

## ONE YEAR SURVEILLANCE DATA OF ACUTE FLACCID PARALYSIS AT BAHWAL VICTORIA HOSPITAL BAHAWALPUR

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### ABSTRACT

**Objective:** To find out the demographic characteristics and analyze the stool culture results of the Acute Flaccid Paralysis (AFP) cases presenting at Bahawal Victoria Hospital Bahawalpur during the year 2005.

**Methodology:** It is a simple observational study conducted at Department of Pediatrics and EPI centre in Pediatric outpatient Department Bahawal Victoria Hospital Bahawalpur. Study was conducted from January 2005 to December 2005. All the AFP cases presenting at Bahawal Victoria Hospital Bahawalpur during the year 2005 were included. The data of these cases was analyzed regarding the demographic characteristics and stool culture results.

**Results:** In 73 cases of AFP presenting during the year 2005 male to female ratio was 1:1 while rural to urban ratio was 2.9:1. In 71(97%) of the cases stool samples were sent for poliovirus isolation. In 64(90%) stool samples no virus was isolated. Enterovirus was isolated in 6(8.5%) stool samples. In one stool sample, vaccine poliovirus was isolated. In two cases stools could not be sent; one out of these two expired while the other one was already notified from another district.

**Conclusion:** Active surveillance of all AFP cases is mandatory to get the Polio eradicated. In this way all the cases of Poliomyelitis can be picked up and necessary measures can be taken.

**KEY WORDS:** Acute flaccid paralysis, Surveillance, Poliomyelitis.

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### INTRODUCTION

Acute Flaccid Paralysis (AFP) is defined as acute onset of focal weakness or paralysis characterized as flaccid (reduced tone), without other obvious cause (e.g. trauma) in children < 15 years old. Transient weakness (e.g. postictal weakness) should not be reported. The surveillance of acute flaccid paralysis is the

detection of flaccid paralysis of new onset in children <15 years (and any suspected poliomyelitis case in a person of any age), with prompt virological testing to disprove or confirm poliovirus infection.

A confirmed case is identified by clinically compatible signs and symptoms of paralytic poliomyelitis (AFP of one or more limbs, decreased or absent tendon reflexes on affected limbs, no persistent sensory or cognitive loss, no other apparent cause, and neurologic deficit present 60 days after onset of initial symptoms unless the patient has died), associated with the isolation of vaccine or wild poliovirus from a clinical specimen.<sup>1</sup>

A possible case is indicated by clinically compatible signs and symptoms of paralytic poliomyelitis (as listed above), without isolation of poliovirus from clinical specimens, with

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serologic evidence of recent poliovirus infection, and without evidence for infection with other neurotropic viruses. Serologic evidence of recent poliovirus infection is provided by a fourfold or greater rise in poliovirus antibody titre in paired sera and/or the presence of poliovirus-specific immunoglobulin (Ig) M antibody.

Any disease eradication initiative relies on highly sensitive surveillance to guide programmatic action. This is especially important for polio eradication, since only one out of 200 infections with poliovirus results in clinically apparent paralytic disease. To identify and eliminate the remaining pockets of wild poliovirus transmission, surveillance must detect and investigate as many cases of paralytic poliomyelitis as possible. To achieve eradication, high levels of polio vaccine coverage must be sustained worldwide, which is dependent on an adequate vaccine supply.<sup>2</sup>

Following the 1988 World Health Assembly resolution to eradicate poliomyelitis, the number of polio-endemic countries has decreased from > 125 in 1988 to only six countries considered polio-endemic by the end of 2003. As part of the eradication strategies, a sensitive global surveillance system was established that captures a high proportion of acute flaccid paralysis (AFP) cases in children aged  $\leq 15$  years of age, with virologic testing of stool specimens to detect cases of paralytic poliomyelitis. As AFP surveillance systems matured, countries increasingly applied the AFP structure and system to detect other priority diseases, mostly measles and other vaccine-preventable diseases. In the World Health Organization (WHO) Region of the Americas, fever and rash surveillance was added to capture measles and rubella. In the WHO African Region, AFP surveillance provided the nucleus to develop an "Integrated Disease Surveillance and Response" (IDSR) system for priority infectious diseases.

As of mid-2004, AFP surveillance systems were operating in 198 of 215 countries and territories in the world, with surveillance data reported weekly from all countries to WHO at

the regional and global level. Field AFP activities are supported by a three-tiered global polio laboratory network which operates in all six WHO regions and consists of 145 laboratories: 123 at the national level, 15 regional reference laboratories and seven global specialized laboratories. Network laboratories process stool samples from AFP cases to perform virus isolation, serotyping, intratypic differentiation and genomic sequencing. A WHO-sponsored laboratory accreditation program ensures high-quality laboratory performance, and 96% of network laboratories were fully accredited by WHO in 2003. The surveillance system is able to cope with very large workloads: in 2003, almost 35,000 AFP cases were reported globally, with testing of adequate stool specimens from 86% of all AFP cases.<sup>3</sup>

AFP surveillance can not only promptly identify poliovirus circulation if it is occurring, but also provides certification-quality evidence that wild poliovirus transmission is not occurring. Quality indicators are: (A) detection of AFP due to background causes at a rate of 1.0 per 100,000 children under 15 years of age per year. (B) appropriate geographical distribution by population, (C) at least two adequate specimens collected within 14 days of onset in 80% or more of cases and, (D) testing of specimens in laboratories accredited by WHO. External technical and funding support for AFP surveillance is provided by the international polio partnership. Of the more than US\$ 98 million provided for AFP surveillance in 2003 by the partnership, US\$ 47 million was used for surveillance activity costs (including the laboratory network, transport and communication, meetings), and US\$ 51 million funded more than 2,700 international and national staff to support AFP surveillance and, where appropriate, supplementary immunization activities

As AFP surveillance is important nationally as well as internationally, we planned a study to review surveillance of AFP cases at Bahawal Victoria hospital Bahawalpur. This is one of the important tertiary care centres in the southern Punjab where most of the AFP cases from the surrounding drainage area are referred.

Besides providing information on the progress made to-date, this update serves as a reminder to all reporting pediatricians, pediatric infectious disease specialists, neurologists and laboratory directors that in addition to neurological investigations, evidence of adequate polio-specific laboratory investigations (even for negative results) is vital to the evaluation of AFP cases. Prompt collection and laboratory processing of stool and serum specimens is paramount, particularly as differential diagnosis of poliomyelitis will often not be considered during the initial stages of case management. The objective of this study was to find out the demographic characteristics and analyze the stool culture results of the AFP cases presenting at Bahawal Victoria Hospital Bahawalpur during the year 2005.

*Selection Criteria:* The cases included in this study were those who fulfilled the definition of AFP as: acute onset of focal weakness or paralysis characterized as flaccid (reduced tone), without other obvious cause (e.g. trauma) in children < 15 years old. The cases of transient weakness (e.g. postictal weakness) were excluded from the study.

### PATIENTS AND METHODS

In this simple observational study, the record of all the AFP cases presenting at Bahawal Victoria Hospital Bahawalpur during the year 2005 was obtained. All of these were admitted cases fulfilling the above mentioned definition and selection criteria. At the time of admission, detailed history and examination were recorded by the duty doctor and later on these findings were verified by the consultant. These cases were reported to the district health officer. Two stool samples were obtained in each case with interval of 24 hours. The parents were provided special stool containers with ice packing and proper labeling. When the patient passed the stool, it was transferred to the container. The size of the sample was ensured in each case to minimum of 8 grams or equal to the terminal digit of the thumb. The second sample of the stool was collected with similar precautions. These stool samples were sent to

the WHO regional reference laboratory situated at Islamabad, Pakistan. In the laboratory, stools were cultured for the isolation of virus using cell culture method. The results of these cultures were received through the district health officer. The information regarding the demographic features like age, sex, rural to urban distribution and seasonal variation of the cases of AFP and the results of stool cultures was recorded on a Performa. The record was entered in computer and Microsoft excel was used to analyze the results.

### RESULTS

A total of 73 children with acute flaccid paralysis were reported at B.V.H. during the year 2005. The following results were obtained regarding the demographic features. There were 36 males and 37 females with male to female ratio of 1:1. Fifty-four (74%) children belonged to the rural area while 19 (26%) were of urban area with rural to urban ratio of 2.9:1 (Fig-1). The youngest case was of one year of age while the oldest was of 13 years with mean age of 4.5 years. Average interval between onset of disease and admission was 2.5 days. In 71(97%) of the cases stool samples were sent for poliovirus isolation. In 64(90%) stool samples no virus was isolated. Enterovirus was isolated in 6(8.5%) stool samples (Fig-2). In one stool sample, vaccine poliovirus was isolated. In two cases stools could not be sent; one out of these two expired while the other one was already notified from another district. Although the cases were reported all over the year but the maximum cases were seen in the months of summer (Fig-3).

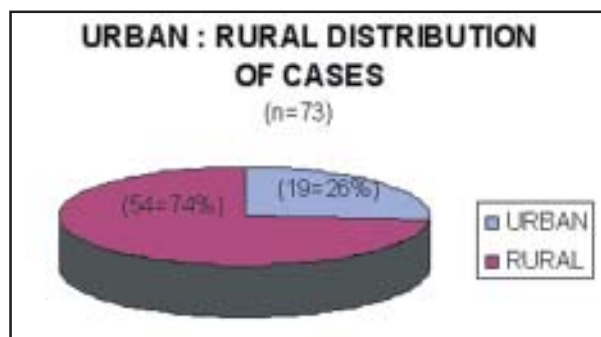


Figure-1

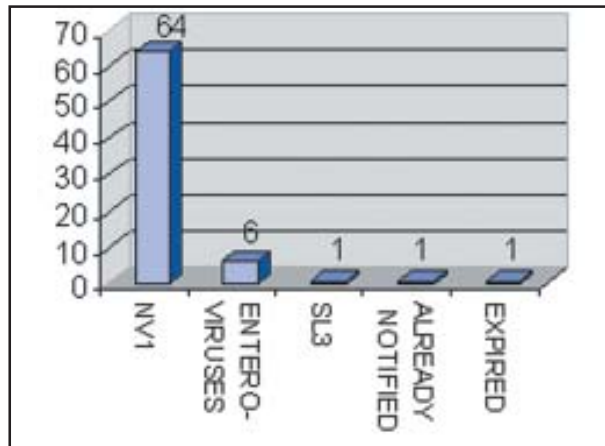


Figure-2: Results of stool cultures in AFP (n=73)  
 NV1= No virus isolated  
 SL3= Vaccine associated virus

## DISCUSSION

Active surveillance of acute flaccid paralysis (AFP) in children less than 15 years old played a pivotal role in monitoring suspected cases of paralytic poliomyelitis and provided evidence of the elimination of indigenous wild poliovirus.

A combination of active surveillance and hospital-based searches increase the investigated AFP rate, to fulfill one of the certification requirements to be certified polio free.<sup>4</sup> AFP surveillance continues to be a critical component of the World Health Organization (WHO) global polio eradication campaign. WHO estimates a background annual incidence of at least 1 case of AFP per 100,000 population less than 15 years old, in the absence of wild poliovirus transmission. This rate can be used to evaluate the sensitivity of AFP surveillance activities.

Bahawal Victoria Hospital is a tertiary care centre where referral cases from most of the southern Punjab of Pakistan are referred. The drainage of the cases is both from the rural as well as the urban areas. In our study, the majority of the cases were from the rural area. This is due to fact that the majority of the population in Pakistan lives in the rural area. This also indicates the level of awareness in the people of rural area to seek medical care in cases of AFP. In this way the cases of AFP are

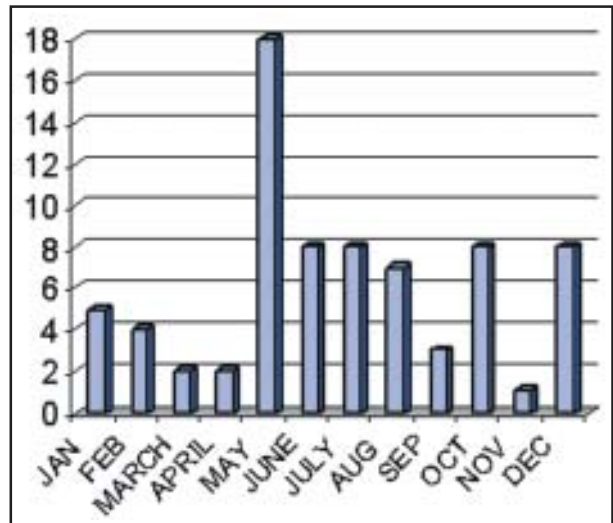


Figure-3: Seasonal variation of cases of AFP (n=73)

brought into the notice of health professionals and the surveillance of AFP becomes possible.

Non-polio enteroviruses were isolated in 8.5% of the cases of AFP. They are one of the important causes of acute onset paralysis.<sup>5</sup> In the neighboring country, up to 36% cases of AFP has been reported due to these non-polio enteroviruses.<sup>6</sup> It may be feasible to guide the formulation of antigens for rapid and less expensive diagnosis of these viruses to reduce unnecessary hospitalization, allow immune globulin batches of high titres to frequently circulating serotypes.

In our study, vaccine associated virus was isolated in one stool sample. This is the most serious disadvantage of the Oral Polio Vaccine. In fact, in any attenuated vaccine, there exists a danger that the attenuated form will revert to the virulent form. Vaccine-associated paralytic poliomyelitis (VAPP) is a rare event where neurological damage is caused by a virus ingested from the live oral polio vaccine. A mutation of the vaccine virus known as a reversion causes previously attenuated poliovirus to revert to a more neurovirulent form. The paralysis that results is identical to that caused by wild virus, and is usually permanent. One case per 2.5 million doses of OPV distributed results in vaccine-associated paralytic polio, however, the risk increases significantly for the first dose of OPV, which results in one case

per 790,000 doses administered. Particularly problematic in Third World countries, other gastrointestinal viruses interfere with the replication of the attenuated polio vaccine viruses in the intestine of the vaccinees. Also, the fact that several boosters are required to induce protective immunity significantly decreases the success of polio vaccination programs, which is corroborated by studies that reveal that in Third World countries 20% of people, fail to return for each subsequent booster.

Developed countries are trying to handle this problem by adopting changed schedule of vaccination. In these countries, 2 doses of IPV are followed by 2 doses of OPV as part of the routine childhood immunization schedule. If the inactivated Polio Vaccine, which has no known risk of vaccine-associated polio, is administered prior to the Oral Polio Vaccine, then the killed vaccine prevents against the small risk of contracting polio from the live vaccine. Since implementation of the all-IPV schedule in 2000 in USA, no cases of VAPP have been reported.<sup>7</sup> Unfortunately the relative expense of IPV as compared with OPV inhibits the implementation of this immunization schedule in certain countries like our one.

Death after fever and paralysis brings a retrospective WHO diagnosis of polio. In our sample of 73 patients, one child was diagnosed on death as polio case, regardless of the symmetry of their paralysis. The case-fatality rate was 1.85% for 175,081 children with acute polio seen in sentinel hospitals in India from 1976 to 1984,<sup>8</sup> higher rates were based on severe cases admitted to specialist hospitals.<sup>9</sup>

## CONCLUSION

Active surveillance of all AFP cases is mandatory to get the Polio eradicated. In this all the cases of Poliomyelitis can be picked up and necessary measures can be taken. It is further possible by the surveillance to differentiate between wild polio virus and vaccine associated virus induced paralysis.

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