

**KERTAS SAINTIFIK****HOLISTIC APPROACH IN CHOLERA OUTBREAK: THE PETALING EXPERIENCED**

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**ABSTRACT**

*A cholera outbreak reported at the end of June 2001, from the Midlands Estate Petaling gave rise to three (3) cases and fifteen (15) carriers identified. An investigation was conducted to understand the epidemiological characteristic, identify the source of the outbreak and effective control measures. Upon notification, quick and prompt actions were taken including active case detection. Nine hundred and fifty (950) contacts of the whole estate and neighbouring population and one hundred and forty-four (144) food handlers were examined and rectal swabs were taken. Daily morbidity data were collected and recorded for analysis. Disinfections spraying, inspection of drinking water supply, sewage disposal and vector survey was done. Twenty-two (22) and thirty-seven (37) water and food samples respectively together with twelve (12) environmental swabs were taken for *Vibrio cholerae* analysis. To control the outbreak comprehensively, several relevant agencies were consulted to participate actively as one team in combating the outbreak. The Selangor State Exco and the Head of State were also very committed in tackling the disease. Shah Alam City Council, Indah Water Consortium, Selangor State Economic Development Corporation, Selangor Water Department, and Alam Flora were directed to act swiftly with Selangor State Health Department and Petaling District Health Office to upgrade the infrastructure facilities and the sanitary hygiene in that area. Potable water supply, proper disposal of waste and sewage system were temporarily installed. The residents were also promised by the authorities to be shifted to nearby low-cost housing scheme in a month's time. Concurrently, activities on active case detection and a health education programme are continuously conducted to ensure that the outbreak is being contained. Lectures, dialogues session, counseling and distribution of health education materials were carried out to ensure that the people understand the disease. During this one-week outbreak, three (3) cases and fifteen (15) carriers were identified. The fifteen (15) carriers were identified through active case detection. Both cases and carriers were that of *Vibrio cholerae* serotype Ogawa. No death was reported. A total of thirty-three (33) food premises were closed under the Communicable Disease Control Act 1988. The environmental swab taken from the rubber band covering a leakage from the main pipe was positive for *Vibrio cholerae*. This pipe supplies the drinking water to the residents in the estate. This outbreak was primarily due to poor and inadequate infrastructure that led to cross contamination between the drinking water and the sewage system. Effective and comprehensive preventive and control measures were taken to contain this outbreak within the estate, implicating the importance of thorough investigation and active case detection together with the sustainable networking and commitment between the various agencies.*

**INTRODUCTION**

Petaling, a district in the state of Selangor, Peninsular Malaysia, is rapidly experiencing urbanization. Nevertheless, the water borne diseases is still a problem to public health, due to the existence of squatters and disused estate areas, which lacks basic amenities infrastructure. Factors associated with precarious living and environmental conditions are frequently cited as major obstacles for the control of cholera outbreaks and epidemics (Gerolomo M, 2000). For the past five years, there were eighty-two (82) cases of cholera that has been detected in the Petaling district (Petaling District Health Office Annual Report 2000).

Midlands's estate with a population of 1,000 people is an example of an occupied disused estate area. The Midlands estate in Shah Alam City is situated adjacent to the Federal Highway. The

peoples here did not work in the estates anymore; they are working with the firms and other sectors in the vicinity. All of them who still occupied the estate will be shifted to a Selangor State Economic Development Corporation housing estate nearby, which is still under-construction.

Midland's estate is divided into two areas based on the terrain. The area that was earlier developed, is located on a higher ground compared with the other area. Since it is a disused estate, all the facilities, such as basic housing, a clean water supply, toilet, sewerage and solid waste disposal is not provided and monitored. Hence, the surrounding and the sanitation are dirty and neglected. Rubbish and solid waste, faeces and animals excrete were littered indiscreetly. Furthermore, the house compounds are dirty with poor sewerage system, and stagnant with water particularly at the lower area. The sewerage water from the higher ground flows through to the lower area of the house's compound and stagnated there. It is vividly visible

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that the water pipe and its hose was joint to the main pipe by the residents for water supply and domestic consumption. It is noticed that the hose is leaked and the clean water is mixed with the sewer water.

In May, this year (which was one month prior to this present outbreak), there was a cholera outbreak in this estate, which involved five cases. Most of the patients involved was staying in the higher ground. Three weeks after the outbreak, there was a flash flood in that area. All the area is submerged. One week after the flood, this present outbreak was notified.

The first case reported to Petaling District Health Office, was 39 years old Indian lady who is a resident of this estate. She complained of abdominal pain and diarrhoea after taken her meals, which was cooked by her at home. She also drinks unboiled water from the pipe of her house. On the 29<sup>th</sup> June 2001, after four days admitted to the hospital, it was found from the analysis sample of her faeces, positive *Vibrio cholerae* serotaip Ogawa.

## METHODS

Petaling Health District Office has been notified by Tengku Ampuan Rahimah Hospital, Klang on the 29<sup>th</sup> June 2001 at 4.00 p.m. An investigation has been conducted by the District Medical Officer of Health together with his Health Inspector team and directed prompt opening of a 24 hour operational room. Appropriate investigation and control teams were immediately formed. Daily feedback on preventive and control of the outbreak were reported to the Selangor State Health Departement.

Cases and their contacts were investigated via direct interviews using a standardized questionnaire set up by the Ministry of Health. The Case was defined as patient identified as having clinical symptom i.e. abdominal pain and prolonged diarrhoea together with positive *Vibrio cholerae* in the faeces. The carrier is a non-clinical symptom, however his faeces are a *Vibrio cholerae* positive.

A hypothesis was put forward to guide for epidemiological investigation plan in identifying the source of the outbreak and to control it effectively. The intervening period of the hypothesis of the outbreak is due to drinking water that was contaminated with the *Vibrio cholerae* bacteria. The hypothesis was made based on the epidemiological research case and the carrier was found as below,

1. Majority of those positive were housewives and primary school children who gave no history of consuming food outside this estate.
2. All cases and the carrier's history shown that they always drink from the un boiled water pipe.
3. Splash floods occurred a week from the outbreak and had submerged the leaking hose pipe.
4. Their houses are in proximity and they get their water supply from the same source.

5. Most of their food taken is home cooked.
6. Their history on outside food taken is different and from miscellaneous places.

Active case detection was instituted whereby nine hundred and fifty (950) contacts and forty-four (44) food handlers were examined and rectal swabs taken. Disinfectant spraying with Lysol at waste disposal site, sewage water and toilets were carried out. Thirty- seven (37) food premises were screened with subsequent thirty-three (33) food premises closed under Communicable Disease Control Act 1988. A total of twenty-two (22) and thirty-seven (37) water and foods samples respectively together with twelve (12) environmental swabs were taken for *Vibrio cholerae* analysis.

Two educational lectures and few reinforcement dialogues with the villagers, including a video session was held and seven hundred and fifty eight (758) health pamphlets were circulated to raise their awareness on cholera disease.

A comprehensive discussion chaired by Chief Minister of Selangor in collaboration with Selangor State Economic Development Corporation, Shah Alam City Council, Indah Water Consortium, Alam Flora and Selangor Water Department further enhanced a holistic approach and remedial actions to contain the outbreak. A mass public co-operation were held for two consecutive days with multilevel and intra-agencies participation to upgrade the cleanliness of the area. Shah Alam City Council has provided the machinery to maintain the existing drain and to clean the estate. Fifteen units of the mobile toilet were also provided to the estate residents. Alam Flora that is responsible for the rubbish collection of this area had increase the frequency of rubbish collection to this area. Indah Water Consortium, the national sewerage operator came to clear the septic tank and improved the sewerage system. Selangor State Economic Development Corporation also allocate and distribute some of the low cost houses to Midland estate resident. Selangor Water Department provided the estate with static water tank for potable water supply. All illegal tapings and connections of water supply were disconnected. The chlorine content and quality inspection of the water supply was also check regularly to ensure safe drinking water to the consumers.

## RESULT

The outbreak was successively controlled within one week. A total of three (3) cases were reported and fifteen (15) carriers were identified through active case detection. Both cases and carriers were *Vibrio cholerae* serotype Ogawa . All of them are Midland's estate residents. No death was reported. Their distribution by sex and social status were as described in Table 1 and Figure 1.

As in figure 1, most were of sedentary community members ( 71%) with no active

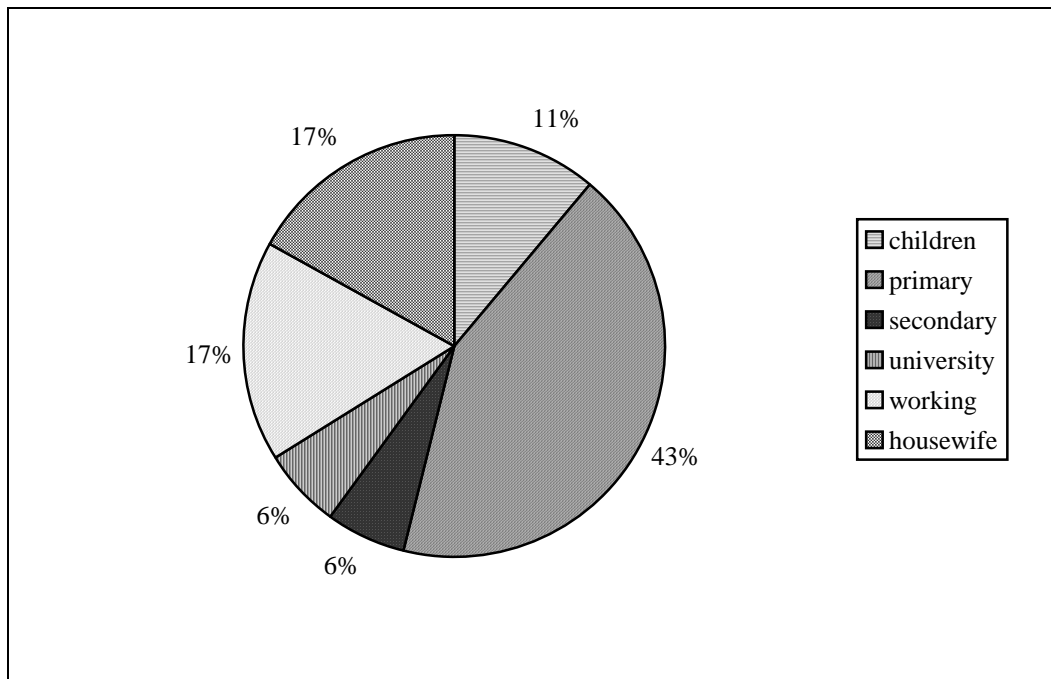
movement elsewhere. Their eating habits were also widely discrepancy between each other and most cooked on their own. This further reinforced the hypotheses that the cholera outbreak was from Midlands itself. Environmental swab taken from the rubber band covering a leakage from the main pipe was positive for *Vibrio cholerae*. The pipe supplies the drinking water to the residents in the estate. These further reinforce the above statement. All food samples sent for analyses were negative. The

operational room was closed on 15.7.2001 after no more cases were detected since 5.7.2001.

**Table 1: Distribution of cases and carriers by gender**

Sex	Cases	Carriers	Total
Men	2	8	10
Women	1	7	8
Total	3	15	18

**Figure 1: Distribution of cases and carriers by social status**



**DISCUSSION**

Cholera is spread by contaminated water and food. Bacteria *Vibrio cholerae* from the water supply recently caused the cholera outbreak in Midland Estate. This had been proven by the samples taken from various locations and the results shown that the rubber band that was used to wrap the leakage water pipe tested positive with *Vibrio cholerae*. In addition to the aforesaid, the estate residents are used to drink water straight from the tap without boiling the water.

The sewerage system in this estate was in bad condition and some houses have not even had a proper toilet facility. The flooding that hit the estate before the outbreak have contaminated the water supply since most of the houses and the water pipes were submerged under water. As mentioned earlier, because of the terrain, sewerage water from the houses at the higher ground flows down and contaminated the clean water. This include sewerage water from patient’s house of the first outbreak. The water supply to the household is by series of rubber

hoses that have not been laid properly and most of them leaked. The improper illegal connections and tapings of the main supply pipe by the residents have contributed to the contamination of the water supply during the flood even though, the water supply by Selangor Water Department is potable and safe. In 1998, an explosive epidemic of cholera in the district of Malda in the state of West Bengal, was also induced by contaminated water following devastating floods (D Sur et al, 2000) .

The sanitation in the estate is in depleted conditions. The cattle waste was scattered all over the housing area and there was also no proper drainage system to channel the waste- water to the drain. Excreta and household waste that were disposed indiscriminately had a high probability of contaminating environment and water sources . D Sur et al, (2000) said in West Bengal, lack of clean water, overcrowding, insufficient understanding of personal and domestic hygiene, nutritional deficiency and overall poor sanitation are the major contributing factors for the spread of diarrhoeagenic

enteropathogens and appearance of epidemic of diarrhoeal diseases particularly cholera. He also discovered that where diarrhoe is endemic throughout the year, the risk of an outbreak is enhanced many folds following natural disasters especially floods.

The government has arrange and mobilize all agencies involve to improve the infrastructure and to upgrade the sewerage and sanitation system of the estate. It was a collaboration that produced extremely useful results. When cholera appears in a community, it is essential to ensure three things; hygiene disposal of human feaces, an adequate supply of safe drinking water and good food hygiene (WHO Fact Sheet,2000). Having an adequate tap water supply is of maximum priority for cholera prevention (Geromolo M,2000).

The experience in containing the outbreak has proved that the importance of integrated activities from all aspect of controlling and prevention and joint-effort from various agencies. The controlling of the outbreak started when the hospital expeditedly notified the Health District Office. The result from the intensive and comprehensive case investigation coupled with prompt preventive and control measures together with the cooperation from the interagency and the participation from the state resulted in the outbreak confining in the estate within a short period of time i.e one week.

Active case detection has been conducted on almost all the residents of the estate and has detected 15 carriers. Integrated activities with all the agencies have eventually upgraded the infrastructure facilities and sanitation in the area. Lectures on health, counseling, dialogues and distribution of health pamphlets have aware the estate residents on self-hygiene, sanitation and healthy life style. For a long term controlling approach, they will be moved to new houses with better infrastructure facilities

which is more decent and suitable for a living. Thus this will ensure that there will be no more similar outbreak occurred.

## **CONCLUSION**

Proactive actions such as active case detection have to be increased in order to formulate new effective strategies. The immediate and coordinated prevention and control system with the participation and commitment of various agencies are needed in order to control the outbreak in shortest time possible.

## **ACKNOWLEDGEMENT**

We wish to thank all the agencies that had been participated actively in controlling the outbreak.

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