INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 5, Issue 4)
Available online at: www.ijariit.com

Routine and research cohort coverage of vaccines in Tamil Nadu: Implications for the Universal Immunization Program

Arun S. Karthikeyan
dr.arunks@gmail.com
Christian Medical College, Vellore, Tamil Nadu

Jacob John
jacob@cmcsph.org
Christian Medical College, Vellore, Tamil Nadu

Gagandeep Kang
gkang@cmcvellore.ac.in
Christian Medical College, Vellore, Tamil Nadu

ABSTRACT

Immunization coverage in Indian states varies from 24.8 % to 89.7%. Comparison between the routine vaccine coverage with two research cohorts in Tamil Nadu showed the routine immunization system performed well with >80% coverage for EPI vaccines and reasonable timeliness. Given Tamil Nadu's performance, this and similar states should not be denied access to new antigens, pending improvement in coverage in other parts of India.

Keywords— *Immunization coverage, Vaccine timeliness, Universal Immunization Program*

1. INTRODUCTION

Poor routine immunization coverage is stated as a reason why new antigens have not been included in the national immunization schedule. States with well-developed public health infrastructure have had high coverage of the Expanded Program of Immunization (EPI) vaccines for over a decade (1), but the lack of progress in poorer performing states has hampered inclusion of newer antigens into the schedule. In this study, the coverage of EPI vaccines was evaluated in two observational cohorts in an urban slum in Tamil Nadu and compared with the state and national averages. The implications of the findings of these studies for routine immunization are discussed.

The first cohort (Cohort-1) from 2002-2006, followed 373 children from birth till three years of age (2) in a peri-urban slum in Vellore, with vaccines provided by a dedicated research team. In the second cohort (Cohort-2) from 2008 to 2012 followed 580 children till the age of two years (3)(4), with vaccines provided by routine vaccine providers (Government/private), in the area, but with recording and motivation by the study team. We extracted the date of birth and the date of vaccination of the children from the two cohorts and calculated the proportion of children vaccinated and age of vaccination, in days, for each of the individual EPI vaccines. The age at vaccination between the two cohorts was compared using Mann-Whitney's U test. The Tamil Nadu state and Indian National averages were obtained from the Coverage Evaluation Survey (CES-2009) by UNICEF covering all the states and union territories from November 2009 till January 2010 (5).

The EPI vaccines considered in this analysis were BCG, DPT dose1, 2, 3 and booster, and measles. The study cohorts had higher immunization coverage than the state and national averages (Fig 1). Cohort 1 shows extremely high immunization coverage close to 100%. Cohort 1, Cohort 2 and Tamil Nadu averages were more than 80% for all vaccines. Cohort-1 was vaccinated a few days earlier than Cohort-2, who depended on the routine system (Table I), but the timeliness of immunization was only marginally better (range 2-14 days) considering the efforts required for that change. Tamil Nadu averages >80% coverage for all vaccines, much higher than the national average, and most vaccination is within the desired window. Clearly, in Tamil Nadu, the existing infrastructure for routine immunization is achieving high coverage with reasonable timeliness of vaccination.

However, system performance can decline over time and it is important that immunization systems be supported to continue to perform well and incentivized to achieve higher levels. The recent introduction of pentavalent vaccine is being reported as having strengthened the immunization system (6). Diseases, such as pneumonia and diarrhea still claim lives of millions of children in India (7)(8). The National Vaccine Policy (2011) has called for effective introduction of newer and underutilized vaccines into the Universal Immunization Program (9). With the availability of effective vaccines for these diseases (8)(10), efforts should be taken to introduce additional vaccines into routine immunization in states with high immunization coverage, rather than waiting until all states perform at similar high levels, which is unlikely to be achieved in the near term.

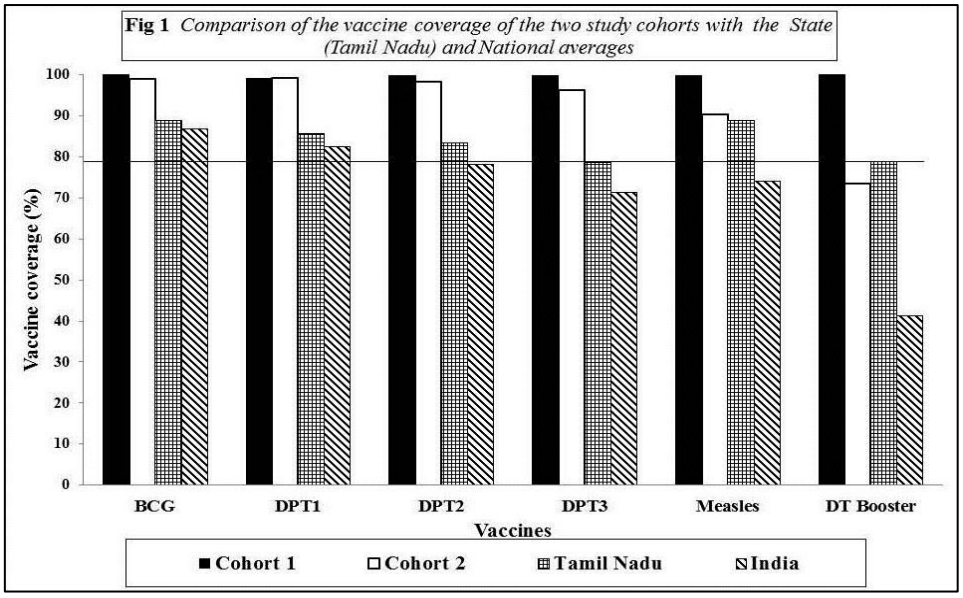

Fig. 1: Comparison of the vaccine coverage in a closely monitored cohort with a dedicated team providing vaccination (Cohort 1), cohort of children in an observational study, which depended on the routine system (Cohort 2), with the State (Tamil Nadu) average and the National (India) average (1)

Table 1: Comparison of distribution of age at vaccination in the two cohorts in urban slums of Tamil Nadu, Cohort-1 with a dedicated team providing vaccines and Cohort-2 depending on the routine vaccine system of the state

	Cohort-1 (n=373)		*Cohort-2 (n=580)*	
Vaccine	***Median age (days)***	***IQR***	***Median age (days)***	***IQR***
BCG	**5**	(1.5-11)	**4**	(1-9)
DPT1**	**47**	(45-51)	**49**	(46-56)
DPT2**	**80**	(76-87)	**84**	(76-99)
DPT3**	**113**	(108-123)	**121**	(108-146)
DT booster*	**550**	(546-555)	**556**	(537-580)
Measles**	**278**	(275-284.5)	**294.5**	(282-314)

**p<0.01 **p<0.001*

2. REFERENCES

[1] Khera A, Gupta A, Gogai H, Rao S. India's National Immunization programme. SHOT IN THE ARM-a symposium on the future of immunization, vaccination and childhood disease; 2012 Mar. Available from: URL: http://www.indiaseminar.com/2012/631/631_ajay_khera_et_at.htm/. Accesed July 07, 2014.

[2] Gladstone BP, Muliyil JP, Jaffar S, Wheeler JG, Le Fevre A, Iturriza-Gomara M, et al. Infant morbidity in an Indian slum birth cohort. Arch Dis Child. 2008 Jun; 93(6):479–84.

[3] Sarkar R, Sivarathinaswamy P, Thangaraj B, Sindhu KNC, Ajjampur SSR, Muliyil J, *et al*. Burden of childhood diseases and malnutrition in a semi-urban slum in southern India. BMC Public Health. 2013 Jan 30; 13(1):87.

[4] Kattula D, Sarkar R, Sivarathinaswamy P, Vasanthakumar V, Srinivasan V, Naumova E, *et al.* The first 1000 days of life: Pre- and post-natal risk factors for morbidity and growth in a birth cohort in southern India. BMJ OPEN (in press).

[5] 2009 Coverage Evaluation Survey All India Report, UNICEF New Delhi India. Available from: URL: http://www.unicef.org/india/1_-_CES_2009_All_India_Report.pdf/. Accessed July 07, 2014.

[6] Gupta SK, Sosler S, Lahariya C. Introduction of Haemophilus Influenzae type b (Hib) as pentavalent (DPT-HepB-Hib) vaccine in two states of India. Indian Pediatr. 2012; 49(9):707–9.

[7] WHO | the top 10 causes of death. WHO. Available from: URL: http://www.who.int/mediacentre/factsheets/fs310/en/index.html/. Accessed July10, 2013.

[8] Mulholland K. Pneumococcal Conjugate Vaccine– Relevance for Developing Countries Editorial - Indian Pediatrics 2001; 38: 453-460.

[9] National Vaccine Policy, Ministry of Health and Family Welfare, Government of India, April 2011. Available from: URL: http://mohfw.nic.in/. Accessed July 09, 2013.

[10] Bhandari N, Rongsen-Chandola T, Bavdekar A, John J, Antony K, Taneja S, *et al.* Efficacy of a monovalent human-bovine (116E) rotavirus vaccine in Indian infants: a randomised, double-blind, placebo-controlled trial. The Lancet. 2014; 383(9935):2136 – 2143.

