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Short Communication

Oral Polio Vaccines Have Not Yet Covered West Africa: Survey of Immunization Coverage Conducted in Niger

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SUMMARY: Following the re-emergence of polio in West Africa, an investigation was conducted on the occasion when transients gather for the festival in Niger, where the oral polio vaccine (OPV) and BCG coverage among children under the age of 5 years can be evaluated. A total of 259 children were investigated, including 186 from settled families and 73 from unsettled families. OPV coverage was found to be as low as 32.4%, and 61.8% of all participants in the study had not received both OPV and BCG. There were more children who had not received the OPV in unsettled families than in settled families. As there are still unvaccinated children in Niger, polio continues to occur among them. Moreover, outbreaks can transfer to more densely-populated areas, causing much larger outbreaks. To stop the chain of transmission, it is essential to reconsider the strategy of mass vaccination in order to cover all children thoroughly, including transients.

In Africa, tremendous progress has been made with great effort towards the achievement of polio eradication. By widely applied acute flaccid paralysis (AFP) surveillance and oral polio vaccine (OPV), the circulation of wild poliovirus was stopped in almost all African countries; only four countries in Africa (Egypt, Nigeria, Niger, and Somalia) reported indigenous wild polioviruses in 2002. In particular, the area of West Africa centering around northern Nigeria is one of two main epidemic areas (including India); we previously presented the issues regarding a polio eradication program for this area (1,2). In 2003, polio outbreak in Nigeria and Niger spread to neighbouring polio-free countries, including Ghana, Burkina Faso, Togo, and Chad. Molecular epidemiological analysis revealed that the polioviruses isolated in these countries were genetically related to a lineage of wild polioviruses circulating in Niger and Nigeria (3,4). This study investigated whether or not the vaccine reached the entire area and aimed at defining how to improve the rate of administration in underserved areas. The present investigation of vaccination coverage was conducted in the area of Niger.

The polio vaccination status in Niger was investigated during the yearly festival "Cure Salee" (22 - 28 September 2003), a time at which many nomads join together. Figure 1 shows the area in which this investigation was conducted, as well as the areas in which wild polioviruses were isolated. The research was conducted by interviewing mothers or guardians of children under the age of 5 years. At that time, the chidlren were checked for BCG scars. The interviews were conducted in French, Hausa, Tamashk, and Pleuh. In order to make the investigation as brief as possible, questions were limited to the subject's age in months and years, sex, residency status (settled or unsettled), and OPV history.

The replies obtained from the participants and the existence of BCG scar were grouped by residency status or the child's age, and a comparison between each group was performed. Statistical analysis was carried out using the chi-square test for independent variables.

A total of 259 children under the age of 5 years were investigated (124 boys, 47.9%; 135 girls, 52.1%). Sixty-four subjects were under 1 year old (24.7%), 191 were aged 1 - 5 years (73.7%), and 4 participants were of uncertain age, but less than 5 years (1.5%). One hundred and eighty-six children (71.8%) were from settled families and 73 (28.2%) were from unsettled families, including the nomads.

Eighty-four children (32.4%) had an OPV history and 49 children (18.9%) had a BCG scar. The percentage of children who had received the OPV was significantly higher than that of children with BCG scars (P = 0.0004). Children with neither an OPV history nor BCG scar numbered 160, i.e., 61.8% of the total number of participants.

In the comparison according to resident status (Fig. 2), 37.6% of the children from settled families (70/186) and 19.2% from unsettled families (14/73) had an OPV history, and the OPV coverage of children in the settled families was significantly higher (P = 0.004). As regards BCG coverage, the percentages of children with BCG scars was 21.5% (settled families, 40/186) and 12.3% (unsettled families, 9/73); although the children in the settled families had a high rate of vaccination coverage, there was no significant difference (P = 0.09). The number of children under 1 year old with an OPV history was 12 of 64 (18.8%). The number of children between the ages of 1 and 5 (inclusive) with an OPV history was 68 of 191 (35.6%).

As regards children in settled families, those with OPV increased with increasing age, i.e., 8 of 60 children were under 1 year old (13.3%) and 57 of 136 children were 1 - 5 years old (41.9%). In unsettled families, there was less of an

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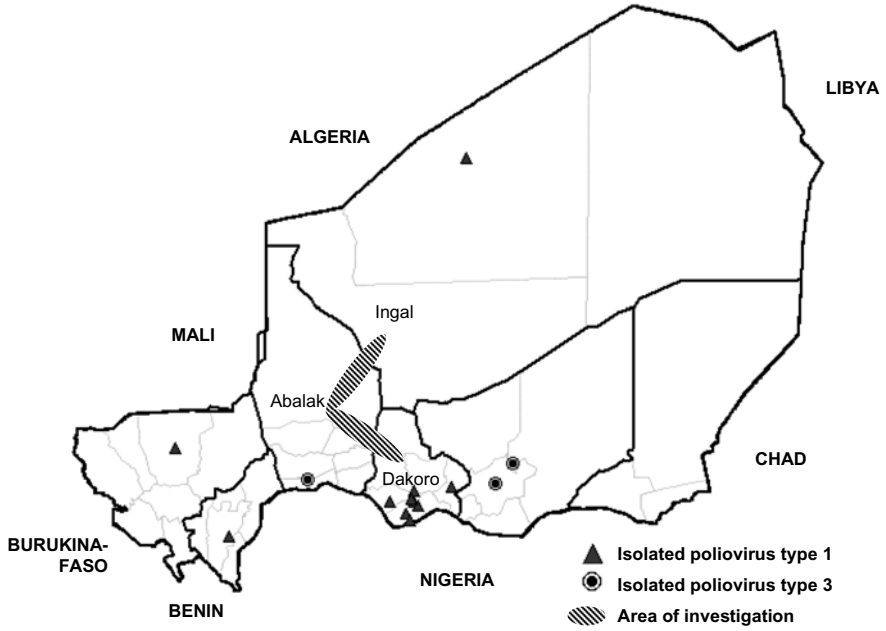

Fig. 1. Isolates of wild poliovirus in Niger in 2003* and the area where the investigation was conducted.
*: Data as of 4 December 2004 from the source of WHO/AFRO. http://www.afro.who.int/polio/priority_countries/niger.html. (last updated 04 Dec 2003, cited 31 Mar 2004) (10)

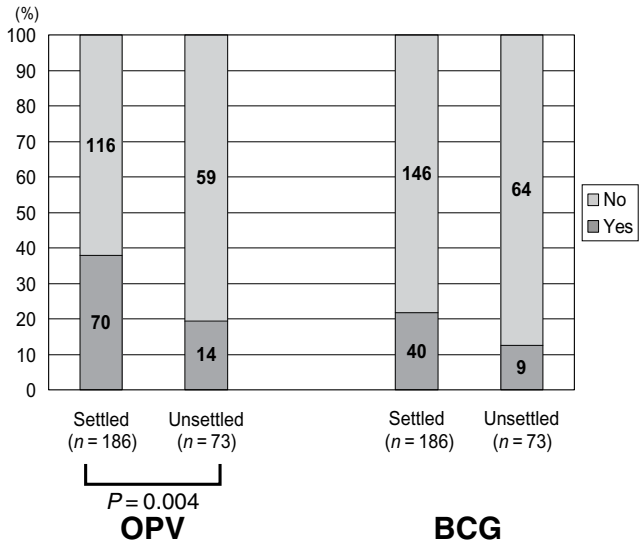

Fig. 2. Comparison by resident status: vaccination history of OPV and BCG.

increase in the rate of OPV with increasing age, compared to that in settled families: 17.6% of children under 1 year old (3/17) and 28.6% of children aged 1-5 years (12/42) had an OPV history in unsettled families.

Previous reports (1,2) have indicated that transients are high risk group for polio epidemics. We therefore selected the festival season for this investigation. OPV coverage was found to be as low as 32.4% of the total number of children investigated. Furthermore, in many cases, children without an OPV history and those without BCG scars were identical. We investigated only a small percentage of the population; similar children are scattered in West Africa. At this point in time, it is difficult to determine whether has been achieved with the vaccine; it is thought that polio outbreaks will continue in OPV-unvaccinated groups. The progress of polio eradication programs in other areas has been discussed elsewhere (5-7), Those who travel across national borders, such as transients, appear to remain a susceptible group on the African Continent.

When the children under 1 year old and the children aged 1 - 5 years were compared, the OPV vaccination rate rose from 18.8 to 35.6%, but there was no similar increase in terms of the BCG scars. OPV mass vaccination programs are repeatedly conducted during National Immunization Days (NIDs). However, the present OPV vaccination rate is still insufficient. In order to increase the vaccination rate, it will be necessary to improve the mass vaccination strategy. Considering the low rate of BCG coverage and the low OPV coverage in children under 1 year old, the current routine immunization strategy is not expected to be effective. Enhancing mass vaccination remains a key factor in polio eradication.

Since population density is not high in this area of West Africa, sporadic cases of polio are expected to have continued over a long period of time. Nomads who move within the Ogaden Desert have experienced smallpox eradication (8), without an explosive polio outbreak like that in India (9). However, new outbreaks will still occur, when patients are transient and meet others from susceptible groups. The re-emergence of polio is thus still poses a problem in West African countries. In Niger, the number of polio cases in 2003 increased sharply, and the cases of polio also have occurred in densely-populated areas, such as prefectural capitals. If a sporadic polio outbreak enters a densely-populated area and many susceptibles live there, it will lead to a major outbreak. In order to achieve the goal of polio eradication, the transmission of wild polioviruses must be stopped immediately. Two keywords are important in this context: “movement of the population” and “densely-populated area”, which are to some extent contrastive.

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