

# Mumps Outbreak among Military and Police Training Camps in Bahrain: Epidemiology and Evaluation of Control Measures

A Al- Sayyad, J Jawad, K Nasser, M Al Musawi

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## Abstract

**Background**This paper investigates an outbreak of Mumps among trainee in military and Police training camps occurs in September 2007 and the implication for vaccination policy in Bahrain. **Method:**A cluster of mumps cases were reported from Military Training Camp (MTC) and Police Training Camp (PTC) to Diseases control section (DCS) in public health directorate. All information were collected using a standard mumps investigation form used in diseases control section. The data entry and analysis was undertaken by EPI info program. **Results**The total screened trainee was 317 from MTC and 797 from PTC.A total of 56 cases met the clinical criteria of having mumps. Out of the 56 , 12 were tested negative while 44 fit the WHO definition of either laboratory confirmed or epidemiologically confirmed mumps cases. The incidence rate was 3.9 % for both camps. **Conclusion**A total of 1114 suspected cases were reported of which 44 cases were either laboratory or epidemiologically confirmed cases with an incidence rate of 3.9%. 45.5% of the cases found to have documented one dose MMR vaccination, but none received the 2<sup>nd</sup> dose. This outbreak highlights the importance of reviewing the immunization status of all newly recruited personnel in MTC and PTC and to complete their vaccination.

## INTRODUCTION

Mumps is an acute viral disease characterized by fever, swelling and tenderness of one or more salivary glands, usually the parotid and sometimes the sublingual or sub maxillary glands. Orchitis occurs in 20-30 % of post pubertal males and it is usually unilateral. Other complication may include sensory-neural hearing loss, encephalitis, and pancreatitis. [1,2]

The disease is transmitted by droplet spread and by direct contact with the saliva of an infected person. The incubation period range between 14 to 25 days. The period of communicability of the mumps virus started 3 days before the onset of the symptoms and up to 9 days after that.[3] It can be prevented by good infection control measures and sustain high vaccination coverage.

In Bahrain, an immediate notification of any suspected or confirmed cases of mumps is required from all health institutes to public health directorate in the Ministry of Health. All reported cases are investigated within 48 hours of notification by public health specialist and managed aggressively. Surveillance and control measures applied

through vaccination of those below 15 years who didn't complete two MMR doses in residency block or schools of the case.

Mumps vaccination (included in MMR) is part of the routine vaccination schedule. It is given at one year of age and at school entry (5-6 years). Those who were born before 1985 did not receive any Mumps vaccination, while those who were born between 1985 to 1998 received one dose in the routine immunization schedule at age of fifteen months. Since 1998 a second MMR dose has been incorporated into the routine immunization schedule. The first is given at one year of age and the second at preschool. Moreover, catch-up immunization campaigns targeting twelve years age students at school were conducted annually between 1998 until 2006. [4]

Following the introduction of routine infant measles-mumps-rubella (MMR) vaccination in Bahrain in 1985, and the addition of a second routine dose of MMR vaccine in 1998, mumps became uncommon disease. [4]

The average incidence of mumps in Bahrain for the period

2001-2008 was 6.3 per 100,000 populations. [5] The total mumps cases were 80 in 2008. [6]

In the absence of immunization, the annual Mumps incidence vary across the globe between 100-1000 cases per 100,000 population with epidemics peaks every 2-5 years. [7] Large scale MMR vaccination results in remarkable decrease in Mumps incidence globally. [7]

It was reported that most currently licensed Mumps containing vaccines are efficacious and safe if more than one dose implemented and high immunization coverage is sustained. [7]

A cluster of mumps cases were reported from a Military Training Camp (MTC) to Disease Control Section (DCS) at public Health Directorate in 2<sup>nd</sup> week of October 2007 which turns to be an outbreak in that training camp. Another cluster of cases were reported from a Police Training Camp (PTC) on the second half of October 2007.

## **METHODS**

### **DATA COLLECTION**

After receiving the notification from the military and police training camps, all trainees in the camp - except two- were interviewed by public health specialist and the data collected using the Ministry of Health (MOH) standard mumps investigation form. In addition, a special form developed for mumps outbreak was used for contact tracing from both camps.

Both forms include demographic data, date of onset, symptoms, complications, immunization status, and laboratory results for cases and contacts if applicable.

The data entered in the mumps access file used for mumps surveillance while contact data entered in a separate EPI info file.

#### Case definition

The investigation team adopted the WHO case definition for mumps, that is:

#### Clinical case definition

Acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting two or more days and without other apparent cause.

#### Laboratory criteria for diagnosis

Positive serological test for mumps-specific IgM antibodies.

#### Case classification:

Clinical case: A case that meets the clinical case definition.

Laboratory-confirmed: A case that meets the clinical case definition and is

Laboratory-confirmed.

Epidemiologically confirmed: A case that meets the clinical case definition and is linked epidemiologically to a laboratory-confirmed case. [7]

## **INTERVIEW AND EXAMINATION**

The interview and clinical examination of all trainees (cases and contacts) were conducted by the investigation team. Those who were found to meet the case definition were classified as per WHO case classification and included in the analysis.

## **LABORATORY TESTING**

Blood serological testing for confirmation of suspected cases was done centrally at public health laboratory.

## **CONTROL MEASURES**

All cases were isolated in separate buildings in the camps until they become non-infectious. Active search for cases were conducted among contacts in both camps. All asymptomatic contacts were given MMR vaccine to ensure completion of two MMR doses. In addition, educational materials were distributed to all staff and trainees in both camps. Furthermore, DCS report the address of all cases to the concerned health centers to administer the vaccine to the residence (below 15 years) of the same blocks were cases living if they don't have a documented completion two MMR doses.

## **RESULTS**

### **GENERAL**

Total candidates screened using WHO criteria were 317 from Military Training Camp (MTC) and 797 from Police Training Camp (PTC). A total of 56 cases met the clinical criteria of having mumps of which 25 were from MTC & 31 from PTC.

**Figure 1**

Table 1: Distribution of mumps cases in Military and police Training camps In Bahrain in 2007\*

	Laboratory confirmed	Epidemiological confirmed	Total
Military	9	15	24
Police	6	14	20
total	15	29	44

Out of the 56, 12 were tested negative; while 44 fit the WHO definition of either laboratory confirmed or epidemiologically confirmed mumps cases. From those 44 cases, 24 were from MTC of which 9 cases were laboratory confirmed. The remaining 20 were from PTC of which only 6 cases were laboratory confirmed. (Table 1)

\*12 cases of clinically suspected cases were tested negative

All the cases were Bahraini male trainees between the ages of 18-24 years. They gave history of leaving the camps every few weeks distributed according to a schedule.

The incidence rate of mumps was 3.9 % for both camps.

**INITIATION OF OUTBREAK**

The 1<sup>st</sup> case came to the attention of public health authorities was from the military training camp (MTC). He started to have symptoms on 27<sup>th</sup> September 2007 and reported travel to UAE four days prior to development of symptoms. He gave no history of contact with mumps cases, neither in Bahrain nor in UAE. No other cases gave a history of travel outside Bahrain.

On the other hand, the 1<sup>st</sup> case notified from police training stated that his symptoms started on 26<sup>th</sup> November 2007, one day earlier than the 1<sup>st</sup> case notified from MTC, and gave a history of mixing with the 1<sup>st</sup> MTC case in addition to many other military camp trainees who use to meet regularly.

**EPIDEMIC CURVE**

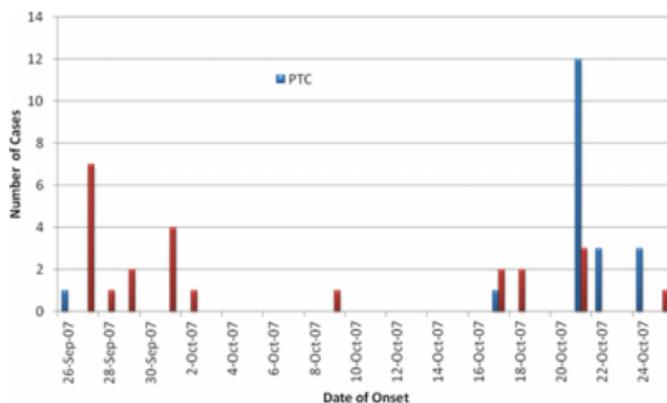
There were two clusters of cases. The 1<sup>st</sup> one started in the last week of September & 1<sup>st</sup> two days of October 2007 with a total of 16 cases (7 lab confirmed & 9 epidemiologically linked). The 2<sup>nd</sup> cluster started on 17 October till 25/10/2007 with a total of 28 cases (8 lab confirmed and 20

epidemiologically linked).

All – except one- of the cases from the 1<sup>st</sup> cluster were from the military training camp, while 19 of cases from the 2<sup>nd</sup> cluster were from police training camp.

**Figure 2**

Fig 1: Mumps cases in Military and Police training camps in Bahrain during 2007



**IMMUNIZATION RESULT**

Almost half (45.5%) of the cases found to have a document of one dose MMR vaccination, but none received a 2<sup>nd</sup> dose.

As preventive measure, a total of 310 contact in the military camp and 782 in police training camp were given MMR vaccine. This represents more than 98% vaccination coverage in both camps.

**DISCUSSION**

Several reports of Mumps outbreak in camps – including military- have been reported in different countries around the world [8, 9, 10] This article describes an outbreak in a similar setting in Bahrain.

In this outbreak, several factors contributed to transmission including virus circulation in the community. This was demonstrated by the fact that the first notified case gave a short travel period outside Bahrain (four days) which was much less than the average incubation period (16 -18 days).[1] This fact suggested that he may had contact with a mumps case in Bahrain which was unnoticed by him as he denied any contact with a symptomatic case.

Social mixing is another factor that fuels this outbreak. This was shown by the fact that the first notified case was mixing socially with trainees from both camps during their holidays outside the camps. These exposed trainees return to the crowded camps which is another favorable transmission

setting

There have been several reports supporting that social mixing and crowded living condition facilitate Mumps outbreaks. [8, 9, 11, 12] This may explain partly the current outbreak in both training camps in Bahrain.

Based on the above, we think that the 1<sup>st</sup> two cases in military camp and police training camp were the source of infection to all other cases.

Moreover, our finding suggests low coverage of 2<sup>nd</sup> dose MMR which is considered another significant factor associated with higher susceptibility to acquire mumps comparing to those who received two doses. [7, 13, 14]

This low coverage may explain partly the outbreak among this group and it is an indication for the need to strengthen their vaccination status. This may be a possible indication for the need to give a 2<sup>nd</sup> dose of MMR to raise the coverage rate of Mumps vaccine.

The authors believe that the outbreak stopped mainly because of the natural history of the outbreak and partially because of the preventive measures taken.

## **CONCLUSION**

A total of 1114 trainee were screened using WHO case definition for mumps, of which 44 cases were either lab or epidemiologically confirmed cases with an incidence rate of 3.9%. Only 45.5% of the cases a document of one dose MMR vaccination, but none received a 2<sup>nd</sup> dose. This outbreak highlights the importance of reviewing the immunization status of all newly recruited personnel in MTC and PTC and to complete their vaccination.

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**Author Information**

**Adel S. Al- Sayyad, MD, ABFM, MSc, DLSHTM**  
Chief of Disease Control Section, Ministry of Health

**Jaleela S. Jawad, MBChB, ABFM, MSc, DLSHTM**  
Head of Immunization Group, Ministry of Health

**Kubra S. Nasser, MBChB, ABFM**  
Head of Communicable Disease Control Unit, Ministry of Health

**Muna Al Musawi, MBChB, ABFM**  
Consultant Public Health for IHR, Ministry of Health