

## ACUTE FLACCID PARALYSIS IN NINEWA PROVINCE IN NORTH OF IRAQ

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### ABSTRACT

Acute Flaccid Paralysis (AFP) is a clinical manifestation characterized by weakness or paralysis and reduced muscle tone without other obvious cause (e.g., trauma). This abnormal condition may be caused by disease or by trauma affecting the nerves associated with the involved muscles., among those below 15 y old, or any person of any age with paralytic illness if poliomyelitis is suspected. AFP surveillance is a key strategy in the polio eradication initiative adapted by WHO in 1988. The aim of the study was to know some clinical, epidemiological aspects and the common causes of the reported cases of AFP in children below 15 year at Ninewa in 10 years period from 2004 to 2013. Case series study was conducted among children < 15 y by by the epidemiological surveillance unit in Ninewa during the last 10 years, from January 2004 to the end of December 2013, and there are about 371 cases that had been reported. A total of 371 cases of AFP (199 male ,172 female) aged from <1 y to <15 y was reported by surveillance system between 2004 to 2013 those below 5 y accounted for 61.7%.327 from 371 receive 3 doses or more of oral polio vaccine( opv) (88.1%) ,while 3(0.8%) not receive. The highest number seen in the months of April and December.

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### INTRODUCTION

Is a clinical manifestation characterized by weakness or paralysis and reduced muscle tone without other obvious cause (e.g., trauma) (Arthur Marx, 2000). This abnormal condition may be caused by disease or by trauma affecting the nerves associated with the involved muscles., among those below 15 y old. The differential diagnosis of AFP varies considerable with age, with potential etiology, including:

- Gillian Barre Syndrome (GBS).
- Transverse myelitis.
- Traumatic neuritis.
- Toxins such as lead and metabolic neuropathies (Arthur Marx, 2000).

**Poliomyelites:** The disease is caused by one of three polioviruses which are subgroup of enterovirus, and it cause lymphatic meningitis and infect grey matter of spinal cord especially of lumbar segment (Andrus, 1992).

If untreated, AFP not only persist but also lead to death due to failure of respiratory muscles (Andrus, 1992; Biellik, 1992 and Dietz, 1992).

**Clinical Features:** 95% are asymptomatic other called hot cases that have fever with rapid asymmetrical paralysis in not or partially vaccinated in children less than 5 year. In May 1988, the World Health Organization (WHO) established the goal of global eradication of poliomyelitis by the year 2020.

#### Their main strategies:

- Maintaining high (> 90%) routine immunization (OPV).
- Conducting National Immunization Days of OPV (NIDs).
- Detecting all suspected poliomyelitis cases through the Acute Flaccid Paralysis surveillance.

A country's surveillance system should be sensitive enough to detect at least one non polio case of AFP for every 100,000 children under 15 years (World Health Assembly, 2000). Polio cases have decreased by over 99% since 1988, from an

estimated 350,000 cases then to 650 reported cases in 2011. In 1988 there are about 20 countries that have polio disease but In 2012, only three countries (Afghanistan, Nigeria and Pakistan) remain polio-endemic, down from more than 125 in 1988. now a days there is some investigation show that only afghanistan and Pakistan remain polio endemic .Failure to eradicate polio from these last remaining strongholds could result in as many as 200,000 new cases every year, within 10 years, all over the world (Tangermann, 2000). A national polio eradication program was started in Iraq since 1997, including AFP surveillance to identify AFP cases due to poliomyelitis. The last case of paralytic poliomyelitis in Ninewa was in 1999 and in Iraq was in Dyala province in January 2000 and since that time Iraq was polio-free as of we conduct this study (World Health Organization, 2009).

### Investigation

- Two stool specimen are collected from each suspected case with an interval of 24–48 hours between collections.
- Cytochemical analysis of CSF via lumbar puncture.
- Electromyography studies EMG.
- Nerve conduction velocity.
- CT and MRI.

Around 400 case of AFP were reported annually in Iraq, 5-10% of which was from Ninewa province in the north, All the cases finally diagnosed and classified as non-polio AFP (WHO, 2009).

### METHODS

The surveillance database about AFP cases under the age of 15 y reported from Ninewa province by the epidemiological surveillance unit during the last 10 years, from January 2004 to the end of December 2013 was used in case series.

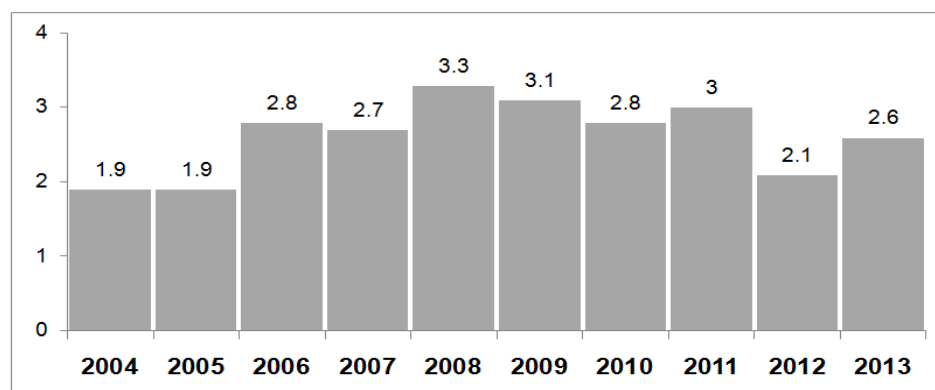
The study was done at epidemiological surveillance unit, health department during a period of four months extending from 1<sup>st</sup> February to the end of May 2014. Reported AFP cases found to be (371), The case investigation, The national polio laboratory (NPL) result and the 60 day follow up and classification forms of each case were all analyzed. We search about the teporal cause of the paralysis, some epidemiological characters Gender, Residence (urban, rural) and clinical symptoms like Presence of fever at the onset of the paralysis, symmetry of the paralysis, Immunization status, survival at least 60 day after paralysis onset and persistence of the paralysis after the 60 day follow up, Notification site and result of the viruses isolated by the NPL.

### RESULTS

Three hundred seventy one cases of AFP in children younger than 15 years reported to the surveillance unit of Communicable Diseases section in the public health department of Ninewa Health Directorate from 2004 to 2013 in a period of 10 years were included in this study; 2 cases died and one lost before 60 days follow up. The male to female ratio was 1.1: 1, for a average annual incidence rate of 2.6/100,000 children aged under 15 years. The incidence ranged from 1.9/100,000 in 2004 and 2005 to 3.3 /100,000 in 2008 (tab.1). 98% of the cases were investigated within 48 hours of the notification time; with 90% adequate stool sampling; 80% of the collected samples reached the national polio laboratory within 72 hours from time of collection tables (2,A &B); There was no clear seasonal variation in the number of the reported cases apart from slight increase in April and December months (Fig 3). Average rate of non polio enterovirus isolated (NPEV) was 9.9% Table 7, 309(83.2) reported at hospitals. Two hundred twenty- nine cases (61.7%) were (1-4) year of age, 28(5.7%) less than one year; 183 (49.3 %) of the cases were from urban area in al ayemen and al ayser districts inside the province (Table 6); 249 (67.8)

**Table 1. Total population and annual non polio AFP rate in Ninewa children<15 y 2004-2013 (n= 371)**

year	Tot. Population	<15years old	Nu.AFP cases	Annual ate/100000<15 Y.
2004	2 724 719	1 226 124	24	1.9
2005	2 825 723	1 271 575	25	1.9
2006	2 930 275	1 318 624	38	2.8
2007	2 804 705	1 262 117	35	2.7
2008	2 952 827	1 328 772	44	3.3
2009	2 938 295	1 322 233	41	3.1
2010	3 290 611	1 480 775	42	2.8
2011	3 395 911	1 528 160	47	3.0
2012	3 335 200	1 500 840	34	2.1
2013	3 438 196	1 547 188	41	2.6



**Fig. 1. Non polio AFP incidence rate**

**Table 2. Frequency distribution of AFP causes in Ninewa children <15 year**

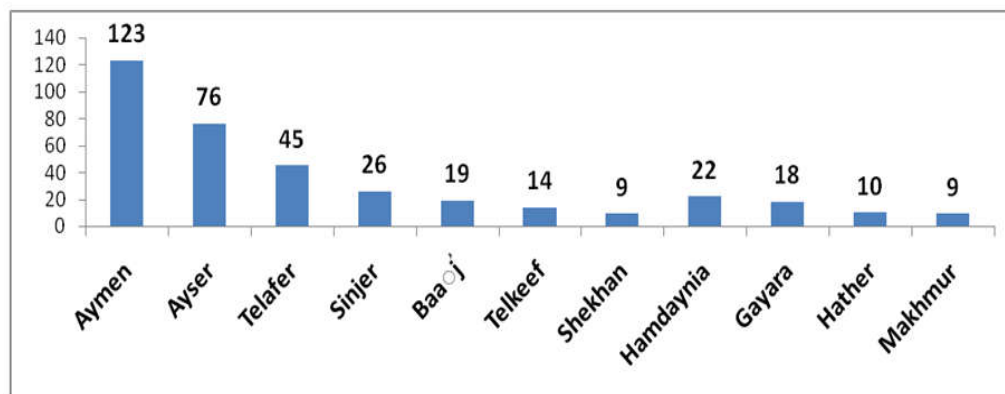
Cases	Number (%)
Gillian - Barre syndrome	241 (64)
Traumatic neuritis	78 (23)
Meningitis/Encephalitis	33 (8)
Transverse myelitis	5 (1.3)
Others (Tumors, CVA, Hypokalemia, Trauma)	14 (3.7)
Poliomyelitis zero	371(100)

**Table 3. Selected clinical characteristics of cases with AFP**

Features	Cases (%)
Fever at the onset of paralysis	371 (100)
Yes	168 (45.2)
No	203 (54.8)
Symmetrical paralysis	371 (100)
Yes	249 ( 67.8)
No	122 (32.2)
Survival at least 60 days from onset	371(100)
Alive	368 (99.3)
Dead	2 (0.5)
Unknown	1 (0.2)
Residual paralysis at least 60 days from	
Onset	368 (100)
Yes	99 (26.9)
No	269 (73.1)

**Table 4. Distribution of AFP cases according to age group, gender and residence**

Parameter	Male=199	53.6	Female= 172	46.4	Total= 371	
Age group	No.	%	No.	%	No.	%
<1 y	15	53.6	13	46.4	28	7.5
1- 4y	124	54.1	105	45.9	229	61.7
5-<15y	60	53.6	54	46.4	114	30.8
Residence						
Urban	112	56.2	71	41.2	183	49.3
Suburban	49	24.6	77	44.7	126	34.0
Rural	38	19.2	24	14.1	62	16.7

**Fig. 2. AFP cases in Ninewa by districts 2004-2013 (n= 371)****Table 5. AFP cases in Ninewa children < 15y by immunization status (OPV)**

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total	%
Un immunized	0	0	2	0	0	0	0	0	1	0	3	0.8
1-2 Dose	3	3	6	0	0	0	0	1	1	1	15	4.1
3D&More.	21	18	27	35	41	38	39	39	30	39	327	88.1
Un known	0	4	3	0	3	3	3	7	2	1	26	7
Total	24	25	38	35	44	41	42	47	34	41	371	100

had symmetrical paralysis, Fever at the onset was found in 168 (45.3%) of the cases (table5); Guillain Barre Syndrome (GBS) was the most frequent cause of the paralysis 241 (64%), followed by traumatic neuritis 78 (23%), meningitis/encephalitis 33 (8%), and other causes (Tumors, CVA, hypokalemia, Trauma) 14 (3.7%) (Table 4), Three hundred

twenty-seven (88.1%) of cases were vaccinated with at least three OPV dose, 26 (7%) had unknown history of vaccination status, only 3(0.8%) found to be un vaccinated for polio (Table 5). 368 (99.3%) cases were followed up after 60 day from onset of symptoms , most of them 269 (73.1) had no residual paralysis, only 99(26.9%) had residual paralysis

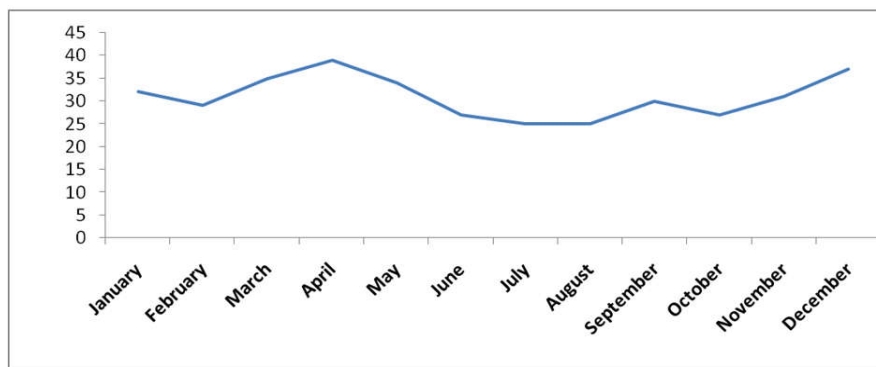


Fig. 3. Monthly distribution of AFP cases

Table 6. AFP cases in Ninewa children &lt;15 y by reporting site

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total	%
Hospitals	22	23	29	28	40	31	34	43	25	34	309	83.2
Phcs	0	0	3	2	1	4	0	1	6	3	20	5.3
private sector	0	1	3	2	1	2	2	2	2	3	18	4.8
Other Province	2	1	3	3	2	4	6	1	1	1	24	6.7
Total	24	25	38	35	44	41	42	47	34	41	371	100

Table 7. NPL result of AFP cases in Ninewa children &lt;15 year

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total	%
Neg.	24	21	34	30	41	30	39	44	30	38	331	89.2
N.P.E..V	0	3	4	4	3	10	3	3	4	3	37	9.9
Sabin .v.	0	1	0	1	0	1	0	0	0	0	3	0.9
Total	24	25	38	35	44	41	42	47	34	41	371	100

(Table 5). 309(83.2%) of the cases reported from hospitals, 20 (5.3%) from primary health care centers and only 18 (4.8) were from private sector Table (7).

## DISCUSSION

We found no cases of poliomyelitis between 2004 and 2013 in Ninewa province, when the last case was reported in 1999, while the last case in Iraq was since January 2000 as of we conduct our study. This result may be accepted as evidence of poliomyelitis eradication (AFP, 1998). The mean annual incidence of non polio AFP rate was 2.6 /100,000 in children aged less than 15 years during the period (2004-2013) in Ninewa (AFP, 2013). This incidence rate was about similar to that of the national level in Iraq during this period 2.5/100 000. There is considerable variation in the rates of AFP reported internationally (D'Errico Marcello, 2008). In similar study conducted in the southern of turkey (1999-2010) the annual incidence rate found to be ranger from 0.6 – 1.6/100 000 below 15 years old (Funda Sevensan, 2010). But it consider it low as compared to the same study in Nigeria Akawa ibom state which was 4.5-6.5/100000. 45.5% of our cases had at least one prodromal symptom, particularly fever, However, this proportion was more than that reported by Funda Sevensan *et al.* (2010) 15% in southern Turke and also more than that reported by Dietz *et al.* (1995), who found that 37% of cases with non-polio AFP had prodromal fever. High rate of symmetrical paralysis 67.8% in our study might be related to the high frequency of Guillain Barre Syndrome GBS (64%) as a cause of AFP in Ninewa, This is consistent with findings from other countries (Poorolajal, 2011 and Chroni, 2004), And secondly traumatic neuritis and then encephalitis/meningitis. It was higher than that found by another study conducted in Iraq an AFP cases reported in the national level for a period of 15 year (1997- 2011) by which was found to be (52.5%).

The proportion of GBS in other studies ranged between 30-45%. Children 1–4 years old were the most commonly affected age group (61.7%), This is believed to be due to their relatively high susceptibility to infections in this age group and the increased susceptibility to the young myelinated peripheral nerves to demyelination and presented with GBS (Alberta Government Health and Wellness, 2005). The male to female ratio 1.1:1 and age range of cases were similar to those reports (Turkey study, and it is similar to study conducted in Iran 2007\_2013. About half of the AFP cases in our study 49.3 lived in urban residence in the main two districts Al aymen and Al ayser inside the province this was in relation with the high density of population that constitute more than half of the total population of Ninewa province. There was no obvious variation in the number of cases reported by month of onset accept simple increase in April, The lack of clear seasonal may be due to the fact that the respiratory and enteric infections that precede GBS have opposite seasonal patterns. In a previous report from the Americas, there was no significant increase or decrease by the month of onset of AFP cases. Contrary to this situation in temperate climate countries there may be an increase in number of cases during summer and autumn which could be related to the epidemiological progress of enterovirus infections. The isolation of non-polioentero viruses regardless of their specific types from at least 10% of total stool. samples of AFP cases is an important indicator from WHO point of view for good surveillance system The mean rate of non- polioentero virus isolation in our study was 9.9 which was slightly below that recommended by the WHO.

## Conclusion

A successful AFP surveillance program depends mainly on the reporting of cases. The incidence rate, age, gender distribution,

and seasonality of AFP among Ninewa children is similar to those reported from other previous studies. GBS is the most prevalent cause, especially in those (1- 4) years old.

**Recommendation:** There is a need to increase pediatricians, physicians and all health workers awareness about the importance of AFP surveillance and reporting especially in the primary health care centers and private sector in order not miss any case of poliomyelitis.

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