ORIGINAL ARTICLE

The Quality of Poliomyelitis Linked Acute Flaccid Paralysis Surveillance Systems in Zambian Districts Bordering Angola and the Democratic Republic of Congo

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ABSTRACT

Objective: To evaluate the quality of poliomyelitis linked Acute Flaccid Paralysis (AFP) surveillance system in Zambiandistricts bordering Angola and the Democratic Republic ofCongo.

Design: A concurrent mixed method design was used to collect data in 7 of 9 provinces; cross sectional surveys, a retrospective descriptive analysison secondary AFP surveillance data and routine immunization trivalent Oral Polio Vaccine (tOPV) coverage data collected between 2000 and 2009. A case study on community based AFP surveillance was conducted utilizing focus group discussions.

Results: Sixteen out of twenty-five districts did not attain90% target for OPV 3 immunization in the period under review (2000 to 2009).All provinces attained the 80% target of the stool adequacy indicator while the Non-polio AFP rate indicator of 2/100,000 children aged <15 years was not attained. Levels of knowledge on all aspects of AFP surveillance were generally low regardless of administrative level (province, district & health facility) duration of service, work department, profession and geographical location.Knowledge levels were lowest (P value=<.0001) at health facility level(8.4%). Only 31.8% heath workers were trained across all levels. Logistics for AFP surveillance were not adequate at health facility level. There was inadequate staffing and supervision for AFP surveillance, especially at health facility level. Focus group discussions revealed that communities were not involved and not sensitized in AFP surveillance.

Conclusions: There is suboptimal AFP surveillance quality in districts bordering Angola and DRC. The gaps identified need to be addressed, or could result in failure to detect imported wild polio viruses from neighbouring countries or from any part the world. This would lead to sustained transmission of the polio virus and resurgence of poliomyelitis, given the fluctuatingtOPV 3 immunization coverage.

INTRODUCTION

In May 1988, the World Health Assembly (WHA) committed the World Health Organisation (WHO) to the global eradication of poliomyelitis by the year 2000, a goal that was later pushed to 2005, 2010, 2012 and finally 2018. The continued decrease in the incidence of polio in many countries and the progressive disappearance of polioviruses both suggest that the interruption of human transmission, and thus eradication, is within reach.[1,2]

Prior to the advent of vaccination, poliomyelitis occurred worldwide. As a result of implementing the WHO recommended strategies (Sensitive AFP surveillance, achieving and maintaining high routine immunization coverage, conducting National Immunization Days (NIDs) in all endemic countries to interrupt circulation of WPVs and conducting mopping-up immunization to eliminate the final chains of transmission),the Americas, Western Pacific , European and South East Asia WHO regions have been certified polio free. These regions have not had any confirmed indigenous polio cases for 15, 8, 7 years and 3 weeks respectively. A country can only be certified polio free when all countries in the WHO region attain a zero WPV circulation for three consecutive years[3].However, importations and re-emergence of Wild

Polio Viruses (WPV) is a constant threat. Between 2003 and 2005, 25 previously polio-free countries were re-infected due to importations. In 2009, 19 countries were re-infected. The biggest risk to importation is proximity[3]. There were more imported than indigenous polio viruses in the period 2000 to 2009.The AFP Surveillance system was introduced in Zambia in 1993 by the Ministry of Health its partners and spearheaded by WHO, but the quality has never been evaluated, meaning the quality or the ability to detect AFP cases is not known.

The last WPVs in Zambia were in 1995 in Kafue district. However, as the world approaches polio eradication, the use of case-free periods as an indicator of the cessation of disease transmission becomes increasingly imprecise due to the high proportion of subclinical infections.Even after five years without a detected case; freedom from poliovirus infection cannot be assumed.Sustained sensitive surveillance is therefore required to demonstrate freedom from poliovirus infection and support the prevention of polio re-emergence or resurgence[3]. According to WHO, it is important for polio free countries to maintain effective and good quality surveillance beyond the period required for WHO certificationto support polio eradication through the detection of imported and vaccine-associated polio cases.Formal evaluation of AFP surveillance is also crucial to ensure that surveillance is adequate to detect poliovirus infection at an appropriate prevalence to enable programmatic response and to avoid long spells of undetected circulation[4].

The non-polio AFP rate, one of the core performance indicators for polio eradication was achieved and sustained way before 2005 when the country was awarded a polio free status. It increased from 2.3 in 2000 to 3.3 by the end of 2009.The quality of AFP surveillance in the high risk districts which share boundaries with Angola and DRC is however not known. Zambia therefore, risks failing to detect imported wild poliovirus quickly from these countries where there is on-goingWPV transmission. This could lead to re-established polio infection in Zambiaand compromise the polio free status. Furthermore, the goal of global polio eradication would be delayed. The specific objectives were to; review OPV 3 immunization and AFP surveillance data, assess health worker's knowledge on AFP surveillance, determine availability of logistical support and determine whether health workers at all levels have been trained in AFP surveillance. Others were to establish staffing levels, supervisory support for AFP surveillance and explore community involvement. The research hypothesis was;"There is good quality AFP surveillance system in districts bordering Angola and DRC".

METHODS

Study setting and design

Zambia is a landlocked country covering an area of 752,612 square kilometres (about 2.5% of Africa). It is bounded by Democratic Republic of Congo (DRC) and Tanzania in the north, Malawi and Mozambique in the east; Zimbabwe and Botswana in the south; Namibia in the southeast and Angola in the west. Ithas an estimated 2010 population of 13,046,508 million, forty eight percent of the total population is aged less than 15 years, under 5yrs constitutes 20% and 4% is under 1yr. It is divided in nine provinces. The study was conducted in 25 districts in Copperbelt, Western, Central, Northern, North-western and Luapula provinces and Lusaka.

A concurrent mixed method design was used to collect data; Interviews were conducted among health workers at provincial and district levels, as well as those working in health facility departments where AFP cases are likely to be seen to determine the quality of AFP surveillance;250 at health facility level, 6 at provincial and 24 at district level, making the total sample size 280. Astructured questionnaire was used. Purposive sampling was used to select study sites and units at all levels. A retrospective record review was done to collect secondary AFP surveillance and routine immunization OPV 3 coverage data collected between 2000 and 2009. Twenty four (24) focus group discussions were conducted with communities to explore their involvement in AFP surveillance using a focus group discussion guide. According to WHO, a surveillance system is deemed to be of good quality when; Health workers are knowledgeable on AFP surveillance, there is adequate logistical support for surveillance, adequate staffing levels and regular supervisory support from higher levels. There should also be a feedback, feed forward mechanism, as well as community involvement.

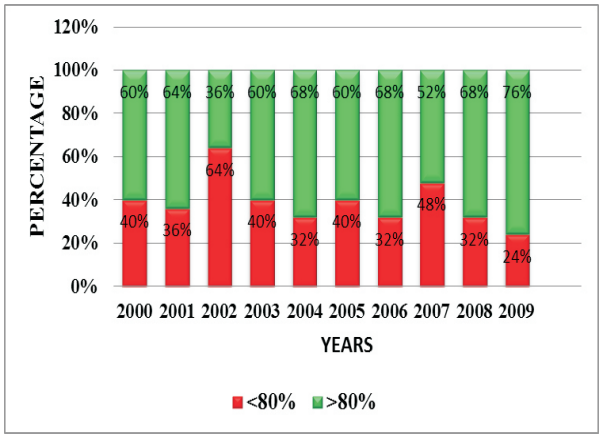
Quantitative data was analysed using Epi info version 3.2.2 and Statistical Analytical Software (SAS). EpiInfo™

was used for data management, whilst SAS 9.2 was used for statistical analysis and to enable hypothesis testing. Levels of knowledge, training, logistics, staffing and supervision were determined using proportions along with their exact 95% confidence limit, comparing them to an ideal 100%, according to Pearson-Clapper method. The level of significance was predetermined at ($p<0.05$).Qualitative data was analysed using thematic content analysis.

RESULTS

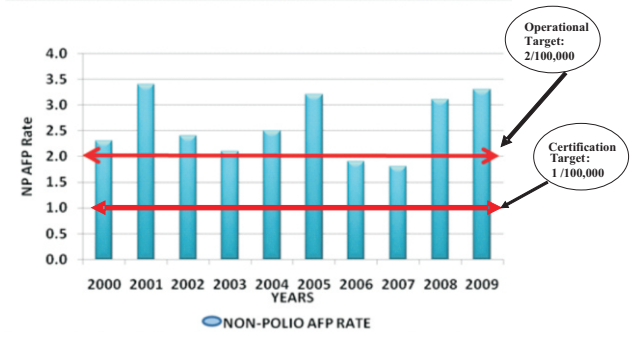
Sixteen out of twenty-five districts did not attain the 90% target for OPV 3 immunization coverage.

Table 1: Proportion of districts that did not attain the 90% target for OPV3 coverage



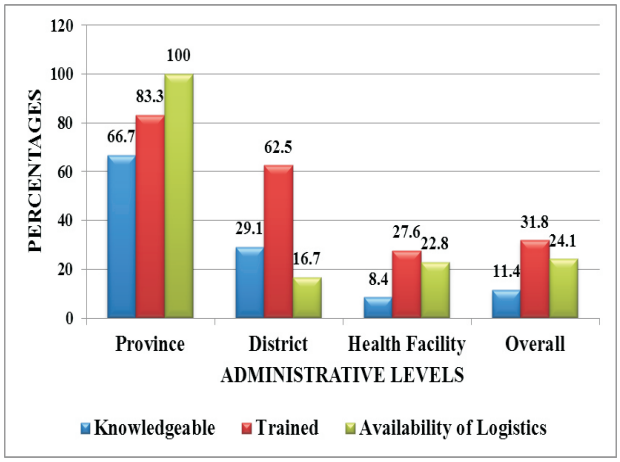
All districts attained the 80 % target for the stool adequacy indicator while the Non-polio AFP rate indicator of 2/100,000 children aged <15 years was not attained.

Figure 2: Non-polio AFP rate by year



Levels of knowledge on all aspects of AFP surveillance were low across all levels, 32/280 (11.4%),being lowest at health facility level (P value=<.0001).Only 31.8% health workers were trained. Logistics for AFP surveillance were inadequate at health facility level;(P value=<.0001),0.9805 at provincial and <.0001 at district levels respectively.

Figure 3: Proportion of Health worker's knowledge, training and availability of logistics at all levels



There was inadequate staffing and supervision for AFP surveillance, especially at health facility level. Focus group discussions revealed that communities were not involved and sensitized in AFP surveillance. All the participants in the 24 sites of the focus group discussions at community level said they were not involved in AFP surveillance. They said the subject is only mentioned during Child Health Week preparations. Further inquiries revealed that they were willing to participate in AFP surveillance activities and suggested how they could participate. When asked whether some people have been coming to conduct community sensitization at community level, all the 198 participants in the sites said no one had ever come to sensitize them on AFP surveillance.

DISCUSSIONS

The low OPV 3 routine immunization coverage revealed in this study coincides with the global OPV3 coverage which indicated that most WHO regions could not meet the target of 90%. In 2004, the global coverage was81%.

In 2005, it was 78%. There was a variation in the coverage among WHO regions in 2005 as follows; 63% in South-East Asia, 69% in the African region, 84% in the Eastern Mediterranean, 87% in the Western Pacific. It was only the European and America regions that attained>90%.In the four polio-endemic countries, 3-dose OPV coverage was estimated at 77% in Pakistan, 76% in Afghanistan, 58% in India, and 39% in Nigeria; however, lower coverage has been reported in areas with ongoing polio transmission (e.g., northern Nigeria and the northern Indian states of Uttar Pradesh and Bihar)[3].

Factors affecting the coverage could be attributed to non-availability of a financial sustainability plan for immunizations that is being implemented and monitored at national and district levels, regular vaccine stock outs and lack of active efforts, e.g. training, supervision, which would improve interpersonal communication at vaccination sessions. High routine immunization coverage is a critical factor in reducing the risk of outbreaks following importation of WPV. All identified countries with persistent high risk of importation ought to review or develop plans for strengthening Immunization coverage[5].The target for Supplemental Immunization Activities (SIAs) was reached during all rounds in Zambia, apart from the first two (2) rounds in1996. The inability to reach the target could be because the country was doing it for the first time, so there could have been organization, coordination and logistic problems. To the contrary, a global outlook of SIAs showed that there were low coverages for OPV in countries that conducted SIAs using mOPV1 in 2005 and 2006 with coverages of 22% and 46% respectively, reflecting programmatic shift in campaign strategy[6]. There is need to strengthen routine immunization activities to ensure reduction in the number of unvaccinated children and raise population immunity to avoid sustained circulation of WPVs in the event of an importation. This can be done through strong partner coordination under government leadership, advocacy, sustained political commitment, local resource mobilization and strengthening cross border immunization and AFP surveillance.

The results show an upward swing in the non-polio AFP indicator in 2008 and 2009, as compared to a decrease recorded in earlier years, which may continue in subsequent years and should be the focus of policymakers' special attention.These findings coincided with the global picture which showed an increase in AFP case reporting by 10% in 2006, especially in endemic countries and in countries in which polio was introduced apart from Kenya. There was an increase in the core indicators in 2008 as compared to 2007 [7, 8]. There was a similar increase in majority of countries in the African region compared to the East Mediterranean region and the South-East Asia region[9]. In view of the decrease recorded in earlier years, there is need to strengthen the quality of AFP surveillance system to ensure there are no missed AFP cases. Cross border activities (immunizations and physical check of all children passing through borders) also need to be strengthened in collaboration with Angola and DRC.

The low levels of knowledge noted in the present study ties with findings recorded in Kara state of Nigeria in 2007[10]. This could lead to missing cases and accelerate spread of WPVs.This study also revealed inadequate training of health workers, which could lead to missing cases and perpetuate the spread of polio in case of an importation. Planning and implementation of regular targeted training, orientation and sensitization of health workers by program officers is required.Logistics for AFP surveillance (investigation forms, sample collection bottles, funds to conduct active surveillance) were reported to be inadequate in this study, especially at health facility level. This is likely to cause delays in the investigation of cases.

The critical shortage of health man power in Zambia revealed in this study was also highlighted in the first (2006-2010) and second (2011 – 2015) National Human Resources for Health Strategic Plan (NHRH SP), as well as in the Ferrinho et al study.Non-qualified workers formed between 31% to 54% of all staff in rural health centers[3]. In addition to the critical staff shortage, supervision of health workers was inadequate and feedback mechanisms were not in place. A study done in Tanzania by Ahmed et al revealed that it is important to supervise health workers in order to maintain and improve their performance and the overall quality of care[11]. Feedback is a powerful method for promoting timely reporting, local data use, and action. Data validation through feedback can improve data quality, completeness, and timeliness[12].

The present study also showed that communities were not involved and sensitized in AFP surveillance. Similar findings were recorded in a study in Kwara state of Nigeria in 2009 on community awareness and sensitization on AFP surveillance and case reporting which revealed low levels of awareness on AFP among community members [10]. While passive and active surveillance of AFP by health workers is important for detection of polio cases, reporting of cases occurring among community members would provide greater yield in number of reported cases. High level of awareness by community members is important for early detection and reporting of AFP cases. A study in Niger by Ndiaye *et al* indicated that high quality of surveillance can improve in developing countries if a community based approach is adopted, like the approach used for smallpox-eradication and guinea worm-control campaigns in Niger[5].

A community level structure for AFP surveillance should be established by MoH, MCDMC and partnersto ensure quick detection of AFP cases at community level. Communities should be trained to beef up the health worker shortage.Early detection and reporting of AFP cases is important in the detection of poliomyelitis.The findings of this study do not support the research hypothesis which stated that, there is good quality AFP surveillance system in districts bordering Angola and DRC. To the contrary, results show that there is suboptimal AFP surveillance quality in these districts. This may lead to failure of detecting imported polio viruses quickly; resulting in long spells of undetected circulation leading to the resurgence of poliomyelitis in Zambia.Addressing the identified gaps could enhance the quality of AFP surveillance in bordering districts and lead to quick detection of imported polio viruses. The results of this study could not be generalized since randomization was not applied in selection of study units.

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