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Barriers to timely administration of birth dose vaccines in The Gambia, West Africa

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ABSTRACT

Objective: Although vaccine coverage in infants in sub-Saharan Africa is high, this is estimated at the age of 6–12 months. There is little information on the timely administration of birth dose vaccines. The objective of this study was to assess the timing of birth dose vaccines (hepatitis B, BCG and oral polio) and reasons for delayed administration in The Gambia.
Methods: We used vaccination data from the Farafenni Health and Demographic Surveillance System (FHDSS) between 2004 and 2014. Coverage was calculated at birth (0–1 day), day 7, day 28, 6 months and 1 year of age. Logistic regression models were used to identify demographic and socio-economic variables associated with vaccination by day 7 in children born between 2011 and 2014.
Results: Most of the 10,851 children had received the first dose of hepatitis B virus (HBV) vaccine by the age of 6 months (93.1%). Nevertheless, only 1.1% of them were vaccinated at birth, 5.4% by day 7, and 58.4% by day 28. Vaccination by day 7 was associated with living in urban areas (West rural: adjusted OR (AOR) = 6.13, 95%CI: 3.20–11.75, east rural: AOR = 6.72, 95%CI: 3.66–12.33) and maternal education (senior-educations: AOR = 2.43, 95%CI: 1.17–5.06); and inversely associated with distance to vaccination delivery points (≥2 km: AOR = 0.41, 95%CI: 0.24–0.70), and Fula ethnicity (AOR = 0.60, 95%CI: 0.40–0.91).
Conclusion: Vaccine coverage in The Gambia is high but infants are usually vaccinated after the neonatal period. Interventions to ensure the implementation of national vaccination policies are urgently needed.

1. Introduction

The Expanded Programme on Immunization (EPI) is an essential, cost-effective health intervention able to reduce child morbidity and mortality worldwide [1]. The World Health Organization (WHO) recommends to administer three vaccines soon after birth, namely hepatitis B virus (HBV) vaccine, Bacillus Calmette-Guerin (BCG) and oral polio vaccine (OPV) [2–4]. Their early administration aims at preventing both mother-to-child and early horizontal HBV transmission [4]; TB meningitis in childhood [5]; and to increase OPV sero-conversion rates with subsequent doses [3]. Among the 49 countries in sub-Saharan Africa (SSA), BCG and OPV are scheduled at birth in 48 and 39 of them, respectively, whilst only eight countries have introduced HBV vaccine at the birth [6]. According to 2014 WHO/UNICEF reports, coverage of third dose of HBV vaccine, BCG and third dose of OPV in infants in the WHO Africa region was 77%, 84% and 77%, respectively [7]. Nevertheless, these figures were estimated at defined time points (i.e. 12–23 months of age) without considering the national policy and timing of vaccines [8]. For example, recent studies in SSA reported BCG vaccine coverage mostly by 4 or 8 weeks of age [9–13], and few assessed coverage at birth or at 7 days of age [14,15].

In The Gambia, a west-African country with high rates of neonatal and infant mortality [16] and high chronic HBV prevalence (>8%) according to the WHO classification [17–19], the EPI

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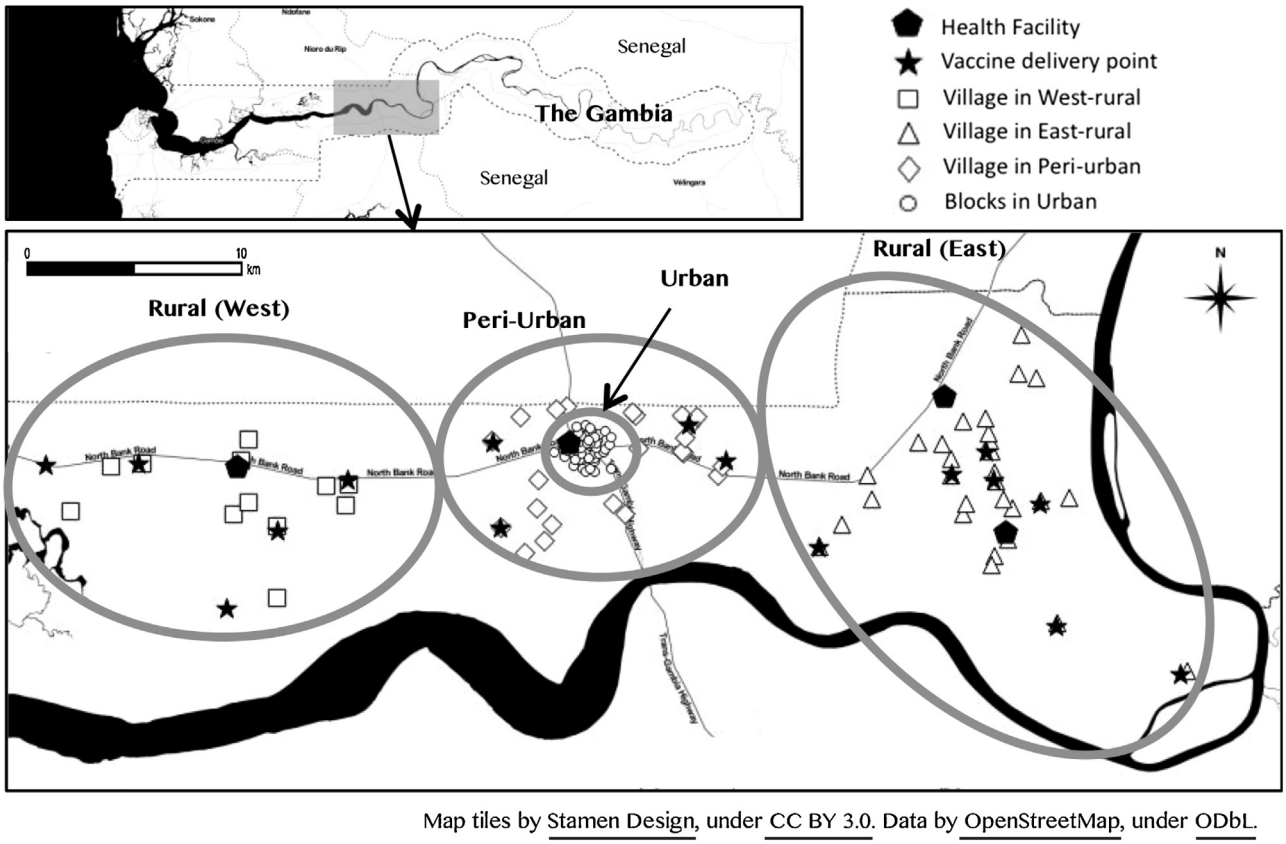

Fig. 1. Map of Farafenni.

schedule includes HBV vaccine, BCG and OPV immunization at birth or as soon as possible after birth. Although the coverage of these vaccines is above 95% [20], two previous small studies described important delays in BCG administration [9,10].

Here, we present a large study assessing coverage and timing of the birth dose vaccines (HBV vaccine, BCG and OPV) over a 10-year period (2004–2014) in The Gambia using the Farafenni Health and Demographic Surveillance System (FHDSS). We also assessed demographic and epidemiological factors associated with delayed vaccination.

2. Method

2.1. Study sites and data collection

The Farafenni Health and Demographic Surveillance System (FHDSS) in the North Bank Region of The Gambia was established in 1981 [21]. The details of FHDSS have been described in elsewhere [21]. Briefly, the FHDSS covered all residents living in Farafenni town and surrounding villages located in North Bank Region of The Gambia. In 2012, the FHDSS covered a population of 50,455. Trained field workers visit each household every four months to collect demographic data (e.g. births, deaths, in and out migrations). Vaccination status of children under 5 years of age is collected from their infant welfare cards. If this is not available, children are considered unvaccinated. They constitute no more than 2% of children under 5 years of age [22].

For the purposes of this study, we divided the area covered by the FHDSS into four regions reflecting the catchment areas of the respective health facilities that serve the FHDSS population. These are rural west (11 villages), the catchment area of Illiasa Minor Health Centre; rural east (31 villages) served by Ngaiyen Sanjal and Sarakunda Minor Health Centres in the north and south respectively; and peri-urban (23 villages located between 5 and 10 km from the central point of the urban area) and urban areas (49 blocks) (Fig. 1). The peri-urban and urban regions access health care from a major health centre and a regional hospital located in Farafenni town. The urban area is divided into residential blocks with roughly similar number of inhabitants.

The vaccine data were collected prospectively since mid-2003 as part of routine FHDSS data collection. Socio-economic data were collected in two surveys conducted in 2007 and 2013. Place of birth is collected prospectively since January 2014, as well as other birth information such as birth weight and assistance at delivery.

2.2. Vaccine delivery

Health facilities within the study area are supplied with vaccines by the central medical stores in Banjul, Gambian capital, every month through the office of the Regional Health Team in Farafenni, and stored in fridges with temperature operated by solar panels. Each facility conducts reproductive and child health (RCH) clinics once or twice a week; and undertakes visits to a set schedule of outreach clinics depending on the population of the vicinity within its catchment areas on other days of the week [23]. Vaccines are administered and only available through RCH clinics and these outreach clinics (Fig. 1). Even the hospital in the study area, Farafenni Hospital, does not vaccinate children born in the hospital. Both health facilities and outreach clinics use multiple-dose vials for monovalent HBV vaccine (10 doses/vial), BCG (20 doses/vial) and OPV (20 doses/vial). As recommended by the WHO, an opened vial needs to be used within six hours for BCG and within 28 days for HBV vaccine and OPV [24].

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