
On 15/1/1430H, the General Health Directorate of Taif region reported an unusually large number of hepatitis A cases from different villages of Rania, an area located in Makkah Al Mokarramah region, south west Saudi Arabia (total population 13500). A team from the Field Epidemiology training program (FETP) investigated this outbreak.

A case control study was conducted to identify risk factors associated with the occurrence of the disease. The objectives of this study were to describe the outbreak, identify possible risk factors, and provide recommendations for control and prevention.

All villages of Rania area were included. A case was defined as any person living in the catchments areas of Rania, who had presented to the PHCC with jaundice, and/or had been diagnosed as suffering from hepatitis A clinically, and/or confirmed by laboratory tests, during the period from 14/01/1430 to 15/02/1430 H (10 January to 10 February 2009). A control was defined as any person who lived in the same area who had not complained of jaundice symptoms before 15/02/1430H (10 February 2009). Three controls were selected for each case, either from the same household or nearest neighbor. Data was collected by face to face interviews and documented on a structured data collection instrument.

The epidemic curve showed three peaks (once every 1-2 weeks) which most likely presents person to person transmission and may be some sort of extended common source (Figure-1).

The cases were scattered over 8 villages. We were able to identify and interview 25 cases that fulfilled the case definition criteria. Their ages ranged from 7-15 years (mean ± Standard Deviation (SD) of 11.2 ± 2.2 years). There were 17 males (68%) and 8 females (32%). Twenty three cases were students at different levels, 23 (92%) were Saudis and 2 (8%) were Yemenis.

Symptoms reported were vomiting (72%), fever (68%), dark urine (64%), jaundice (48%), nausea (48%), anorexia (48%), abdominal pain (40%), diarrhea (27.6%), headache (24%), itching (24%), muscles and joints pain (20%), and general weakness (12%).

We were able to identify and interview 75 controls. Their ages ranged between 4 – 17 years (mean ± SD of 11.2 ± 3.13 years); 46 males (61.3%), and 29 females (38.7%); 71 were students; 69 (92%) were Saudis and 6 (8%) were Yemeni.

Among the 25 cases, 18 (72%) reported contact with a known case of jaundice, compared to 33 (44%) of the 75 controls (OR= 3.27, 95% CI=1.22 – 9.21) and this association was statistically significant. The risk was much higher when the jaundiced cases were school peers (OR=16, 95% CI= 2.82 – 103), which was statistically significant. However, contact with a jaundiced person who lived in the same household (OR=2.12, 95% CI=0.53 – 8.48), or was a relative (OR =1.33, 95% CI= 0.16 – 9.11), or neighbor (OR=3, 95% CI=0.31 – 26.0), was not statistically significant. Those who attended school were less likely to acquire hepatitis A in comparison to those who did not (OR = 0.65, 95% CI= 0.09 – 5.49), but this was not statistically significant.

The study showed that 76% of cases washed their hands before eating, compared to 96% of controls (OR= 0.13, 95% CI= 0.02 – 0.67). Washing hands with water and soap before eating was reported by 28% of cases compared to 72% of controls (OR= 0.06, 95% CI= 0.01 – 0.39). Washing hands after eating was reported by 96% of cases, compared to 97.3% of controls (OR=0.66, 95% CI= 0.04 – 19.22). On the other hand, 72% of cases washed hands after going to toilet compared to 96% of controls (OR=0.11, 95% CI= 0.02 – 0.53). Washing hands with water and soap after going to toilet was reported by 8% of cases, compared to 13.3% of controls (OR= 0.09, 95% CI= 0.01 - 0.89).

Vaccination of the population at risk with immunoglobulin was carried out by the preventive department of Al Taif health directorate as part of the control measures; 52% of controls had received the vaccine, and 36% of the cases had also been vaccinated. Those who had received the vaccine among controls were protected against infection (OR= 0.52, 95% CI = 0.18 – 1.45).

There were 2 different water sources from scattered wells around the area. The water was brought to the households by the tank vehicles (Wayet) in all the villages where cases were reported. Schools in these areas used the same water source as houses.

There was no general sewage system in these villages; each house either had its own sewage system (sewage tank or bayara), or had artesian-well-holes for sewage disposal done by digging a deep hole down to 40 meter below ground. We found that 92% of cases and 96% of controls used these sewage tanks, and 8% of cases and 4% of the controls used artesian well-hole (OR= 0.48, 95% CI = 0.06 – 4.41), indicating that type of sewage disposal was not a risk factor for acquiring infection.

All the cases and controls used the same source of water for drinking.

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tank vehicles (Wayet) and did not know the exact source, except either (Alhojra) which is the collection of many wells, or AlHasawi which is superficial pools of water inside the valley. We were not able to distinguish if a specific well caused the outbreak.

The majority of both cases (80%) and controls (68%) drank from the pipes at their houses (OR=1.88, 95% CI = 0.57 – 6.54); 95.7% of cases drank water from coolers at schools compared to 84.5% of controls. Eating food bought from outside was not associated with acquiring infection (OR=1.06, 95% CI = 0.38 – 3.02).

Photograph of Alhasawa (superficial collection of water), Rania, Taif.

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Editorial notes: Although Hepatitis A is a self-limited disease, with fulminant hepatitis and deaths occurring in only a small number of patients, it is a major cause of morbidity and economic loss.1,2 Hepatitis A occurs sporadically and epidemiologically worldwide, with a tendency to cyclic recurrences.3 It is typically an infection of younger patients and is related to conditions of cleanliness and hygiene. It is mainly acquired by the fecal-oral route, but can be transmitted from feacally contaminated food and water.2

Hepatitis A is endemic in many parts of the world, including Saudi Arabia, such that nearly 41% of cases of viral hepatitis in the western province have been reported as HAV.4 In 1989, a community-based study of all viral hepatitis reporting the age-related prevalence of antibody to HAV (anti-HAV) among 4375 Saudi children (1-10 years) was found to be 52%.5

In this study, despite all efforts, no source of infection that could explain a common source model was identified, whether in household or school environments. Also, a person-to-person transmission pattern could not be established due to a high proportion of subclinical cases. Unfortunately, facilities for HAV isolation with sub typing were not available and the outbreak was disrupted by passive immunization of most of the population by immunoglobulin. However, the cumulative evidence in support of person-to-person transmission is large. The epidemic curve exhibits multiple peaks, and sequential transmission from one area to another is quite supportive to person-to-person transmission model.

This outbreak is very similar to a previous hepatitis A outbreak that occurred at a rural community in Jazan region in 2001, in which person-to-person transmission was implicated.6 This outbreak can be treated as an exacerbation of the endemic person-to-person, feco-oral transmission of disease which is prevalent in such areas with poor water supply and low socioeconomic status.2

The study clearly showed the absence of any causal role of environmental risk factors or water supply for disease transmission. Immunoglobulin mass vaccination applied by the preventive department of Altaif health Directorate was efficient in controlling the outbreak when direct contacts were vaccinated.

General measures for hepatitis A prevention include hygienic and sanitary measures to prevent transmission of any enteric illness. In household settings, good personal hygiene, including good hand-washing practices and attention to proper food preparation are important in reducing the risk of transmission. At the community level, provision of safe drinking water and proper disposal of sanitary waste will reduce the incidence of hepatitis A. Future similar outbreaks could be prevented mainly by water source control. Following basic hygienic practices and vaccination helped in epidemic control. It is recommended to start health education campaigns especially among school children, particularly in endemic areas over Saudi Arabia.

References: