Abstract

With a very high vaccine coverage rate in infancy in Sri Lanka, Adverse Events Following Immunization (AEFI) emerges as a threat to perceived safety in the near absence of vaccine preventable diseases. Provision of facilities for successful management of AEFI based on scientific research is essential.

This study was conducted to describe the epidemiology of selected AEFI following vaccination in the public sector and to assess the potential accessibility for public AEFI clinical management services.

Infants (n=1845) were enrolled to a prospective cohort at the post natal wards of public sector hospitals in and around the Kalutara district after exposure to BCG vaccine. They were actively followed up for the development of AEFI for 42 days at each encounter of first, second and third doses of DTwP-HepB-Hib vaccine and Japanese Encephalitis (live attenuated) vaccine while for BCG, the follow up period was 6 months.

A nested case-control study among 221 cases and 442 controls was carried out to determine the association of preselected predictive factors and the occurrence of AEFI.

A descriptive cross sectional study was carried out to observe the pattern of healthcare accessibility in emergency and non-emergency situations by parents or principal care givers of the study infants. Perceived time to travel to each of these healthcare centres with the mode of travel also was recorded. Using this preliminary data and the geospatial tools, potential accessibility within 15 minutes for each mode of transport was calculated separately in non-emergency and emergency situations assuming all the health centres were available for access. Same analysis was carried out assuming that the 24 hour open government healthcare centres were the only centres able to be accessed in an emergency.

A location-allocation analysis was carried out in GIS environment to identify the new places where future healthcare centres could be established to increase the emergency healthcare accessibility in the Kalutara district.

There were 591 observed AEFI. The commonest AEFI (95%) was fever. DTwP-HepB-Hib vaccine caused the highest amount (86%) of observed AEFI. Cumulative incidence rate for fever after the first dose of DTwP-HepB-Hib was 14% (95% CI 12.1,

16.0). Most vulnerable period for AEFI following exposure to vaccine is the first three days, out of which 50% of AEFI occurred within first 12 hours except for BCG. There was no clustering of AEFI according to the residencies of the infants. Low birth weight infant has a 2.3 higher risk (OR=2.3, 95% CI 1.5, 3.6) of developing an AEFI than the normal weight infant (p=0.000).

In an emergency, assuming only 24 hour open government sector healthcare centres were accessible, the potential accessibility within 15 minutes for infants living in the Kalutara district was 44.3% when transportation mode used was walking and the accessibility rose to 56.2% if the transportation was a personal vehicle. It was shown that establishing 49 new primary health care type centres could increase the potential accessibility for AEFI to 96% if the mode of transport was personal vehicle.

Above findings highlight that AEFI detection is optimised by concentrating during first three days following vaccination in infancy. By concentrating on the first 12 hours following vaccination alone, 50% of AEFI can be detected. The incidence rates estimated in this study can be used to monitor and evaluate vaccine safety programmes of the Kalutara district and possibly any setting within Sri Lanka. Possible strategies to increase emergency healthcare access within the Kalutara district include establishing new healthcare centres and improving road conditions.

Keywords: Vaccine safety, Adverse Events Following Immunization, AEFI, Potential accessibility, Location-Allocation modelling, GIS, Sri Lanka