

Lessons learned from success of polio eradication in Egypt

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Abstract

Background: In Egypt, the improvements in vaccine delivery and disease surveillance that have been undertaken have aided also in the control of other vaccine preventable diseases.

Objective: This study aims to through light on the Egyptian success story of polio eradication.

Methodology: Systematic review of literature on efforts done to eradicate the disease from 1996 to 2015 was done.

Results: In Egypt 1996, there were 100 confirmed polio cases. This number was decreased by time and became only one case in 2004. Egypt was declared a polio- free country in 2006.

Conclusion and Recommendations: Formulation of an informed post elimination immunization policy. Key polio eradication activities need to continue in the face of the risk of virus importation from the remaining endemic areas.

Key words: Poliomyelitis- Eradication- Immunization- Egypt

الدروس المستفادة من نجاح استئصال مرض شلل الأطفال في مصر

أعلنت مصر استئصال مرض شلل الأطفال بحلول عام ٢٠٠٦. وتهدف هذه الدراسة لإلقاء الضوء على قصة هذا النجاح فلقد كان للتحسن في توصيل اللقاحات ونظام التقصي للحالات المرضية الذي تم إتباعه، وهذا قد ساعد أيضا في التحكم في الأمراض الأخرى التي يمكن الوقاية منها بالتطعيمات. وقد تم عمل مراجعته مكثبيه منهجيه للجهود المبذولة لاستئصال المرض. وقد أوصت الدراسة بصياغة سياسة تحصين مستتيرة لما بعد القضاء على المرض. هذا ولا بد من مواصلة الأنشطة الرئيسية للقضاء على شلل الأطفال في مواجهة خطر استيراد الفيروس من المناطق المتوطنة المتبقية.

Introduction:

Polio was once a fearful disease. Now, the world has now reduced polio by > 99.9%. The Iraq "outbreak" in 2014 was only 2 cases whereas Somalia has an outbreak of 199 cases in 2013- 14. In fact, it is the largest-ever internationally- coordinated public health effort in history.⁽¹⁾ Polio now survives only among the world's poorest and most marginalized communities, where it affects the most vulnerable children (WHO, 2015).

Despite the immunization across the world, many children in endemic countries are still missed, allowing the polio virus to spread. Several large outbreaks have occurred in the Republic of the Congo, Tajikistan and Chad, Syria and Iraq (CDC, 2015).

Two doses of oral polio vaccine protect young children from being infected with this disease. The eradication effort was founded on the idea that polio can be prevented through a cost- effective, easily administered vaccine that is one of the miracles of modern medicine (UNICEF, 2016).

Objective:

The aim of this study is to spot light on Egypt success story of polio eradication.

Methodology:

Question formulation about the impact of polio eradication efforts in Egypt. Literature review with the key words on Egyptian bank of knowledge and Google engine from 1996 to 2015. Assessing quality of information and lastly summarizing evidence

Results:

Table (1) showed the trend and the number of confirmed poliomyelitis cases in Egypt 1996- 2015. Table (2) showed the proportion of children aged (12- 23) month who have received 3 doses of poliomyelitis vaccine by location. Fig (1) showed the WHO and UNICEF estimates of national immunization coverage. National immunization and surveillance data demonstrate that the combination of high routine immunization coverage' (> 85%) with oral polio vaccine combined with two properly conducted rounds of national immunization days (NIDs) resulted in rapid decline in poliomyelitis incidence.

Table (3) showed poliomyelitis indicators in Egyptian governorates 2014. Routine vaccination coverage is high in Egypt both national and provincial wise. In 2013 all provinces showed above 90% coverage except Cairo. At provincial level Kafr- Alshikh and Matrouh provinces showed only 50% of the children have completed 3 OPV doses while all other provinces showed 88%. There were some gaps in AFP surveillance and investigation timeliness indicators subnationally. In the Red Sea and New Valley governorates, the NPAFP rate is 1.6 and in a few additional governorates at the time of investigation indicators were low (WHO, 2014).

Discussion:

Egypt agenda to combat poliomyelitis began when vaccination with oral polio vaccine (OPV) was made compulsory in 1968. When the global eradication effort began in 1988, Egypt was reporting several thousand cases every year. By 2000, national immunization days (NIDs) had

achieved a coverage of > 98% of the population (WHO, 2015). The year 2002, a technical advisory group was set up to help with the initiative. The quality of the surveillance system improved with the introduction of environmental monitoring routinely to 34 site (WHO, 2014).

Consequently, the last reported case of polio in the country was in 2004. Today Egypt is no longer a reservoir for the virus. Egypt has been polio free since 2004. Wild virus in sewage samples was detected in May 2004, January 2005, late 2008, 2010 and December 2012 with virus imported from South Sudan and India (Bassioni et.al., 2003). Shift to the house- to- house strategy began in 2000 and became a national strategy in 2002. (El Sayed et.al., 2008).

The Ministry of Health is conducting two rounds of a national polio immunization campaign targeting 14.3 million child. The surveillance indicators at national and governorate levels showed satisfactory results and indicate that the system can detect any importation. The WHO definition for certification standard surveillance is as follows:

1. Detection rate of at least one case of non- polio AFP per 100000 children <15 years in the population.
2. Two stool specimens should be collected 24- 28 h apart from at least 80% of cases of AFP within 14 days of paralysis.
3. All specimens processed at a WHO accredited laboratory, and a follow up visit to the patient should be made after 60 days (WHO, 2015).

Overcoming ongoing challenges to interruption of WPV transmission globally will require sustained programmatic enhancements, including improving the quality of supplementary immunization activities. However, the push for eradication has not been without roadblocks. Despite the immunization across the world, many children in endemic countries still suffer with the risk of exportation of wild virus (CDC, 2015).

India's success has silenced critics who predicted that polio was not eradicable in India with its low standards of sanitation and hygiene; or that wild polioviruses (WPVs) cannot be eradicated using live or it was a low priority disease but with very high cost of eradication (Johan and Vashishtha, 2011).

In Egypt, political will, youth involvement during supplementary vaccination activity ensured success (CDC, 2009). Technological innovation cannot overcome gaps in program management and community engagement. Egypt- posed exceptional challenges to stopping poliovirus transmission due to high population density, poor sanitation and a very high force of infection (Endgame Strategic Plan, 2013).

Most Syrian refugees are clustered in the 6th October district and the four governorates along the Suez Canal. Many of these refugees emigrated from parts of Syria known to have low vaccination coverage; hence, they constitute a group with a potentially significant immunity gap against polio (UNICEF, 2014). Technical solutions cannot compensate for basic management and accountability issues, nor political, societal and cultural factors. Combination of innovations can succeed in the most challenging settings (Grassly, 2013).

On the contrary vaccine derived poliomyelitis as occurred in Ukraine

July 2015. The risk of circulating vaccine- derived poliovirus (cVDPV) is higher when polio vaccination coverage is low. As of early 2015, 19 countries in the WHO European Region withdrawal the type 2 component of OPV in all affected WHO countries (Johan and Vashishtha, 2011).

There is also fear of accidental release of WPV or cVDPV from laboratories and vaccine production plant. While the program had many successes, both external and internal factors still stand in the way of reaching eradication goals. Recent obstacles include insecurity in the Middle East, Pakistan, and Africa and a diversion of polio staff to West African countries struggling with Ebola. Internal factors affecting progress include persistent pockets of suboptimal polio surveillance and a pattern showing that the same difficult- to- reach children are chronically missed in polio vaccination drives. The current global policy is for all OPV- using countries to switch from trivalent OPV to bivalent OPV and for all countries to introduce at least one dose of IPV into the routine childhood immunization schedule (Bristol, 2015).

Conclusion:

Egypt was able to interrupt transmission because of its ability to apply a comprehensive set of tactics and tools to reach and immunize all children that included innovations and Strategies for 'underserved' populations.

Challenges:

1. Insecurity, particularly in Syria and Iraq, which affected access to some high risk areas and resultant low coverage rates.
2. Low risk perception among families and medical personnel who did not fully understand the urgency and need of repeated rounds.
3. Fatigue within national health systems due to the human resources and time demands.
4. Inconsistent use of finger marking made it difficult to objectively assess post- campaign coverage.

Recommendations:

1. Short Interval Additional Dose (SIAD) strategy, sero prevalence surveys and modeling, universal finger- marking, migrant and transit strategies.
2. Careful evaluation of post eradication policy and involvement of youth, mass media and community leaders in immunization activities.

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Table (1) Trend of poliomyelitis cases in Egypt 1996- 2015

Year	Afp Cases Reported	Non- Polio Afp Rate	AFP cases with adequate specimens (%)	Total Confirmed Polio Cases
1996	309	0.9	85	100
1997	217	1	82	14
1998	295	1.2	82	35
1999	276	1.3	79	9
2000	275	1.3	90	4
2001	257	1.2	91	5
2002	576	2.4	91	7
2003	608	2.5	93	1
2004	768	2.8	92	1
2005	859	3.1	92	0
2006	978	3.4	93	0
2007	1070	3.7	95	0
2008	1116	3.8	94	0
2009	1125	3.8	95	0
2010*	561	3.5	90	0
2015	856	2.9	90	0

Adapted from Global Polio Eradication Initiative website (WHO, 2010- 2015)

Table (2) Proportion of children aged 12- 23 month who have received 3 doses of poliomyelitis vaccine by location.

	2000	2005	2008	2014
Total	94.9	96.6	94.5	96.6
Urban	94.3	96.7	95.3	96.8
Rural	95.3	96.5	94.0	95.5
Urban Governorate	93.7	96.1	96.5	97.5
Lower Egypt	95.4	98.1	95.8	97.8
Urban	94.4	95.7	96.6	95.7
Rural	95.8	98.1	96.6	98.3
Upper Egypt	95.1	95.4	92.4	94.8
Urban	95.4	98.2	92.6	97.3
Rural	95.0	94.4	92.3	94.0
Frontier Governorates	88.6	95.5	88.7	97.0

Source Egypt Demographic and Health Survey, 2000, 2005, 2008 and 2014. (UNICEF, 2015)

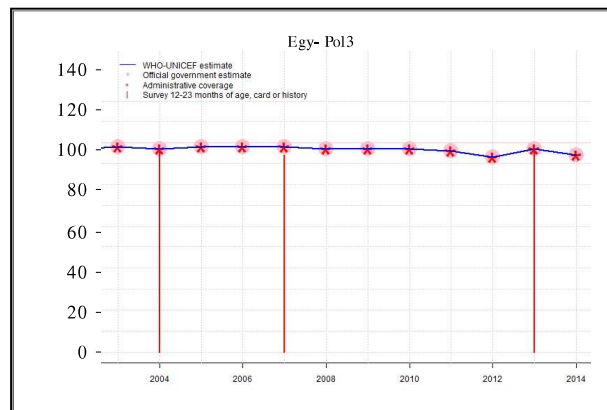


Fig (1) WHO and UNICEF estimates of national immunization coverage.

Table (3) Poliomyelitis indicators in Egyptian governorates 2014.

Province	Adjusted Population estimate below 15 years	Count Of Afp Cases	Confirmed Polio	Non polio AFP rate/ 100.000< 15 years	% Adequate Stool Specimens	GB Rate/ 100.000< 15 yrs	% Non Polio Enterovirus	%Cases notified within 7 days from onset of paralysis	%Cases investigated within 48 hours from onset of paralysis	%AFP Cases investigated after 60 days from onset of paralysis	%Coverage with 3 or more OPV doses in NP/AFP cases 6- 59 months
Alexandria	1.309.192	38	0	2.9	94.7	0.5	10.5	100.0	92.1	71.1	96.0
Assiut	1.547.107	31	0	2.0	96.8	0.8	12.9	100.0	87.1	77.4	100.0
Aswan	478.207	14	0	2.9	78.6	1.1	0.0	85.7	85.7	71.4	100.0
Beheira	2.218.707	86	0	3.9	80.2	0.6	19.8	94.2	75.6	86.1	100.0
Beni suef	957.312	23	0	2.4	91.3	0.1	26.1	95.7	100.0	69.6	100.0
Cairo	3.141.469	66	0	2.1	97.0	0.4	27.3	92.4	93.9	71.2	100.0
Dakahlia	1.947.741	55	0	2.8	96.4	0.3	10.9	100.0	96.4	72.7	94.6
Damietta	353.778	13	0	3.7	84.6	0.9	15.4	92.3	100.0	53.9	87.5
Fayoum	1.194.451	35	0	2.9	94.3	0.3	20.0	94.3	100.0	80.0	96.6
Gharbia	1.668.918	47	0	2.8	91.5	1.3	23.4	100.0	100.0	85.1	100.0
Giza	2.048.396	96	0	4.7	90.6	0.3	15.6	93.8	93.8	69.8	96.5
Ismailia	372.059	15	0	4.0	100.0	0.3	0.0	100.0	100.0	86.7	100.0
Kafr El Sheikh	1.019.634	38	0	3.7	94.7	0.6	10.5	97.4	86.8	73.7	100.0
Kalioubia	1.543.629	39	0	2.5	89.7	0.5	20.5	97.4	61.5	74.4	100.0
Luxor	428.576	7	0	1.6	85.7	0.2	14.3	100.0	100.0	57.1	100.0
Matrouh	186.223	1	0	0.5	0.0	0.0	0.0	100.0	0.0	0.0	50
Menia	1.909.491	51	0	2.7	88.2	1.0	31.4	100.0	100.0	78.4	100.0
Menoufia	1.353.725	46	0	3.4	87.0	0.4	13.0	95.7	93.5	69.6	100.0
N. Sinai	134.916	2	0	1.5	100.0	0.0	0.0	100.0	50.0	50.0	100.0
New Valley	90.346	2	0	2.2	100.0	0.0	0.0	100.0	100.0	50.0	100.0
Port Said	167.720	4	0	2.4	100.0	0.6	0.0	100.0	75.0	100.0	100.0
Qena	1.088.867	31	0	2.9	93.6	0.6	16.1	93.6	87.1	77.4	100.0
Redsea	114.307	5	0	4.4	100.0	0.0	40.0	80.0	60.0	100.0	100.0
S. Sinai	36.925	1	0	2.7	100.0	0.0	0.0	100.0	100.0	0.0	100.0
Sharkia	2.268.587	66	0	2.9	98.5	0.5	15.2	100.0	97.0	83.3	100.0
Sohag	1.505.854	39	0	2.6	92.3	0.9	15.4	100.0	92.3	71.8	96.7
Suez	208.758	5	0	2.4	100.0	0.5	0.0	100.0	100.0	100.0	100.0

Adapted from WHO acute flaccid paralysis surveillance indicators (2014)