Prevention & Control of Communicable Diseases During and After The Flood; Kelantan Experience.

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Outline of Presentation

- Introduction
- Common Diseases Related to Flood
- Risk factor of CD & Factors Favouring Diseases Outbreak
- Kelantan Experience;
  - Prevention & Control Activities
  - Overview of Communicable Diseases Related to Flood.
Introduction

• Flood are the most common natural disaster in both developed and developing countries, and they are occasionally of devastating impact, as the floods in China in 1959, Bangladesh in 1974 and the tsunami in Southeast Asia in December 2004.

• Their impacts on health vary between populations for reasons relating to population vulnerability and type of flood event (Epidemiologic Review 2005:36-46, http://epirev.oxfordjournals.org/)

• Flooding is associated with an increased risk of infection. However, this risk is low unless there is significant population displacement or water sources are disrupted (WHO 2007)

• Eg: Measles' outbreak in Sudan 1980 - due to flood complicated by population displacement & cholera outbreak (O1, El Tor, Ogawa) in India 1998
Flood could increase the transmission of:

- **Water-borne diseases**, such as typhoid fever, cholera, hepatitis A & Leptospirosis
  - Leptospirosis - zoonotic diseases contracted through contact of skin and mucous membrane with water or environment contaminated with infected animal urine; esp. rodent (rat)
  - Flooding facilitated the spread by proliferation of rodents which shed large amounts of leptospires in the urine
Common Communicable Diseases related to flood

Flood could increase the transmission of:

• Vector-borne diseases, such as malaria & dengue - stagnant water promote breeding sites for mosquitoes.

• Heavy dust- increased risk of respiratory infection

• Infected soil- increased risk of melioidosis
Key Factors in Prevention & Control of Communicable Diseases Post Flood:

• Factors causing them@ risk factor
• Mode of Transmission
• Management of Infectious/Communicable Diseases
• Preventive intervention to control the spread of the Communicable diseases
1. **Presence of pathogens**
   - Typhoid is endemic in Kelantan
   - Incidence of leptospirosis increases in Kelantan since 2014 (before flood)

2. **Displacement of population**
   - Kelantan - 312,000 people evacuated to gazetted evacuation centre

3. **Change in environment**
   - Increase risk in transmission of diseases such as contamination of water due to cross contamination between water source & sewage line

4. **Disruption of basic public utilities**
   - Include water pipe line, water source (open/tube well) or sewage system - causes FWBD.

5. **Lack of basic health services** - service disruption

6. **Food Shortage** - malnutrition and prone to infection
Factors Favouring Disease Outbreak

- Compromised sources of water
- Displacement of large numbers of people
- Temporary sheltering/evacuation centre in crowded conditions
- Inadequate sanitation
- Compromised waste management
- Potential food shortages
- Malnutrition/malnourishment
- Level of immunity
- Ongoing outbreaks prior to flood
Kelantan Experience; Prevention & Control of Communicable Disease During & After Flood...
Establishment of Health Team at Flood Operation Centre

- Flood operation centre at state level was immediately activated when flood involved two districts.
- Large Flood 2014 (Bah Kuning):
  - Kelantan has experienced a large flood from 18th December 2014 till 5th January 2015.
  - Seven teams was formed under Flood Management Committee at state level and health team was one the committee members.
- Operation centre was running for 24 hours/day, and the staffs in charge had been scheduled according to shift system (8 hourly/per shift)
Organization chart of Flood Operation Centre

Komandan PKOB Kesihatan Pengarah Kesihatan Negeri

Timbalan Komandan PKOB kesihatan TPKN (Kesihatan Awam)

Urusetia CPRC

- Kesihatan Awam KPP Epid CDC
- Perubatan TPKN (Perubatan)
- Bantuan Luar KPP NCD LSD
- Logistik TPKN (Pengurusan)
- Kejuruteraan KPP (Kejuruteraan)
- Pembersihan TPKN (Pergigian)
- Psikososial KPP NCD (MeSVIPP)
Term of references of health team at State Level

• Epidemiology & surveillance of diseases
  • Establish disease surveillance system
  • Monitoring and Evaluation disease control activities; using designated form (Guidelines of Flood Management, KKM 2008)

• Ensure stockpile for disinfectant, abate, chlorine, PPE, and health education materials are adequate

• Monitoring of disease control activities at evacuation centres

• Necessities health staffs deployment either from local and outside Kelantan to utilised the services at evacuation centre and community (flood area).

• Monitoring of staff welfare in term of psychological preparedness in doing their routine activities
Task of Surveillance and Rapid Response Team (Health Team)

- Rapid assessment of epidemic-prone infectious diseases at evacuation center and community affected flood.

- Enhance existing surveillance system
  - Daily monitoring of IID, ARI (health clinic)
  - Daily monitoring of AGE cases in hospital (A& E & wad)
  - Lab surveillance for FWBD; stool sample taken for every 4th AGE cases at health clinic. 560 sample taken; no cholera & 4 +ve rotavirus.
  - Daily monitoring of Leptospirosis cases and ICU cases for anticipation of severe cases.

- Establishing surveillance in evacuation center
- Investigation and control of infectious diseases
- Follow up on the implementation of sanitation and health measures
Prevention & Diseases Control Activities at Evacuation Centres

- Evacuation centres with > 1000 flood victims: static team should be placed for 24 hours
- Evacuation centers with 500-1000 flood victims: mobile team should be placed for 8 working hours
- Evacuation centers with < 500 flood victims: Daily visit by mobile team
- Monitoring of disease at evacuation centres - data collection format

<table>
<thead>
<tr>
<th>Daerah</th>
<th>Pusat Pemindahan Banjir (Nama)</th>
<th>AGE</th>
<th>ARI</th>
<th>Konjunctivitis</th>
<th>Skin Infection</th>
<th>Demam (Tiada Simptom Lain)</th>
<th>HFMD</th>
<th>Typhoid</th>
<th>**Lain-lain Penyakit Berjangkit</th>
<th>Leptospirosis</th>
<th>Chicken Pox</th>
<th>Denggi</th>
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<tbody>
<tr>
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<td>Harian</td>
<td>Kum ulatif</td>
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<td>Kum ulatif</td>
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<td>Kum ulatif</td>
<td>Harian</td>
<td>Kum ulatif</td>
<td>Harian</td>
</tr>
<tr>
<td>Gua Musang</td>
<td>BALAIRAYA ARING</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kel (11/2)</td>
<td></td>
<td>0</td>
<td>539</td>
<td>0</td>
<td>288 1</td>
<td>0</td>
<td>94</td>
<td>0</td>
<td>203   0</td>
<td>178 0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Task of Health Team During Flood (District)

- To ensure the evacuation centers are clean and healthy
- To keep updated regarding the number of the victims at the evacuation centers
- To detect the presence of LILATI & their breeding areas and subsequently act accordingly
- To ensure the safety and hygiene of the basic facilities such as toilets and disposal areas
- To investigate any reported communicable diseases among victims at the evacuation centers and to do the preventive measures
- To perform disease control measures at the evacuation centers such as disinfection of the premises
- To deliver the information regarding health education especially on infection control, self-hygiene and food safety
- To cooperate with other agencies to ensure the evacuation centers are always safe and clean
- To provide daily report regarding the activities of the health team to the CPRC
Prevention & Control of Communicable diseases: Post Flood

- Increase Surveillance And Disease Control Activities
- Identifying Common Health Risks
- Risk Communication Of Related Diseases;
  - Health education activities
  - Media (radio, TV and press release)
- Improving Sanitation And Hygiene
- Water Supply Chlorination
- Food Safety Activities
- Sanitation assessment at the flood affected areas especially involving basic infrastructure such as safe water supply (GFS, private/regulated well), toilet, as well as water supply to the estate (bekalan air ladang)
- Implement remedial action on affected basic health infrastructure at the flood area
- Proper disposal of the flood wastes and carcass in order to prevent breeding places and environmental pollution.
Monitor The Health Status of Staff & Volunteers

- Distribution of health alert card
- Checklist monitoring the health status of staff and volunteers
• To provide risk assessment regarding fWBD and assess the level of destruction of sanitation and its related facilities at the affected areas such as toilets, GFS and wells. Water samples taken will be analyzed within 24 hours and action is to be taken immediately
• To perform chlorination of the all water supplies (at least 0.5ppm)
• To restore the affected health-related basic facilities as soon as possible
• To assess the standard of safety and hygiene of food premises in order to restart the operation
• To assess the environmental hygiene in order to control the presence of LILATI
• To destroy all the dead animals and related biological wastage that can contribute to infections
• To involve with surveillance regarding the occurrence of communicable diseases among the victims such as leptospirosis, food water borne diseases and vector borne diseases.
• To deliver health education to the population at the affected areas.
• To do assessment on the evacuation centers to ensure they are clean and safe to be operated normally
New strategies: Flood Preparedness Dealing with Unexpected Events.

• Formation of Public Health Response Team- (PHRT) - lead by Public Heath Specialist
  • to increase the level of preparedness toward flood related diseases.
  • the team will be equipted with transport, instruments eg; spray can, fogging machine, PPE, mobile tank, sleeping bag, life jacket & food ration.
• The team members will be trained for special survival and disaster preparedness course
## Prevention And Control Activities during & After Flood 2014

<table>
<thead>
<tr>
<th>Activities</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sanitation Inspection</strong></td>
<td></td>
</tr>
<tr>
<td>- No of villages visited</td>
<td>1956 (100%)</td>
</tr>
<tr>
<td>- No house visited</td>
<td>71,283 (100%)</td>
</tr>
<tr>
<td><strong>Chlorination</strong></td>
<td>42,725 (100%)</td>
</tr>
<tr>
<td><strong>Premise disinfection</strong></td>
<td>30,477</td>
</tr>
<tr>
<td><strong>Vector borne control</strong></td>
<td></td>
</tr>
<tr>
<td>- Larvaciding</td>
<td>3,044</td>
</tr>
<tr>
<td>- Fogging</td>
<td>4,500</td>
</tr>
<tr>
<td><strong>Lilati control</strong></td>
<td>3,854</td>
</tr>
<tr>
<td><strong>Health promotion</strong></td>
<td></td>
</tr>
<tr>
<td>- Talk</td>
<td>126</td>
</tr>
<tr>
<td>- Individual advice &amp; demonstration</td>
<td>5,3870</td>
</tr>
<tr>
<td>- Public Announcement</td>
<td>6,329</td>
</tr>
<tr>
<td>- Distribution of flyer, bunting &amp; banner</td>
<td>60,918</td>
</tr>
<tr>
<td><strong>Distribution of Hand Sanitizer</strong></td>
<td>1,700 (60ml), 2,190 (500ml)</td>
</tr>
</tbody>
</table>
# Food Safety Activities

Flood affected premises had to dispose all food that being spoilt due to flood.

Food premises being inspected for ensuring that premises were able to operated without compromised of food safety and quality.

<table>
<thead>
<tr>
<th>Premises</th>
<th>No. Inspection done</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Restaurant</td>
<td>131</td>
<td>0</td>
</tr>
<tr>
<td>Food loft (Gerai)</td>
<td>111</td>
<td>0</td>
</tr>
<tr>
<td>Canteen/kitchen</td>
<td>370</td>
<td>0</td>
</tr>
<tr>
<td>Food Factory</td>
<td>77</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>689</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>
Involvement of Intra and Interstate Agencies including NGOs in Prevention & Control of CD.

• Deployment of health staff for health team from other state - 500 personnel including from JKN Johor
• Management of domestic Sewage conducted by local authority and assisted by volunteers from other states & NGOs
Challenges: Control of Infectious Diseases During & After Flood in Kelantan

- Disrupted Water Supply
- Water Contamination
- Environmental Contamination
  - Domestic sewage, animal carcass
- Lack of stock pile for chlorine, disinfectant & hand sanitizer
- Inaccessible area due to disrupted road /transport issue- delayed in prevention activities
- Lack of Human resources
  - > 30% of Health staff- flood victim
Flood Related Communicable Diseases In Kelantan 2014/2015
AGE cases 3 fold increased (600-1200/week post flood compare 300 cases before flood)

Post Flood: consultation rate of AGE cases increased.

One episode of FP (evacuation centre) dan no cholera cases reported
Comparison of Typhoid Incidence in Kelantan & Malaysia; 2003-2014

Typhoid fever still endemic in Kelantan and the incidence rate - highest in Malaysia.
Typhoid cases increased in 2005 related to large flood in 2004. 2015, typhoid cases also increased compared to cases in 2010-2014, most probably related to large flood 2014.
Typhoid cases did not increase immediately after flood in 2015; the number of typhoid cases started to increase in Epid Week 25, which was 6/12 after flood, the same situation occurred in 2005...4/12 after flood.
Why Typhoid still ongoing ?... Endemic in Kelantan

• Healthy Carrier
• Cases have not been clean-up
• Personal Hygiene
• Vaccination for food handler
• Food Premises
• Sanitation/Water supply
Prevention & Control of Typhoid

Strengthen of The Typhoid Initiative program (2005) with focus on:

- Health Promotion
- Surveillance & field control
- Management of cases, contact & carrier
- Environmental sanitation
  - **Chlorination**
  - Safe water supply
  - Safe food practices
    - Food premises inspection
    - Anti typhoid vaccination for food handler
    - Enforcement of Food Hygiene Regulation 2009
- Involvement of other agencies; eg Education department, Local Authority (PBT) etc.
Number of Leptospirosis Cases in Kelantan 2014 – 2015 (Epid Week 33)

- Leptospirosis in Kelantan start to increase at EW 34/2014.
- Leptospirosis cases increased by 3-fold after flood, then reducing in trend but still above epidemic level (26 cases/week).
- Till EW 33- 1386 cases were reported compared to 447 Cases in 2014.
Prevention & Control of Leptospirosis

Risk factor for leptospirosis In Kelantan:
- Poor environmental sanitation (presence of rats)
- Occupation related to agricultural

Action focus on:
- Health promotion
- Advice on using PPE
- Early detection & treatment
Melioidosis

- Melioidosis is not included as a notifiable disease under CDC Act 1988, administrative instruction to report began in January 2015.
- No significant increase of melioidosis cases related to flood in Kelantan
- Till EW 38; 17 cases of melioidosis were reported whereby 8 cases were reported 2 month after flood and only 3 cases were related to flood
• Dengue cases was not increased after flood 2014.
• The number of cases start to increase in Epid Week 29, that was 2 weeks after Hari Raya Aidil Fitri.
• The increasing cases probably related to the influx of Kelantanase from Klang Valley to celebrate Hari Raya in Kelantan.
**Haze Post Flood**

Flooding areas were left with thick yellowish mud
- It would dry up and became flying dust

**Effect of dust**
- Eye irritation
- Skin irritation
- Respiratory effect (runny nose, cough, shortness of breath)

**Advice to public**
- Reduce outdoor activities
- Wearing face mask when doing cleaning activities
- Drink plenty of water
Increased trend of ARI Post Flood, then reducing trend but increased at EW 29 & 30, most probably due to hot weather and dust...
Controlling communicable diseases related to flood: Adequate preparedness
Risk assessment and hazard management

- Proper placement of evacuation centre
- Adequate sanitation
- Adequate personal hygiene/using PPE
- Vector/Lilatin control
- Provision of clean water/Chlorination
- Health education
- Adequate and clean food

Factors that play key roles in controlling communicable diseases related to flood

✓ Strengthen the prevention & control activities Pre, During & Post Flood.
Thank you very much...