

Poliomyelitis Surveillance for sustainable development in Côte d'Ivoire

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Abstract—The objective of this work is to show the importance of national immunization campaigns days against Poliomyelitis in Côte d'Ivoire for sustainable development. The human being is the only natural reservoir of poliovirus. Once this virus is deprived of its host by vaccination, it disappears quickly. Some researches show that the continuous decrease in the incidence of poliomyelitis in many European countries was possible due to the vaccination. This decrease has also led to the gradual disappearance of poliovirus, an interruption of human transmission and the eradication of poliovirus in these countries. In view of these results, Côte d'Ivoire, which wants to be an emerging country in 2020 has set the goal of eliminating the circulation of wild poliovirus. To this end, the authorities in charge of health are making the Ivorian population conscious to participate massively in the various national immunization days against poliomyelitis they regularly organize.

Index Terms— Children, Poliovirus, Vaccine

I. INTRODUCTION

During the years 1990, a series of global conferences had been held under the auspices of the United Nations. In 1990, the World Summit for Children took place in New York. This summit emphasized that children make up more than half of the world's population. These children are the poorest communities and most at risk for negative impacts of poverty [1]. Children suffer disproportionately from the consequences of high rates of malnutrition, deficient sanitary conditions, ingestion of contaminated water and unsanitary housing conditions that seriously affect their health [2]. This study is particularly interested in poliomyelitis which is an infection caused by a virus called poliovirus which enters the body orally, mainly through food and which water have been contaminated due to poor personal hygiene, health or wastewater management [3]. Furthermore, poliomyelitis is most common among children under five; However, anyone who is not immunized against poliovirus, regardless of age, can be infected [4]. Most infected people have no symptoms [5; 6].

In some cases, the poliovirus can infect nerve cells of the spinal cord, causing weakness or paralysis of muscles [6]. Neurological damage is permanent in this case and can result in death if respiratory muscles are affected [7]. The most apparent symptom of polio acute flaccid paralysis is the lower limbs [6]. Poliovirus can spread widely before an outbreak is

detected [8; 9]. Vaccination is the only remedy for the prevention and fight against this infection [10; 11; 12; 13]. So to achieve high immunization coverage of 80% in Côte d'Ivoire, new approaches were adopted in 2008, namely the redeployment of experienced staff and training of vaccinators supports to the campaigns of national immunization days against poliovirus (source: JRF UNICEF / OMS 2008). Some series of synchronized immunization campaigns border were carried out simultaneously in 19 countries. This, to reach remote areas which are often sources of re-infection with wild poliovirus to plan a joint cross-border vaccination (source: JRF UNICEF / OMS 2008).

II. MODE OF TRANSMISSION

The wild poliovirus is transmitted from one person to another by direct or indirect contact. The virus is spread mainly indirectly, by contaminated water by fecal, food or hands called commonly fecal-oral route. In institutions or situations where poor personal hygiene or sanitary measures are practiced, the virus can spread quickly in the environment through contamination of drinking water in the community. Direct transmission occurs via the respiratory route by, coughing, sneezing and inhalation of droplets. This mode of transmission requires close contact with the infected person and is less common. In rare cases, poliomyelitis associated with vaccination may be incurred as a result of the administration of an oral poliovirus vaccine. It should be noted that the oral poliovirus vaccine contains a live attenuated virus, that is weakened. At the time of vaccination, the virus reproduces in weakened intestine before entering the bloodstream and elicit a protective immune response.

In some cases, the virus can undergo genetic changes during reproduction. In this case it give a new form of virus called poliovirus vaccine strain. This, in rare cases, can lead to paralysis called associated paralytic poliomyelitis vaccination (APPV). According to Pérrin and al study in 1988, one child in 2.7 million children receiving their first dose of oral poliovirus vaccine is likely to suffer from associated paralytic poliomyelitis vaccination [14]. So, vaccination stimulates the immune system to produce antibodies that react when exposed to infectious agents [15]. It is therefore an important means of prevention.

III. VACCINES AGAINST POLIOMYELITIS

If you are using In 1974, WHO launched the Expanded Programme on Immunization (EPI) against six diseases namely diphtheria, tetanus, pertussis, measles, tuberculosis and poliomyelitis. The target populations were newborns and infants in their first year of life, children 3 to 4 years. In 1990, eradicating Polio was one of the main WHO guidelines. In 2005, WHO and UNICEF launched the program for

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improving the health of populations, namely: "The Global Immunization Vision and Strategy 2006-2015" which aims to reduce morbidity and mortality caused by vaccine-preventable diseases such as poliomyelitis, improving the effectiveness of national immunization programs [16]. Medicine does not recognize cure for poliomyelitis. Extra-neurological forms and aseptic meningitis, if they are diagnosed as such, depend only on symptomatic measures. In cases of paralytic poliomyelitis, the objectives of the therapeutic management focus on the alleviation of symptoms, speeding recovery and preventing complications. Prophylaxis of paralytic poliomyelitis since the years 1950 is done by two types of vaccine: inactivated injectable polio (IPV) vaccine developed by Salk and an oral poliovirus vaccine attenuated (OPV) developed by Sabin [17]. Mass vaccinations have eradicated wild poliovirus strains in industrialized countries and greatly reduce the frequency and amplitude of poliomyelitis outbreaks in developing countries. However, OPV can cause neuropathogenic strains due to the reversion of attenuating mutations [17]. The strains of vaccine-derived poliovirus can circulate for several years before their pathogenicity is revealed. Nonspecific prevention is then based on the respect of food hygiene and clean hands. Therefore vaccination is the only way to specific prevention against poliomyelitis. Also, there are two types of poliovirus vaccines namely inactivated poliovirus vaccine administered by subcutaneous injection or intramuscular and live attenuated poliovirus vaccine administered orally [18]. The injectable poliovirus vaccine (IPV) is a formalin-inactivated vaccine prepared from poliovirus grown in monkey kidney cells [19]. It has no replicative capacity so no possible mutation. Tolerance is perfect in general. Four inoculations are necessary for the primary immunization, the three first 4 to 6 three-week intervals and the fourth 6 to 12 months later. For this vaccine, a booster is necessary every year to maintain immunity [19]. The absence of live virus provides employment for people with immune deficiency or undergoing immunosuppressive treatment, and in their household contacts. This vaccine has been used since 1975 in France and systematically since 2000 exclusively in the USA. This is the vaccine used in all Western countries currently [20]. It is considered safe, either alone or in combination with other vaccines. There is no proven causal relationship with an adverse event other than minor local erythema (0.5-1%), induration (3-11%) or tenderness (14-29%) [21]. This inactivated vaccine was highly effective in stimulating antibody responses to poliovirus circulating in high-income countries as in poor countries [21]. It has lower efficacy compared to the VPO in the induction of intestinal mucosal immunity in unvaccinated people. Thus, children who received IPV, which subsequently undergoes a test of provocation OPV were infected and OPV excreted in their stool. Also, the VPI is likely to reduce the extent and duration of viral shedding in stool samples, which potentially reduces the transmission. It was recognized that IPV could have a greater impact on the oropharyngeal excretion [21]. The oral polio vaccine (OPV) is an attenuated vaccine that still having its replicative capacity. Once ingested, it replicates in a massive way in the intestine allowing protection of the intestinal flora. This vaccine is used in most endemic countries for massive vaccination campaigns against poliovirus. The decline of poliomyelitis in the current proportions and its usefulness are undeniable [20]. Several

forms of OPV currently in use are: the trivalent form (tOPV) against poliovirus types 1, 2 and 3, used for routine or supplementary immunization; the bivalent form against poliovirus types 1 and 3 (bOPV); and monovalent form against poliovirus 1 (mOPV1) or against poliovirus 3 (mOPV3). Monovalent OPV against poliovirus 2 (VPOm2) was approved, which should be used primarily in response to outbreaks of wild poliovirus circulation, from the emergency stock [21]. Furthermore, OPV is used by some health workers 'qualified'. It also provides protection in the gut by inhibiting the fecal-oral transmission [22]. Immunity mass or group obtained because vaccine promotes the eradication of poliovirus. This is because herd immunity protects unvaccinated people by breaking the transmission of poliovirus [20].

IV. POLIOMYELITIS ERADICATION

In 1988, the World Health Assembly has established the Global Initiative to eradicate polio, which aims to eradicate poliomyelitis worldwide. This initiative has become the largest international public health action to date and is currently led by the World Health Organization (WHO), the Centers for Disease Control and Prevention of the United States, Rotary International and UNICEF. Since its inception in 1988, much progress has been made in the eradication of poliomyelitis. In 1994, the Americas WHO was declared polio-free, followed by the Western Pacific in 2000 and the European Region in June 2002. In addition, the number of poliomyelitis cases has decreased over 99% and there are only three countries where polio is endemic compared to 125 at the start. Remaining endemic countries are including Afghanistan, Nigeria and Pakistan.

V. IMPORTANCE OF VACCINATION CAMPAIGNS AGAINST POLIOVIRUS IN COUNTRIES

Since its launch in 1988 on the occasion of the World Health Assembly, the Global Initiative to eradicate polio has reduced the global incidence of polio by more than 99% and the number endemic of countries decreases of 125 to 3. Without this global effort, more than 10 million people who are walking today may be paralyzed. At the beginning of 2013, poliomyelitis was only a memory in most parts of the world. At the end of 2012, the number of poliomyelitis cases as that of the countries affected by the disease had never been so low (WHA65.5 Resolution). Thus, the Strategic Plan for Poliomyelitis Eradication and the final phase 2013-2018 has been developed to take advantage of this new opportunity to put an end to poliomyelitis. This plan was drawn simultaneously with the wild poliovirus eradication and elimination of poliovirus vaccine-using infrastructure Poliomyelitis to provide other health services for the most vulnerable children in the world [23]. Progress during the year 2012 by the Program Strategic Plan for Poliomyelitis Eradication and the final stage from 2013 to 2018 now make it possible to finally eradicate polio (Resolution WHA65.17). Among the most significant advances, India, in February 2012, celebrated a full year without any cases of child paralysis due to indigenous wild poliovirus [24]. Moreover, India was the country in which the elimination of the disease raised the most complex technical problems [25; 26; 27]. This is mainly the fact that the program could benefit all children in

successive interventions; the use of bivalent oral poliovirus vaccine (bOPV); the unwavering commitment and responsibility policies; in support of the company; and, finally, to the provision of the necessary resources to carry out operations [15]. Thus, India is always polio-free at the end of 2012, poliomyelitis has dropped of 66% in the world. Of the four countries where wild poliovirus transmission was restored by imports, three like as Angola, Democratic Republic of Congo and Sudan have not registered [15 ; 24]. The fourth country, Chad, reported no cases since June 2012 [15; 24]. So the reducing number of cases in Afghanistan and Pakistan, shows that these countries and Nigeria have greatly expanded their coverage in 2012 [15]. These countries are on track to interrupt transmission before the end of 2014 [16]. In Nigeria, the number of cases of wild poliovirus transmission has increased in 2012, and has been stabilized in the last quarter of the year by a better selection of vaccination teams to more effective monitoring and supervision close to the national and state level. The percentage of local high-risk districts where immunization coverage has reached the target threshold from 10% in February 2012 to 70% in February 2013 [15; 16]. Vaccines remain the main instrument of the global initiative to eradicate poliomyelitis and they are at the center of technological innovation and research [21]. The development and wider use of bivalent OPV (bOPV) in 2009-2010 helped to maximize immunogenicity against both serotypes of wild poliovirus remaining (types 1 and 3) for each contact vulnerable children [14; 16; 28]. This has resulted in low levels of wild poliovirus type 1 and 3 circulating globally in 2012, the data suggest that wild poliovirus type 3 can now be considered virtually eradicated [16; 29; 30]. The global initiative to eradicate poliomyelitis has also spearheaded the development of other vaccine products, including monovalent OPV, and conducted essential research to reduce the cost of using IPV and to better understand of its impact in some areas of developing countries [26; 31; 32; 33].

VI. ADVANTAGE OF MONITORING VACCINATION CAMPAIGNS FOR COUNTRIES

One unvaccinated child can infect other 200 [16; 30]. Its full vaccination is one of its fundamental rights of health [16; 30]. The only way to guard against another step poliovirus are to achieve vaccinate all children and to strengthen surveillance of any new cases (www.polioeradication.org). So, it is vital to reach out all people, especially nomadic, insular and vulnerable, in order to reach all children. The organization of immunization campaigns in a country is therefore essential that the vaccine is the most effective way to prevent poliomyelitis. Vaccination also avoids dangerous, contagious and deadly diseases such as measles and yellow fever (Schedule of vaccinations and vaccination recommendations, 2013). If all children are vaccinated, poliovirus, which causes acute flaccid paralysis has made millions of victims will be wiped off the map. We must also continue to immunize all children to prevent the importation of the virus from neighboring countries and its circulation in countries. Thus we can eradicate this disease in the world. In addition, all proposed vaccines in the routine immunization program for children aged 0 to 59 months are reliable [34]. They are given several times consistent with the age of the child to help build a barrier against immune diseases doses. For poliomyelitis,

there is no risk that a child receives too vaccines. The risk is rather that he did not receive enough [16; 30]. Full implementation of the program by proper monitoring of immunization campaigns in a country not only to eradicate polio forever but also expand the benefits of improving vaccination rates among children of primary vaccination with life-saving vaccines [35]. furthermore, much of the infrastructure vaccination campaigns will continue to be put at the service of public health.

The eradication of poliomyelitis has also significant economic benefits (Resolution of the Executive Board of WHO EB130.R10). According to 2010 study, this program will generate a net profit of US \$ 40-50 billion for the poorest countries in the world, by in large part, on the one hand, the savings achieved by eliminating the costs of treatment cases of paralytic poliomyelitis and, secondly, to productivity gains (Resolution of the Executive Board of WHO EB130.R10). The development of other health interventions, strengthening disease surveillance capacity and improved vaccine delivery systems resulting from the activities of poliomyelitis eradication will also have a positive economic impact.

VII. VACCINATION CAMPAIGNS AGAINST POLIOMYELITIS IN CÔTE D'IVOIRE

The The provision of public health services has been virtually halted in September 2002 because of the crisis, particularly in the Centre, North and West (CNW) in the country. However, with the support of UNICEF and its partners to raise the health system has been made possible through the strengthening of the cold chain, supply of equipment, essential drugs, vaccines, vitamin A and treated mosquito nets. In addition, priority was given to the rehabilitation and retrofitting a hundred maternity and health centers damaged or degraded during the crisis. Through advocacy, UNICEF has played a key role in the return of qualified staff who left their jobs because of the crisis and restore operation management teams and sanitary districts. Thus, the supply of quality services for primary health care has been restored. However, some constraints remain due to the lack of skilled health personnel and the low use of services. After 17 cases of poliomyelitis (wild virus) reported in 2004, poliomyelitis immunization coverage has improved through supplementary immunization campaigns, and strengthening of routine immunization and disease surveillance system.

Since 2005, no cases of poliomyelitis have been recorded. Also, by vaccination campaigns in Côte d'Ivoire since July 2011, no cases of wild poliovirus circulation has been notified. The country is on track to eradicate poliomyelitis [36].

VIII. CONCLUSION

Vaccination remains the easiest and most cost effective to ensure that the right to survival and health of all children is respected. In the developing world, immunization saves lives of 2.5 million children per year. Thus, worldwide mobilizing more resources to the health of children is required. This is to ensure that all children are protected by vaccination and also facilitate the discovery of new vaccines against other deadly diseases.

Although the elimination of the disease is a little delayed, remarkable progress has already been made. In 2013, through the National Immunization Days, 470 million children in 83 countries have been vaccinated. In 52 of these countries, vitamin A supplements, which help to lower the number of children from common infections deaths were distributed as part of the immunization activities. As an authority, the fact that my own children are vaccinated publicly, is a source of motivation, trust and confidence for the rest of the population. It should also mobilize the nearest regional delegates namely employees, prefects, sub prefects, mayors, district and village chiefs and all community leaders to do the same around them to ensure that all parents vaccinate their children during immunization campaigns. The vaccination certificate must become an automatic reflex in communities and every family should have shows all their children to the passage of vaccinators.

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