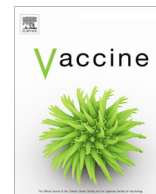




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Knowledge, attitudes, and practices of private sector immunization service providers in Gujarat, India

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ABSTRACT

Background: India is responsible for 30% of the annual global cohort of unvaccinated children worldwide. Private practitioners provide an estimated 21% of vaccinations in urban centers of India, and are important partners in achieving high vaccination coverage.

Methods: We used an in-person questionnaire and on-site observation to assess knowledge, attitudes, and practices of private immunization service providers regarding delivery of immunization services in the urban settings of Surat and Baroda, in Gujarat, India. We constructed a comprehensive sampling frame of all private physician providers of immunization services in Surat and Baroda cities, by consulting vaccine distributors, local branches of physician associations, and published lists of private medical practitioners. All providers were contacted and asked to participate in the study if they provided immunization services. Data were collected using an in-person structured questionnaire and directly observing practices; one provider in each practice setting was interviewed.

Results: The response rate was 82% (121/147) in Surat, and 91% (137/151) in Baroda. Of 258 participants 195 (76%) were pediatricians, and 63 (24%) were general practitioners. Practices that were potential missed opportunities for vaccination (MOV) included not strictly following vaccination schedules if there were concerns about ability to pay (45% of practitioners), and not administering more than two injections in the same visit (60%). Only 22% of respondents used a vaccination register to record vaccine doses, and 31% reported vaccine doses administered to the government. Of 237 randomly selected vaccine vials, 18% had expired vaccine vial monitors.

Conclusions: Quality of immunization services in Gujarat can be strengthened by providing training and support to private immunization service providers to reduce MOVs and improve quality and safety; other more context specific strategies that should be evaluated may involve giving feedback to providers on quality of services delivered and working through professional societies to adopt standards of practice.

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1. Background

India leads the world in number of childhood deaths [1], is responsible for 30% of the annual global cohort of unvaccinated

children [2], and accounts for 47% of global measles mortality [3]. In 2015, through routine immunization programs, only 82% of India's children received three doses of oral polio vaccine (OPV3) [4]; during 2014, estimated state-level percentage of children aged 9–11 months who had been fully vaccinated (i.e., having received bacille Calmette–Guérin [BCG], three doses of diphtheria–pertussis–tetanus vaccine [DPT3], three doses of OPV3, and one dose of measles-containing virus [MCV1]), ranged from 27% to 89% [5]. While strategies for measles elimination and polio eradication have focused on improving vaccination coverage and access to services in the public sector, the private health care sector, com-

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prising a wide range of for-profit and not-for-profit practices, also plays a large and important role in India. In 2013, expenditures in the private sector accounted for 68% of total health expenditures country-wide [6], and an estimated 21% of routine childhood vaccinations in urban areas of India are provided in the private sector [7].

The few studies that have explored the role of the private sector in immunization service delivery in low- and middle-income countries have generally found less knowledge of recommended immunization services and lower quality of service delivery among private sector providers when compared to their public sector counterparts [8]. Globally the pooled prevalence of missed opportunities for vaccination (MOV) for children, in which a person eligible for vaccination, and with no valid contraindication, visits a health service facility and does not receive all of the recommended vaccines, is estimated at 32% among low- and middle-income countries [9]. Little is known, however, about the specific behaviors and practices among private sector providers that could be targeted to decrease this high prevalence. In studies conducted in India, private sector providers had less concern about polio, greater likelihood to depart from recommended vaccine schedules, and lower sense of personal responsibility for providing vaccinations, than did providers in the public sector [10–12]. However, these studies were limited to members of the Indian Academy of Pediatrics (IAP) in Bihar and Uttar Pradesh, and were limited to attitudes rather than actual practices.

Because of limitations of previous studies and the lack of on-site observational assessment of immunization practices, many questions remain about actual immunization practices in the private sector setting in India, and the role that practice changes can play in improving vaccination coverage. To address this knowledge gap, we conducted a study among private providers who offered child vaccination in two urban settings in Gujarat State, India. Gujarat is a state in Western India, which, like many population centers in India, is urbanizing rapidly (currently 43% urban) and has experienced rapid economic growth that is outpacing growth of social and development metrics. In urban Gujarat state, private immunization providers deliver a large percentage (24%) of immunization services, similar to other urban areas of India [7]. The second and third most populous cities in Gujarat State were selected for this study, Surat (pop. 4,591,246), and Baroda (pop. 1,822,221).

The objectives of our study were to assess: (a) the knowledge, attitudes, and practices of private providers regarding administration of polio, measles and other vaccines, including vaccination schedules, cold chain storage of vaccines, recording vaccine doses administered, and vaccine management; (b) acute flaccid paralysis (AFP) and measles case reporting; and (c) the feasibility of potential public-private partnership strategies to improve access to immunizations in urban populations.

2. Methods

2.1. Survey design

We conducted a systematic assessment of urban private medical providers who offer childhood immunizations in Surat and Baroda municipal corporations in Gujarat State, India. A comprehensive sampling frame of private immunization providers was created by obtaining a list of vaccine purchasers from the major vaccine distributors in these two cities, accounting for approximately 90% of the combined market. This list was supplemented with membership lists of the Surat and Baroda Branches of both the Indian Academy of Pediatrics and the General Practitioner Association, and other published directories of pediatricians

(defined as practitioners with an MBBS degree, plus a diploma in pediatrics, or MD in pediatrics) and general practitioners (MBBS degrees without further specialization) from the region. Finally, snowball sampling was used to identify additional providers that were not captured through the previous methods [13].

All identified practitioners were contacted by telephone and a brief interview was conducted to determine whether they provide immunization services to children in a practice located within the city limits. All practitioners were offered the opportunity to participate in the study if they provided immunization services in any non-governmental setting, including both for-profit and not-for-profit practices, such as charity or faith-based organizations. In the case that a given practitioner contacted by telephone was a member of a provider group that share common immunization practices and supplies, he or she was requested to identify a provider who was familiar with the common practices among the group; that provider was contacted to schedule an in-person interview. Practitioners were not required to offer a specific minimum set of vaccines to be eligible to participate; however, practitioners were excluded from the study if they did not provide vaccines to children as part of the routine childhood immunization schedule. Representatives of IAP, Indian Medical Association, and the Gujarat Department of Health and Family Welfare were consulted during study design and pilot testing of the questionnaire, which was performed among pediatricians in Ahmedabad city to avoid exposing potential study participants in Surat and Baroda to the questionnaire.

2.2. Measures

Each assessment included administration of an in-person structured questionnaire (Web Appendix), which captured information on knowledge, attitudes and practices related to vaccination schedules, potential MOV, record-keeping of vaccine doses administered, injection safety, vaccine management and storage, and reporting of vaccination coverage, adverse events following immunization (AEFI), and notifiable diseases. In addition, for each participant, we directly observed practices for vaccine management and storage, and safety of vaccine administration. Vaccine refrigerators were examined for the presence of thermometers and temperature logs and non-vaccines, including food, and other medications. One vaccine vial was randomly selected from each refrigerator and the vaccine vial monitor (VVMs) was examined.

We also assessed practitioner's willingness to enter into partnerships with the government to deliver subsidized vaccine and improve vaccine dose administration reporting. Practitioners were asked to rate the acceptability of three example partnership models: "Allow the government to use my facility to administer free vaccines to the public", "Receive some free vaccines from the government in exchange for me reporting the number of doses given, and I **could not** charge any fee", and "Receive some free vaccines from the government in exchange for me reporting the number of doses given, and I **could** charge a fee".

2.3. Data collection and analysis

The assessments were conducted by trained interviewers composed of faculty members and residents from the Department of Preventive and Social Medicine at Surat and Baroda Medical colleges. Data were collected on paper case report forms, double entered and managed using REDCap electronic data capture tools [14]. R statistical programming language v.3.2.3 [15] was used for descriptive analyses using chi-square or Fisher's exact tests, as appropriate. P-value cut-offs for statistical significance were determined after adjusting for false discovery rate due to multiple comparisons [16].

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