be excluded from the event.

3. Develop a protocol for detecting, investigating and responding to suspected cases of MERS-CoV during the event. Surveillance plan should include a syndromic approach that reports the absence of camel handlers during the event.
4. Standard infection control protocol should be implemented in all health facilities to prevent nosocomial transmission of MERS-CoV
5. An infectious diseases ambulance for the safe evacuation of suspected cases of MERS-CoV should be provided for the event.

Rift Valley Fever

Rift valley fever (RVF) is a zoonotic hemorrhagic viral disease transmitted to humans by infected animals. The last known outbreak of RVF in Saudi Arabia was reported in 2000. Currently, no outbreak of the disease has been reported in the Gulf, but RVF was reported in August 2016 in Niger, Africa. Currently, the risk of RVF during the festival is very low, but there is need for surveillance to detect any cases of the disease during to the anticipated close interaction between animals and humans during the festival.

Recommendation

1. Ensure surveillance for vector-borne diseases during the festival
2. Provide vector control initiatives, such insecticide spraying of the area before and during the games

Bronchial Asthma/Chronic Obstructive Airway Disease

Bronchial Asthma is among the leading causes of chronic morbidity in Saudi Arabia. Over 2 million Saudis suffer from Bronchial Asthma (Al-Frayh et al), and both indoor and outdoor air pollution contribute significantly to the rising trend of the disease in Saudi Arabia. Potentially, many participants would be exposed to dust and other outdoor pollutants during this event and this may trigger episodes of exacerbated bronchial asthma among participants

Recommendation

1. Encourage the use of facemask and promote other risk reduction activities
2. Smoking should be restricted within the tents and other designated areas
3. Ensure adequate supply of bronchodilators, including nebulized salbutamol and inhalers during the event

Snakes and Scorpion bites

Certain types of snakes and scorpions are typically found in Riyadh desert areas. These may constitute public health threats during the festival. A study showed that most cases of snake bites occur in the lower limbs and are caused by *cerastes cerastes gasperetti*. Fortunate enough the lowest incidence

usually during March and April, In a five-year period (2005-2010), there were 1019 cases of snake bites, including 1 fatality in Riyadh. (Al-Sadoon 2014)

Recommendation

1. Promote awareness about snake bites prevention and control among participants
2. Ensure adequate supply of symptomatic treatment medication , anti-allergy, and anti-venoms in health centers
3. Train healthcare workers to recognize the clinical features of snake bites and the proper management.

Foodborne diseases

Foodborne diseases outbreaks occur commonly worldwide. So far, in 2017, 14 outbreaks of foodborne diseases have been reported Riyadh. Many of these outbreaks are transmitted among individuals sharing the same food.

During the festival, it is likely that 48 food venders, on recognized food chains, beside local producers, food quality monitoring is mandated to municipality, while surveillance system only detect suspected cases at health facilities, which would increase the risk of an outbreak from foodborne diseases. Furthermore, poor storage of cooked food by participants living in tents may increase the vulnerability to foodborne diseases. Although foodborne diseases outbreaks may not result in high mortality during the event, it may impinge on the legacy of the festival. To mitigate these threats, health units may provide early intervention for potential cases if they operate for 24hours and are extended to provide services in the living areas.

Recommendation

1. Provide health education to promote hand hygiene, food storage and health-seeking behavior among participants using leaflets, fliers and loud speakers(especially in the tent areas)
2. Provide potable drinking water
3. Regulate the operations of food vendors and eateries to ensure they comply with standard food safety practices
4. Provide 2 health units within the tent areas to increase access to health services
5. Ensure active surveillance for foodborne diseases outbreak during the festival

Road Traffic Accidents and Injuries

Road traffic accidents (RTA) and injuries occur commonly during mass gatherings. Young people tend to drive fast cars at high speeds in desert areas. Additionally, gun violence and acts of terrorism may occur between tribal groups and could be perpetrated by aggrieved parties or those who disagree with the hosting of the festival.

Recommendation

1. Reinforce health education through social media platforms and other electronic media to prevent over speeding
2. Ensure animals are safely removed from traffic areas
3. Ensure road signs are provided at designated locations and install speed breakers/bumps at designated areas
4. Provide a toll free emergency line for the games
5. Provide an emergency team, including first responders at designated location and provide safe evacuation plan for critically injured people to designated hospital.
6. Provide an emergency response plan with an incident command system for the festival.

Fire Emergencies

Fire emergencies are also common during mass gatherings. The living area, which is composed of tents and make-shift accommodation are at increased risk of fire emergencies compared to other areas, since participants are obliged to cook their own meals. Other potential sources of fire could be related to smoking and electrical appliances malfunctioning. Fire incidents may spread quickly to other areas due to high wind and rising atmospheric temperatures that are expected during the period of the games

Recommendation

1. Provide health education to reinforce fire safety practices
2. Install user-friendly fire safety equipment in the tent areas and provide clear instruction for use
3. Recommend the use of fire-proof tents during the games
4. Provide health safety training for staff, as minimum requirement for participation in the games
5. Provide an emergency protocol for responding to fire emergencies during the festival

Conclusion

Many hazards could occur during mass gatherings, such as the camel festival. RTA, MERS-CoV, environmental hazards and foodborne diseases outbreak may pose significant threats during the event. Health education is vital for prevention and there is need to boost existing capacity by providing more health units, training of staff and the requisite infrastructure, including medical supplies for a successful event.