RESEARCH Open Access

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:

(2014 and 2015) before the study. Only 7 (20%) of the 35 clinicians at the non-focal AFP sites had received training on AFP surveillance in the last 2 years. Of the 85 clinicians at the focal sites and 35 at the non-focal sites who were interviewed, 60 (71%) at the focal sites and 17 (39%) at non-focal sites had adequate knowledge (good and very good knowledge) of case definitions of AFP, and 75 (88%) and 28 (65%) for stool collection for investigation among staff, respectively (Table 4 e **4** K i i i (i i (AF)) i i i AF i

K	C i i i AF , **n** (%)		i , **n** (%)	
	F i	N - i	F i	N - i
	15 (17.6%)	14 (32.6%)	7 (8.2%)	6 (14.0%)
F i	10 (11.8%)	12 (27.9%)	3 (3.5%)	9 (20.9%)
G	30 (35.3%)	9 (20.9%)	28 (32.9%)	10 (23.30%)
	30 (35.3%)	8 (18.6%)	47 (55.3%)	18 (41.9%)
	85 (100.0%)	43 (100.0%)	85 (100.0%)	43 (100.0%)

Feedback was not given to 26 (68%) of the caregivers. The majority (79%) of the community leaders interviewed were aware of AFP and knew that the stool was the specimen needed for investigation of the case, but 21% did not know to whom they needed to report a case of AFP in their community.

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The results of this study on the evaluation of quality surveillance revealed that there was a functional and sensitive surveillance system for polio eradication in the state, evident by the high AFP detection and non-polio AFP rates between January 2012 and June 2016 at both state and LGA levels. A highly sensitive surveillance system is required for polio because it is a disease targeted for eradication, and the desire is not to miss any case of AFP that could have been caused by WPV. The importance of the highly sensitive system is to ensure prompt investigation for the disease as noted by WHO [16].

e **5** E i i i (AF) i i - i i B i , 2016

i	F i **n** = 85	N - i **n** = 43
i i	85 (100.0%)	42 (97.7%)
i	85 (100.0%)	42 (97.7%)
G i i i	77 (90.5%)	16 (37.2%)
i i	85 (100.0%)	39 (90.7%)
A i i i i i	84 (98.8%)	35 (81.4%)
	79 (92.9%)	35 (81.4%)
	84 (98.8%)	40 (93.0%)
i	36 (42.4%)	11 (25.6%)
m	64 (75.3%)	N/A
i	82 (96.5%)	31 (72.1%)
Li i m	80 (94.1%)	N/A
C i m	63 (74.1%)	N/A
AF 001	63 (74.1%)	11 (25.6%)
AF 002	61 (71.2%)	N/A
AF 003	51 (60.0%)	5 (11.6%)
ID m	47 (55.7%)	7 (16.3%)
i i	69 (81.m( )-302(5))	m

The results show that the polio surveillance system had achieved its key objectives in both the state and LGAs since each had met and maintained the two core surveillance indicators for polio eradication since 2012. Although the state identified the last confirmed case of WPV1 in September 2013 and WPV3 in November 2011, it had remained free of any polio-compatible disease for 4 years which can be credited to the good and functional surveillance system in the state. The achievement is also an indication of an efficient system supporting the interruption of WPV and, as such, the state might be confident of the true absence of WPV [17].

Despite the good results shown for the state, at the operational level, and particularly at the non-focal sites in the study, it was revealed that some of the critical elements for the quality of the surveillance system for polio eradication and eventual certification of polio-free states were deficient. These key elements are knowledge and documentation, and are not mutually exclusive; documentation depends on knowledge of AFP and the skills of the reporting procedures of the officer. They are key determining factors for the completeness, correctness, and reliability of the data. Good knowledge of case definition of the disease enables early detection and prompt investigation. The importance of documentation on the other hand cannot be overemphasized; it is the documentation that provides evidence that efforts have been made to search for WPV and that the virus was absent. Pomerai et al. in their study on evaluation of AFP surveillance in the Bikita district of Masvingo Province in Zimbabwe noted that failure of detection of AFP was due to a lack of the knowledge of the healthcare workers on its symptoms [18].

Documentation is also affected by the motivation and attitude of the public health official. For example, to elicit prompt action, the report must be sent promptly; thus, failure to send a well-documented report on time will not elicit the expected result, and this is dependent on the motivation and attitude of the officer responsible for the task. Several factors affect staff motivation and attitude towards their assigned duties, including surveillance for polio. Studies in African countries show a functional AFP surveillance system that operates despite challenges such as chronic insecurity and inaccessibility, and a lack of capacity and infrastructure [19–25]. Similar studies in Kenya in 2012 observed and reported deficiencies at multiple levels of the health system and were most commonly related to the challenges of funding, training, and supervision [26]. These results corroborate the findings from our study, where capacities at the non-focal sites were a major challenge.

The authentication of reports of AFP investigated revealed discrepancies in the birthday, the birth month of the child, the date of onset of paralysis, and the date of the investigation, indicating problem with both knowledge and documentation by the healthcare workers. This information was collected in retrospect and could had been subject to recall bias. The poor documentation in our study might be one of the important pointers to the outbreak of WPV in Nigeria in June 2016. The genetic sequencing of the outbreak that occurred in Borno state in August 2016 after 2 years of absence suggested that the new cases were most closely linked to a wild poliovirus strain that was last detected in the state in 2011 [27].

Bauchi state, our study site, has been host to some of the displaced persons from Borno state, also putting the state at risk for outbreaks of WPV. Poor knowledge, documentation, and archiving by the LGA DSNOs means that the state could have missed cases of WPV. Furthermore, one of the core assignments of the certification committee in all regions is to review documentation to verify the absence of wild poliovirus [28]. It serves as the critical basis for quality of the entire system. The documentation acts as the sum of the evidence for the knowledge of the operation of the entire surveillance system. Good and complete documentation is a proxy indicator of the quality of the system. Poor documentation, on the other hand, translates into the possibility of missing vital information leading to wild poliovirus being overlooked, either in the past or the future. Documentation is also a proxy indicator of the knowledge of the responsible officers in the polio eradication initiative. The implication is that people with poor knowledge of the requirements may not document the activities correctly. In our study, it was evident that there are gaps in the knowledge of the key operational staff at the health facility and at community levels on the requirements for polio eradication. For example, poor surveillance, especially at the operational level. Additionally, the WHO consultants should provide all the essential materials and tools for documentation of AFP surveillance and to ensure their judicious use at the operational level. The primary healthcare development agency of Bauchi state should conduct aggressive public awareness campaigns on the signs and symptoms of AFP, including surveillance for it.

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Our study revealed a gap in the quality indicators for polio eradication in the state, especially knowledge and documentation for AFP surveillance at the operational level. The state surveillance unit should update the knowledge of the DSNOs and the focal persons, conduct regular sensitization of clinicians and community informants, and timely and adequate supply of reporting tools; ensuring their judicious use will improve AFP surveillance in the state.

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